



# StandICT.eu 2023

ICT STANDARDISATION OBSERVATORY AND SUPPORT FACILITY IN EUROPE

## **FOLLOWING THE FELLOWS**

**IMPACT REPORT FROM  
FUNDED APPLICANTS TO  
THE STANDICT.EU 2023  
FELLOWSHIP PROGRAMME**

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### **FIFTH OPEN CALL**

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## Disclaimer

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This Impact report was produced by the StandICT.eu 2023, a Coordination and Support Action (CSA) project co-funded by the European Commission within the Research and Innovation Framework Programme, Framework Programme Horizon 2020 (H2020), under grant agreement no. 951972. The information and views set out in this report are those of the authors and do not necessarily reflect the official opinion of the European Commission and may not be held responsible for the use which may be made of the information contained therein. Reproduction is authorised provided the source is acknowledged.

## About StandICT.eu

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The StandICT.eu 2023 Coordination and Support Action project has received funding from the European Union's Horizon 2020 - Research and Innovation programme - under grant agreement no. 951972. The project is coordinated by [Trust-IT Srl](#) (IT), supported by its partners from the [Dublin City University](#) (IE) and [AUSTRALO](#) (ES). The content of the present report does not represent the opinion of the European Union, and the European Union is not responsible for any use that might be made of such content.



## Acknowledgements

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StandICT.eu 2023 would also like to thank **Thomas Reibe, StandICT.eu 2023 Project Officer & Senior Expert at DG Connect European Commission, and Emilio Davila-Gonzalez, Head of ICT Standardisation sector at DG Connect leading Unit F3-Blockchain & Innovation** for their leadership and guidance.

The **External Advisory Group (EAG)** provided invaluable support throughout the course of the project. Our appreciation for their effort and commitment goes to: **Ray Walshe (EAG Chair), Stefan Hallensbellen, Brian McAuliffe, Lindsay Frost, Jens Gayko, Karl Grun, Enrico Scarrone, Nuria de Lama, Tom de Block, Martin Chapman, Fergal Finn, Ana Garcia Robles, Stefan Weisgerber, Jochen Friedrich, Antonio Conte, Omar Dhafer, Barbora Greplova, and Stefano Nativi.**

Finally, we would like to thank all our **EUOS Technical Working Groups (European Observatory for ICT Standardisation)** chairs and members for the investment in gathering expertise and producing outstanding landscape reports of the standardisation status across different ICT sectors. We warmly thank the TWG chairs guiding this work: **Lindsay Frost, Ismael Arribas, Matthias Pocs, Dimosthenis Kyriazis, Jeroen Broekhuijsen, Antonio Kung, Claude Baudoin, Joel Myers, Arkopaul Sarkar, Georgios Karagiannis, Brian McAuliffe and Fiona Delaney.**



# ■ Foreword

We are very pleased to see the continuation of our “Following the Fellows” series with the issue of the fifth dedicated booklet, bearing a tangible testimony of the impact generated by European ICT experts working within international Standardisation Developing Organisations, thanks to the financial support provided through the StandICT.eu 2023 Fellowship Programme Open Calls, as part of the broader mission of the StandICT.eu 2023 Coordination and Support Action, funded by the European Commission’s H2020 Framework Programme.

The goal of these regular publications is to place the work carried out by our fellows at the centre stage and to illustrate the demonstrable outcomes that excellent research can make to both society and to the economy. Therefore, we attempt to substantiate how each effort on which the fellows are engaged provides a potential benefit to society and contributes to the achievement of specific, desired, societal outcomes as a result of the ICT Standardisation efforts. As the EU Strategy on Standardisation<sup>1</sup> outlines, standards are a vital tool to valorise research result, standards:

- ▷ Help researchers to bring faster their innovation to the market and spread technological advances by making their results transparent and ensuring high quality.
- ▷ Ensure confidence for consumers about safety of innovation.
- ▷ Codify the technology requirements and inform both manufacturers and consumers on what to expect.
- ▷ Allow technologies and materials to be interoperable.

«*Technical standards are of strategic importance. Europe’s technological sovereignty, ability to reduce dependencies and protection of EU values will rely on our ability to be a global standard-setter*». (Thierry Breton, European Commissioner for the Internal Market).

In this regard, the work undertaken by our Fellows will concretely contribute to strengthening the link between R&I and the standardisation ecosystem as well as to pushing towards the path of the twin green and digital transition in support of the resilience of the single market.

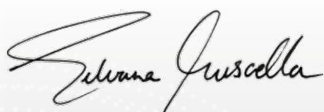
Finally, we believe that this Report can effectively respond to the recommended approach envisaged under Horizon Europe to implement a more evidence-based impact, presenting the tangible results available from each activity in a tidy fashion, as the result of careful and continuous monitoring of the impact that each successful applicant is making to European priorities and European contributions.

Special thanks in putting together this booklet go to External Advisory Group who, as always, have provided high-level input to fine-tune the topics covered by the Open Calls, as well as the dedicated work of our External Pool of Evaluators who have scrupulously vetted the numerous applications received in response to this call, to our Partners, Dublin City University and AUSTRALO Marketing Lab key to the monitoring activities, our project officers at the European Commission of DG Connect for their relentless support and, of course, to our fellows for the strenuous months of work behind each activity and impact.

## **Silvana Muscella**

CEO, Trust-IT Srl

StandICT.eu 2023 Project Coordinator



<sup>1</sup> <https://ec.europa.eu/docsroom/documents/48598>

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# ■ Introduction

This report provides an immersion to user empowered outcomes of the StandICT.eu 2023 Open Call #5 from the perspective of fellows that were selected and funded in this call.

Our team is delighted to showcase the fifth series of StandICT.eu 2023 success stories of the funded fellowships detailing the addressed standards and landscapes, how these will fill in the identified gaps as well as impact the related stakeholders and society. The results obtained by our Fellows fully respond to many of the objectives set out in the [EU Strategy on Standardisation](#), mainly prioritise and address standardisation needs in strategic areas, enhance European leadership in global standards, support innovation and, finally, improve the overall integrity of the European Standardisation system.

Standards are at the core of the EU Single Market and global competitiveness and play a fundamental (even if sometimes invisible) function in our daily life. They can ensure the interoperability of products and services, reduce costs, improve safety, and foster innovation.

At the same time Standards act as a powerful driver for Innovation and Growth by helping researchers bring their innovation to the market and spread technological advances by making their results transparent and ensuring high quality. One of the key-purposes of StandICT.eu 2023 is to support the activity of European ICT experts to contribute to the modernisation and consolidation of the European Standardisation system as well as to the valorisation of their research outputs, with a view to efficiently respond to the EU's ambitions towards a climate neutral, resilient, and circular economy that cannot be delivered without European standards.

The primary purpose of this document is to share the results attained through the work carried out by the funded experts, and to showcase the most relevant outcomes, creating awareness of the potential impact and repercussions of such impact on commerce, industry, governmental policies and strategies and the society.

This Open Call is the fifth one of a series from 9 StandICT.eu 2023 Open Calls, and each call will have a dedicated impact report with the goal to share the timely key findings, contributions, and observations with StandICT.eu community, the European Commission, the Multi-Stakeholder Platform, the SDOs, and even beyond with all interested actors of our ever-growing StandICT.eu 2023 community.

In this report, the Open Call #5 is presented with key takeaways and figures, then the fellowship outcomes are presented in the targeted technology areas, as defined in the Rolling Plan for ICT Standardisation<sup>1</sup>, addressed by the 35 Fellows:

- ▶ **Key Enablers and Security** (26 fellowships), including fellowships on *Cybersecurity* (8 fellowships), *Artificial Intelligence* (6), *5G* (5), *Quantum Technology* (2), *Semantic Interoperability* (2), *Cross domain technologies* (1) and *Electronic ID* (2).
- ▶ **Sustainable Growth** (6 fellowships) covering *Intelligent Transport Systems* (2), *Digital Twins* (1), *Construction* (2) and *ICT Environmental Impact* (1).
- ▶ **Innovation for Digital Single Market** (3 fellowships) focusing on *Blockchain and DLT* (2) and *FinTech* (1).

To be noted, in this funding batch, no fellowships were founded in the fields of societal challenges.

1 [www.standict.eu/publications/rolling-plan-ict-standardisation-2022-european-commission](http://www.standict.eu/publications/rolling-plan-ict-standardisation-2022-european-commission)



# Overview of the Open Call #5

The fifth StandICT.eu 2023 Open Call was launched on the 27<sup>th</sup> of September 2021 and closed on the 29<sup>th</sup> of November 2021. The StandICT.eu Open Calls target European ICT standardisation experts contributing to the international SDOs, work groups and/or technical committees at any of the priority topics, as taken from the Rolling Plan for ICT Standardisation.

This Open Call identified **“Climate, Energy and Mobility”**<sup>2</sup> as its leading theme. The development of open technical specifications and standards that aim to represent European values and ethics, strengthen the take-up, scalability cross-border and cross-sector interoperability of their technological solutions, as well as decreasing the costs of technical due diligence on the private and public procurers. This will fight against climate change by making the energy and transport sectors more climate and environment-friendly, more efficient, and competitive, smarter, safer, and more resilient.

The Open Call was however completely open for applications tackling a broad range of ICT domains (as encompassed in the ICT Rolling Plan for Standardisation) and treated as equally valid.

## Fellowship profiles

This fifth Open Call totalled 85 eligible applications received out of which 36 have been selected for funding, with an overall 305,000 Euro granted. This Open call confirmed oncemore the excellent high quality of most of the submitted proposals, marking a noticeably high average quality score (the minimum threshold to access funding was 7,90 score in a 1 to 10 scoring scale).

2 [https://research-and-innovation.ec.europa.eu/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe/cluster-5-climate-energy-and-mobility\\_en](https://research-and-innovation.ec.europa.eu/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe/cluster-5-climate-energy-and-mobility_en)



### 5<sup>th</sup> Open Call RESULTS & POPULAR TOPICS

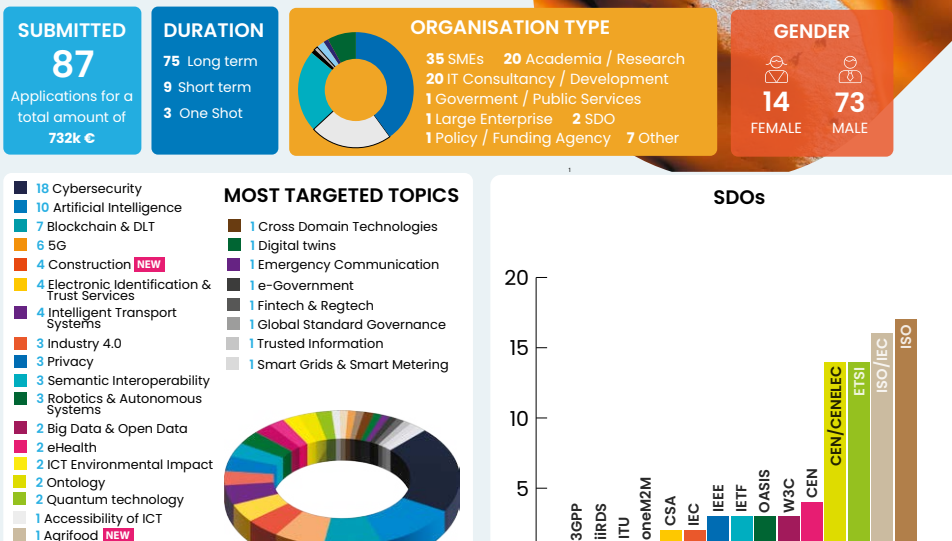


Figure 1 - StandICT.eu 2023 OC#5 Results snapshot

**FOLLOWING THE FELLOWS / IMPACT REPORT FROM FUNDED APPLICANTS TO THE STANDICT.EU 2023 FELLOWSHIP PROGRAMME / FIFTH OPEN CALL**

The funded applications provided an extensive geographical coverage with 14 different EU countries represented with a satisfying balance across the key technologies and priority topics of the fifth Open Call, and with a wide spectrum of SDOs that will benefit of the competence and expertise of the applicants.

As outlined in Figure 1, major part of the granted fellows has chosen their focus in Key Enablers and Security, in trending areas as Cybersecurity, Artificial Intelligence, 5G and Blockchain. It is noteworthy to point out that several fellowships tackled the sustainability and efficiency of buildings and constructions.

## Engaged SDOs, Organisations and European Projects

70% of the fellows' performed work contribute to the regular activities of Committees or Working Groups operating in global SDOs, namely in ISO, IEC, ISO/IEC, ITU, IEEE, IETF, while the remainder works with European Standardisation Organisations (ESOs), namely in ETSI, CEN, CEN/CENELEC, and other groups engaged in standardisation (notably OneM2M and W2CEricim). One of the most apparent advantages that SDOs can benefit is the wide and solid know-how of the funded experts that can be instrumental to achieve a better understanding of standards (and their underlying design), trade-off and compromising during the development process, and the operating conditions and environments they are intended to serve. Moreover, SDOs can leverage the expertise of the fellows in view of building consensus within key areas of technology. Finally, 8 European funded research projects (see Table 1) are related to the engaged work in the OC#5 fellowships, with a focus on different vertical technologies.

Table 1 Overview of OC5 related EU projects

Research Project	Grant Programme	Domain	Hyperlink	OC#5 Fellow
NGI ESSIF-Lab	Horizon Europe	SSI (Self-Sovereign Identity)	<a href="http://www.ngi.eu/ngi-projects/essif-lab">www.ngi.eu/ngi-projects/essif-lab</a>	Markus Sabadello
ASCLEPIOS	Horizon 2020	eHealth	<a href="http://www.asclepios-project.eu">www.asclepios-project.eu</a>	Nicolae Paladi
CoCEM	funded through project NGI DAPSI / Horizon 2020	Cloud Computing	<a href="http://www.canarybit.eu/project/cocem-project-ngi-dapsi">www.canarybit.eu/project/cocem-project-ngi-dapsi</a>	
New Focus	COST Action	Wireless Communication	<a href="http://www.newfocus-cost.eu">www.newfocus-cost.eu</a>	Tuncer Baykas
AI4MEDIA	Horizon 2020	Artificial Intelligence	<a href="http://www.ai4media.eu">www.ai4media.eu</a>	Andrea Basso
InterConnect	Horizon 2020	Interoperability	<a href="http://interconnectproject.eu">interconnectproject.eu</a>	Amelie Gyrard
AI4EU	Horizon 2020	Artificial Intelligence	<a href="http://www.ai4europe.eu">www.ai4europe.eu</a>	Amelie Gyrard
OpenDei	Horizon 2020	Cross-domain Technologies	<a href="http://www.opendei.eu">www.opendei.eu</a>	Antonio Kung

Now, we are delighted to share with you the insights from our granted fellows' work – and we truly hope that these results encourage you to follow even more closely all activities that the StandICT.eu 2023 initiative leads in the Fellowship Programme but also on the European Observatory for ICT Standards (EUOS, [www.standict.eu/euos](http://www.standict.eu/euos)) - via the Technical Working Groups (TWGs) delivering up-to-date landscape and gap analysis ([www.standict.eu/landscape-analysis-reports](http://www.standict.eu/landscape-analysis-reports)) and policy recommendations to help shaping together and reinforcing the European and international ICT standardisation arena.





**1.**

# Key enablers and Security



# IoT Semantic Interoperability-Implementation of Semantic Discovery and Query in oneM2M architecture



## **Joachim Koss**

*Independent consultant (freelance), JK Consulting and Projects  
Germany*

### Sector

Semantic Interoperability

## Engaged SDOs, WGs and TCs



| oneM2M Working Group SDS (System Design and Security)

## Role (chair, convener, member)

Vice Chairman of oneM2M Technical Plenary

## Addressed EU standardisation priorities and gaps

oneM2M has currently native discovery capabilities that work properly only if the search is related to specific known sources of information (e.g. searching for the values of a known set of containers) or if the discovery is well scoped and designed (e.g. the lights in a house). When oneM2M is used to discover wide sets of data or unknown sets of data, the functionality is typically integrated by ad hoc applications that are expanding the oneM2M functionality. This means that this core function may be implemented with different flavours and this is not optimal for interworking and interoperability.

This fellowship enhances the semantic capabilities of the oneM2M architecture by introducing “Advanced Semantic Discovery” which provides capabilities to request semantic discovery to whom would know the candidate targets to perform the semantic discovery in the oneM2M system.

## Concerned ICT Standards and contribution to the related landscape

The proposed action contributes to enable an easy and efficient discovery of information and a proper interworking with external source/consumers or to directly search information in the oneM2M system for big data purposes. Contributions to the oneM2M standard are designed based on the principle and the solution defined by the existing SAREF standard developed in ETSI TC SmartM2M and supported by the European Commission.

Since the addressed standards enable semantic interoperability across the IoT, it provides cross-domain and -vendor IoT semantic interoperability. This will become increasingly important as greater quantities of data are generated and shared across the IoT. It opens new market opportunities in domains of e.g. Healthcare, Smart Grid, ITS, Industrial Automated Systems, and Smart Cities, which depend on collecting and processing data. With that, it directly supports the strong European goal of the “digital single market”. oneM2M Standards: TS0001, TS0004, TS0034

## Impact (on European SMEs, related project or in the society)

### **Impact on SMEs**

The standards addressed by the contributions enable cross-domain and cross-vendor

IoT semantic interoperability. The adoption of Semantic Discovery and Query as a part of interoperability between IoT addresses EU Policy objectives, e.g. greater resource efficiency for a more circular economy, sustainable and responsible supply chains through transparency and traceability and with that also will provide leadership to European manufacturers (not only but also SMEs), on interoperable IoT devices.

### **Impact on the Society**

Since the addressed standards enable semantic interoperability across the IoT, it provides cross domain and cross-vendor IoT semantic interoperability. IoT users can compile their equipment from different vendors. Cross domain and cross-vendor IoT semantic interoperability fosters the digitalization and with that enables new applications to increase the lifestyle of the community and also is supporting the emergence of business models unleashing the commercial capabilities of systems and devices integrations.

### Has your project directly involved or led to a specific recommendation or proposal for the development of new or revised standards?

Yes, to the following technical specifications: oneM2M Technical Specification TS-0001 for Release 5, oneM2M Technical Specification TS-0034 for Release 5, oneM2M Technical Specification TS-0004 for Release 5.


### Have the standardisation activities in your project led to specific deliverables?

Yes, to the above-mentioned technical specifications.

### What future efforts or activity are still necessary in your area of application?

To complete the introduction of the new feature ASD in the oneM2M architecture, further contributions addressing the Technical Specifications TS-0001 on Architecture and TS-0004 on Protocol are necessary. Also, the specification of the ASD propagation policy is outstanding.

### Online references related to the fellowship work

 [www.linkedin.com/posts/joachim-koss-2a78a68\\_the-technology-roadmap-to-enable-iot-data-activity-6912176641569910784-592r?utm\\_source=linkedin\\_share&utm\\_medium=member\\_desktop\\_web](https://www.linkedin.com/posts/joachim-koss-2a78a68_the-technology-roadmap-to-enable-iot-data-activity-6912176641569910784-592r?utm_source=linkedin_share&utm_medium=member_desktop_web)

 [www.linkedin.com/posts/onem2m\\_tr-103-714-v111-smartm2m-study-for-activity-6932668056791896064-qBi0?utm\\_source=linkedin\\_share&utm\\_medium=member\\_desktop\\_web](https://www.linkedin.com/posts/onem2m_tr-103-714-v111-smartm2m-study-for-activity-6932668056791896064-qBi0?utm_source=linkedin_share&utm_medium=member_desktop_web)

# IoT Semantic Interoperability - Specialization to Energy and relationship to AI



**Amelie Gyrard**

*Principal Research & Innovation Consultant, Trialog  
France*

## Sector

IoT Semantic Interoperability  
Specialization to Energy and relationship to AI

## Engaged SDOs, WGs and TCs



ISO/IEC JTC1/SC41 IoT and Digital Twins  
ISO/IEC JTC1/SC42 Artificial Intelligence

## Role (chair, convener, member)

Contributor

## Addressed EU standardisation priorities and gaps

With this fellowship, I contribute to the standardisation of energy ontology by ensuring alignment with ETSI SmartM2M SAREF (as a contributor) via IEC TC57 new work item on smart energy ontology (joint working group JWG3 of SC41 IoT and digital twins) (as a contributor).

Also, I contribute to the standardisation of IoT Interoperability by ensuring integration of SAREF and other European contributions into ISO/IEC 21823-3 IoT semantic interoperability (as co-editor) as well as to the standardisation of AI architecture by ensuring integration of European contributions on AI and interoperability (e.g. BDVA, IDSA, AIOTI, and H2020 projects such as IoT large-scale projects) into ISO/IEC JTC1/SC42 AI 5392 Knowledge Engineering Reference Architecture (as a contributor).

Concerned ICT Standards and contribution to the related landscape

My activity via this fellowship impacts at least 3 standards under development:

- ▶ ISO/IEC 21823-3 IoT semantic interoperability
- ▶ ISO/IEC 5392 Knowledge Engineering Reference Architecture (KERA)
- ▶ IEC Syc Smart Energy WG06 - SRD 63417 SE Ontology

## Impact (on European SMEs, related project or in the society)

### Impact on SMEs

Trialog is a SME, and our company is directly impacted by my contribution. In addition, the standards under consideration will benefit to all the Smart Energy ecosystem, including SMEs.

### Impact on Society

The IoT addresses many societal challenges including climate change, resource and energy efficiency and ageing. In the emerging IoT economy, voluntary global standards can accelerate adoption, drive competition, and enable cost-effective introduction of new technologies.

Moreover, standardisation facilitates the interoperability, compatibility, reliability, security, and efficiency of operations on a global scale among different technical solutions, stimulating industry innovation and providing greater clarity to technology evolution. In consequence,

interoperability between IoT networks operated by different companies along the value chain opens opportunities to address EU Policy objectives, e.g., greater resource efficiency for a more circular economy, sustainable and responsible supply chains through transparency and traceability, and others.

## Has your project directly involved or led to a specific recommendation or proposal for the development of new or revised standards?

Yes, one standard is now published and two are under development:

- ▷ (Now published) JTC1-SC41/167/CDV - ISO/IEC 21823-3:2021 Internet of things (IoT) — Interoperability for IoT systems — Part 3: Semantic interoperability
- ▷ (Under development) ISO/IEC 5392 Knowledge Engineering Reference Architecture (KERA)
- ▷ (Under development) IEC TC57 “Power systems management and associated information exchange” new work item (NWI) on smart energy ontology.

## Have the standardisation activities in your project led to specific deliverables?

Yes – to several technical reports on development for a new standard.

## What future efforts or activity are still necessary in your area of application?

The engaged work continues still with the two unpublished standards: on ISO/IEC CD 5392 and on IEC TC57 “Power systems management and associated information exchange” NWI on smart energy ontology, and this work is carried through contributions via the joint working group JWG3 “IEC Smart Energy Roadmap Managed by SyC Smart Energy” of SC41.

## Online references related to the fellowship work

 [https://iec.ch/dyn/www/f?p=103:214:::FSP\\_ORG\\_ID:11825](https://iec.ch/dyn/www/f?p=103:214:::FSP_ORG_ID:11825)

 [www.iso.org/standard/83752.html](http://www.iso.org/standard/83752.html)

 [www.iso.org/standard/81228.html](http://www.iso.org/standard/81228.html)



# Continued support as the Secretary for ETSI ISG Securing Artificial Intelligence



## **Alex Cadzow**

*Senior Cyber Security and Human Factors Researcher, Cadzow Communications Consulting Ltd.*

*United Kingdom*

## Sector

Artificial Intelligence

## Engaged SDOs, WGs and TCs



ETSI ISG SAI - The Securing Artificial Intelligence Industry Specification Group

## Role (chair, convener, member)

the Secretary of ETSI ISG SAI

## Addressed EU standardisation priorities and gaps

The rationale for ISG SAI is that autonomous mechanical and computing entities may make decisions that act against the relying parties either by design or because of malicious intent. The conventional cycle of risk analysis and countermeasure deployment represented by the Identify-Protect-Detect-Respond cycle needs to be reassessed when an autonomous machine is involved.

The intent of the ISG SAI is to address three aspects of AI in the standards domain:

1. Securing AI from attack e.g. where AI is a component in the system that needs defending.
2. Mitigating against AI e.g. where AI is the 'problem' (or used to improve and enhance other more conventional attack vectors)
3. Using AI to enhance security measures against attack from other things e.g. AI is part of the 'solution' (or used to improve and enhance more conventional countermeasures).

## Concerned ICT Standards and contribution to the related landscape

The Securing Artificial Intelligence Industry Specification Group (ISG SAI) will develop technical specifications that mitigate against threats arising from the deployment of AI, and threats to AI systems, from both other AIs, and from conventional sources. As a pre-standardisation activity, the ISG SAI is intended to frame the security concerns arising from AI and to build the foundation of a longer-term response to the threats to AI in sponsoring the future development of normative technical specifications. Though upcoming regulation on AI from the EU/EC SAI may be called upon to support mandated standardisation work at ETSI. Since the start of this contract, the group have finalized and published a group report (GR) on 'The role of Hardware in the Security of AI' and in the process of finalising for publication a GR 'Security Testing of AI'. Upcoming publications from in progress work items include reports on 'Traceability of AI Models', 'Automated Manipulation of Multimedia Identity Representations', 'Collaborative Artificial Intelligence', 'Explicability and transparency of AI processing', 'Privacy aspects of AI/ML systems' and 'Artificial Intelligence Computing Platform Security Framework'. There is also a development in progress on a new work item proposal on 'Proof of Concepts' with an aim for this to be started in September 2022 as agreement to proceed was obtained at the July 2022 Plenary meeting.

## Impact (on European SMEs, related project or in the society)

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### Impact on Society

Artificial Intelligence impacts our lives every day, from local AI systems on mobile phones suggesting the next word in our sentences to large manufacturers using AI to improve industrial processes. AI has the potential to revolutionize our interactions with technology, improve our quality of life and enrich security – but without high quality technical standards and good practices, AI has the potential to create new attacks and worsen existing security measures.

The ETSI Industry Specification Group on Securing Artificial Intelligence (ISG SAI) has a key role to play in improving the security of AI through production of high-quality technical standards; the ISG SAI will create standards to preserve and improve the security of new AI technologies.

### Has your project directly involved or led to a specific recommendation or proposal for the development of new or revised standards?

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No.

### Have the standardisation activities in your project led to specific deliverables?

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Yes, during this period the Group Report on 'The role of Hardware in the Security of AI' has been published.

### What future efforts or activity are still necessary in your area of application?

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ETSI Security Conference is taking place in October 2022 and ISG SAI members will give presentations on AI and the AI Act along with demonstrations of securing AI. In addition, it is expected that the European Commission will issue formal standardisation requests related to AI which will relate to the AI Act. The SAI group is well placed to respond to this request and any support the group receives in completing these requests would be most welcome.

### Online references related to the fellowship work

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 [https://portal.etsi.org/Portals/0/TBpages/SAI/Docs/2021-12-ETSI\\_SAI\\_Introduction.pdf](https://portal.etsi.org/Portals/0/TBpages/SAI/Docs/2021-12-ETSI_SAI_Introduction.pdf)

 [www.etsi.org/deliver/etsi\\_gr/SAI/001\\_099/006/01.01.01\\_60/gr\\_SAI006v010101p.pdf](http://www.etsi.org/deliver/etsi_gr/SAI/001_099/006/01.01.01_60/gr_SAI006v010101p.pdf)

# Strengthening AI standardization (ISO/IEC JTC1/SC42 and CEN/CENELEC JTC21)



## **Francisco Medeiros-Filho**

Consultant, FM Tech Consult BV  
Belgium

### Sector

Artificial Intelligence

## Engaged SDOs, WGs and TCs



CEN/CENELEC JTC21 Artificial Intelligence  
ISO/IEC JTC1/SC42 Artificial Intelligence

## Role (chair, convener, member)

Vice-convener of JTC21 Strategic Advisory Group

Head of the Belgian delegation to ISO/IEC JTC1/SC42 and CEN/CENELEC JTC21

## Addressed EU standardisation priorities and gaps

CEN/CENELEC JTC21 is under pressure to reflect the ISO/IEC JTC1/SC42 structure and adopt SC42 standards. Clearly, there is a knowledge gap to be bridged between AI standardisation at international level (ISO/IEC) and at European level. The challenge from a European perspective is to counteract the US and China massive efforts in the domain of AI standardisation. In this context, JTC21 should act as a catalyst for greater European influence at ISO/IEC level. On 20 May 2022, the European Commission submitted a Standardisation Request to the ESOs. One of my priorities has been to contribute to the preparation of a response from CEN/CENELEC (drafted by the SRAHG AI).

## Concerned ICT Standards and contribution to the related landscape

In this fellowship, my objectives focused on coordinating and strengthening the effective involvement of the Belgian delegation at international and European AI standardisation (ISO/IEC JTC1/SC42 and CEN/CENELEC JTC21). The Belgian AI mirror committee has grown to 27 representatives from academia, large industry, public sector, and SMEs. I continue leading the Belgian delegation at SC42 and JTC21.

Due to the large number of groups in SC42, I have focused only on WG1 (Foundational standards) and WG3 (Trustworthiness). Relevant standards are:

- ▶ ISO/IEC 42001 (CD Stage) "Information technology - Artificial intelligence - Management system"
- ▶ ISO/IEC DIS 22989 "Information technology - Artificial intelligence - Artificial intelligence concepts and terminology"
- ▶ ISO/IEC DIS 23053 "Framework for AI Systems using Machine Learning"

Also, I am Vice-Convener of the JTC21 Strategic Advisory Group (SAG) that has put forward the standards ISO/IEC 22989 and 23053 to be adopted as European Norms (ENs). These proposals were accepted by JTC21 through ballots.

## Impact (on European SMEs, related project or in the society)

### Impact on SMEs

Compliance with harmonised European standards (hENs) are a means for providers of AI systems to demonstrate conformity with the requirements of the proposed European AI Act. The standardisation work by CEN/CENELEC JTC21 will have a direct impact on the industry, especially on SMEs. Standards will be 'mandated' (via formal standardisation requests) by the European Commission. The contribution of the Belgium delegation in JTC21 is fundamental for the development of such harmonised standards (hENs). This work has started on 20 May 2022 and will continue until 2024.

### Impact on Society

Recital 61 of the proposed AI Regulation of 21 April 2021 states that "standardisation should play a key role to provide technical solutions to providers to ensure compliance with the AI Regulation. Compliance with harmonized standards should be a means for providers of AI systems to demonstrate conformity with the requirements of the AI Regulation". Therefore, the standardisation work being carried out by CEN/CENELEC JTC21 will have a direct impact on the industry, especially on SMEs.

## Has your project directly involved or led to a specific recommendation or proposal for the development of new or revised standards?

Yes, it has led to the adoption of ISO/IEC 22989 "Information technology - Artificial intelligence concepts and terminology" and ISO/IEC 23053 "Framework for AI Systems using Machine Learning" by CEN/CENELEC.

## Have the standardisation activities in your project led to specific deliverables?

No.

## What future efforts or activity are still necessary in your area of application?

Harmonized European standards (hENs) need to be developed as the result of EC standardisation requests. These will be used by stakeholders to demonstrate compliance with the requirements of the forthcoming AI Act. Considering that negotiations at Council and European Parliament are expected to be concluded by the end of 2023, the relevant hENs must be finalised and approved in 2024. Until then, standardisation actions must continue. In addition, The EU - US Trade and Technology Council (WG1 Technology Standards) is becoming an important forum to coordinate EU-US cooperation on AI standardisation. Therefore, I have become a member of WG1.

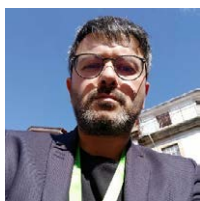
## Online references related to the fellowship work

[www.cencenelec.eu/areas-of-work/cen-cenelec-topics/artificial-intelligence/](http://www.cencenelec.eu/areas-of-work/cen-cenelec-topics/artificial-intelligence/)

[www.iso.org/committee/6794475.html](http://www.iso.org/committee/6794475.html)



# Support AI-enhanced nudge standardisation in CEN/CEN-CENELEC JTC-21



**Enrico Panai**

*AI & Data Ethicist, Sardus France  
France*

**Sector**

Artificial Intelligence

## Engaged SDOs, WGs and TCs



## Role (chair, convener, member)

Convener and Project Editor of the CEN-CENELEC JTC21 AHG 6 on AI-enhanced nudge

## Addressed EU standardisation priorities and gaps

The standard will address a specific gap in the regulation in coping with morally loaded consequences of such mechanisms. In fact, even if in the EU AIA draft “unacceptable” AI systems are simply prohibited (art. 5) and “high risk” AI systems are subject to a precise regulatory regime (art. 6 to 51), “low risk” (art. 52) and “minimal risk” AI systems should respect transparency obligations and may need to be shaped ethically using a standardised approach. In other words, even if a mechanism is composed by set of neutral actions, it may be part of a multiagent system that can become morally loaded according to 3 dimensions (time, quantity and distribution). Therefore, AI-enhanced nudges open up new scenarios of concern for unexpected consequences caused by morally neutral nudging mechanisms that target the public. The prescriptive nature of the proposed standard should be seen as complementary to the proscriptive approach of existing regulations; in practice, the standard is intended to support regulations in improving a responsible use of such mechanisms and it allows industry to understand the soft behavioural manipulations mechanisms and the treatment strategies.

On one hand, the regulation of nudging techniques can be useful to guarantee the individual autonomy of the data subject and to protect the right to self-determination in children. On the other hand, it will serve to reduce informational and behavioural pollution in the European democratic debate.

## Concerned ICT Standards and contribution to the related landscape

As Co-convener and Project Editor of the CEN-CENELEC AHG 6 on AI-enhanced nudge, I am proposing a standard to regulate the use of AI-enhanced nudging mechanisms by defining a standardised terminology to describe AI-enhanced nudges and sludges, defining an ethical framework for their assessment.

Our work is based on the following standards:

- ▷ ISO/TR 8124-8:2016(en) Safety of toys — Part 8: Age determination guidelines. For the consequences of behavioural and emotional design in childhood, to define the developmental stages of childhood and the appropriateness of behavioural design by earliest age.
- ▷ ISO/IEC TR 24368 Information technology — Artificial intelligence — Overview of ethical and societal concerns.
- ▷ ISO/IEC DIS 30150-1(en) Information technology — Affective computing user interface (AUI)

**FOLLOWING THE FELLOWS / IMPACT REPORT FROM FUNDED APPLICANTS  
TO THE STANDICT.EU 2023 FELLOWSHIP PROGRAMME / FIFTH OPEN CALL**

- ▷ ISO/IEC TR 24030:2021(en) Information technology — Artificial intelligence (AI) — Use cases
- ▷ ISO 9241-11, Ergonomics of human-system interaction — Part 11: Usability: Definitions and concepts

This document also considers applicable legislation, in particular:

- ▷ the Bolstering Online Transparency Act regulates transparency by requiring all developers of conversation agents to disclose the artificiality of digital artifacts.
- ▷ the UK Children’s Code providing for special attention to children’s digital rights.
- ▷ the Article 5 of the Draft EU AI Act that explicitly prohibits some AI practises as ‘real-time’ remote biometric identification, classification of the trustworthiness of natural persons, exploits any of the vulnerabilities of a specific group of persons (due to their age, physical or mental disability), and principally, the deployment of subliminal techniques beyond a person’s consciousness.
- ▷ H.R.2231 - Algorithmic Accountability Act of 2019 The US Algorithmic Accountability Act of 2021 requires assessment of risks to “privacy and security of personal information” and risks of “inaccurate, unfair, biased, or discriminatory decisions.”

## Impact (on European SMEs, related project or in the society)

### Impact on SMEs

The risks posed by reputational damage are increasingly worrying small and medium-sized enterprises (SMEs). Reputational damage can come from several sources that are not directly related to the intention of a company, as cybersecurity or technical failures. However, for SMEs that are producing or massively using AI-related technologies, reputational damages could be directly caused by the misbehaviour of a model. The reputational risks improve when the interaction with human users involves subtle decision-making manipulations, as in the case of nudging mechanisms. SMEs can considerably reduce the risks of reputational damage by mitigating ethical risks arisen related to AI-enhanced nudging mechanisms using the set of references that the standard is going to produce (criteria, terminologies, concepts, etc.).

### Impact on Society

This standard will serve to reduce informational and behavioural pollution in the European democratic debate. It can be useful to guarantee the individual autonomy of the data subject and to protect the right to self-determination in children.

## Has your project directly involved or led to a specific recommendation or proposal for the development of new or revised standards?

Yes, to the development of a standard to regulate the use of AI-enhanced nudging mechanisms.

## Have the standardisation activities in your project led to specific deliverables?

Yes, this activity has led to a technical report on recommendations for new standards.

## What future efforts or activity are still necessary in your area of application?

This action is not finalised yet. The continuous work on a standard on AI-enhanced nudging systems is crucial to provide the European market with a tool for ethical risk mitigation, safeguarding communication in democracies, and for the proper development of children.

## Online references related to the fellowship work

[www.cencenelec.eu/areas-of-work/cen-cenelec-topics/artificial-intelligence/](http://www.cencenelec.eu/areas-of-work/cen-cenelec-topics/artificial-intelligence/)

[www.youtube.com/watch?v=OKY0jYM50i4](https://www.youtube.com/watch?v=OKY0jYM50i4)

# Standardization of an AI Framework in the context of Motion Picture audio and Data by AI (MPAI)



## **Andrea Basso**

*Chair of the MPAI - AI Framework development committee,  
Synesthesia s.r.l*

*Italy*

## Sector

Artificial Intelligence

## Engaged SDOs, WGs and TCs



MPAI-AIF DC Artificial Intelligence Framework

## Role (chair, convener, member)

Chair of MPAI-AIF DC

## Addressed EU standardisation priorities and gaps

AI technologies are yielding one of the fastest growing markets in the data analysis and service sector. It is a priority to enable industry to easily create innovative products based on AI. However, the challenge is that the current development model is in the hands of few big players and makes application redeployment difficult, monolithic, and opaque.

MPAI's AI framework (AIF) enables building high-complexity AI solutions by interconnecting multi-vendor AI modules (AIMs) operating in a standard AI framework (AIF) and exchanging data in standard formats.

MPAI benefits:

- ▶ Technology providers will be able to offer AIMs to an open market
- ▶ Application developers to access open market of AIMs
- ▶ Innovation will be fuelled by the demand for novel AIMs
- ▶ Consumers will be offered a wider choice of better AI applications by a competitive market
- ▶ Society will be able to lift the veil of opacity from large, monolithic AI-based applications

## Concerned ICT Standards and contribution to the related landscape

Moving Picture, Audio and Data Coding by Artificial Intelligence (MPAI) is an international non-profit organisation with the mission is to develop Artificial Intelligence (AI) enabled digital data compression specifications, with clear Intellectual Property Rights (IPR) licensing frameworks, of Moving Picture, Audio and Data Coding, especially using new technologies such as Artificial Intelligence, and that facilitate integration of Moving Picture, Audio and Data coding components into systems.

## Impact (on European SMEs, related project or in the society)

### **Impact on Society**

Use of technologies based on Artificial Intelligence (AI) is extending to more and more applications yielding one of the fastest growing markets in the data analysis and service sector. However, industry and society must overcome hurdles for stakeholders to fully exploit this historical opportunity: the current framework-based development model that makes

application redeployment difficult, and monolithic and opaque AI applications that generate mistrust in users. MPAI – Moving Picture, Audio and Data Coding by Artificial Intelligence – believes that universally accessible standards can have the same positive effects on society as digital media standards and has identified data coding as the area where standards can foster development of AI technologies, promote use of AI applications and contribute to the solution of existing problems.

### Has your project directly involved or led to a specific recommendation or proposal for the development of new or revised standards?

Yes, my fellowship activity was focused on the standardisation of an AI Framework inside the MPAI standard.

### Have the standardisation activities in your project led to specific deliverables?

Yes, I have contributed to Technical Specifications.

### What future efforts or activity are still necessary in your area of application?

The current standards in AI are in very early stage and in great need for further development. Artificial Intelligence (AI) is a resurgent technology experiencing significant advances. Since 2017, 14 of the world's most advanced economies have announced over 86 billion EUR in focused AI programs and activities. This growth in AI and the investment underpinning it has the potential to transform the lives of European, who are already keen and early adopters of AI. Alongside this opportunity, concerns have been raised about the impact of AI on the future of work, social inclusion, and opportunity, among other issues. With these concerns, the interest in AI Standards to shape responsible design, deployment, and evaluation of AI, and facilitate global adoption, has been growing and today is perceived as a key need. Support for this effort is key for Europe to ensure that an effective and responsible AI is developed.

### Online references related to the fellowship work

 <https://mpai.community/wp-content/uploads/2021/11/N426-MPAI-14-Press-Release.doc>

 <https://mpai.community/about/organisation/>

 <https://mpai.community/standards/mpai-aif/about-mpai-aif/>

 <https://mpai.community/standards/mpai-aif/draft-standard/>



# Standards for data spaces and trustworthy AI



**Antonio Kung**

CEO, Trialog

France

Sector

Artificial Intelligence

## Engaged SDOs, WGs and TCs



ISO/IEC JTC1/SC27 Information security, cybersecurity, and privacy protection

ISO/IEC JTC1/SC41 Internet of things and digital twin/AG25, AHG30, AG31

ISO/IEC JTC1/SC42 Artificial intelligence

ISO/IEC JTC 1/AG 8 Meta Reference Architecture and Reference Architecture for Systems Integration TF Use Cases and Patterns

ISO/PC 317 Consumer protection: privacy by design for consumer goods and services TF Use Cases

## Role (chair, convener, member)

Convener of JTC1/SC41/AG25, AhG30, AG31, and Task force leader ISO/IEC JTC1/ AG8 TF, Head of the French delegation to ISO/IEC SC41 and contributor in others.

## Addressed EU standardisation priorities and gaps

My fellowship addresses are the following gaps and challenges:

- ▶ There are no standards concerning data spaces focusing on architecture and interoperability aspects. This is a barrier for industry, and especially for SMEs.
- ▶ There is no guidance on guide the creation of interoperability standards on the IoT-edge-cloud continuum. This is a barrier for IoT-edge-cloud pilots when they wish to promote their work to standardisation and create an impact
- ▶ There is a need to provide guidance on how to ensure trustworthiness in artificial intelligence. Especially, industrial organisations face difficulties understanding how to comply with the AI act.

## Concerned ICT Standards and contribution to the related landscape

The objective is to lead the creation on three standards (or more) related to projects that were initiated as part of my previous StandICT.eu 2023 fellowship (under OC#2):

- ▶ “Integrating data space in the computing continuum” related to work carried out by AIOTI and BDVA/DAIRO on two position papers with a plan to propose a family of data space standards integrating data sovereignty as a principle and leveraging European common building blocks.
- ▶ “Behavioral and policy interoperability” that will complete the ISO/IEC 21823 family of standards on interoperability. Current standards are on interoperability framework (part 1), and on the transport, semantic and syntactic interoperability facets (parts 2, 3, 4). My current fellowship activity will leverage reports from SC41/AhG26 (trustworthiness interoperability), and work carried out in JTC1/WG13 (trustworthiness) and in JTC1/AG8 (meta reference architecture).
- ▶ ISO/IEC 27563 “impact of security and privacy in artificial intelligence use cases” (<https://>), started an outcome of work done in PWI 6089 (impact of AI on security and privacy).

## Impact (on European SMEs, related project or in the society)

### Impact on SMEs

The proposed standards on architecture and interoperability will enable SMEs to provide technology solutions.

### Impact on Society

The proposed activity directly enables the meeting of European strategy on data space (e.g. Gaia-X) and trustworthiness AI. As stated by the European Commission: "The European data strategy aims to make the EU a leader in a data-driven society. Creating a single market for data will allow it to flow freely within the EU and across sectors for the benefit of businesses, researchers, and public administrations. People, businesses, and organisations should be empowered to make better decisions based on insights from non-personal data, which should be available to all."

In addition, trustworthy artificial intelligence (AI) can bring many benefits, such as better healthcare, safer and cleaner transport, more efficient manufacturing, and cheaper and more sustainable energy. The EU's approach to AI will give people the confidence to embrace these technologies while encouraging businesses to develop them.

## Has your project directly involved or led to a specific recommendation or proposal for the development of new or revised standards?

Yes, I have contributed to two standards to be published this year (31700-2, 27563), two proposals being socialised (27564, 5896) and to one placeholder to submit data space standards from an IoT and Digital twin viewpoint.

## Have the standardisation activities in your project led to specific deliverables?

Yes, to a technical report on development of a new standard.

## What future efforts or activity are still necessary in your area of application?

In collaboration with AIOTI and BDVA, a series of initiatives has led to the creation of ISO/IEC JTC1/ SC41/AG31, and a similar initiative will be made in ISO/IEC JTC1/ SC42.

This is paving the way to future data space standards.

## Online references related to the fellowship work

 [www.standict.eu/landscape-analysis-report/landscape-digital-twins](http://www.standict.eu/landscape-analysis-report/landscape-digital-twins)

 [www.iso.org/standard/80396.html](http://www.iso.org/standard/80396.html)

 [www.iso.org/committee/6483279.html](http://www.iso.org/committee/6483279.html)

 [www.iso.org/committee/6794475.html](http://www.iso.org/committee/6794475.html)

# International Standardisation of AI, as an Expert and European ad-hoc Group Convenor



**Lauriane Aufrant**

*NLP lead scientist for Defense & Security applications, Inria France*

Sector

Artificial Intelligence

## Engaged SDOs, WGs and TCs



ISO/IEC/JTC 1/SC 42 Artificial Intelligence (including WG 1, WG 3, WG 5, AG 3)

CEN/CLC/JTC 21 Artificial Intelligence (including AHG 4, WG 3)

## Role (chair, convener, member)

Convenor of CEN/CLC/JTC 21/AHG 4 “AI systems for human language processing”, and now candidate for Convenorship of CEN/CLC/JTC 21/WG 3 “Engineering aspects”, to which AHG 4’s activities are about to be transferred.

## Addressed EU standardisation priorities and gaps

In the context of the upcoming AI Act, there is a clear need for a shared terminology and for standardizing fundamental concepts (e.g., explainability, or even the concept of AI itself). But there is also a need for standardized processes for performance assessment, as in that field it is quite common that two seemingly identical evaluation processes produce in practice very different results, for lack of sufficiently formalizing their implementation details.

Through this fellowship and my involvement as a Convenor in CEN/CLC/JTC 21/AHG 4, I also aim at making standards more applicable, as generic concepts and requirements need to be refined within each subfield of AI to become actionable. In the context of the committee discussions held over the last six months on roadmapping and JTC 21 organization, I have been a strong advocate for the creation of a working group dedicated to those aspects. This proposal has been escalated into creating a working group dedicated to engineering aspects of AI, thereby enabling more technically focused work than what the other existing structures offered.

## Concerned ICT Standards and contribution to the related landscape

Within ISO-IEC/JTC1/SC42, I am focusing on TS 6254 (explainable AI) and TS 12792. I took an active part into IS 22989 (AI concepts) and IS 23053 (machine learning framework), which are ISO-IEC’s main two foundational standards for AI, and both are now under publication. TS 4213 (performance assessment metrics) is another document in which I was significantly involved and that is about to be published now. More generally, I have been surveying the ISO-IEC landscape of AI-related standards projects, and contributed some insights to road mapping groups, both directly and through my national mirror committee.

At the CEN-CENELEC level, and more precisely within its newly created JTC 21, I have been working on establishing a strong roadmap for standards on language processing AI systems, which has been my focus since assuming the convenorship of the corresponding ad-hoc group. To lay solid conceptual foundations for upcoming work items on the topic, my group has already pushed a first New Work Item (NWI) Proposal to ballot and now acceptance (under work item number JT021002), and I have been appointed as project leader. I am now

pursuing the efforts to consolidate the gap analysis and resulting roadmap, with prospects for at least two new projects for standards on evaluation and data formats.

## Impact (on European SMEs, related project or in the society)

### Impact on SMEs

By introducing new strong requirements, the upcoming AI Act bears the risk of hindering innovation if no guidance is offered on how to implement it. This is especially true for SMEs which are less used to follow such frameworks and have typically less access to legal counsel. Yet within the AI field, SMEs represent a large part of the European innovative ecosystem. My work on voluntary AI standards within CEN-CENELEC, but also ISO-IEC, will help support the SMEs to adapt for pursuing their activity within this new legal framework.

In addition, I have included into the roadmap of CEN/CLC/JTC 21/AHG 4 a dedicated part on standardizing formats for interoperability. One of its purposes is to help small companies to put forward their own products by ensuring they will fit within the larger tool suites of bigger companies. This will typically foster European alternatives to Big Tech's products.

### Impact on Society

My work serves as support to the preservation of consumer rights, by enabling more transparency, comparability, and clarity on the actual performance of AI systems in the market. Its societal impact also encompasses ethical aspects of AI such as human agency, for which appropriate use of explainability methods is a key enabler. More generally, it benefits the society at large through its interplay with the upcoming AI Act that will impact daily lives in Europe.

## Has your project directly involved or led to a specific recommendation or proposal for the development of new or revised standards?

Yes, I have contributed to multiple standards already under development, but I have also personally initiated a new work item within CEN/CLC/JTC 21: "Artificial Intelligence – Overview of AI tasks and functionalities related to natural language processing" (registered under number JTO21002). The purpose of this document is to lay the terminological and conceptual foundations for subsequent standards on the topic, for which I am actively working on establishing a roadmap.

## Have the standardisation activities in your project led to specific deliverables?

Yes, I have contributed to a technical report on development of a new standard.

## What future efforts or activity are still necessary in your area of application?

Within TS 6254 project on explainable AI, I have been by far the main contributor, which does not appear as a sustainable process for a consensus-driven organization. Even though the EU is eager to establish strong guidelines on such topics since the AI HLEG's ethics work, in practice there is a major discrepancy between the high number of people wanting such projects to advance, and the lack of corresponding experts with practical experience of the topic. This is in part due to the limited maturity of the field itself but could be circumvented with a larger pool of technical experts.

As for my natural language processing activities, AHG 4 was recently created as a rather small group, but it has been expanding at a regular pace. However, its scope is rather large, with very diverse topics to address (from evaluation to documentation, from speaker recognition to machine translation), and therefore the work needs to rely on more diverse expertise. I have already entertained multiple actions to broaden that pool (reaching out to the community, meeting with other groups, raising awareness about standardisation), but efforts are to be pursued.

## Online references related to the fellowship work

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- ▷ [www.cencenelec.eu/areas-of-work/cen-cenelec-topics/artificial-intelligence](http://www.cencenelec.eu/areas-of-work/cen-cenelec-topics/artificial-intelligence)
- ▷ [www.iso.org/standard/74438.html](http://www.iso.org/standard/74438.html)
- ▷ [www.iso.org/committee/6794475/x/catalogue/p/0/u/1/w/0/d/0](http://www.iso.org/committee/6794475/x/catalogue/p/0/u/1/w/0/d/0)



# Participation in the development of a risk analysis in support of RED Articles 3(3)(d/e/f)



## **Octavian Popescu**

*Consultant and researcher, EUROMREG  
Belgium*

### Sector

Cybersecurity

## Engaged SDOs, WGs and TCs



ETSI TC CYBER, ETSI TC Reconfigurable Radio Systems (RRS)

## Role (chair, convener, member)

## Addressed EU standardisation priorities and gaps

Currently, there are no standards for the essential requirements of Article 3.3 d, e, f of the Radio Equipment Directive. Also, there are no European level guidelines for the standardisation activity leading to the production of Harmonised European Norms for the 3 newly activated essential requirements of the Radio Equipment Directive Article 3.3. As these standards will cover RED Art 3.3 d, e, f requirements dealing with requirements for radio equipment connected to the internet, these standards must cover aspects of cybersecurity, protection of personal privacy and combatting fraud in a way that can be tested and demonstrate to improve the security of using the radio devices connected to the internet. This is a new way of dealing with the threats to security posed by the higher degree of connectivity and the requirements for regulating the European Union market for radio equipment intended to be connected to the internet.

## Concerned ICT Standards and contribution to the related landscape

The stated goal for my fellowship is to participate in discussions on the topic of Cybersecurity Risk Analysis in support of Radio Equipment Directive (RED - 2014/53/EU) Articles 3(3)(d/e/f) taking place in ETSI, in particular in ETSI TC CYBER, and to a lesser extent in TC RRS, where I present the perspective of the SME community based on my experience and prior discussions.

ETSI members were preparing for the standardisation activities by setting up a risk analysis process. The objective of this risk analysis is to derive specific security capabilities based on risk assessment, that will support the ability to address identified threats, risks and vulnerabilities assessment in the framework created by the newly activated RED essential requirements. Risk analysis methodologies are currently under discussion in ETSI, mainly in Technical Committee CYBER and in other technical committees, like RRS where the standardisation deliverables regarding radio matters standards are produced. One approach is a generic risk analysis to be performed such that a common horizontal baseline set of basic requirements are identified which are applicable to all equipment under the scope of RED Articles 3(3)(d/e/f).

I contribute to the discussions and inform members, with the view that the resulting requirements are focused on the radio communication functionality and the radio interface controls. This position is informed by my experience as engineer in several SME-type companies where the main expertise and most of the resources are dedicated to development of the core product and service of that company. SMEs might have limited cybersecurity expertise,

updated standards can support them but also, they need guidance accompanying them to comply to a changed legal framework.

There are currently no standards for the essential requirements activated by the European Commission Delegated Act of October 2021.

### Impact (on European SMEs, related project or in the society)

The objective of my work was to add elements for clarifying the terminology and the scope of application for the standardisation deliverables covering the essential requirements of Article 3.3. I supported the explanation of the terms used in this work to be able to communicate efficiently to the SMEs, and in general.

### Has your project directly involved or led to a specific recommendation or proposal for the development of new or revised standards?

Yes, the aim of the work was to set up the development of a risk analysis leading to the development of the new horizontal European Harmonised standards, covering the essential requirements of Art.3.3.

### Have the standardisation activities in your project led to specific deliverables?

No.

### What future efforts or activity are still necessary in your area of application?

Currently the European Commission is working on elaborating a Standardisation Request covering the RED Article 3.3 essential requirements for CEN and CENELEC only. The European standards have yet to be written and the work of the ETSI TC CYBER should also be considered as it may fit the purpose of the Standardisation Request.

I set up my participation to this effort by becoming member of the National Belgium Standardisation organisation and I intend to continue this work in CEN/CENELEC.

### Online references related to the fellowship work

[www.etsi.org/cyber-security/tc-cyber-roadmap?highlight=WyJpb3QjXQ==](https://www.etsi.org/cyber-security/tc-cyber-roadmap?highlight=WyJpb3QjXQ==)

[www.etsi.org/committee-activity/activity-report-rrs?highlight=WyJ3aXJlbGVzcyIsIndpcmVsZXNzJyIsImNvbWl1bmljYXRpb25zIiwiaY29tbXVuaWNhdGlvbnMnIiwid2lyZWxic3MgY29tbXVuaWNhdGlvbnMjXQ==](https://www.etsi.org/committee-activity/activity-report-rrs?highlight=WyJ3aXJlbGVzcyIsIndpcmVsZXNzJyIsImNvbWl1bmljYXRpb25zIiwiaY29tbXVuaWNhdGlvbnMnIiwid2lyZWxic3MgY29tbXVuaWNhdGlvbnMjXQ==)

# ISO/IEC 27005 - upgrading from Enquiry stage to Approval/Publication Stage



**Elzbieta Andrukiewicz**

*Head of the Cybersecurity Laboratory, National Institute of Telecommunications  
Poland*

Sector

Cybersecurity

## Engaged SDOs, WGs and TCs



ISO/IEC JTC1/SC27/WG1 Information security, cybersecurity and privacy protection

## Role (chair, convener, member)

Editor of ISO/IEC 27005 4th edition

## Addressed EU standardisation priorities and gaps

Previous (third) version of the standard that will replace by the new one is, in fact, the version from 2011 (only minor revision done in 2018). It is obsolete for two reasons; it does not support current version of ISO/IEC 27001, and it does not cope with latest achievement in the subject matter. Moreover, the updated version contains examples that makes it easier to implement by SMEs.

## Concerned ICT Standards and contribution to the related landscape

Long-waiting international standard ISO/IEC 27005 (fourth edition) is approaching the end of development. The standard can serve not only as supporting document for correct and efficient implementation of the Information Security Management System (ISMS) compliant with ISO/IEC 27001 (relevant sections contain references to ISO/IEC 27001:2013) but as stand-alone document that supports managing information security risks in all organizations, regardless their nature, type, or size. As the risk assessment typically creates a basis for proper implementations of management systems, security architectures developed in various sectors it a cornerstone of Information Security or Cybersecurity.

## Impact (on European SMEs, related project or in the society)

Thanks to the revision, the standard can be more easily implemented by any organization, regardless its size, thus including SMEs. Moreover, the work supports the most fundamental area of managing information security and cybersecurity, i.e., information security or cybersecurity risks. By providing principles, ordered description of activities and examples, it supports successful risk-based implementations of secure environments and ecosystems, from the most complicated to quite simple ones. Annexes contain additional information on context criteria. Risk assessment techniques and supporting material for risk identification approaches.

## Has your project directly involved or led to a specific recommendation or proposal for the development of new or revised standards?

No.

## Have the standardisation activities in your project led to specific deliverables?

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Yes, to technical specifications.

## What future efforts or activity are still necessary in your area of application?

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In this topic, the standards are mature, and my specific action was successfully finalised. The Project Editor has finished the work regarding the standard. During Enquire stage (DIS) the project received overwhelming support from National Bodies. Approval stage encompasses editorial changes only, implemented by the ISO Editors.

## Online references related to the fellowship work

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 [www.iso.org/committee/45306.html](http://www.iso.org/committee/45306.html)

# IEC 62351-100-4, Cybersecurity Conformance Testing for IEC 62351-4



## **Erik Andersen**

*Independent Expert, Andersen L-Service  
Denmark*

### Sector

Cybersecurity

### Engaged SDOs, WGs and TCs



IEC TC 57 Power systems management and associated information exchange / WG 15 Data and communication security

### Role (chair, convener, member)

Contributor

### Addressed EU standardisation priorities and gaps

Many cyber-attacks are made possible by peoples' misbehaviour, like clicking on an unsafe link. Other attacks are made possible by installing unsafe programs or by bad physical protection. It is all about what people should do or should not do, i.e., it is about procedures. Much cyber security standardisation is concerned with procedures. A major part of government and EU cyber security activities are concerned with procedures, possibly because many cyberattacks are caused by missing or ignored procedures.

However, here is a gap. Certain attacks are possible even when all procedures are in place and observed. Systems in a network communicates use standardized protocols. If these protocol standards do not specify secure authentication, encryption, support for access control, data integrity protection and many other safety features, systems based on such protocols are open for attacks. This latter aspect has less attention by authorities but is the priority for the fellowship.

The different security standards for power industry define what is expected of implantations to fulfil the security requirements. However, it is important that implementations are tested to verify that it supports all necessary security requirements. The aim of my fellowships is to bridge this gap between the established standards and the procedures in place.

Concerned ICT Standards and contribution to the related landscape

The ICT standard in question is IEC 62351-100-4, Cybersecurity conformance testing for IEC 62351-4. It has currently completed comment period and the comment resolution phase for a second committee draft (CD), The document has been submitted to the IEC secretariat to be issued as a committee draft for vote (CDV).

IEC 62351-100-4 is a standard for how to test IEC 62351-4 implementations to ensure that such implementations fulfil all the security requirement. IEC 62351-4 specifies that an implementation shall implement many security features, such as digital signature for ensure the identity of a communication partner and the integrity of the information received from that partner shall be check for unauthorized modification. There are also many requirements on the management of cryptographic keys and possible encryption of transferred information.

It is essential that an implementing of IEC 62351-4 thoroughly monitor a communication partner to ensure that it fulfil all requirements and to watch for any sign of unexpected behaviour indicating that the communication partner has been subject to an attack by an adversary.



An IEC 62351-4 implementation will only be secure system if all the security requirements are properly implemented. The purpose of IEC 62351-100-4 is to provide test specifications that allows checking that all security capabilities are properly implemented. IEC 62351-100-4 specifies many tests to perform and the expected results of these test. As part of my activity, I have developed the most of such test specifications.

### Impact (on European SMEs, related project or in the society)

Cyber security attack is a major problem for the society. It has widely economic and human consequences. It is almost viewed in the same context as military threats. IEC 62351-100-4 objective is to ensure that IEC 62351-4 implementations have correctly integrated all security features.

### Has your project directly involved or led to a specific recommendation or proposal for the development of new or revised standards?

Yes, it contributes to the development of a new standard IEC 62351-100-4.

### Have the standardisation activities in your project led to specific deliverables?

Yes, to a technical report on recommendations for new standards.

### What future efforts or activity are still necessary in your area of application?

The engaged work is to be continued; IEC 62351-100-4 is currently submitted to the IEC secretariat. When the secretariat has gone through all the administrative procedures for the text, it will be issued as a committee draft for vote (CDV). When that happens, the document will go through a very thorough review resulting in comments that I will issue as representative the Danish member body of IEC. Following that comes a ballot resolution phase and a final editing. After that, all technical work has completed. The document is then issued for a Final Draft International Standard (FDIS) vote, where only minor editorial comments are accepted.

### Online references related to the fellowship work

 [www.iec.ch/ords/f?p=103:14:616099657232376:::FSP\\_ORG\\_ID:2389](https://www.iec.ch/ords/f?p=103:14:616099657232376:::FSP_ORG_ID:2389)

# IoT Cybersec: IoT Cybersecurity standard framework. Stage 1 Technical Report



## **Xiaoying Suo**

*ICT Standardization Project Manager and Head of Cybersecurity, Spanish Association for Standardization Spain*

## Sector

Cybersecurity, IoT

## Engaged SDOs, WGs and TCs



ISO/IEC JTC1/SC27 Information security, cybersecurity and privacy protection  
CEN/CLC JTC13 Cybersecurity and data protection  
ITU-T SG17 Security  
ETSI TC CYBER

## Role (chair, convener, member)

Contributor

## Addressed EU standardisation priorities and gaps

There is currently no recognised international IoT cybersecurity standard for IoT device manufacturers/designers to comply with. This leaves manufacturers/designers without a customer-facing label or recognition programme that they can leverage to promote their cybersecurity credentials. Organisations such as ISO, IEC, IEEE, CSA, and OCF are working in this area, but their approaches differ, and there remains a need to look at the end-to-end solution that encompasses the device, its control applications and back-end cloud services.

IoT devices do not operate in isolation; by their very nature they operate in a system that generally uses Cloud-based servers and multiple third-party service providers for connectivity and functionality. This broadens the exposure to cybersecurity threat beyond what comes in the box when you buy a new IoT device. Manufacturers/designers are asking where this is all heading, what can I do right now and how can I make sure my design complies with an industry standard when no standard applies.

What are the main barriers to explain why manufacturers/designers make insecure IoT devices? The IoT manufacturers/designers' view of security is often as follows:

- ▷ Financial motivation, manufacturers/designers do not prioritise security, it is an afterthought.
- ▷ Competitive edge and speed to market is held back by a focus on security.
- ▷ Security hinders free innovation and innovation hinders security.

It is therefore essential to develop a universal and integral IoT Cybersecurity Framework that covers these aspects. Moreover, the fragmentation and complexity of IoT security requirements not only leaves key aspects unaddressed but also hinders their implementation.

Finally, the IoT industry lacks adequate security and privacy controls at present. To address the challenge, the proposed universal and integral IoT security and privacy framework will be developed. The framework is the result of a close collaboration between industry professionals, academia, research institutions and government officials with expertise in supervising the adoption, implementation, and auditing of standards such as ISO/IEC 27001 and legislation such as the General Data Protection Regulation (GDPR). The purpose of the framework is to

address the present lack of standards in the IoT security industry and assist organizations in securing and maintaining the security of their expanding IoT infrastructure. The framework intends to enhance the legitimacy of IoT-related businesses and to ensure the long-term survival of their infrastructure.

## Concerned ICT Standards and contribution to the related landscape

The initiative is framed within the scope of several Technical Committees such as ISO/IEC JTC1, ISO/IEC JTC1/SC27, CEN/CLC JTC13, ITU-T SG17 and ETSI TC CYBER.

The objective is to develop a universal, integral, risk-based and cost-effective standard based on IoT cybersecurity and privacy framework, which integrates the main requirements, coming from multiple standards, frameworks, guidelines and best practices. The adoption of proposed (universal and integral) IoT cybersecurity framework standard by the industry will not only help with the realisation of what steps are required to achieve acceptable security level in IoT products, it will also provide less experienced manufactures with insight into potential design, manufacturing, governance and maintenance issues, which may have been overlooked. Consequently, wider implementation and compliance with this framework will also improve the overall security of IoT devices in the industry and boost consumer trust. The proposed IoT Cybersecurity framework standard will be applicable to any type and size of organisation, and specific vertical sectors of IoT applications.

The concerned ICT standards:

- ▷ ISO/IEC JTC1/SC27
  - ▷ ISO/IEC 27400:2022 Cybersecurity - IoT security and privacy - Guidelines
  - ▷ ISO/IEC CD 27402.2 Cybersecurity - IoT security and privacy - Device baseline requirements
  - ▷ ISO/IEC CD 27403.2 Cybersecurity – IoT security and privacy – Guidelines for IoT-domotics
  - ▷ ISO/IEC NP 27404 Cybersecurity - IoT security and privacy - Universal cybersecurity labelling framework for consumer IoT
- ▷ ISO/PC 317
  - ▷ ISO/FDIS 31700-1 Consumer protection - Privacy by design for consumer goods and services - Part 1: High-level requirements
  - ▷ ISO/CD TR 31700-2 Consumer protection - Privacy by design for consumer goods and services - Part 2: Use cases
- ▷ CEN/CLC JTC 13
  - ▷ prEN 17640 Fixed time cybersecurity evaluation methodology for ICT products
- ▷ ISO/IEC JTC1/SC41:
  - ▷ ISO/IEC TR 22417:2017 IoT - Cases of IoT use
  - ▷ ISO/IEC 20924:2018 IoT - Vocabulary
  - ▷ ISO/IEC 30141:2018 IoT - Reference architecture
  - ▷ ISO/IEC 21823-1:2019 IoT - Interoperability for IoT systems - Part 1: Framework
  - ▷ ISO/IEC 21823-2:2020 IoT - Interoperability for IoT systems - Part 2: Transport interoperability
  - ▷ ISO/IEC 21823-3:2021 IoT - Interoperability for IoT systems - Part 3: Semantic interoperability
  - ▷ ISO/IEC 21823-4:2022 IoT - Interoperability for IoT systems - Part 4: Syntactic interoperability
- ▷ ITU-T:
  - ▷ ITU-T -Y.2060 Overview of the Internet of Things
  - ▷ ITU-T -Y.4203 Requirements of the description of things in the IoT
  - ▷ ITU-T -Y.4459 An architecture for IoT interoperability
  - ▷ ITU-T -Y.4204 Accessibility requirements for IoT applications and services
- ▷ ETSI:
  - ▷ ETSI EN 303 645 Cybersecurity for consumer IoT

- ▷ ETSI TR 103 375 IoT landscape standards and future evolutions
- ▷ ETSI TR 103 376 IoT LSP use cases and gaps in standards

## Impact (on European SMEs, related project or in the society)

### Impact on SMEs

This work prepares the first phase/step of the project for the creation of a new standard to help SMEs to adopt the most appropriate IoT-Cybersecurity standards to solve specific business or organizational challenges.

The analysis of the overview of IoT-Cybersecurity standards landscape help to investigate what are the main challenges that SMEs are facing when developing and designing secure IoT products and services.

The Technical Report highlights key priority areas for SMEs that are trying to adopt IoT Security and Privacy standards and best practices into their businesses, products, and services; And help to SMEs to identify the most suitable standards and guidelines currently available.

The significance of this initiative lies in its objective to speak directly with industry players, enterprises, and SMEs in the IoT ecosystem to determine their participation, or lack thereof, in standards development, how they currently utilize standards, any barriers they face with IoT-Cybersecurity standards, and what could facilitate their increased implementation of standards. Standards are advantageous to SMBs because they may enhance the safety, security, and privacy of the products on the market, as well as the business who use and manufacture them. This project intends to increase the interaction between standards and SMEs, hence enhancing the security of the products and services provided by SMEs and positively impacting their business models.

### Impact in society

The establishment of standards is made more challenging by cutting-edge technologies, such those that are surfacing in the IoT ecosystem. Due to the application domains that IoT includes, including consumer goods, mobility, essential services, industrial processes, and critical infrastructures, standardisation for IoT is particularly challenging. Since a single IoT product or service might come under numerous traditional product categories and since these products and services are used globally, standards for IoT-Cybersecurity frequently are fragmented across the international standards landscape. The distinctions between horizontal and vertical standards further exacerbate the fragmentation of the standards landscape. Horizontal standards, such as those for safety, security, or privacy, provide “fundamental principles, concepts, definitions, vocabulary, and similar general information applicable to a broad subject area.” While vertical standards focus on the information required specifically for a particular application, domain, or product. Additionally, there is generally a latency concern when standards are unable to keep up with the faster pace of technological development.

As a result, there is a need to standardize IoT cybersecurity in creative new ways to support the benefits of these technologies while simultaneously minimizing any potential drawbacks. It is suggested that these new methods of standard-making be approached through the development of a universal and integral standard. Agility management is regarded as a method that uses “adaptive, human-centered, inclusive, and sustainable policy-making” to deal with the pace of technological change.

Startups, SMEs, enterprises, and other sectors of the public administration will be able to put into effect the precise best practices and recommendations they require to address the challenging adoption and implementation of IoT security requirements after the standard has been developed. All businesses will be able to benefit more from the security management contained in the standards and good practice frameworks as a result. Organizations will be able to integrate the agile and integral standard, best practices, digital transformation, motivation, and people management techniques with the proposed standard.

## Has your project directly involved or led to a specific recommendation or proposal for the development of new or revised standards?

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Not yet. The work of this Phase I, aims to analyse the State-of-the-Art on how the organizations are adopting and implementing IoT Cybersecurity and Privacy standards and best practice frameworks. The analysis carried out of different use cases shows that, based on all these experiences, it is possible to establish requirements and recommendations that help organizations to implement standards and best practice frameworks more efficiently. Based on the analysis carried out, it can be deduced that the creation of a standard that makes organizations more efficient and competitive is possible and advisable.

The report on the state of the art can serve as a basis, baseline, or reference for future standardisation development in the IoT security field.

## Have the standardisation activities in your project led to specific deliverables?

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Yes, a technical report on how to adopt IoT Cybersecurity and Privacy standards/frameworks.

## What future efforts or activity are still necessary in your area of application?

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This is the first step (Phase I) of the effort to build a comprehensive and universal IoT Cybersecurity and Privacy framework standard that supports the adoption and implementation of a variety of guidelines and best practices. The next step (Phase II) will also be presented at the next StandICT.eu 2023 Open Call.

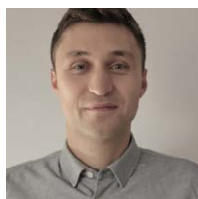
## Online references related to the fellowship work

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 [www.en.une.org/la-asociacion/sala-de-informacion-une/noticias/impulso-a-la-ciberseguridad-iot](http://www.en.une.org/la-asociacion/sala-de-informacion-une/noticias/impulso-a-la-ciberseguridad-iot)



# Interoperable trustworthiness attestation results



**Nicolae Paladi**  
CEO, CanaryBit.eu  
Researcher, Lund University  
Sweden

## Sector

Cybersecurity

## Engaged SDOs, WGs and TCs



IETF Remote Attestation procedureS (RATS) and Trusted Execution Environment Platform (TEEP) workgroups.

## Role (chair, convener, member)

Member

## Addressed EU standardisation priorities and gaps

The priority focuses on limiting or preventing fragmentation of confidential computing architectures. Confidential computing is about creating secure computing environments on hardware platforms; this technology can be implemented in various ways, leading to fragmentation among hardware vendors. Fragmentation is undesirable as it leads to incomparable and incompatible trustworthiness claims obtained through attestation.

Thus, end-users cannot obtain a consistent, comparable, and measurable way to assess the security guarantees of the infrastructure they use. The ongoing work takes a first step in addressing this challenge, by defining the interaction models to obtain attestation results and formats and to define principles for assessing the trustworthiness of endpoints that produce the attestation results.

In addition, the engaged work contributes ensuring compatibility between attestation results from competing vendors. Attestation results are cryptographic evidence that help to assess the trustworthiness of computing platforms. Inconsistent and incomparable data lead to a situation of “comparing apples and oranges”. This challenge is addressed by defining methods to compare the security guarantees communicated by attestation results from competing vendors.

## Concerned ICT Standards and contribution to the related landscape

This fellowship directly supports my contributions to the standardisation work within the IETF RATS workgroup. I am particularly focusing on several highly relevant IETF RFC (request for comments) documents, namely Remote Attestation Procedures Architecture, Attestation Results for Secure Interactions and Reference Interaction Models for Remote Attestation Procedures.

## Impact (on European SMEs, related project or in the society)

### Impact on SMEs

My contribution focuses on defining a format for interoperable trustworthiness attestation results. A successful implementation of this will create a new technical landscape that European SMEs can use for innovation. My expectation is that such standardisation work will

pave the way for innovative solutions in the areas of cloud security, network security and trust services.

To further highlight this point, CanaryBit AB is a Swedish start-up that is building a confidential data collaboration service using new capabilities for extracting, verifying, and sharing trustworthy results from hardware platforms. Several other European SMEs are active in this space and will directly benefit from an interoperable and comparable format for trustworthiness attestation used by competing hardware vendors.

#### Impact on Society

On a very high level, my works addresses two of the UN Sustainable Development Goals (SDGs), namely:

SDG 9 - Industry, innovation, and infrastructure, through focus on standardisation of an emerging computational technology.

SDG 10 - reduced inequalities, by opening the pathways for competing and alternative hardware vendor implementations that allow broader access to secure and efficient computational tools.

### Has your project directly involved or led to a specific recommendation or proposal for the development of new or revised standards?

Yes, in this fellowship I focus on IETF RFC (request for comments) documents, namely Remote Attestation Procedures Architecture, Attestation Results for Secure Interactions and Reference Interaction Models for Remote Attestation Procedures.

### Have the standardisation activities in your project led to specific deliverables?

Yes, my activity contributed to Technical Specifications, Technical Reports on Development of a new standard and on Common Terminology.

### What future efforts or activity are still necessary in your area of application?

I would strongly recommend having additional EU experts needed to better support the EU position. Hence, we need a stronger participation of EU experts in critical domains such as cybersecurity and computational hardware. This is necessary to ensure the adoption of open and vendor-neutral standards that will allow alternative hardware implementations of cybersecurity features. This effort will support and complement the recently announced European thrust in microchip manufacturing.

### Online references related to the fellowship work

 <https://datatracker.ietf.org/doc/draft-ietf-rats-architecture/>

 <https://datatracker.ietf.org/doc/draft-ietf-rats-ar4si/>

 <https://datatracker.ietf.org/doc/draft-ietf-rats-reference-interaction-models/>

# Developing Security Standards Roadmap for Blockchain and Distributed Ledger Technologies



**Paul Ferris**

*Chair, European Distributed Computing Association  
United Kingdom*

## Sector

Cybersecurity

## Engaged SDOs, WGs and TCs



ISO/TC307/JWG 4 - Security, Privacy and Identity for Blockchain and DLT

## Role (chair, convener, member)

Member

## Addressed EU standardisation priorities and gaps

My fellowships focus on the Roadmap document that provides planning guidance for TC307/JWG4 in the priority, interdependencies and resource issues in developing security standards for DLT/Blockchain. The work has generated a gap analysis that informs the JWG 4 in setting priorities, allocating resources, and formulating plans.

The Roadmap has prioritised three areas for standards development in DLT/Blockchain security:

- ▷ Decentralised/Centralising pressures, especially during the stages of the lifecycle of DLT systems (development, operation, and decommissioning)
- ▷ Security in Governance, including on and off-chain, permissioned and permissionless, including audit.
- ▷ Security in relation to privacy and identity.

The major gaps indicated as existing in fundamental security considerations. These span considerations and the guidance needed, in technical areas, but also legal domain, sociological, governance, audit, regulatory and compliance. As an illustration, technical focus should include assessing the impact of distributed ledger topologies on the overall security of a system, the measurement of security of distributed systems that employ DLT and comparative considerations of the cryptographic schemes used by various DLT systems. Other categories being considered have similar wide-ranging and fundamental gaps in existing standards development initiatives. My work has successfully drawn on real world, market-led experience and needs, and is now being expanded across the whole of the Technical Committee via ISO/TC 307/AG 1.

## Concerned ICT Standards and contribution to the related landscape

My consultative document on delivering a strategic planning process and “Roadmap” was published as an N-document (N283) by ISO/TC307 - Blockchain and distributed ledger technologies. The core expertise of JWG04 - Security, Privacy and Identity for Blockchain and DLT, is security and so the paper generated enthusiastic support from the meeting participants.

The next stage will set priorities, highlight new dependencies with other ISO technical

committees that are discussing DLT/Blockchain technologies for use in security, such as ISO/TC 68 – finance, ISO/IEC JTC 1/SC 27 - security and ISO/TC215 – health informatics. Preliminary liaisons and initial networking have been established with each of these technical committees. Feedback from these committees will result in the drawing up of planning timelines, resource plans, etc.

Working Groups within TC307, especially WG5 – Governance, ISO/TC 307/AHG 2 - Guidance for Auditing DLT Systems and ISO/TC 307/AG 3 – Digital Currencies has already formally requested input that is likely to be coordinated through ISO/TC 307/AG 1 - SBP Review Advisory Group, of which I'm a member.

## Impact (on European SMEs, related project or in the society)

### **Impact on SMEs**

Positive security effects are often quoted as justification for the use of DLT/blockchain systems but without quantifying or fully justified reasons. Positive security impacts are only available where diverse organisations are aiming to share the same system. Alternatively, it may be that such systems would be more secure if they applied more traditional or alternative approaches to achieve similar ends. There are a confusing range of possibilities that SMEs are unlikely to be equipped to assess without a set of dependant standards to guide them. The criterion for making such decisions needs examination, and the approach comparative measurement needs standards to be effective. Comparative measurement standards are a key part of the roadmap. All these are very important considerations for SMEs that do not have the multinational resources to consider their individual circumstances and require cooperation with other SMEs/companies and other parties to enable their business plans.

### **Impact on Society**

Good security of data and systems is fundamental to maintaining democracy and freedom. Within the framework of StandICT.eu 2023 EUOS TWG Trusted Information, my contribution provided an early forum for discussing where DLT security standards are urgently needed, the interdependencies between on and off-chain security, the societal impact, and the impact of the organisation the lifecycle of DLTs. There is a heightened urgency for this work on security since February 2022.

The creation of a blockchain system is necessarily centralised, and at some point, it is “launched” into a decentralised world. The governance and planning for creating a means for a system’s termination must be addressed from the start, or again security is seriously impacted. The impact of systems that have no model for creation of termination will be profound on society; where will legacy data be held, how will it be controlled, what access rights are there to systems that have reached their end of life? These questions need urgent guidance and are built into the roadmap structure so that appropriate standards can be developed to help protect society.

## Has your project directly involved or led to a specific recommendation or proposal for the development of new or revised standards?

Yes, the created Roadmap provides planning guidance for TC307/JWG4 in the priority, interdependencies, and resource issues in developing security standards for DLT/Blockchain.

## Have the standardisation activities in your project led to specific deliverables?

Yes, I have worked on several deliverables: a roadmap report, a mind map deliverable as well as organising a workshop for all experts of JWG4 Deliverable.

## What future efforts or activity are still necessary in your area of application?

Rapid standards development is springing from a base of very mature foundations

(e.g., cryptography, audit, systems security, etc). The need for new standards is driven by a shift from 'centralised' to 'decentralised' systems and even hybrid models. This has created new business models, governance methods and new technical approaches. The widespread application of Blockchain and DLT to distributed applications is driving new standards that address distributed systems models. Many of these standards will build upon already mature standards addressing centralized systems but need to standardise the impact of decentralisation. Therefore, these standards are "new" while mature standards are included, providing a hybrid of maturity. The application of these technologies in ensuring trust, transparency and privacy means that standards need to become mature rapidly to service these vital attributes 307/AC 1 - SBP Review Advisory Group will include a presentation by the JWG4 Security planning team.

## Online references related to the fellowship work

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 <https://zenodo.org/record/5926395#YryOlbJBxD>

 [www.iso.org/committee/6266604.html](http://www.iso.org/committee/6266604.html)



# Contribution to e-identification terminology and concepts at CEN/CLC/JTC 13 & ISO/IEC JTC 1/SC 27 WG5's



**Christophe Stenuit**  
CEO, Viewconcept.be  
Belgium

Sector

Cybersecurity

## Engaged SDOs, WGs and TCs



CEN/CLC/JTC 13 Cybersecurity and data protection WG5 Data protection, Privacy and Identity Management  
ISO/IEC JTC 1/SC 27 Information security, cybersecurity and privacy protection / WG5 Identity management and privacy technologies

## Role (chair, convener, member)

Editor of and contributor to standards related to identity and identification terminology and concepts

## Addressed EU standardisation priorities and gaps

The proposed activity aims of positively influences the European market and its infrastructures by benefiting from international contributions (e.g. ISO/IEC) in the controlling of civil security and the protecting of e-identity and e-privacy. The proposed activity enhanced existing references and encouraged promoting the use of these references through adoption at the European market.

## Concerned ICT Standards and contribution to the related landscape

My fellowship contributes to a better harmonization of e-identity terminology and concepts for standardisation support in Europe, which eases the implementation of other e-identity and e-privacy developments. The scope of my action includes proposing/revising/amending/reviewing standards. Progress was made on the following ICT standards:

- ▷ ISO/IEC 24760-1 about identity management terminology and concepts, adopted as prEN ISO/IEC 24760-1, and amended
- ▷ ISO/IEC 24760-2 about identity management architecture, being revised
- ▷ ISO/IEC 24760-3 about identity management practices, being amended
- ▷ ISO/IEC 29146 about access management, amended and approved as prEN NWI
- ▷ ISO/IEC 29184 about online privacy notices and consent approved as prEN NWI

Other supporting activities were also carried out, e.g., contributions on supporting standardisation activities in relation to eIDAS2 as part of the CEN-CLC-JTC13-WG5 (CEN/CLC/JTC 13/WG 5 N 248) and Cooperation Agreement between CEN-CENELEC and EDPB (CEN/CLC/JTC 13/WG 5 N 262).

## Impact (on European SMEs, related project or in the society)

### Impact on SMEs

SME are better aware of risks and of controls required in IT and information protection.

Recent EU GDPR, eIDA2 regulations and NIS directive developments impose a different view on IT risks, information security, data privacy protection and identity management controls, and by this a different awareness of the consequences that may fall improper compliance to good practices. Good standard references help confidence establishment and maturity improvement in matter.

### **Impact on Society**

The standards ensure security in several societal arenas, including Cybersecurity, network and identity information security and ePrivacy protection, which contribute in securing our societies and in protecting freedom and security of Europe and its citizens.

### Has your project directly involved or led to a specific recommendation or proposal for the development of new or revised standards?

Yes, one part of my activity focus on supporting revisions and amendments of existing work items, and another part is engaged in supporting the adoption and the publicity of these work items at EU market, and by this guaranteeing the sustainability of existing references in a changing world.

### Have the standardisation activities in your project led to specific deliverables?

Yes, I have contributed to multiple technical reports on recommendations for development of a news standard on Common Terminology, on Development of a new standard, on Reference material and on New Operating procedure.

### What future efforts or activity are still necessary in your area of application?

Most developed texts are achieving maturity. The referred work items are being more and more used or referred in the industry. Some efforts are still required to achieve publications. This could take up to 18 or 24 months. This activity will continue over 2022 and achieve a publication during 2023 and 2024.

### Online references related to the fellowship work

 [www.cenelec.eu/areas-of-work/cenelec-sectors/digital-society-cenelec/cybersecurity-and-data-protection/](http://www.cenelec.eu/areas-of-work/cenelec-sectors/digital-society-cenelec/cybersecurity-and-data-protection/)

 [www.iso.org/committee/45306.html](http://www.iso.org/committee/45306.html)

# Participation, contribution to ISO/IEC SC37 WG3/WG4, development of ISO/IEC 39794-2 finger format



**Pavel Cuchriajev**

*Delegate for Standards Norge Standard Norge  
Lithuania*

Sector

Cybersecurity

Engaged SDOs, WGs and TCs



ISO/IEC SC37 WG3 Biometric Data Formats

Role (chair, convener, member)

Contributor

Addressed EU standardisation priorities and gaps

The new extensible minutiae format, that is being developed will fix the issues and flaws of its predecessor as well as simplify the adoption of biometric user authentication (by using the latest data exchange formats that are easier to integrate into the latest development environment) and data exchange between different government organizations in Europe and worldwide. Existing flaws with forward and backward compatibility as well as XML and ASN.1 compliance will be fixed making the new extensible formats future proof.

Concerned ICT Standards and contribution to the related landscape

The key objective of this fellowship is to set and enhance industry standards for enabling the protection of citizens' privacy, digital identities, and interoperability of different systems that operate with mentioned identities. Biometrics has become very important over the last decades but most of the implementations of system-level and actual biometric systems still rely on proprietary solutions and store data in potentially insecure environments and not in the transferable or interoperable states. The Extensible Biometric Information Interchange Format ISO/IEC 39794 defines a system that can help to improve on previously defined standards considering the latest technology improvements that were or are currently being developed. ISO/IEC 39794-2 covers fingerprint minutiae is designed for various applications including government ID.

Impact (on European SMEs, related project or in the society)

### Impact on SMEs

Standardized data formats for biometric data like ISO/IEC 39794-2 are essential for the interoperability of biometric data and the adoption of biometrics worldwide. They allow the creation of common interfaces for biometric data interchange and usage. This is important, because SME can this way compete with big corporations to provided biometric services to governments and business.

### Impact on Society

Once the standard is released and adopted, it should ease the use of the biometrics in everyday life by introducing interoperability between different governments, government systems and consumer applications.

## Has your project directly involved or led to a specific recommendation or proposal for the development of new or revised standards?

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Yes, ISO/IEC 39794 standard was revised and promoted to DIS stage.

## Have the standardisation activities in your project led to specific deliverables?

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Yes, I have worked on technical reports on development and recommendations of a revised standard.

## What future efforts or activity are still necessary in your area of application?

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This standard is currently in DIS stage where national governing bodies are voting for approving the standard. Based on voting results, modifications to the standard could be required – therefore, the engaged work should be continued until the publication of the revised standard.

## Online references related to the fellowship work

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 [www.iso.org/committee/313770.html](http://www.iso.org/committee/313770.html)

# Phase II of Federated Autonomics, Federated Testbeds and Use Case Standardization



## **Muslim Elkotob**

*Principal Solutions Architect, Vodafone  
Germany*

### Sector

5G

## Engaged SDOs, WGs and TCs



ETSI TC INT Core Network and Interoperability Testing  
ETSI TC INT AFI Autonomic Management and Control Intelligence for Self-Managed Fixed & Mobile Integrated Networks  
IEEE INGR SBB Standardization Building Blocks  
IEEE INGR SysOpt System Optimization  
IEEE INGR Testbeds  
ITU-T SG11 Focus Group on Federated Testbeds

## Role (chair, convener, member)

Vice Chairman of the ITU Focus Group FG-TBFxG

Chairman of ETSI AFI

Vice Chairman of ETSI TC INT

## Addressed EU standardisation priorities and gaps

In this activity I focus on the following identified gaps:

- ▶ Establishing and standardizing Testbed as a Service (TaaS) concept to enable scalability and leveraging capabilities for collaboration and asset sharing; this has been set as the second Working Group (WG2) of the newly founded ITU-T SG11 Focus Group on Federated Testbeds due to its importance and value to industry and society.
- ▶ Lack of standards-backed interoperability to ensure a fair share among stakeholders in FT on innovations and Time-to-Market acceleration for products and services; this gap is now systematically being addressed via our FG in collaboration with partners and via liaisons with various stakeholders.

In addition, the following priorities are at the core of my activity in this fellowship:

- ▶ Establishing a platform to help harmonize testbeds specs across SDOs and leverage and align with the Testbed Federation Reference Model (now approved); this priority is being addressed as a key item of ITU Focus Group FG-TBFxG.
- ▶ Aligning roadmaps of different stakeholders and SDOs with focus on FT
- ▶ Challenges.
- ▶ Capturing specific properties of testbeds across stakeholders and eco-systems in an inclusive model for federation.
- ▶ Helping SDOs collaboratively work and share the burden of collaborating in the space of Federated Testbeds with sharing content, mechanisms for federations such as APIs, and procedures, whereby they all align to a common set of design and operational principles.



## Concerned ICT Standards and contribution to the related landscape

My work within this fellowship has enabled me to co-establish the ITU Focus Group FG-TBFG together with partners: Testbeds Federations for IMT-2020 and beyond.

This FG will serve as a junction point and platform for other SDOs besides ITU (ETSI, IEEE, NGMN, etc.) and R&D organizations, SMEs, and large corporations as well as public stakeholders to collaborate on the topic of Federated Testbeds and drive it further.

The landscape of Testbeds Federations including use-cases, blueprint reference mode, instantiations into various scenarios, specifications of Reference Points and Interfaces (APIs) in Phase II of my work on Federated Testbeds is being shaped by standards where the foundation is being laid for subsequent work, manifested in, but not limited to, the following documents:

- ▶ ETSI Technical Report (TR) 103 763 based on the new Work Item DTR/INT-00181. The TR Standard provides a Description of Test Requirements and Approach for E2E Federated Testbeds with an Example Use Case of Testing Federated Autonomic Management and Control (AMC) operations.
- ▶ Use Case to leverage the concept of Federated Testbeds, on E2E AI-powered Autonomic Security Management & Control Across Multi-Domain 5G Networks (Ref. Nr. DTR/INT-00900) 63106

At Layer123 World Congress 2021, ETSI Forum Day, Nov 2021, I presented on the topic of: ETSI Standards for Test and Certification of AI Models, Systems, Networks, and Autonomic Test Systems. I provided insights into APIs and Interfaces for Autonomic Test Systems, and Testbeds Federations in CSP-centric Ecosystems that form a core contribution of my work in this project. I also presented a model: Generic Federated Testbeds Model and Federations of Federations.

## Impact (on European SMEs, related project or in the society)

### Impact on SMEs

The standardized ITU-T SG11 Reference Model for Federated Testbeds has an inclusive purpose to leverage and enable collaboration and monetization of Testbeds assets and services among all stakeholders in the eco-system of Testbeds for 5G and beyond. Many SMEs in this domain are integrators having a huge potential to become testbed suppliers, and they join the service and business cycle through the Reference Model. The Testbed-as-a-Service (TaaS) concept is important and instrumental resulting from the ongoing work, which enables SMEs to better expose and monetize on their ICT assets and Testbeds hosting capabilities.

### Impact on Society

This work on Federated Testbeds, including the blueprint reference model, use cases and their instantiations, and enhanced ecosystems impacts society in two main ways:

- ▶ Increasing inclusion and collaboration among stakeholders of all types, such as SMEs, vendors, ISVs. CSPs, public stakeholders, and disruptive IT and Telco players via the reference model for Testbeds Federations and the newly established ITU Focus Group that promotes and enables such collaboration.
- ▶ Enabling better leveraging of resources and assets among stakeholders and value chain players through Federations to endorse the Digital Economy and Digital Transformation paradigm and respond to the challenges caused by the pandemic with increased demand for remote collaboration, teleworking, and hybrid operational mode.

## Has your project directly involved or led to a specific recommendation or proposal for the development of new or revised standards?

Yes, this activity results in several documents including:

- ▶ ETSI TR 103763, (The TR Standard provides a Description of Test Requirements and Approach for E2E Federated Testbeds with an Example Use Case of Testing Federated Autonomic Management and Control (AMC) operations.

- ▶ Use Case to leverage the concept of Federated Testbeds, on E2E AI-powered Autonomic Security Management & Control Across Multi-Domain 5G Networks, (Ref. Nr. DTR/INT-00900)
- ▶ ITU-T Recommendation Open APIs for interoperable testbed federations; Work item: Q.4068 (ex Q.API4TB)
- ▶ Stable Draft of ETSI TR DTR/INT-00900 (as Contributor and Rapporteur: Muslim Elkotob) End-to-End AI-powered Autonomic Security Management & Control Across Multi-Domain 5G Networks;

## Have the standardisation activities in your project led to specific deliverables?

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Yes, to a technical report on a development of a new standard and another technical report on new operating procedures.

## What future efforts or activity are still necessary in your area of application?

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The work in Federated Testbeds is broad and multi-faceted; it has touchpoints with Autonomics and the Architectures as they evolve to be more digital and more automated, it opens the door for new ecosystems, stakeholders, and value chain models, and it drives innovation for federating assets and enabling new services. Therefore, it is essential to think long term when it comes to this area. Leveraging this topic within SDOs such as ETSI, ITU and IEEE is essential. In conclusion, there is still a lot of work to do and a lot of potential to build upon.

## Online references related to the fellowship work

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 [www.itu.int/en/ITU-T/focusgroups/tbfxg/](http://www.itu.int/en/ITU-T/focusgroups/tbfxg/)

 [https://portal.etsi.org/webapp/WorkProgram/Report\\_WorkItem.asp?WKI\\_ID=59577](https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKI_ID=59577)

 [https://portal.etsi.org/webapp/WorkProgram/Report\\_WorkItem.asp?WKI\\_ID=](https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKI_ID=)

 [www.itu.int/ITU-T/recommendations/rec.aspx?rec=14765](http://www.itu.int/ITU-T/recommendations/rec.aspx?rec=14765)

# Phase II Mature Standard: Testing ETSI GANA Autonomics as Use Case for Federated Testbeds



**Muslim Elkotob**

*Principal Solutions Architect, Vodafone  
Germany*

Sector

5G

## Engaged SDOs, WGs and TCs



ETSI TC INT Core Network and Interoperability Testing  
ETSI TC INT AFI Autonomic Management and Control Intelligence for Self-Managed Fixed & Mobile Integrated Networks  
IEEE INGR SBB Standardization Building Blocks  
IEEE INGR SysOpt System Optimization  
IEEE INGR Testbeds  
ITU-T SG11 Focus Group on Federated Testbeds

## Role (chair, convener, member)

Vice Chairman of the ITU Focus Group FG-TBFxG

Chairman of ETSI AFI

Vice Chairman of ETSI TC INT

## Addressed EU standardisation priorities and gaps

As a part of this fellowship, that is a follow-up of my previous StandICT.eu 2023 fellowships, I aim at bridging the following gaps:

- ▶ Lack of mature widely adoptable standards and standardized native mechanisms for Testbed Federation, that are uniform and inclusive of all stakeholder types including SMEs, smaller players, roaming partners, visiting MNOs, etc.
- ▶ Lack of standards-backed interoperability innately supported by the eco-system for ensuring a fair share among the various stakeholders impacted by the area of testbeds, on innovations, opportunities, and Time-to-Market acceleration for products and services.

I continue focusing on several priorities:

- ▶ Providing a mature standards document that includes comprehensively aspects of Federated Testbeds from an architectural perspective (reference model, APIs, etc.) and process and functional point of view (stakeholder models, roles, KPIs, etc).
- ▶ Capturing the various requirements, metrics, parameters, and characteristics of Federated Testbeds across various dimensions (technologies, verticals, use cases) into a single model as a reference for the industry.
- ▶ Establishing a platform to help harmonize testbeds specs across SDOs and leverage and align with the Testbed Federation Reference Model as being addressed as a key item of ITU Focus Group FG-TBFxG.

Through these activities, several challenges are addressed:

- ▶ Capturing specific properties of testbeds across stakeholders and eco-systems in an inclusive model for federation. The heterogeneity of use cases, networking technologies

(both fixed and wireless), verticals, and applications, all form dimensions of the Federated Testbeds landscape, and it is a challenge to capture all those and analyse their synergies, interconnections, and dependencies.

- ▶ Capturing the key trends in ICT testbeds (particularly Testbeds for 5G & beyond) and assets across all stakeholders and eco-systems in a single inclusive model for federation is a key challenge faced and addressed in this project.

## Concerned ICT Standards and contribution to the related landscape

After successfully co-establishing the ITU Focus Group FG-TBFxG Testbeds Federations for IMT-2020 and beyond (in December 2021) and setting up an ETSI Work Item to back the TR Standards Document DTR/INT-00181 (TR 103 763), this fellowship has helped me to progress immensely on those two fronts, including:

- ▶ The ETSI Work Item is now in the status of a mature standard document and titled: Description of Test Requirements and Approach for E2E Federated Testbeds.
- ▶ ETSI Technical Report (TR) 103 763 based on the new Work Item DTR/INT-00181. The TR Standard provides a Description of Test Requirements and Approach for E2E Federated Testbeds with an Example Use Case of Testing Federated Autonomic Management and Control (AMC) operations.
- ▶ Use Case to leverage the concept of Federated Testbeds, on E2E AI-powered Autonomic Security Management & Control Across Multi-Domain 5G Networks, (Ref. Nr. DTR/INT-00900).

## Impact (on European SMEs, related project or in the society)

### Impact on SMEs

Many SMEs in this sector are integrators, and they have potential to become testbed suppliers, join the service and business cycle through the Reference Model. The Testbed-as-a-Service (TaaS) concept is important and instrumental resulting from the ongoing work, which enables SMEs to better expose and monetize on their ICT assets and Testbeds hosting capabilities.

### Impact on Society

This work on Federated Testbeds, including the blueprint reference model, use cases and their instantiations, and enhanced ecosystems impacts society by:

- ▶ Increasing inclusion and collaboration among stakeholders of all types, such as SMEs, vendors, ISVs, CSPs, public stakeholders, and disruptive IT and Telco players via the reference model for Testbeds Federations and standardisation groups.
- ▶ Enabling better leveraging of resources and assets among stakeholders and value chain players through Federations to endorse the Digital Economy and Digital Transformation paradigm and respond to the challenges caused by the pandemic with increased demand for remote collaboration, teleworking, and hybrid operational mode.

## Has your project directly involved or led to a specific recommendation or proposal for the development of new or revised standards?

Yes, to The ETSI Technical Report DTR/INT-00181 (TR 103 763).

## Have the standardisation activities in your project led to specific deliverables?

Yes, this fellowship has contributed to several technical reports on development of a new standard, on common terminology and on reference material.

## What future efforts or activity are still necessary in your area of application?

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The Testbeds Federations area, including Asset Federation, Sharing, and Discovery, Ecosystem Evolution, Common Operational Principles and Models are all not yet fully matured aspects, and they are best streamlined and brought to a common line via standardisation; this project has achieved a significant step in the right direction, and there is more to do regarding more detailed architectural models (with APIs, reference points, etc) to be standardized, populating the pool with instances of Federated Testbeds based on the reference model provided, etc.

## Online references related to the fellowship work

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 <https://www.itu.int/en/ITU-T/focusgroups/tbfxg/Pages/default.aspx>

 [https://portal.etsi.org/webapp/WorkProgram/Report\\_WorkItem.asp?WKI\\_ID=59577](https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKI_ID=59577)

 [https://portal.etsi.org/webapp/WorkProgram/Report\\_WorkItem.asp?WKI\\_ID=63106](https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKI_ID=63106)



# Phase-2 Standardisable Framework: Industry Guide to Implementing GANA Autonomic IPv6 based 5G Networks



## **Ranganai Chaparadza**

*Senior Advanced ICT Technologies Consultant and Standardization Expert on Evolving and Future Network Technologies, Altran Capgemini Germany*

## Sector

5G

## Engaged SDOs, WGs and TCs



ETSI TC INT AFI WG on Autonomic Management and Control (AMC) Intelligence for Self-Managed Fixed & Mobile Integrated Networks (AFI)

ITU T SG11 Focus Group FG-TBFxG

IEEE INGR Future Networks Initiative (FNI) Standardization Building Blocks (SBB) Roadmap WG

IEEE INGR Future Networks Initiative (FNI) Systems Optimization WG

IEEE INGR Future Networks Initiative (FNI) Testbeds WG

TMForum Multi SDO Initiative

## Role (chair, convener, member)

Vice Chair for Newly launched ITU-T SG11 FG-TBFxG.

Chairman of the ITU-T FG-TBFxG WG3.

Rapporteur of the Work Item in ETSI TC INT AFI WG.

## Addressed EU standardisation priorities and gaps

My work is about guiding the industry to develop a Framework to Implementing Autonomic/Autonomous IPv6 based 5G Networks, by leveraging the ETSI GANA Multi-Layer AI / Multi-Layer Autonomic Management and Control Model and IPv6 Capabilities & Extensions that enable to Build Autonomic Networks. The Framework prescribes how to introduce software components called Autonomic Functions (ETSI GANA Decision-making-Elements (DEs), e.g. Autonomic-QoS-Management-DE, Autonomic-Security-Management-DE, etc., in the 5G Architecture and its associated Management and Control Architecture. Such a Framework does not exist yet in the industry. As 5G deployments are taking momentum as well as the considerations for the Benefits IPv6 brings to 5G and GANA Autonomics, this Framework closes an important gap in Network Automation Standards for 5G.

The Draft of the Framework is now being evolved with inclusion of contributors from various Groups in ETSI (ISG IPE, ISG ENI) and Experts from IETF, with the aim having experts from the various areas of relevance to the Framework be involved in shaping the Framework and contributing to its further development and promotion in the various industry standards groups.

## Concerned ICT Standards and contribution to the related landscape

Via this fellowship I am contributing to the ICT Standards landscape in the following way: The work has significant impact in the broad scope of Standards for Network Automation in Emerging and Future networks (e.g. 5G and Beyond) that are intelligent and autonomous in the way they operate — thanks to the use of autonomies paradigm and associated Artificial Intelligence (AI) Algorithms for Self-Managing Networks. The Standards activities on Autonomic/Autonomous (ANs) in various SDOs/Fora are increasingly adopting the ETSI GANA Framework and Principles Standard (ETSI TS 103 195-2), and this means the work on the “Framework on Autonomic/Autonomous IPv6 based 5G Networks: powered by ETSI GANA Multi-Layer Autonomics & Multi-Layer AI-Algorithms and IPv6 Capabilities”, shall complement ongoing efforts in developing complementary ETSI GANA based frameworks that address other autonomic management and control areas. The Framework being developed can be adopted in the work on ANs in the various SDOs/Fora such in TMForum’s AN work; in ITU-T work on ANs, in IEEE Future Networks Project (IEEE INGR FNI Project); GSMA work on ANs; BroadBand Forum’s AIM Framework; IETF work on Autonomic Networking; NGMN work on Autonomic Networking; 3GPP work on Autonomous Networks.

## Impact (on European SMEs, related project or in the society)

### Impact on SMEs

The ETSI GANA Framework (ETSI TS 103 195-2) has defined a Market Place Concept for Suppliers and Consumers of GANA Software for Autonomic Management and Control (AMC) of Networks called GANA Decision-making Elements (DEs), GANA Knowledge Plane (KP) Platforms and associated AI Algorithms for AMC. ETSI White Paper No.16: different players (e.g. SMEs) can play the role of supplier of GANA Components for AMC for specific networks. GANA Market Place offers huge opportunities for SMEs to be suppliers of GANA software.

### Impact on Society

The Framework (ETSI TR 103 858 Standard document) shall enable the collaboration of Stakeholders to work together in delivering Solutions and Deployments of IPv6 based Autonomic/Autonomous 5G Networks, due to the fact that CSPs, ISVs, Network Vendors and Research Institutes working on AI/ML Algorithms research have a role to play in the move towards Self-Managing Networks of the Future (powered by ETSI GANA Framework, IPv6, AI/ML): The ETSI TR communicates the value ETSI GANA and AI/ML bring to IPv6 adoption and to 5G, hence the impact would be acceleration in wider deployments of IPv6 based 5G Networks.

## Has your project directly involved or led to a specific recommendation or proposal for the development of new or revised standards?

Yes, it has led to a specific recommendation or proposal for the development of new Standard, starting with the ETSI TR 103 858.

## Have the standardisation activities in your project led to specific deliverables?

Yes, my activity has contributed to a technical report on development of a new standard.

## What future efforts or activity are still necessary in your area of application?

The Framework on Industry Guide to Implementing GANA Autonomic IPv6 based 5G Networks is creating an insight on New Standards that needs to be developed further; to complement this work in ETSI and to introduce new activities in other SDOs like IETF, IEEE and ITU.

## Online references related to the fellowship work

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 [https://portal.etsi.org/webapp/WorkProgram/Report\\_WorkItem.asp?WKI\\_ID=63527](https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKI_ID=63527)

 [https://intwiki.etsi.org/images/ETSI\\_5G\\_PoC\\_White\\_Paper\\_No\\_4\\_v31.pdf](https://intwiki.etsi.org/images/ETSI_5G_PoC_White_Paper_No_4_v31.pdf)

# Contributions to IEEE 802 LSMC Visible Light Communication Standards



**Tuncer Baykas**

Associate Professor, Kadir Has University  
Turkey

Sector

5G

Engaged SDOs, WGs and TCs



IEEE 802.11 Wireless Local Area Networks

Role (chair, convener, member)

IEEE 802.11 Task Group bb Vice Chair and IEEE 802.15 Task Group 13 Secretary and Comment Resolution Committee Member

Addressed EU standardisation priorities and gaps

The demand for high-speed and ubiquitous broadband wireless access has spurred an immense growth in mobile data traffic. The increasing number of smart devices in different forms and capabilities combined with the worldwide adoption of social media and advanced multimedia applications are the primary contributors to this growth. Recent market analysis reports that the global mobile data traffic is up 82% in the first quarter 2019 (year-on-year) and will increase almost five-fold by 2024; at the same time, short-range Internet of Things (IoT) connections are expected to increase almost fourfold. 5th generation (5G) and beyond-5G (B5G) wireless networks are being developed to meet this extraordinary data demand, also referred to as “data tsunami” in industry circles. The design of future wireless communication networks, which cope with the ever-growing mobile data traffics and support a range of services and applications in vertical sectors, is recognized as a major technical challenge in Europe and the rest of the world.

The aim of is to position optical wireless communications (OWC) as one of the key enabling technologies for B5G networks, in particular, to address the ever-increasing demand for the bandwidth in high-speed and ubiquitous wireless access .

Concerned ICT Standards and contribution to the related landscape

Optical wireless communication uses the visible spectrum, the infrared spectrum, or the ultraviolet spectrum to provide wireless communications. Four main optical wireless communication variants can be distinguished:

- ▷ Free Space Optical Communications, which is used for long range and point to point communication
- ▷ Wireless Local Area Communications using light, which is for indoor short range systems that enables multiple access.
- ▷ Optical Camera Communications, that is low data rate and used for broadcasting
- ▷ Ultra-violet (UV) communication, which can be used for none-line-of-sight communication systems

In this project, the focus is on the second variant of optical wireless communication, and the joint ICT standards IEEE P802.11bb Light Communications and IEEE P802.15.13 Multi-Gigabit/s Optical Wireless Communications.

Main purpose of this standard is to provide wireless connectivity for fixed, portable, and moving stations within a local area. This standard will also offer regulatory bodies a means of standardizing access to one or more frequency bands for the purpose of local area communication. I made contributions about the use cases, channel models, channelization, and MIMO communication.

## Impact (on European SMEs, related project or in the society)

### Impact on SMES

SMEs worldwide operating in the field of optical wireless communications are impacted by these standards, and few SMEs were involved in the standard development. A British SME is leading the 802.11bb effort, and I assist them to start the letter ballot process in the standard. A Turkish SME was part of the 802.15.13 standardisation project and made several contributions. I informed them about the latest developments of the status of the standardisation efforts.

### Impact on Society

OWC fosters the green transitions of the EU; optical wireless communication is considered a green alternative to radio communications. It can have dual functionality of illumination and data communications if visible light spectrum is used. Both the IEEE 802.11bb and IEEE 802.15.13 groups design their systems mainly for visible light spectrum. So, there will be no need to employ an indoor radio communication system. Another positive effect of OWC is it employs low energy consumption LEDs as transmitters.

## Has your project directly involved or led to a specific recommendation or proposal for the development of new or revised standards?

No, the standards I contributed are towards the end of their life cycles. There could be new proposals in 2023.

## Have the standardisation activities in your project led to specific deliverables?

Yes, we provided a report on how 802.11bb and 802.15.13 standards can operate at the same location. In addition, relaying procedure in 802.15.13 standard is optimized.

I led an effort for a special issue in one of the top wireless communications journals about 802.11 standards.

## What future efforts or activity are still necessary in your area of application?

IEEE 802.15.13 standard will be approved within 2022 whereas 802.11bb standard will finish in 2023. Both standards require an effort for commercialization. Afterwards, new projects could start.

## Online references related to the fellowship work

<https://ieeexplore.ieee.org/document/9855241>

<https://standards.ieee.org/ieee/802.11bb/10823/>

<https://standards.ieee.org/ieee/802.15.13/10269/>

<https://mentor.ieee.org/802.11/dcn/21/11-21-1876-04-00bb-ieee-802-11tqbb-coexistence-assessment-document.docx>

<https://mentor.ieee.org/802.15/dcn/22/15-22-0224-01-0013-comment-resolution-text-for-cid-291726.docx>



# Low latency networking to improve digital inclusion



## **John Grant**

*Standards technical expert, Nine Tiles  
United Kingdom*

## Sector

5G

## Engaged SDOs, WGs and TCs



ETSI Industry Specification Group (ISG) Non-IP Networking (NIN)  
ETSI TC DECT Digital Enhanced Cordless Telecommunications  
ETSI TC DECT WG TDE  
IEC TC100 Audio, video and multimedia systems and equipment WG11  
IEC TC100 PT63448  
ISO/IEC JTC1/SC6 Telecommunications and information exchange  
between systems/WG7 Network, transport, and future network  
AESSC WG SC-02-02 and SC-02-12

## Role (chair, convener, member)

Chair in ETSI ISG NIN and AESSC working-group SC-02-02

## Addressed EU standardisation priorities and gaps

Mobile network operators have estimated that with current protocols half the bits transmitted over the radio interface are overheads such as packet headers. ISG NIN's technology reduces these overheads by an order of magnitude, thus making much better use of the radio spectrum, which is a scarce and expensive resource.

Internet Protocol was not designed for conveying real-world time-critical signals; for example, audio and video for a videoconference, or audio from a performer's microphone to a mixing desk and back to their headphones, or where a control loop in an industrial process includes a connection across a network, or for remote robotic surgery. ISG NIN's technology natively provides the lowest possible latency without needing any special configuration or provisioning. The IEC projects will also provide important advances in this area.

## Concerned ICT Standards and contribution to the related landscape

ETSI is developing various standards to address the need for more efficient networking protocols in IMT-2020, including to support low-powered IoT devices and applications needing guaranteed low latency. The group ISG NIN (Non-IP Networking), which I chair, is standardizing the concept of a flow, control plane protocols for managing flows, and appropriate packet formats, building on the output of the ETSI NGP (Next Generation Protocols) Group including ETSI GS NGP 013 v.1.1.1 (2018-2019) "Flexilink efficient deterministic packet forwarding in user plane". Standards currently under development are GS NIN 004 (Carriage of Flexilink flows over DECT-2020 New Radio) and GS NIN 005 (Flexilink signalling messages and protocols).

Additionally, I have been contributing to the discussions on the new DECT-2020 NR system. DECT-2020 NR is a new radio interface supporting Ultra Reliable Low Latency Communications (URLLC) and Machine Type Communications (MTC) as specified for IMT-2020 usage scenarios. ETSI's DECT specification is the leading standard around the world

for digital cordless telecommunications. I am the editor of TR 103 884 (DECT-2020: guide for implementers).

Also, in IEC TC100 (audio, video, and multimedia systems and equipment) I am co-leader of project 100-44 (User's Quality of Experience (QoE) on Multimedia Conferencing Services) and contribute to IEC 63448: Low and Ultra-low Latency Communication and Control System.

## Impact (on European SMEs, related project or in the society)

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### Impact on SMEs

The new networking technology is significantly simpler to implement and to use than IP-based systems, thus reducing barriers to entry and providing them with an opportunity to disrupt a market that has been dominated by large multinationals.

### Impact on Society

Technological innovations, such as robotics, big data, increased computing power, and machine learning, promise great potential for increasing productivity and boosting general welfare and that these innovations play a crucial role in securing the competitiveness and growth of EU economies. However, underpinning the deployment of all these innovations is the need for better, faster, more resilient networking.

The development and implementation of ISG NIN's new networking technology offers a chance for an evolution of networking technology to something much more responsive to the needs of humans and of industrial systems.

The new protocols can coexist with current systems, so can be introduced gradually, making it easier to migrate from the old technology to the new. They also have the potential to make networks much more secure.

## Has your project directly involved or led to a specific recommendation or proposal for the development of new or revised standards?

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Yes, to a New standard IEC 63448 as well as to standards under development GS NIN 004, GS NIN 005, and TR 103 884.

## Have the standardisation activities in your project led to specific deliverables?

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Yes, I have contributed to Technical Specifications and to a Technical Report - Reference Material.

## What future efforts or activity are still necessary in your area of application?

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Work is progressing in ISG NIN and other fora, but more participation is needed.

## Online references related to the fellowship work

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 [www.etsi.org/technologies/non-ip-networking](http://www.etsi.org/technologies/non-ip-networking)

 [www.etsi.org/committee/nin](http://www.etsi.org/committee/nin)

 <https://www.etsi.org/technologies/dect>

 [www.etsi.org/committee/dect](http://www.etsi.org/committee/dect)

 [www.brighttalk.com/webcast/12761/510705](http://www.brighttalk.com/webcast/12761/510705)

 [www.ninetiles.com/Flexilink\\_details.html](http://www.ninetiles.com/Flexilink_details.html)

## ■ Hudobivnik-3 ITU SG13 Q2-3 2022



### **Alojz Hudobivnik**

*Independent expert, AH.TS Alojz Hudobivnik s.p.  
Slovenia*

### Sector

5G

### Engaged SDOs, WGs and TCs



ITU-T SG13 Future networks / WPI IMT-2020 and Beyond: Networks & Systems  
JCA IMT-2020 and beyond  
ITU-T Focus Group on Autonomous Networks (FG-AN)

### Role (chair, convener, member)

ITU-T SG13 WPI vice-chair

### Addressed EU standardisation priorities and gaps

This fellowship focuses on IMT-2020 (5G) and beyond network aspects. Firstly, I contribute on studies on the requirements and capabilities for networks based on the service scenarios of IMT-2020 and beyond. This includes the development of Recommendations on the framework and architecture design including also network-related aspects of reliability, quality of service (QoS), and security. Secondly, I take care of interworking with current networks including IMT-Advanced, etc. This standardisation work continues with the integration of new technologies, new insights, and new requirements of different verticals. Therefore, it is very important that EU science, industry, and also users are well represented and engaged in this process.

### Concerned ICT Standards and contribution to the related landscape

As an ITU-T SG13 WPI vice-chairman “IMT-2020 (5G) and beyond network aspects”, I have important obligations (management activities, presence on live/virtual meetings in Geneva, active involvement in decisions, steering the work of Questions) and a big opportunity to influence the content of outcomes (documents in ITU-T Serie-Y which are freely available, new WI decisions). As a recognized and experienced ITU-T expert, I was nominated as an SG13 Mentor to help newcomers. I contribute to aligning the SG13 plan, content, and standardisation objectives aligned with EU objectives. With the main aim to promote EU solutions. Inside FG AN, I influence the formulation of all aspects of “Autonomous Networks”.

### Impact (on European SMEs, related project or in the society)

The EU Rolling Plan for ICT (2022) clearly defines the importance of 5G infrastructure for verticals and needed actions: “The Communication on ICT standardisation priorities for the digital single market proposes priority actions on 5G, some of which are reflected in section C.2.”

With the management of ITU-T SG13 work, I am contributing to the fulfillment of the EU ICT Rolling Plan 2022. I contribute with a deep overview also to better conclusions made by EU MSP on ICT standardisation, CEPT COM-ITU, and CENELEC BT.

## Has your project directly involved or led to a specific recommendation or proposal for the development of new or revised standards?

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Yes - I contribute to the following standards:

- ▷ ITU-T Y.3181 (ex Y.ML-IMT2020-SANDBOX) »Architectural framework for Machine Learning Sandbox in future networks including IMT-2020«
- ▷ ITU-T Y.3182 (ex Y.ML-IMT2020-E2E-MGMT) »Machine learning based end-to-end multi-domain network slice management and orchestration«
- ▷ ITU-T Y.3158 (ex Y.LSMEC) «Local shunting for multi-access edge computing in IMT-2020 networks«
- ▷ ITU-T Y.3079 (ex Y. ICN-NMR) »Information-Centric Networking in networks beyond IMT-2020: Framework of locally enhanced name mapping and resolution«
- ▷ ITU-T Y.3080 (ex Y.ICN-TL) »Information-Centric Networking in networks beyond IMT-2020: Requirements and Mechanisms of Transport Layer«
- ▷ ITU-T Y.3081 (ex Y.SCid-fr) »Self-Controlled Identity based on Blockchain: Requirements and Framework«
- ▷ ITU-T Y.3137 (ex Y.FMC-AAEC-req) «Technical requirements for supporting application addressing in edge computing for future networks including IMT-2020«
- ▷ ITU-T Y.3138 (ex Y.FMC-EC) »Unified multi-access edge computing for supporting fixed mobile convergence in IMT-2020 networks«
- ▷ ITU-T Y.3139 (ex Y.FMC-SDWAN) »Fixed mobile convergence enhancements to support IMT-2020 based software-defined wide area networking service«

## Have the standardisation activities in your project led to specific deliverables?

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Yes - New ITU-T SG13 organizational plan (ToR) was prepared in 2020 and agreed at WTSA-20 (3/2022) for Study period 2022-2024. It includes updated and new Question descriptions of ITU-T SG13. I also take care of ITU IMT-2020 online database by collecting information from ITU-T SG13 and editing Supplement 59 of ITU-T Y.3100 series "IMT-2020 standardisation roadmap".

## What future efforts or activity are still necessary in your area of application?

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Participation in global standardisation is not cheap, particularly in telecommunications, where globalization requires uniform global standards. European initiatives, contributions, and wishes can only be realized if delegates and experts with their contributions are present in an SDO such as the ITU-T.

## Online references related to the fellowship work

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 [www.itu.int/en/ITU-T/studygroups/2022-2024/13/Pages/default.aspx](http://www.itu.int/en/ITU-T/studygroups/2022-2024/13/Pages/default.aspx)

# European Coordination of Quantum Technologies Standardisation in the CEN/CENELEC FGQT



**Thomas Länger**  
*Independent Expert*  
*Austria*

## Sector

Quantum Technology

## Engaged SDOs, WGs and TCs



CEN/CENELEC Focus Group on Quantum Technologies (FGQT)  
ETSI Industry Specification Group on Quantum Key Distribution (ISG-QKD)

## Role (chair, convener, member)

Co-Editor and Contributing

## Addressed EU standardisation priorities and gaps

In 2018, the European Commission launched its long-term and large-scale Quantum Technology FET Flagship Programme. The European Commission is also very interested in boosting standards for quantum technologies (QTs). The Quantum Flagship has its own cooperation and coordination activities to “coordinate national strategies and activities” and in its “Quantum Manifesto” that explicitly advises to form “advisory boards” to promote collaboration in standardisation. The CEN/CENELEC Focus Group for Quantum Technologies (FGQT) was formed with the goal to support the plans of the Commission. A specific challenge the FGQT addresses is the fact that expertise and resources in quantum technologies standardisation are still scarce and therefore coordination of activities is of great importance to secure progress in the development of standards.

## Concerned ICT Standards and contribution to the related landscape

This fellowship supports my co-editorship of the “CEN/CENELEC FGQT Quantum Technologies Standardisation Roadmap”. The roadmap systematically addresses ongoing and prospective standardisation efforts in quantum technologies (QTs), specifically in the three fields “quantum communication”, “quantum computing and simulation”, and “quantum metrology, sensing and imaging”. This activity evolves in conjunction with an identification of relevant use cases, potential QT-related transactions, and supply chains. It specifically includes an analysis of aspects of QTs that would benefit most from standardisation specifying the ideal timeframe. Besides my editor’s function, I am contributing in the “Quantum Communication/Quantum Key Distribution” sections of the roadmap, and especially also in the field of “security certification of QKD systems”. As co-editor, I am also responsible for the final edition of the document for publication and for sending it out to our liaisons. I have also contributed several procedural improvements for speeding up the repetitive new-contribution-cycles of the FGQT Quantum Technologies Standardisation Roadmap.



## Impact (on European SMEs, related project or in the society)

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### Impact on SMEs

In the field of Quantum Technologies, supported by the large-scale and long-term Quantum Flagship research initiative of the European Commission, several SMEs have started to develop and commercialise related products. Several of these SMEs are participating in the FGQT because standardisation is crucial for growing their products in new technologies, and thus for developing efficient and sustainable supply-chains. I have started as Standardisation and Certification Manager of the newly founded SME ID Quantique Europe GmbH in Vienna, Austria, and I am facilitating an information flow from my standardisation work in the FGQT towards that SME. And the other way around, I inform my work in the FGQT, specifically my contributions for the Quantum Communication Standardisation Roadmap, by knowledge generated in the SME.

### Impact on the Society

This action supports the emerging field of quantum technologies that are a future key technology for the European industries, and hence it will have a major impact on the future labour market and prosperity generation. Especially quantum communication and secure quantum communication will impact in providing new services and securing digital communications of European administration and also of individual citizens.

## Has your project directly involved or led to a specific recommendation or proposal for the development of new or revised standards?

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Yes, I am responsible for the “Quantum Communication/Quantum Key Distribution” part of the roadmap. In that contribution, our group gives recommendations for new and/or revised standards for the entire field of quantum technologies.

## Have the standardisation activities in your project led to specific deliverables?

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Yes, to a technical report on recommendations for new standards and other technical reports, namely to FGQT Standardisation Roadmap.

## What future efforts or activity are still necessary in your area of application?

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The CEN/CENELEC Focus Group of Quantum Technologies FGQT’s Quantum Technologies Standardisation Roadmap needs to be further advanced and progressed, as well as continuously updated and maintained – to finally become the valuable tool for standardisation coordination and support it is intended to be.

## Online references related to the fellowship work

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 [www.cencenelec.eu/areas-of-work/cen-cenelec-topics/quantum-technologies/](http://www.cencenelec.eu/areas-of-work/cen-cenelec-topics/quantum-technologies/)

 <https://arxiv.org/abs/2203.01622>

 [www.cencenelec.eu/media/CEN-CENELEC/AreasOfWork/CEN-CENELEC\\_Topics/Quantum%20technologies/Documentation%20and%20Materials/fgqt\\_q02\\_fgqt\\_wp\\_call\\_for\\_participation.pdf](http://www.cencenelec.eu/media/CEN-CENELEC/AreasOfWork/CEN-CENELEC_Topics/Quantum%20technologies/Documentation%20and%20Materials/fgqt_q02_fgqt_wp_call_for_participation.pdf)

 [www.cencenelec.eu/media/CEN-CENELEC/AreasOfWork/CEN-CENELEC\\_Topics/Quantum%20technologies/Documentation%20and%20Materials/fgqt\\_q03\\_towardsstandardizationforquantumtechnologies.pdf](http://www.cencenelec.eu/media/CEN-CENELEC/AreasOfWork/CEN-CENELEC_Topics/Quantum%20technologies/Documentation%20and%20Materials/fgqt_q03_towardsstandardizationforquantumtechnologies.pdf)

 <https://icc2022.ieee-icc.org/program/industry-panels#IP-8>

## ■ Standards for Quantum Physical Layer - Part 2



**Richard Pitwon**

*Consultant, Resolute Photonics UK Ltd  
United Kingdom*

**Sector**

Quantum Technology

Engaged SDOs, WGs and TCs



| IEC TC86 - Fibre Optics

Role (chair, convener, member)

Chair in IEC TC86 SC86B

Addressed EU standardisation priorities and gaps

The most critical element of quantum networks will be the physical layer infrastructure providing the connections between geographically distant hubs, and this has been mostly neglected as it is assumed that existing infrastructure is sufficient to meet the needs of quantum networks. One of the main challenges of adapting existing commercial passive optical components manufactured for classical communication networks to quantum networks. On this fellowship, I have started working closely with IEC SC86B partners National Physical Laboratory and a European optical connector company (Senko Europe) to help establish metrology benchmarks quantum grade connectors. The culmination of this collaboration will be a 2-day Joint Symposium on Quantum Technologies hosted by NPL, sponsored by Senko and chaired by me.

Concerned ICT Standards and contribution to the related landscape

In the framework of this fellowship, I organised the Spring meetings for the SC86B, which included the meetings for SC86B/WG4 (Fibre-optic test and measurement standards), WG6 (Optical connector standards) and WG7 (Optical passive component standards) and JWG9 (optical circuit board standards).

The SC86B and JWG9 meetings where I continued to engage with key members of SC86B to establish support for a tighter quantum grade of optical connector to support the proliferation of quantum networks. I strengthened my relationship with one of the major optical connector companies in SC86B - Senko Advanced Components - to continue development and promotion of a quantum grade optical connector "QuPC®".

Furthermore, during this fellowship I arranged a collaboration between National Physical Laboratory (NPL) and Senko to establish and identify metrology benchmarks for quantum grade connectors.

One of the main activities of this fellowship was the organisation of the 2-day in-person Joint Symposium on Quantum Technologies hosted by NPL in London in September 2022, which I chair. I am also the Guest Editor of the conference proceedings published by the Institute of Physics (IoP). I will author a joint paper with Senko on their quantum grade connector for this symposium.

Finally, I am the proposer and Guest Editor of a Special Issue of the Applied Sciences journal: "Quantum Interconnect: Moving Qubits to the Network, System, Board and Chip", which I proposed to promote and publish the importance of the quantum physical layer.

## Impact (on European SMEs, related project or in the society)

### Impact on SMEs

Within Europe a technology eco-system is rapidly emerging with many SMEs promoting the application of ultra-low loss optical materials, such as Hollow Core optical fibres, Silicon Nitride, Barium Titanate Lithium Niobate on Insulator targeting quantum operations for communication and computation. Europe is positioning itself as a world-leader in these new physical layer media. Europe also has a strong presence and influence in IEC SC86B as votes are taken on a country-by-country basis, while for example US and China only have one vote each. European SMEs can participate directly in IEC SC86B or via the European SDOs. This provides a pathway for European SMEs to influence these standards. The main challenge is getting them to engage in standardisation bodies since, especially for SMEs, standardisation is not considered a priority. On this fellowship I have encouraged SMEs to participate in standards including giving invited talks at the Joint Symposium on Quantum Technologies.

### Impact on Society

This fellowship has further promoted the commercial need for quantum grade interconnect through the adoption by a mainstream global optical connector company (Senko) of quantum grade connectors, the work by the UK national metrology institute (National Physical Laboratory) on benchmarks for quantum interconnect.

## Has your project directly involved or led to a specific recommendation or proposal for the development of new or revised standards?

Yes, the work on this fellowship (and my previous StandICT.eu 2023 fellowships) have supported the development of an IEC Technical Report: "Introduction to Quantum Interconnect", which is progressing through the IEC development stages. The work on this specific fellowship will set the scene for the first quantum grade standard to be proposed within a mainstream standards committee: IEC TC86 – Fibre Optics.

## Have the standardisation activities in your project led to specific deliverables?

Yes, I have contributed to a technical report on development of a new/revised standard and to a report on reference data.

## What future efforts or activity are still necessary in your area of application?

Thanks to the StandICT.eu 2023 fellowship programme, I have been supported in helping lay the foundation for the first quantum standards, but it will still require a huge effort going forward, requiring many people and organisations.

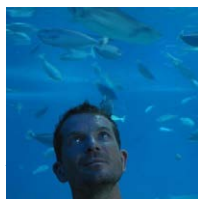
## Online references related to the fellowship work

[www.npl.co.uk/events/npl-joint-symposium-on-quantum-technologies](https://www.npl.co.uk/events/npl-joint-symposium-on-quantum-technologies)

[www.mdpi.com/journal/applsci/special\\_issues/Quantum\\_Interconnect](https://www.mdpi.com/journal/applsci/special_issues/Quantum_Interconnect)

[www.linkedin.com/feed/update/urn:li:activity:6950502102834003969/](https://www.linkedin.com/feed/update/urn:li:activity:6950502102834003969/)

# Moving “Building Blocks for HTTP APIs” forward for and around the IETF 113 meeting



**Erik Wilde**  
Catalyst, Axway  
Switzerland

## Sector

Cross Domain Technologies

## Engaged SDOs, WGs and TCs



IETF WG Building Blocks for HTTP APIs

## Role (chair, convener, member)

Member

## Addressed EU standardisation priorities and gaps

Still today, many Application Programming Interfaces (API) reinvent solutions to problems that could be solved more easily if there were reusable building blocks. While there is an existing set of such building blocks, the API community is steadily looking for ways how to identify new ones. The goal is to make API design and use as simple as possible, so that individual verticals or applications can develop their APIs more effectively. This is an ongoing effort that very likely will be going on for many years. Companies such as Gartner Predict whose API use will continue growing at a very fast pace, and with that growth it becomes increasingly economical to make it easier to design and use APIs.

## Concerned ICT Standards and contribution to the related landscape

By now the Internet is as important for machines to communicate as it is for humans. APIs are by far the most popular way how machines interconnect through the Internet. The IETF has created a dedicated working group for “Building Blocks for HTTP APIs” that focus on developing standards making it easier to define and to use HTTP-based APIs. I am co-author of various standards created in this group. Some of my earlier work in this space have already become widely used building blocks, and the working group’s mission is to extend the set of available building blocks so that application developers can more easily design and use APIs.

## Impact (on European SMEs, related project or in the society)

### Impact on SMEs

APIs are the main tool for companies enabling their participation in the global digital market. In this sense, with APIs being easier to design and use, smaller organizations have a better chance of participating in the global digital market.

### Impact on Society

APIs are improving digital connectivity by making it easier for everybody who wants to provide or consume digital services via the Internet.

## Has your project directly involved or led to a specific recommendation or proposal for the development of new or revised standards?

Yes, I am working on various drafts that are close to stable standard (RFC) status.

## Have the standardisation activities in your project led to specific deliverables?

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Yes, to technical specifications.

## What future efforts or activity are still necessary in your area of application?

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This engaged action should be continued, as the API space is growing fast and better support for this will mean for more digital opportunities to be created.

## Online references related to the fellowship work

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 <https://datatracker.ietf.org/wg/httpapi/about/>

# Advance extensible finger minutiae data standard ISO/IEC 39794-2



**Robert Mueller**

*Independent expert, Dr. Robert Mueller IT Consulting  
Germany*

## Sector

Electronic ID and Trust Services

## Engaged SDOs, WGs and TCs



## Role (chair, convener, member)

Editor and expert contributor

## Addressed EU standardisation priorities and gaps

The data format and compliance standards developed in ISO/IEC SC37 WG3 are used in Europe and world-wide for storing and transferring biometric data. Standardised formats enable interoperability across countries and industrial organisations. The currently published standards from ISO/IEC 19794 series have some flaws with respect to forward and backward compatibility as well as XML and ASN.1 compliance. SC37 therefore decided to develop the ISO/IEC 39794 series specifying extensible formats that are future proof. Part 2 specifically covers finger minutiae as one of the most prominent biometric data formats.

Concerned ICT Standards and contribution to the related landscape

Within the ISO/IEC subcommittee SC37 Biometrics, the working group WG3 develops inter-industry standards for data formats. The ISO/IEC 39794 series of standards specify an extensible format for storage and exchange of biometric data. This series complements the widespread ISO/IEC 19794 series of inter-industry standards. ISO/IEC 39794-2 covers fingerprint minutiae and is designed for various applications including government ID. The standard has been promoted to DIS ballot during the January 2022 meeting according to plan. The outcome of the ballot was positive (DIS passed) with no negative votes. Comments received will be addressed in time.

## Impact (on European SMEs, related project or in the society)

### Impact on SMEs

Data standards enable interoperability between different components, systems, and solutions. Biometric data formats in particular give applications a choice to combine biometric capture devices, algorithms, storage systems, smart cards, and other media from different vendors. This is important for small and medium sized enterprises, because they typically offer only one critical component and otherwise would not be able to compete with large corporations having every required component in their portfolio. The interoperability also helps SMEs in the role of the customer or systems integrator because it allows replacing single components in a solution and reduces dependency from single suppliers.

### Impact on Society

Biometric data format standards are important for the society because they are used in many applications including passports and other machine-readable travel documents. The finger minutiae standard developed during this fellowship allows storing and transmitting extracted biometric feature data instead of finger image data. This is of relevance for EU citizens because



it enables a higher level of privacy and enables GDPR compliance for applications.

### Has your project directly involved or led to a specific recommendation or proposal for the development of new or revised standards?

Yes. Some errors and inconsistencies have been detected in ISO/IEC 39794-1 framework and ISO/IEC 39794-4 extensible finger image data. Collaboration with editors is on-going. Furthermore, liaison reports have been provided to ANSI for alignment on national standards with ISO SC37 WG3.

### Have the standardisation activities in your project led to specific deliverables?

Yes, my activity has directly contributed to technical specifications and to a technical report on development of a revised standard.

### What future efforts or activity are still necessary in your area of application?

There are multiple liaisons to other working groups and resulting changes to other standards that have been identified. Editorial work on ISO/IEC 39794-2 also has to continue and is quite substantial due to many graphics and pictures used in this standard. This requires continuation of the project until the next working group meeting in January 2023 and beyond.

### Online references related to the fellowship work

 [www.iso.org/committee/313770.html](http://www.iso.org/committee/313770.html)

# RESTful services for Biometric Recognition: from specification to application



**Raul Sanchez-Reillo**

Full Professor and Head of the University Group for Identification Technologies, Universidad Carlos III de Madrid Spain

Sector

Electronic ID and Trusted Services

## Engaged SDOs, WGs and TCs



ISO/IEC JTC1/SC37 Biometrics WG2 Biometric technical interfaces

## Role (chair, convener, member)

Contributor and Standard Editor, Secretary in ISO/IEC JTC1/SC37 WG2

## Addressed EU standardisation priorities and gaps

The targeted standard (expected to be published as ISO/IEC 30108-2) will allow service providers to integrate local and remote biometric authentication. This will be applicable not only to the private sector, but also to the Public Administration.

These actors will benefit from a solution that will ease the adoption of GDPR when transmitting biometric information over the network, reducing vulnerabilities, and improving privacy.

Current solutions are mostly based on passwords, although some service providers implement authentication based on e-signatures. Unfortunately, due to the complexity of this kind of systems, or the important number of frequently used passwords, most users try to ease their life by, for example, choosing weak passwords, or just copying them into a vulnerable computer. This kind of practices put the citizen's privacy in risk.

The proposed activity provides a solution that will close this gap between security and usability.

## Concerned ICT Standards and contribution to the related landscape

Biometrics is extensively standardised but, unfortunately, there are some gaps in the standardisation not covering the industrial demands. One gap is the need to provide a standard that will allow an interoperable way of authenticating IT users over the network using biometrics. There have been some initial works in this field, such as the initial definition of BIAS (Biometric Identity Assurance Services), started as an OASIS standard and adopted by ISO/IEC JTC1 SC37 WG2. This initiative was finally published in 2015 as ISO/IEC 30108-1.

Unfortunately, this standard is a specification written in XML and does not adjust to a common implementation in REST-based web services. This piece of work started a couple of years ago, but the development of such standard suffered a huge delay due to the lack of contributions, mainly because of the COVID-19 pandemic situation.

During the second semester of 2021, with the help of the StandICT.eu grant received, I was able to boost the development of the second part of ISO/IEC 30108. Several significant contributions have been made, increasing the content, debugging errors, and changing the specification language. These important contributions allowed to progress the project to CD during the ISO/IEC JTC1/SC37 WG2 meeting in January 2022.

But these contributions only cover the formal specification. Experience shows that a

specification by itself does not guarantee its application in IT products. This applicability is typically eased by the publication of examples and application guides, both in paper and in electronic form.

Therefore, the objective for this fellowship was to debug the standard creating examples and guiding new development. With this, the whole specification of ISO/IEC 30108-2 will be finished, resulting to DIS in July 2022.

## Impact (on European SMEs, related project or in the society)

### Impact on SMES

The proposed activity provides a solution in the field of electronic identification, as is based on the identification of users through biometric means. In addition, the web services to be defined will allow to develop trusted services. This will ease the development of new (or improved) services over the Internet, activity that is handled mainly by SMEs in Europe. Therefore, this standard will boost SME activity.

### Impact on Society

With the development of this standard, many of the current server-based applications can be improved, enabling a more reliable mean to identify or authenticate the users. Also, as this is a standard, all services and application can use the same API, reducing cost and offering a better service to the citizen.

## Has your project directly involved or led to a specific recommendation or proposal for the development of new or revised standards?

Yes, the engaged work leads to the development (in the final stages) of the future ISO/IEC 30108-2. Also, this work has led to find inconsistencies in part 1, and at the end of this fellowship, a revision of ISO/IEC 30108-1 will be started.

## Have the standardisation activities in your project led to specific deliverables?

Yes, to technical reports on development of a new standard and on recommendation of a new standard as well as Technical Specifications.

## What future efforts or activity are still necessary in your area of application?

This action is to be continued; during the DIS ballot, new examples can be provided, to allow a better understanding of the standard by any new reader.

## Online references related to the fellowship work

 [www.iso.org/committee/313770.html](http://www.iso.org/committee/313770.html)

**2.**

# Sustainable Growth



# Convenorship of CEN/TC278 WG4 and ISO/TC204 WG10 and Expert to CEN/TC278 WG17 and ISO/TC204 WG19



## **Paul Burton**

*Independent ITS professional, Paul Burton Consultancy  
United Kingdom*

### Sector

Intelligent Transport Systems

## Engaged SDOs, WGs and TCs



CEN/TC278 Intelligent transport systems WG4 Traffic and Traveller Information (TTI)

CEN/TC278 WG 17 AD HOC group U-ITS

ISO/TC204 Intelligent transport systems WG10 Traveller information systems

ISO/TC204 WG3 ITS geographic data

ISO/TC204 WG19 Mobility integration

## Role (chair, convener, member)

Convenor of CEN/TC278 WG4 and ISO/TC204 WG10

Member of CEN/TC278 WG 17 and ISO/TC204 WG3 and WG19

## Addressed EU standardisation priorities and gaps

My fellowship allows a significant contribution to the work as the Convenor of CEN/TC278 WG4 and ISO/TC204 WG10 and Expert to CEN/TC278 WG17 and ISO/TC204 WG19. This will ensure better standards in a reduced timescale. Progression of the standards in these Working Groups will contribute to the swifter development of the standards for Electromobility and CCAM. In an area of worldwide rapid developments, Europe is a leading player and development of standards and supporting standards will help to that advanced position. The continued adoption of ITS within the European Union will support the environment by the modal shift from private vehicles to public transport and the shift from carbon-based fuels to more environmental alternatives.

Most importantly, standards in this area will ensure compatibility and interoperability in an environment when big industry players seek to impose their platform dependant solutions which do not allow interoperability.

## Concerned ICT Standards and contribution to the related landscape

My fellowship provided resources to convene and execute meetings as well as contributing technically to the work of CEN/TC278 WG4 and ISO/TC204 WG10 and Expert to CEN/TC278 WG17 and ISO/TC204 WG19.

EN ISO 14819:2021 - series (RDS-TMC) is not only in widespread use worldwide but the message sets and location referencing methodologies contained within them support advanced systems like CCAM and Electromobility.

ISO 21219 - series (TPEG2) which is a Traveller and Traffic Information similarly support advanced ITS. The message-set schemas and location referencing methodologies contained within them are already incorporated in Cooperative ITS

Most importantly, ISO 14823 (ITS - Graphic Data Dictionary) that is a way of cataloguing street signs with a unique structured message number plays a significant role in the Management of Electronic Traffic Regulation (METR) projects which will ensure that CCAM vehicles will enjoy up to the moment knowledge of regulations.

### Impact (on European SMEs, related project or in the society)

The agreement of standards allows SME to compete with large organisations that seek to impose their non-interoperable solutions on the markets. Standards assist the small niche organisations to make a positive impact on the markets. In Europe, the mobility market will be improved with smarter and more sustainable solutions.

### Has your project directly involved or led to a specific recommendation or proposal for the development of new or revised standards?

No.

### Have the standardisation activities in your project led to specific deliverables?

Yes, to technical reports on common terminology and on a development of a new standard as well as to Technical Specifications.

### What future efforts or activity are still necessary in your area of application?

I have now retired as Convenor of CEN/TC278 WG4 and ISO/TC204 WG10. The search is now underway to find my replacement. However, I will continue in the meantime to support the WGs and the TC until a replacement is found. I will also support my successor.

### Online references related to the fellowship work

 [www.iso.org/committee/54706.html](http://www.iso.org/committee/54706.html)

 <https://www.itsstandards.eu>

 <https://tisa.org>



# Development of ITS geographic data standardisation for highly automated driving



## **Loïc Blaive**

Consultant, *Loïc Blaive ITS Mobilités Conseils EIRL*  
France

## Sector

Intelligent Transport Systems

## Engaged SDOs, WGs and TCs



CEN/TC 278 Intelligent transport systems / WG 7 ITS spatial data  
ISO/TC 204 Intelligent transport systems /WG 3 ITS geographic data  
ISO/TC 211 Geographic information/JWG 11 joint ISO/TC 211 - ISO/TC 204  
WG: GIS-ITS

## Role (chair, convener, member)

Convener of CEN/TC 278 and expert of ISO/TC 204/WG 3 & ISO/TC 211/JWG 11

## Addressed EU standardisation priorities and gaps

The objective of my fellowship activity is to consolidate the European activities and strengthen the currently limited European participation in international standardisation organisations in the field of intelligent transportation systems. My aim is to reinforce the European influence on development of the concerned standards, make sure that the project editors consider the European needs and specificities, and thus to counterbalance the influence of the non-European country leading the works in ISO/TC 204.

## Concerned ICT Standards and contribution to the related landscape

In this fellowship, I focus on the development of a set of standards and technical specifications about geographic information applied to ITS and specially to automated driving (MHAD), including the following items:

- ▶ ISO/TS 22726-1 and CEN ISO/TS 22726-2
- ▶ Adoption of a data model and data dictionary about vehicle-based sensor data for updating map data
- ▶ Endorsement of ISO 22524 ("GDF 5.1") as EN
- ▶ Preparation of the work to develop the future version of GDF ("geographic data files") from this year (PWI 5974).

## Impact (on European SMEs, related project or in the society)

### **Impact on SMEs**

I see no direct impact but indirectly this impact the European enterprises as standardisation is a convenient way for SMEs to access markets more easily because it avoids to be obliged to use (expensive) proprietary solutions imposed by big international companies.

### **Impact on Society**

Standardisation of maps for connected and automated driving systems is a cornerstone for the deployment of such vehicles, which have indirect societal impacts on two aspects:

- ▶ Contribute to the GHG emission reduction through a better use of vehicle engine.

▷ Reinforce social inclusion of elderly and/or disabled people by keeping their ability to move.

### Has your project directly involved or led to a specific recommendation or proposal for the development of new or revised standards?

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Yes, this fellowship contributes to the revision of CEN/TS 17268.

### Have the standardisation activities in your project led to specific deliverables?

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Yes, to technical specifications.

### What future efforts or activity are still necessary in your area of application?

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I consider that this activity should be pursued, and I foresee more participation in development of GDF 6 and in revision of others technical specifications.

### Online references related to the fellowship work

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 [www.iso.org/committee/54904.html](http://www.iso.org/committee/54904.html)

 [www.iso.org/committee/54706.html](http://www.iso.org/committee/54706.html)

 [https://standards.cencenelec.eu/dyn/www/f?p=205:29:0:::FSP\\_ORG\\_ID,FSP\\_LANG\\_ID:6259,25&cs=13405D9A7C7558D431D3BD775B6106F49#1](https://standards.cencenelec.eu/dyn/www/f?p=205:29:0:::FSP_ORG_ID,FSP_LANG_ID:6259,25&cs=13405D9A7C7558D431D3BD775B6106F49#1)

## Efficient and small C



### **Philipp Krause**

*Researcher Albert-Ludwigs-Universität Freiburg  
Germany*

### Sector

ICT Environmental Impact

### Engaged SDOs, WGs and TCs



ISO JTC1/SC22/ Programming languages, their environments and system software interfaces / WG14 C

### Role (chair, convener, member)

Contributor

### Addressed EU standardisation priorities and gaps

C is an important programming language today, for a wide range of systems from small systems relevant to IoT and sensor networks to high-performance computing. Where efficiency and performance matter, C is the most used programming language. Thus, the potential for compiler optimizations allowed by the language directly translates into reduced energy use by ICT.

However, changes made to C to further other goals (particularly those relevant to safety, security) can restrict this optimization potential. Regarding the environmental impact of ICT, it is important that these goals are balanced, as there is a real risk that a one-sided focus on goals such as safety and security has a disproportionate impact on the environment. E.g., a future C standard unsuitable for 8-bit microcontrollers would result in increased migration to 32-bit microcontrollers, which would occur substantial step costs in resource and energy use both during production and use of future embedded systems. While each individual embedded system only has a small environmental impact, their large number (billions are manufactured yearly) makes for a substantial total impact.

### Concerned ICT Standards and contribution to the related landscape

In this fellowship, I focus on ISO/IEC 9899:2018 standard. My work has mostly been incorporated in the future C2X standard (likely to be published in 2023).

### Impact (on European SMEs, related project or in the society)

#### **Impact on SMEs**

C is a widely used programming language, including in, but not limited to embedded devices. Many SMEs are either involved in programming using the programming language C or produce devices with firmware or other software written in C. My work supported the usefulness of the c programming language when targeting small (and thus energy-efficient and resource-efficient) devices.

### Has your project directly involved or led to a specific recommendation or proposal for the development of new or revised standards?

Yes, contribution to the C2X standard under development.

## Have the standardisation activities in your project led to specific deliverables?

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No.

## What future efforts or activity are still necessary in your area of application?

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I consider that the engaged action should be pursued; I propose to work toward lifting on the use on bit-precise integer types as types for enums and on their use in stdint.h. Since we are beyond the deadlines for changes to the future C2X (expected to be published 2023) standard, this work will have to target C2Y (expected to be published sometime towards the end of the decade).

## Online references related to the fellowship work

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 [www.iso.org/committee/45202.html](http://www.iso.org/committee/45202.html)

 [www.open-std.org/jtc1/sc22/wg14/www/docs/n3035.pdf](http://www.open-std.org/jtc1/sc22/wg14/www/docs/n3035.pdf)

 [www.open-std.org/jtc1/sc22/wg14/www/docs/n2969.htm](http://www.open-std.org/jtc1/sc22/wg14/www/docs/n2969.htm)

 [www.open-std.org/jtc1/sc22/wg14/www/docs/n2960.pdf](http://www.open-std.org/jtc1/sc22/wg14/www/docs/n2960.pdf)

 [www.open-std.org/jtc1/sc22/wg14/www/docs/n2946.pdf](http://www.open-std.org/jtc1/sc22/wg14/www/docs/n2946.pdf)

 [www.open-std.org/jtc1/sc22/wg14/www/docs/n2945.htm](http://www.open-std.org/jtc1/sc22/wg14/www/docs/n2945.htm)

 [www.open-std.org/jtc1/sc22/wg14/www/docs/n2841.htm](http://www.open-std.org/jtc1/sc22/wg14/www/docs/n2841.htm)

## Support finalization of prEN 17549-2



**Pierre-François Jullien**

CEO, Atalane

France

Sector

Construction Building Information Management (BIM)

### Engaged SDOs, WGs and TCs



CEN TC442 Building Information Modelling/WG2/TG 3 Part 2

### Role (chair, convener, member)

Member of CEN/TC442/WG2/TG3-2 team

### Addressed EU standardisation priorities and gaps

This standard includes the structures that shall be used to:

- ▶ Link the objects and properties to their semantic definitions through data dictionaries.
- ▶ Express requirements and describe configurable construction objects using declarative expressions.
- ▶ Organize the data exchanged during business workflows.

This standard selects a few technical IFC classes to leverage the maximum potential from Building Information Modelling (BIM):

It aims to provide access to dynamic business semantics. For this it uses the complementarity between the underlying EN ISO 16739-1:2020 standard and the EN ISO 12006-3 for data dictionaries, thereby outsourcing business semantics of the schema. The use of EN ISO 12006-3 is extended to the negotiation of Data Templates to agree on a common language prior to data exchanges. These data exchanges can concern construction projects as well as catalogues of construction products.

Also, it aims to ease concurrent engineering by allowing the expression of requirements. For this it highlights the use of constraints especially in the perspective of data exchanges related to business processes (EN ISO 29481-2) and the traceability of decisions in models. These constraints make it possible to express requests relating to construction projects or product catalogues. At last, they may also be used to describe configurable products.

And finally, it aims to integrate into workflows as described in EN ISO 19650-1

These three aspects make it possible to achieve interoperability of data used in software for the construction and operation sector.

### Concerned ICT Standards and contribution to the related landscape

An open language to design, transfer and maintain construction models exists with EN ISO 16739-1:2020. Moreover, prEN 17549-2 is a simplification of EN ISO 16739-1:2020 from an information technology point of view and as such is a Model View Definition (MVD). It focuses on core classes and relies on external data dictionaries to describe business semantics.

The CEN / TC442 / WG2 / TG3-2 team submitted its draft standard prEN 17549-2 to CEN for public inquiry on July 3, 2020. Due to the format of the documents, the group asked CEN / BT for a decision to authorize the public inquiry.

Finally, the CEN public inquiry began on November 4, 2021. Over the last 6 months, our group

submitted French comments on the documents considering comments from European countries to improve the standard before publication. Our WG have transferred the document to CCMC on July 1st, 2022, for formal enquiry. This fellowship focus on the finalization of prEN 17549-2.

## Impact (on European SMEs, related project or in the society)

### Impact on SMEs

prEN 17549-2 allows SME software companies to develop BIM software: it is a subset of EN ISO 16739-1(IFC), and therefore its implementation will be straightforward:

- ▷ the number of classes in the standard is reduced from 876 to 73
- ▷ any software compliant with EN ISO 16739-1 will be immediately compliant with prEN 17549-2
- ▷ prEN 17549-2 contains no business classes but only technical classes. In consequence, the standard should be robust and subject to few changes in the future

In addition, prEN17549-2 helps SME construction companies to work with their own vocabulary. It uses the concepts defined by the construction industry (through normative processes) and stored in EN ISO 12006-3 data dictionaries. It means that software will use users' language. Finally, prEN 17549-2 reduces the costs of software acquisition as the implementation of prEN 17549-2 by software vendors is much simpler than the implementation of EN ISO 16739-1. Training will also be cheaper as software will use the users' vocabulary.

### Impact on Society

As a standard aimed at supporting numerical exchanges between partners, EN 17549-2 will support the following societal impacts:

- ▷ Reduction of the digital gap between large companies and SMEs.
- ▷ Improvement in sustainability through a better use of products and materials, reuse of product and materials thanks to platforms that register material and products that were used during construction.
- ▷ Reduction of the CO2 emissions of the building industry: numerical exchanges without human interactions help deciding between multiple options based on simulations: in energy saving, logistic optimization, lifecycle management of buildings.

Has your project directly involved or led to a specific recommendation or proposal for the development of new or revised standards?

Yes, this fellowship contributes in the proposal of development of ISO 16757-5 under CEN lead is based on prEN 17549-2 (submitted to ISO and CEN in May 2022).

## Have the standardisation activities in your project led to specific deliverables?

No.

## What future efforts or activity are still necessary in your area of application?

The document was submitted for the formal enquiry in July 2022. After the vote, if successful, the work continues by implementing the comments of the formal enquiry, communicating with software providers so that they implement the features of this standard and experimenting its usage on real life projects.

## Online references related to the fellowship work

 <https://filedn.com/IEm9lynnCshRFkpw6xGQmL/FprEN17549-2.pdf>



# Incorporating ethical considerations in AVs: From ethical values to standards of trustworthiness



**Hristina Veljanova**

Researcher, University of Graz  
Austria

Sector

Building Trust

## Engaged SDOs, WGs and TCs



ISO/TC 241/WG6 Guidance on safety ethical considerations for autonomous vehicles, ISO/TC 204 Intelligent transport systems, CEN/TC 278 Intelligent transport systems, ISO/TC 268/SC2 Sustainable mobility and transportation, ASI (Austrian Standards)

## Role (chair, convener, member)

Member

## Addressed EU standardisation priorities and gaps

The current standards body on AVs reveals a modest presence of an ethical dimension and the current efforts to modify this are still not on a satisfactory level. The ISO/TC 241/WG6 – Guidance on safety ethical considerations for autonomous vehicles is currently one of the very few WGs that directly focuses on the incorporation of ethical considerations in AVs standards. Including a stronger ethical dimension in the standardisation work on AVs is a key aspect in leveraging digitalisation in transportation. This is the only path towards ensuring an ethical design and use of this technology, and hence a positive long-term impact.

## Concerned ICT Standards and contribution to the related landscape

The targeted standard is ISO 39003 and the main contribution is made within ISO/TC 241/WG6 Guidance on safety ethical considerations for autonomous vehicles. My fellowship work provides an important basis for further work on standards for AVs that covers ethical considerations. Furthermore, as part of this project my goal is to specifically recommend that in the context of AVs ethical considerations should not be limited only to questions of safety and security. Reducing AVs to issues and challenges related only to safety and security will provide only a narrow understanding of the complexity that comes with AVs and with the higher levels of automation. Against this background, the project goes beyond the mainly technical safety and security considerations and suggests other pertinent values that should also be included in the design and implementation of AVs. At the same time, it also presents an example of a methodology on how to translate values into concrete ethically informed building blocks that can be used in the development of a standard for trustworthy AVs.

## Impact (on European SMEs, related project or in the society)

My activity contributes to broadening the focus of relevant values in relation to AVs standard development so that other values than safety and security are included. It also proposes a methodology of value translation. This has an important impact both on society and on SMEs. On a broader societal level, the project contributes to the efforts of strengthening the climate of trust around AVs as well as making standards development related to AVs more

ethically informed. At the same time, SMEs that deal with any aspect of AVs (research, design, development) can derive a great benefit from a more ethically informed standardisation because it will enable them to demonstrate that they follow a trustworthy and human-centered approach in their work.

### Has your project directly involved or led to a specific recommendation or proposal for the development of new or revised standards?

Yes. The findings from the project were translated into recommendations, which were then to be shared and discussed within ISO/TC 241/WG6. One of the recommendations was the development of a separate standard for trustworthy AVs, where trustworthiness is directly targeted and where in particular ethical considerations are taken into account.

### Have the standardisation activities in your project led to specific deliverables?

Yes, I have contributed in ethics recommendations.

### What future efforts or activity are still necessary in your area of application?

The creation of a WG that specifically and directly tackles ethical considerations in the context of AVs is an important step and sign of the relevance and role they should play in standards development. Nevertheless, the creation of such WGs should become the norm since the more complex technologies are developed, the more an ethical expertise will be needed. In that sense, the involvement of ethicists in standards development should be further encouraged. Such an approach will undoubtedly contribute to strengthening the interdisciplinarity in the standardisation community.

### Online references related to the fellowship work

 [https://issuu.com/worldsummitawards/docs/eyif\\_online\\_graz\\_2021\\_program](https://issuu.com/worldsummitawards/docs/eyif_online_graz_2021_program)

 <https://rewi-grundlagen.uni-graz.at/de/veranstaltungen/detail/article/workshop-grazer-c-cam/>

 [www.iso.org/fr/committee/558313.html](http://www.iso.org/fr/committee/558313.html)

 [www.iso.org/fr/committee/54706.html](http://www.iso.org/fr/committee/54706.html)

 [www.iso.org/fr/committee/656906.html](http://www.iso.org/fr/committee/656906.html)

# Develop European and International standards for sustainable finance for climate change solutions



**Caroline Thomas**  
*Innovation Expert, ISO  
United Kingdom*

## Sector

Sustainable FinTech

## Engaged SDOs, WGs and TCs



ISO/TC 322 Sustainable Finance  
ISO/TC 322/ TAG1 Sustainable FinTech

## Role (chair, convener, member)

Convener, ISO TC307 Blockchain and DLT, WG 6 Use Cases (re-elected to 2025)

## Addressed EU standardisation priorities and gaps

This activity aims to fill the gaps and opportunities from the recent ISO 14030 series of standards in on Environmental performance evaluation – Green debt. The priority is addressed in the newly created ISO/TC 322/ TAG1 Sustainable FinTech Roadmap, with 4 key priorities to support standards development in ESG FinTech Standards:

- ▶ Carbon Accounting / Markets (Carbon Trading)
- ▶ Fixed Income: 'Green' Bonds and Loans
- ▶ Trade Finance & Cross Border Payment & Supply Chain
- ▶ Insurance: Reporting on Task Force on Climate-related Financial Disclosures (TCFD)

My focus is filling the gaps on external market fintech activity to goal of TC322 Fintech TAG Roadmap to 'establish unique world leading expertise to inform and inspire new standards for 'Sustainable FinTech'. My focus includes European regulations and the Green Deal, in ESG & climate change reporting.

## Concerned ICT Standards and contribution to the related landscape

ISO/TC 322 Sustainable Finance is responsible for the development of ISO standards relating to financing, as well as related institutional and market arrangements, that support progress to achieving UN SDGs and addressing climate change.

The umbrella standard for TC322 is Sustainable finance — Principles and guidance, which is now due for publication this year. This TC also works in co-operation with other ISO Technical committees including TC 68 - financial services, TC 207 environmental management, TC 251 asset management and TC 309 governance of organizations.

ISO/TC 322/ TAG1 Sustainable FinTech is an advisory group, so does not develop standards. Its role is to provide a regular sounding board for the FinTech community, with the goal of establishing "unique" world leading expertise that feeds into in "Standards for Sustainable FinTech".

## Impact (on European SMEs, related project or in the society)

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### Impact on SMEs

ISO standards should reflect market demand, and SMEs create the future with innovative use of new technologies, creating new products, markets, and user experiences.

With this fellowship, my contribution brings several impacts on SMEs:

- ▷ Innovation networks: I access leading European SMEs in sustainable finance sectors and ask for their pioneering insights to inform standards development.
- ▷ Scale: Standards help SMEs to scale faster and more efficiently, by building on 'best practice' rather than duplicating effort.
- ▷ Use Cases: The 'Use Case' methodology I have created in related ISO activity, enables SMEs to formalize their business reporting through a combined business and technical structure. I run SME workshops on the Use Case approach, most recently in a Blockchain event in Barcelona.

I have extensive European fintech networks, via my professional and mentoring with Innovation ecosystems in the EU, USA, Australia, Asia, Middle East and Africa.

### Impact on Society

The societal context is one of increasingly urgent demand for the creation of new sustainable finance standards which are necessary to 'release' the trillions of dollars of international investment through ESG practices in all aspects of financing economic activities for the European Green Deal, commitments to COP26 and other Climate Change initiatives.

My work supported societal impacts by providing leading insights into new Fintech companies who are addressing issues of climate change reporting, ESG data gathering, sustainable provenance tracking, and new trade finance and sustainable finance providers.

## Has your project directly involved or led to a specific recommendation or proposal for the development of new or revised standards?

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Yes, the TC has identified a key priority recommendation for a new or revised standard in 'Blockchain & Carbon Emissions' (TC322 N623 Plenary Resolutions). As a result of this Call 05 project work, I have been asked to contribute to this project.

## Have the standardisation activities in your project led to specific deliverables?

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Yes, I have contributed to technical reports on reference materials.

## What future efforts or activity are still necessary in your area of application?

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The challenge with the engaged SDO work is that it takes considerable focus and effort in time and coordination to create consensus for robust and standards-level output. The key areas for continued action include:

- ▷ Finance to address emergency impacts of climate change which has seen record levels in 2021/2022 impacting weather patterns, global supply chains and regional emergencies.
- ▷ Standards to support transparent ESG reporting, that enable good governance, and deter the current wave of 'green-washing' and overstating sustainability assets.
- ▷ The TC322/TAG1 Plenary meeting identified a key priority for 2022 'Blockchain & Carbon Emissions' (TC322 N623 Plenary Resolutions).

## Online references related to the fellowship work

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 [www.iso.org/news/ref2716.html](http://www.iso.org/news/ref2716.html)

 [www.iso.org/committee/7203746.html](http://www.iso.org/committee/7203746.html)

 [www.iso.org/standard/77776.html](http://www.iso.org/standard/77776.html)

 <https://committee.iso.org/home/tc322>

 [www.standict.eu/news/trusted-information-digital-space](http://www.standict.eu/news/trusted-information-digital-space)

 [www.bsigroup.com/globalassets/documents/about-bsi/hsb/nov-standards-conference-2020/bsi\\_standards\\_awards\\_2020\\_nominees\\_and\\_winners.pdf](http://www.bsigroup.com/globalassets/documents/about-bsi/hsb/nov-standards-conference-2020/bsi_standards_awards_2020_nominees_and_winners.pdf)



**3.**

# Innovation for the Digital Single Market





## ■ DID Resolution



**Markus Sabadello**  
CTO, Danube Tech GmbH  
Austria

### Sector

Blockchain And Distributed Digital Ledger Technologies

### Engaged SDOs, WGs and TCs



| W3C/ERCIM

### Role (chair, convener, member)

Editor of the DID Resolution specification

### Addressed EU standardisation priorities and gaps

Now, the DID Resolution specification is aligned with the DID Core specification, and it is ready for implementation. There are already many projects and implementations of this technology. Existing gaps in the technical specification include a precise definition of an HTTPS interface for DID Resolution, a better description of threat models when DID Resolvers are used, and the specification of extension DID resolution options, metadata properties, and error codes, which can all be used to add various functionality to the DID Resolution process.

### Concerned ICT Standards and contribution to the related landscape

For years, I have been focusing my expertise on Decentralized Identifiers standard. The DID Core specification at W3C has now reached the state of Proposed Recommendation. In my current focus is the DID Resolution standard that is close to DID core standard and this one is in the state of Draft Community Group Report.

### Impact (on European SMEs, related project or in the society)

#### Impact on SMEs

My contributions to the standardisation of DIDs and DID Resolution impact multiple European SMEs, especially those that are recipients of the NGI ESSIF-Lab grants, as well as those that are part of the larger EBSI/ESSIF ecosystem. Most of those SMEs are building technologies and products that use DIDs in various ways, therefore, my standardisation work directly influences their projects.

#### Impact on the Society

The main impact of this work is the vision “Self-Sovereign Identity”, which is widely recognised as an important paradigm shift in the digital world that will enable more privacy and control over personal data by individuals. This is not only important in a digital environment, but also linked to freedom and democracy in our real-life societies. The work surrounding DIDs offers an alternative to centralized identity providers and mass surveillance that comes with them.

### Has your project directly involved or led to a specific recommendation or proposal for the development of new or revised standards?

Yes, the project involved a proposal for the development of a new standard (DID Resolution).

## Have the standardisation activities in your project led to specific deliverables?

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Yes, to technical specification and a technical report – common terminology.

## What future efforts or activity are still necessary in your area of application?

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Even though the specification is now mature and missing gaps have been filled, it would be good to get additional feedback from the community, and further improve the specification based on implementation feedback and test results from the new DID Resolution test suite.

## Online references related to the fellowship work

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📄 DID Resolution specification: <https://w3c-ccg.github.io/did-resolution>

📄 DID Resolution test suite: <https://github.com/danubetech/did-resolution-test-suite>

📄 Contributions to the DID Resolution specification: [https://github.com/w3c-ccg/did-resolution/search?q=author%3Apeacekeeper+committer-date%3A2020-01-01..2022-12-31&unscoped\\_q=author%3Apeacekeeper+committer-date%3A2020-01-01..2022-12-31&type=Commits](https://github.com/w3c-ccg/did-resolution/search?q=author%3Apeacekeeper+committer-date%3A2020-01-01..2022-12-31&unscoped_q=author%3Apeacekeeper+committer-date%3A2020-01-01..2022-12-31&type=Commits)

📄 Contributions to the DID Spec Registries, which contain various extensions that affect the DID Resolution process:

📄 [https://github.com/w3c/did-spec-registries/search?q=author%3Apeacekeeper+committer-date%3A2020-01-01..2022-12-31&unscoped\\_q=author%3Apeacekeeper+committer-date%3A2020-01-01..2022-12-31&type=Commits](https://github.com/w3c/did-spec-registries/search?q=author%3Apeacekeeper+committer-date%3A2020-01-01..2022-12-31&unscoped_q=author%3Apeacekeeper+committer-date%3A2020-01-01..2022-12-31&type=Commits)

📄 Contributions to DID Spec Extensions, which include DID resolution options, metadata properties, and error codes that are used as part of DID Resolution: <https://github.com/decentralized-identity/did-spec-extensions/>

# Smart Contracts for Media and its use with ISOBMFF



**Panos Kudumakis**

Consultant

United Kingdom

Sector

Blockchain

## Engaged SDOs, WGs and TCs



ISO/IEC JTC1/SC29/WG03 MPEG Systems subgroup on 'Smart Contracts for Media'

## Role (chair, convener, member)

Chair and Head of UK Delegation of ISO/IEC JTC1/SC29/WG03 MPEG Systems subgroup on 'Smart Contracts for Media'

## Addressed EU standardisation priorities and gaps

Copyright legislation has continuously evolved so that fair, timely and transparent revenues are returned to artists and rights holders, e.g., US Music Modernisation Act and EU Digital Single Market Copyright Directive. Meanwhile, several key artists and media companies have turned their hopes for resolving these issues to blockchain, e.g., Open Music initiative by BerkleeICE in US and Mycelia by Imogen Heap in UK.

Furthermore, in line with EC Rolling Plan for ICT Standardisation (2022), Action 7 'to allow the flow of smart contracts between different DLTs', pp 143, the aim of my fellowship is twofold:

- ▶ Finalisation of ISO/IEC 21000-23 Smart Contracts for Media: This standard will greatly assist the media stakeholders in achieving effective interoperability for the exchange of verified contractual data between different DLTs. Such a process in turn will increase trust among the stakeholders for sharing high-value data (e.g., music rights) in the ecosystem. Another important feature of this standard is that it offers the possibility to bind, the clauses of a smart contract with their corresponding ones of the narrative contract. In this way, each party signing an ISO/IEC 21000-23 conforming smart contract will be able to know exactly what its clauses express.
- ▶ Initiation of ISO/IEC 23000-xx Decentralised Media Rights Ecosystem: A standards-based fair and sustainable trade of music and media ecosystem is envisaged based on widely deployed MPEG technologies (e.g., audio-visual codecs, file formats, and streaming protocols), including emerging MPEG IPR ontologies that can be executed as smart contracts on existing DLT environments, thanks to ISO/IEC 21000-23. Such a decentralised media rights ecosystem can drive a shift of power in the music and media value chain (e.g., from the intermediaries to artists and rights holders).

While the first objective is now a safe bet, the latter one is rather challenging due to time-lengthy initiation procedure and fierce competition.

## Concerned ICT Standards and contribution to the related landscape

There is a growing belief that blockchain technologies constitute a revolutionary innovation in how we transfer value electronically. In that vein, blockchain may be a suitable complement to ontologies to achieve Tim Berners-Lee's vision of the Semantic Web. Therefore, if this complementarity is to be achieved blockchain and ontologies must co-evolve.

In the last few years, ISO/IEC JTC1/SC29/WG03 MPEG Systems Working Group has developed several standardized ontologies catering to the needs of the music and media industry with respect to codification of Intellectual Property Rights (IPR) information toward the fair trade of music and media. MPEG IPR ontologies can be used by music and media value chain stakeholders to share and exchange, in an interoperable way, all metadata and contractual information connected to creative works, leading to transparent payment of royalties. However, the challenge that naturally arises is how MPEG IPR ontologies can be converted to smart contracts that can be executed on existing DLT environments, thus enriching DLT environments with inference and reasoning capabilities inherently associated with ontologies.

Thus, an MPEG Systems subgroup has been established on 'Smart Contracts for Media', that I chair, with the aim to develop the means (e.g., application programming interfaces) for converting MPEG IPR ontologies (ISO/IEC 21000-19 Media Value Chain Ontology, 21000-19/AMD1 Audio Value Chain Ontology, 21000-20 Contract Expression Language and 21000-21 Media Contract Ontology) to smart contracts that can be executed on existing DLT environments. The resulting standard, ISO/IEC 21000-23 Smart Contracts for Media, which has reached Final Draft International Standard stage, is envisaged to close the interoperability gap toward a semantic music and media blockchain. As such, it has the potential to unlock both the Semantic Web and in turn the creative economy and open the way forward for other industry domains.

## Impact (on European SMEs, related project or in the society)

### **Impact on SMEs**

EU Digital Single Market Copyright Directive aim to facilitate a fairer marketplace for rights holders and remuneration of authors and performers. Effective IP rights management in the digital environment is key to support the competitiveness of creative industries. More broadly, most of the internet traffic is around creative content, so that creative industries are key to generating economic value for all the stakeholders involved in the creative value chain. Thus, creative SMEs need to be empowered to make better decisions and deploy more advanced solutions based on insights gleaned from data. To that end, MPEG IPR ontologies based smart contracts - thanks to ISO/IEC 21000-23 Smart Contracts for Media which its finalisation is the focus of this project - supported by rich semantic copyright models can be handy when data-based decisions need to be derived by evidence and logic, leading to new business models that can be efficiently deployed on decentralised digital media platforms.

### **Impact on Society**

Inference and reasoning capabilities normally associated with ontology use cannot naturally be done in a blockchain environment. Bridging this gap has the potential to unlock the semantic web and in turn the creative economy. The latter is not only one of the most rapidly growing sectors of the world economy, but also a highly transformative one in terms of income-generation, job creation, export earnings, quality of life and social cohesion. Recent studies have shown that the creative sector is contributing 4.4 % to the EU GDP, while providing quality jobs to 8.3 million people across EU27.

## Has your project directly involved or led to a specific recommendation or proposal for the development of new or revised standards?

Yes, it has led towards facilitation of a fairer marketplace for rights holders and remuneration of authors and performers. This includes the development of ISO/IEC 21000-23 Smart Contracts for Media to Final Draft International Standard (FDIS) stage and the initiated work (exploration stage) on ISO/IEC 23000-xx Decentralised Media Rights Ecosystem.

## Have the standardisation activities in your project led to specific deliverables?

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Yes, it has contributed to technical specifications.

## What future efforts or activity are still necessary in your area of application?

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The standards in this field are mature. However, continuation of actions is suggested.

Finalisation of ISO/IEC 21000-23 Smart Contracts for Media

At the 137th MPEG meeting, Geneva, Online, 17-21 Jan. 2022, the ISO/IEC 21000-23 Smart Contracts for Media standard has been promoted by MPEG Systems (WG03) to Final Draft International Standard (FDIS) stage, which is the final approval milestone in the development of a standard (Press Release of MPEG 137th meeting). However, according to the ISO project schedule the FDIS ballot (a 2 months yes/no vote without comments by NBs) is still pending to be initiated. Publication of the International Standard (IS) is expected no later than Jan. 2023. A white paper on 'MPEG Smart Contracts for Media' has also been approved by MPEG Liaison and Communication (AG3) and published at the 138th MPEG meeting, Alpbach, AT, Online, 25-29 Apr. 2022.

Initiation of ISO/IEC 23000-xx Decentralised Media Rights Ecosystem

Exploration work has also been taking place with respect to the following mandate. Study and solicit contributions on, e.g., technologies, architecture, and APIs towards a Decentralised Media Rights Ecosystem, including: 1) Smart contracts and DLTs, 2) Rights and metadata management, 3) Content and creator IDs, and 4) File formats and streaming protocols. An initial Technologies under Consideration (TuC) document has been published introducing use cases, motivation, scope, and architecture for such a Decentralised Media Rights Ecosystem, but more contributions are needed.

## Online references related to the fellowship work

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📄 Standard (incl. reference software): [www.iso.org/standard/82527.html](http://www.iso.org/standard/82527.html)

📄 Demonstration (incl. videos): <https://scm.linkeddata.es/>

📄 White paper (incl. webinar slides): <https://tinyurl.com/2ne769wn>









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