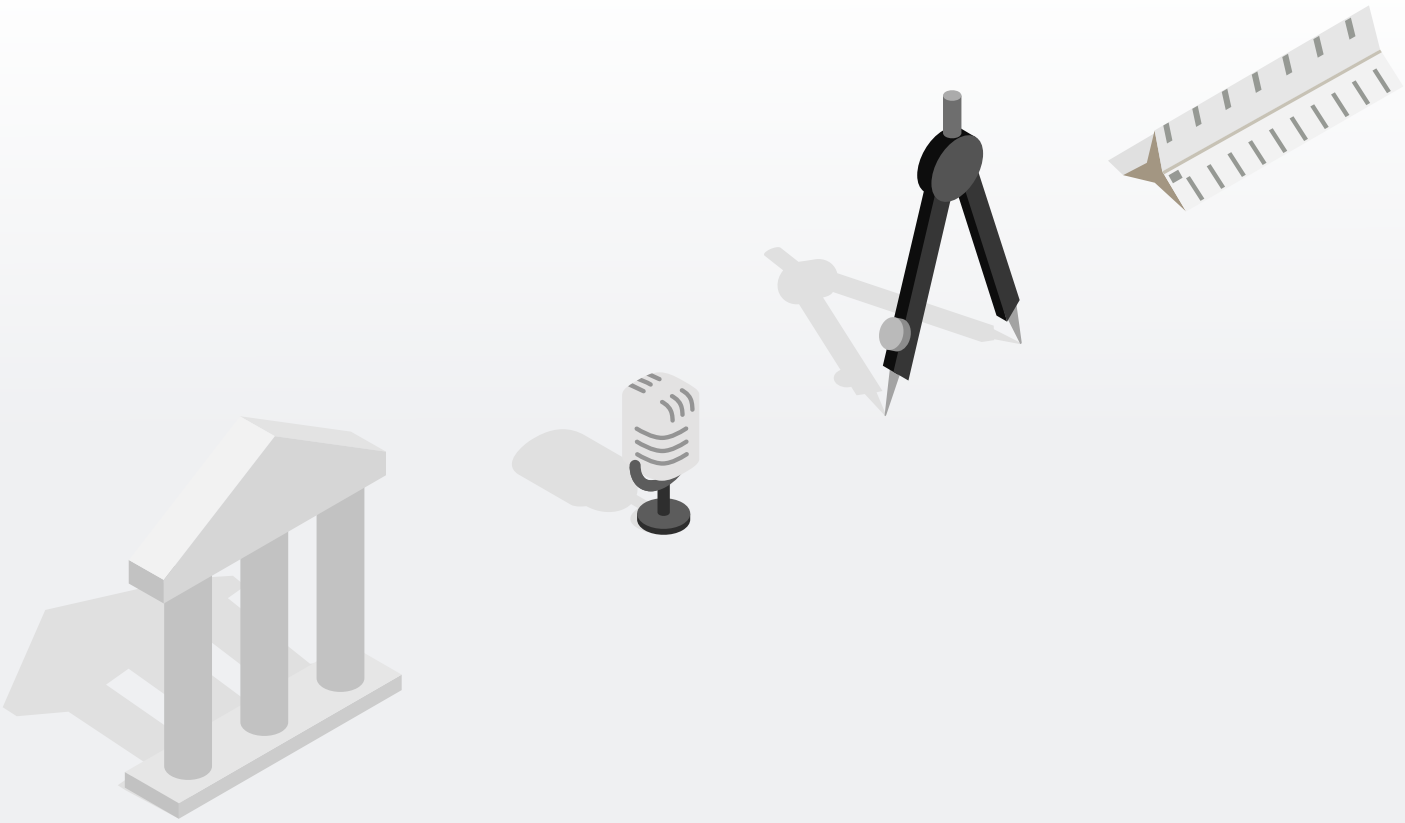
European Commission

ROLLING PLAN FOR ICT STANDARDISATION

2018

Grow



EUROPEAN COMMISSION
Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs
Innovation and Advanced Manufacturing
KETs, Digital Manufacturing and Interoperability

EXECUTIVE SUMMARY

The Rolling Plan for ICT Standardisation provides a unique bridge between EU policies and standardisation activities in the field of information and communication technologies (ICT), allowing for increased convergence of standardisation makers' efforts towards European policy goals. This document is the result of a yearly dialogue involving a wide-ranging representation of the major standardisation's interested parties as represented in the multi-stakeholder platform on ICT standardisation. The Rolling Plan focuses on those actions that can support the EU policies and does not seek comprehensiveness as regards to the work programmes of the various standardisation bodies.

The identification of the standardisation actions in support of European policies made in this document is complementary to other instruments, in particular to the annual Union work programme (AUWP). The Rolling Plan further details the requirements for ICT standardisation, articulates them in the form of actions and provides a follow-up mechanism for the actions.

The Rolling Plan 2018 identifies 170 actions organised around four thematic areas: key enablers, societal challenges, innovation for the single market and sustainable growth.

The Commission has identified five priority domains[1] — 5G, cloud, cybersecurity, big data and internet of things (IoT) —where ICT standardisation is considered most urgent for the completion of the digital single market (DSM), as well as a number of application domains that will benefit from standard setting in those horizontal technologies, in particular eHealth, intelligent transport systems, smart energy and advanced manufacturing. The Rolling Plan 2018 continues to include actions in support of the priorities indicated in the Communication.

1 Communication on ICT Standardisation Priorities for the Digital Single Market, COM (2016) 176 final.

The Rolling Plan is a living instrument. Compared to the 2017 edition, in the Rolling Plan 2018 new sections have been added (RegTech standardisation, Blockchain and Distributed Digital Ledger Technologies) and some sections were merged (eHealth and healthy living and ageing, Fintech and Regtech).

KEY ENABLERS

5G

5G standards are key to competitiveness and the interoperability of global networks and require collaboration between stakeholders from different standardisation cultures. The Communication on ICT standardisation priorities identifies 5G as priority domain and proposes some actions to foster the emergence and uptake of global 5G standards.

Moreover, The European Commission has adopted a 5G Action Plan and called on Member States and industry to commit to the following objectives:

- a standardisation approach that preserves future evolution capabilities and aims at the availability of 5G global standards by end of 2019;
- a holistic standardisation approach encompassing both radio access and core networks as coordinated activities within global standardisation bodies, encompassing disruptive use-cases and promoting open innovation;
- the establishment of cross-industry partnerships to support timely standard-setting, leveraging on international cooperation partnerships, supporting the digitisation of industry.

In 2017 Member States, in the Ministerial Declaration of Tallinn[2] identified the objective of preserving 5G global interoperability as key in order to make 5G a success for Europe. As standards are of paramount importance to ensure the competitiveness and interoperability of global telecommunication networks, Member States endorsed a comprehensive and inclusive approach to 5G standardisation as a priority for the Digital Single Market and called for encouraging innovation and development of products and services which make use of 5G networks across the EU.

CLOUD COMPUTING

The Communication on ICT Standardisation priorities identifies cloud as priority domain and proposes some actions to foster the development and use of cloud standards.

ISO/IEC JTC 1 (SC38) demonstrated significant activity in cloud standardisation with a focus on service level agreements and interoperability aspects. The Commission services in collaboration with standardisation development organisations and open source (OSS) related organisations launched an action to analyse the impact of open source in the cloud standardisation process.

The Commission has also funded the CloudWatch 2 project which, among others, reported on the status of interoperability and security standards, developed a catalogue of cloud services, mapped EU cloud services and providers.

When it comes to certification and ways for customers to know and be assured that their data is equally safe no matter where they are located or who provides the service, the Commission launched the study Certification Schemes for Cloud Computing (SMART 2016/0029) and a public consultation which ended in October 2017.

In the view of facilitating a fair market for the consumers, the Commission also launched a study on Switching cloud providers to collect evidence on legal, economic, and technical issues when switching from provider .

PUBLIC SECTOR INFORMATION, OPEN DATA AND BIG DATA

In January 2017, the Commission has adopted a Communication on "Building a European Data Economy" exploring issues such as free flow of data, access and transfer in relation to machine generated data, liability and safety in the context of emerging technologies, portability of non-personal data, interoperability and standards.

Under the Horizon 2020 ICT Work Programme 2016-2017 on topic ICT-14 / Big Data PPP, several actions have started on data integration and experimentation (including cross-sectorial and cross-lingual issues)..

The Communication on ICT Standardisation priorities identifies big data as priority domain and proposes some actions to contribute to global standardisation in the field of data.

2 Ministerial Declaration "Making 5G a success for Europe" signed during the informal meeting of competitiveness and telecommunications ministers on 18 July in Tallinn

INTERNET OF THINGS

The internet of things (IoT) is a key priority area of the digital single market. Industry is best placed to develop the technological standards and solutions to reap the benefits of new global IoT ecosystems while addressing the challenges such as security, scalability and interoperability. In this context, the European large-scale pilots will support the deployment of IoT solutions by validating their acceptability and enhancing the buy-in from users and the public.

The Communication on ICT standardisation priorities identifies IoT as priority domain and proposes some actions to promote the development and uptake of IoT standards. The alliance for internet of things innovation (AIOTI) plays an important role in this field and help fostering a digital single market for IoT.

In 2017, a study to assess the standards landscape for IOT and identify gaps was concluded. Work is ongoing to develop a European standard for cyber security compliance of products that is aligned with the current compliance framework of organisations.

Standardisation bodies are involved with standardising low-power wireless technologies for optional radio coverage in indoor scenarios for data services.

CYBERSECURITY / NETWORK AND INFORMATION SECURITY

The Communication on ICT Standardisation priorities identifies cybersecurity as a priority domain and proposes actions to accelerate the development of appropriate standards in this field.

The European cybersecurity strategy and the Directive on network and information security adopted in July 2015 provide for action to promote the development and take-up of ICT security standards.

In September 2017 the Commission adopted a cybersecurity package. The package builds upon existing instruments and presents new initiatives to further improve EU cyber resilience and response.

In relation to standardisation, for security and notification requirements for operators of essential services, the focus is about establishing a number of reference standards and/or specifications relevant to network and information security. For security and notification requirements for digital service providers, in line with the objectives of the Digital single market strategy, the aim is to to establish a harmonised set of requirements so that they can expect similar rules wherever they operate in the EU.

In 2018 Standardisation organisations are set to develop standards for data protection, network security, data access control in the cloud, information protection and security techniques with specific focus on cybersecurity.

ELECTRONIC IDENTIFICATION AND TRUST SERVICES INCLUDING E-SIGNATURES

Further to the issue of the standardisation mandate M/460 at the end of 2009, CEN and ETSI are working on various standardisation deliverables needed for the completion of the rationalised framework of e-signatures standards.

More recently, CEN and ETSI have extended their activities to cover the standardisation needs that pertain to the implementation of Regulation (EU) 910/2014 on electronic identification and trust services for electronic transactions in the internal market (eIDAS). Standardisation activities have been started to strengthen the interoperability and security of personal identification and its related personal devices, systems, operations and privacy.

Others SDOs, such as ITU-T, OASIS and IEEE have been involved with further aspects of identification and trust services, such as trust provisioning for future ICT infrastructures, Trust and Secure exchange of web services, and security aspects of blockchain technology and biometric certification.

EPRIVACY

In support of the ePrivacy Directive 2002/58/EC and the General Data Protection Regulation 2016/679/EU, and in line with the standardisation request M/530, standardisation actions are needed to ensure privacy in personal data processing and the free movement of such data. In 2017, the CEN-CENELEC technical committee (TC) 8 “Privacy management in products and services” was set up with the aim to develop standards on Privacy protection by design and by default in products and services. In addition, TC 13 “Cybersecurity and Data protection” has been created to develop standards for data protection, information protection and security techniques with specific focus on cybersecurity covering all concurrent aspects of the evolving information society, including privacy guidelines.

E-INFRASTRUCTURES FOR RESEARCH DATA AND COMPUTING-INTENSIVE SCIENCE

Building on existing EU-funded e-Infrastructures, the European Cloud Initiative strategy aims at consolidating the efforts to accelerate and support the transition to more effective open science and open innovation in the digital single market. In this context, the implementation of standards and recommendations will be of utmost importance in order to allow for interoperability, avoid fragmentation and improve the efficiency and effectiveness of research.

To take advantage of the capabilities of different scientific fields and of the potential of ICT, this Rolling plan calls standard developing organisations to identify the standardisation needs and explore the use of concepts such as digital objects architecture and array databases.

BROADBAND INFRASTRUCTURE MAPPING

The European Commission has launched a project to map fixed and mobile quality of broadband services in Europe, which is a crucial instrument to assess and monitor the achievement of the new connectivity goals as described in the Communication on "Connectivity for a competitive digital single market – Towards a European Gigabit Society". In 2017, in order to complement the deployment of the EU broadband mapping platform, the Commission has launched a new study on Fixed and Mobile Convergence in Europe (SMART 2016/0046). On the basis of the datasets collected in the EU broadband mapping platform, the study will support the EU policy-making process by assessing the technical/political/economic obstacles that prevent the definition of common (fixed and mobile) network performance measurements in the Union.

To support access for individuals to broadband services with higher quality of service, this Rolling Plan calls for the standard developing organisations to analyse the standardisation landscape taking into account the studies the Commission launched to help mapping broadband infrastructures, services offered, demand status and investments, including the definition of common (fixed and mobile) network performance measurement .

ACCESSIBILITY OF ICT PRODUCTS AND SERVICES

Accessibility of ICT products and services includes telecommunications, TV and broadcasting, the web and new emerging technologies both mainstream and in assistive technology, including interoperability of the two.

The Commission adopted the European disability strategy 2010-2020 with the aim of supporting the implementation of the Convention in the EU.

In April 2017, the European Commission issued the standardisation request M/554 to the European standardization organizations in support of Directive (EU) 2016/2102 on the accessibility of the websites and mobile applications of public sector bodies. M/554 requests the development of a CEN-CENELEC-ETSI Harmonized (hEN) Standard covering the essential requirements included in the Directive, based on the EN 301 549 V1.1.2 (2015-04. EN 301 549 will be revised accordingly by the CEN-CENELEC-ETSI Joint Working Group on eAccessibility.

SOCIETAL CHALLENGES

EHEALTH AND ACTIVE AND HEALTHY AGEING

In 2016, CEN TC 251 started to work on standardising an international patient summary, drawing from elements of the guidelines developed under the eHealth network. Completion of the standards is expected in 2018. This activity is funded by the Commission and ensures European participation to an international initiative that is expected to enable people to access and share their health data information for emergency or unplanned care anywhere and as needed.

In 2017, development of a European guidance document based on BSI PAS 277 for the use of the eHealth and wellness apps' developers was started. This standardisation activity will address some of the concerns related to the apps quality and reliability.

Besides already defined standardisation needs around citizens electronic health records; identifiers and identification processes; active living and ageing, this Rolling Plan also calls to assess whether a standardisation request might be needed pursuant to Regulation 1025/2012 for one or more European standardisation deliverable(s) concerning data protection by design for the development of eHealth products and services.

E-SKILLS AND E-LEARNING

In support of the objectives set out in the Communications "A New Skills Agenda for Europe"[3], "A Digital single market strategy for Europe[4] and "e-Skills for the 21st Century: Fostering Competitiveness, Growth and Jobs[5]", the Commission is planning to issue in 2018 a standardisation request as announced in the AUWP to develop standards for a comprehensive European framework for the ICT profession which would complement and build on the existing European e-Competence framework.

The e-Competence Framework (EN 16234-1:2016) provides an efficient and broadly accepted common European language about knowledge, skills and competences of the ICT professional workforce and it has proved to be a useful benchmark for all EU industry sectors and HR companies. In 2017, the Commission initiated the first revision of the EN, in line with current business needs, framework development, digitization of industry and ICT market trends.

EMERGENCY COMMUNICATIONS AND ECALL

In 2017 the standards related to location of the emergency calls in accordance with mandate/493, and the development of standards needed to cope with technology advances, such as smartphone apps and next generation networks were published.

Standards for next generation networks are also expected for eCall, as well as standards for other users than M1 and N1 vehicles (lightweight vehicles for the carriage of goods or passengers), for aftermarket equipment and for integration with the cooperative intelligent transport systems.

EGOVERNMENT

In 2016, the Commission adopted the ISA[2] work programme to support the development of the digital solutions that enable public administrations, businesses and citizens in Europe to benefit from interoperable cross-border and cross-sector public services. The DCAT Application profile has been implemented in the pan-European data portal and was adopted by several Member States for their own data portals.

INNOVATION FOR THE DIGITAL SINGLE MARKET

EPROCUREMENT AND E-INVOICING

The 2014 Public Procurement Directives aimed to make e-Procurement the mainstream method for carrying out public procurement to achieve broader competition (even across-borders), increased transparency, value for money on procurement expenditure and savings on procedural costs, and creating opportunities for innovation. This Rolling Plan calls for aligning the CEN/TC440 and TC434 efforts with the ISA core vocabularies to develop a common semantic model for the e-procurement domain. This joint working group is under establishment between the two technical committees. This work should build synergies with the ontology being developed by the Publications Office.

In the last decade or so, many e-invoicing standards/formats have been developed, based mostly on different versions of XML. Many of these are proprietary formats, and are only used by one multinational company and its suppliers, or embed proprietary unique identifiers that may require licensing from a single source. The published EN16931-1, which establishes a semantic data model of the core elements of an electronic invoice, is intended to tackle the fragmentation that is created by the vast number of e-invoicing standards, data formats, and usage requirements exist across the EU and globally.

3 COM(2016) 381 final
4 COM(2015) 192 final
5 COM(2007) 496

CARD, INTERNET AND MOBILE PAYMENTS

In 2017, the Commission continued to encourage the co-operation initiatives both at standardisation (ESOs, W3C and others) and strategic level (ERPB). More analysis of the standardisation gaps and a precise definition of mobile payments are still required in the following years.

DIGITAL CINEMA

The film heritage sector would benefit from European standards that describe the most efficient digital workflows and data formats for the preservation of digital films. The resulting standards for digital preservation of films could also be of interest for digital preservation of other type of documents in public administrations.

FINTECH AND REGTECH STANDARDISATION

The Commission has set up in 2016 an internal task force on financial technologies. Co-chaired by DG FISMA and DG CNECT, the task force brings together services responsible for financial regulation and for the digital single market, along with other colleagues dealing with competition and consumer protection policy. The results of a consultation on FinTech were published in 2017.

In the area of Regtech, the Commission launched the Financial Data Standardisation Project in 2016, to quantitatively study the findings of the 2015-2016 Call for evidence on EU regulatory frameworks for financial services. Intermediate deliverables of the project expose the need to "Define Once" and move towards one "Regtech Data Dictionary (RDD)" as linking method between Regulation and Supervisory Reporting.

Hence, this Rolling Plan calls for a comprehensive set of standardisation actions in the areas of Regulatory and Supervisory Reporting by assessing the possibilities of and developing the foundations for the RDD and mapping existing supervisory reporting frameworks hereto. This initiative forms a key contribution to the Commission's Better Regulation agenda and the Regulatory Fitness and Performance (REFIT) programme, which ensures that EU Legislation delivers results for citizens and businesses effectively, efficiently and at minimum cost.

BLOCKCHAIN AND DISTRIBUTED DIGITAL LEDGER TECHNOLOGIES

Blockchain has great potential in providing an infrastructure for trusted, decentralised and disintermediated services beyond the financial sector. Blockchain is a promising technology to share data and manage transactions in a controlled manner, with many possible applications to deliver social goods in the field of eHealth and eGovernment, health records, land registries or the security certification of links in an IoT chain of devices, manage intellectual property rights and eID. However, this process is hindered by a lack of harmonisation and interoperability that constitute obstacles to cross border and cross sector transactions.

The Commission has established a liaison A with ISO Technical Committee 307 on Blockchain and Distributed Ledger Technologies in order to engage in and contribute to the development of the future standards. The EC will also engage and follow the works of the ITU-T Focus Group on Application for Distributed Ledger Technologies.

A European observatory on Blockchain technologies is planned to be launched to map and monitor developments, build expertise and promote use cases, also regarding standards and interoperability.

This Rolling Plan calls standard developing organisations to identify potential standardisation needs in relation to blockchain technologies. A white paper is also expected to be published on the EU perspective on block chain standardisation and for identifying use cases relevant for the EU.

SUSTAINABLE GROWTH

SMART GRIDS AND SMART METERING

Standards are needed to cover the communication needs of the grid management, balancing and interfacing with the millions of new renewable sources, as well as standards for the complex interactions of the new distributed energy market, and in special a transparent Demand Response scheme which is accessible for all consumers.

Communication standards will also be crucial for the deployment of electric cars and the building-up of smart cities. Harmonised communication protocols would provide standard components and interfaces giving 'plug-and-play' capability for any new entrant to the network, such as renewables or electric cars, or the use of open architectures based on global communication standards. To further promote interoperability, in addition to standardisation, testing and profiling should also be considered.

The Smart Meters Coordination Group, which was created when the European Commission issued the M441 mandate, oversees the standardisation related to the Smart Metering Infrastructure. It has produced reference architecture (TR 50572), a glossary of terms, an overview of available standards, Smart Metering Use Cases and an overview of technical requirements including those for privacy and security. Since end 2016, the CEN-CENELEC-ETSI Smart Energy Grid Coordination Group (CG-SEG) is the focal point and continue to cooperate with EC Smart Grids Task Force (EC SGTF).

SMART CITIES / TECHNOLOGIES AND SERVICES FOR SMART AND EFFICIENT ENERGY USE

The initial phase of the SSCC-CG work had been completed toward end 2016, and an overview white paper from January 2015 has been published. The work is continued by the CEN-CENELEC-ETSI sector forum on smart and sustainable cities and communities. DG CNECT is funding H2020 support actions. In 2017, the core standardisation work is expected to develop hand in hand with cities work based on the principles developed in the European innovation partnership (EIC) on smart cities and communities (SCC)'s memorandum of understanding.

ICT ENVIRONMENTAL IMPACT

Standardisation request M/462 on efficient energy use within broadband deployment was accepted by the ESOs to provide standards for measurement and monitoring, including definition of energy-efficient KPIs. This standardisation request is not only limited to networks but extends as well to data centres and other ICT nodes associated with broadband deployment.. ETSI started standardisation work, with the objective to development KPI standards by 2018, possibly for referencing in ecodesign-related implementing measures.

EUROPEAN ELECTRONIC TOLL SERVICE

Directive 2004/52/EC provides that Member States having electronic road toll systems are to ensure that operators offer the EETS to heavy goods vehicles at the latest three years after the entry into force of the decision defining EETS and to all other categories of vehicle at the latest five years after. In May 2017 the Commission introduced its proposals for a revision of Directive 2004/52/EC and Decision 2009/750/EC. This Rolling Plan calls for the continuous review and update, when necessary of technical standards that support the EETs. In addition it calls SDOs to support the European Commission with with advice and expertise in technical standards-related activities in the field of EETS and electronic tolling in general.

TRANSPORT

The cooperative intelligent transport systems (C-ITS) platform with Member States completed its report in 2016. In particular, the working group on security defined new needs for security in cooperative systems (see ITS section.

With regard to the standardisation request on Urban ITS via the standardisation mandate 546, the prestudy on Urban ITS was carried out by CEN/TC 278.. Based on the proposals submitted to the Commission, work started in 2017 on a core set of these proposals to support multimodality, traffic management and urban logistics.

In 2017, work also started to steer and manage the integration of accurate (public) road data in digital maps with timely updates, based on the ROSATTE project and other activities such as the iMobility Forum.

ADVANCED MANUFACTURING

The Commission launched in April 2016 a set of initiatives in support of the digitisation of the European industry. ICT standards and technical specifications play a key role in the strategy since they ensure the interoperability of the various components and solutions. However, the ongoing standardisation activities in this domain are fragmented and thus there is a need to bring together the key players with a view to address in more detail the various standardisation issues. In response, the Commission has set up a Working Group (MSP/DEI WG) that will report to both the MSP and the High-level governance meeting of the European platform of national initiatives on digitising industry. The MSP/DEI WG is expected to propose concrete actions at the EU level by November 2018.

ROBOTICS AND AUTONOMOUS SYSTEMS

In 2016 robotics standardisation has continued its work in all fronts. During 2016 ISO has issued two new standards on robotics, namely ISO/TS 15066:2016 "Robots and robotic devices — Collaborative robots", and ISO 18646-1:2016 "Robotics -- Performance criteria and related test methods for service robots -- Part 1: Locomotion for wheeled robots". Work on nine other ISO standards on robotics is ongoing.

In February 2016, SPARC the public private partnership on robotics has issued a new update of the multi-annual roadmap. R&D projects on robotics funded by the EU Horizon 2020 have set the scientific basis for new technologies and interoperability. Among them it is worthwhile highlighting the launch of two new projects dealing with robotic operating systems.

CONSTRUCTION

The Commission is calling on more standardisation work in the area of building information modelling.

A road map for standardization for digitization in construction is under development in CEN/TC 442/WG 1 in collaboration with ISO/TC 59/SC 13/TF02 and the corresponding national mirror committees. Based on a survey of ongoing standardization activities and market needs this will give directions for required future standardization. SDOs shall develop European standards when necessary (i.e. if functional gaps are found or international standards are not available).

This Rolling Plan calls SDOs to develop common information requirements for project and information management as part of construction service procurement standards; and to develop European standards for exchange of data on construction products, to ensure quality in data to support Regulation EU No 305/2011 CPR and trade of construction products in the European market.

CISE — COMMON INFORMATION SHARING ENVIRONMENT IN THE MARITIME SECTOR

The objective of the CISE global action is to develop appropriate semantic, technical, organisational and legal solutions and recommendations to enhance the interoperability between existing systems of around 400 maritime public authorities throughout the EU/EEA. . In 2017, the EUCISE 2020 FP7 project (CISE pre-operational validation) will develop the CISE components using the CISE data and service model and validate them in a pre-production environment, involving 37 authorities from 13 European countries. The current CISE data and service model may be considered for standardisation in.

The Commission would like to thank all Members of the Multi-Stakeholder Platform on ICT Standardisation for their active collaboration and for making this document possible: the EU Member States, EFTA States, standards developing organisations (ETSI, CEN, CENELEC, ISO, IEEE, IEC, ITU, OMG, IETF/IAB, OASIS, Ecma, W3C/ERCIM, UN/CEFACT), industry associations (Business Europe, Cable Europe, Digital Europe, ECIS, ETNO, EBU, EuroISPA, SBS, OFE, Orgalime)and stakeholder associations (AGE, ANEC, ECOS, EDF, ETUC).

ⓘ **https://ec.europa.eu/growth/sectors/digital-economy/ict-standardisation_en**
✉ **GROW-ICT-STANDARDISATION@ec.europa.eu**

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THE STRATEGIC ROLE OF ICT STANDARDISATION IN THE CONTEXT OF EU POLICY MAKING

Standards[6] play a critical role in supporting European policies and legislation. Innovation and technology adoption provide critical support for Europe to face the challenges of a global market place, of society and economies. Policy making in Europe rely on standards and technical specifications to reap the benefits of broader, more interoperable markets and systems, and greater network effects.

The Rolling Plan addresses technology areas in need for ICT standards and explores the role which standards and technical specifications can play in achieving the Policy objectives. The Rolling Plan for ICT Standardisation is published by the Commission to consolidate the different ICT standardisation needs in support of EU policies into a single document, identifying possible actions. It reaches out to both European Standardisation Organisations (ESOs) -ETSI, CEN and CENELEC- and international and global standards bodies who can respond to the proposed actions and support the respective Policy objectives with standardisation deliverables.

The Annual Union Work Programme (AUWP) for European Standardisation is another EU planning tool, more high-level and not exclusively focused on ICT. It is adopted by a Commission Decision in accordance with Article 8 of the EU regulation 1025/2012 and "shall identify strategic priorities for European standardisation, taking into account Union long-term strategies for growth. It shall indicate the European standards and European standardisation deliverables that the Commission intends to request from the European standardisation organisations in accordance with Article 10".

In order to further promote ICT standardisation and develop action plans in support of a set of key EU priority areas for the digital single market the Commission adopted the Communication on ICT standardisation priorities[7] in 2016 "to set out a comprehensive strategic and political approach to standardisation for priority ICT technologies that are critical to the completion of the Digital Single Market". Many actions of the Rolling plan support the implementation of the priorities of this Communication.

The European Multi-Stakeholder Platform on ICT Standardisation (MSP) is a group of experts set-up by Commission Decision 2011/C349/04 with the aim to advise the Commission on all matters related to ICT standardisation. The MSP is composed of all Member States and EFTA countries and all other relevant stakeholders, including standards developing organisations, industry, SMEs and societal stakeholders in the area of ICT standardisation. Its tasks include, inter alia, providing advice on the content of the Rolling Plan and on the ICT technical specifications susceptible to be identified by the Commission for referencing in public procurement (*Regulation EU 1025/2012, Art. 13 and 14*).

In addition there are a number of further technical advisory groups to the Commission that have standardisation within their scope and in a number of cases are called by sectorial regulation (e.g. energy, environment and transport).

DEVELOPMENT AND MAINTENANCE OF THE ROLLING PLAN

The Rolling Plan is a living document. It aims at covering as much as possible the broad range of standardisation activities, technical specifications and standards relevant for the respective Policy objectives and topic areas, but it is not based on a systematic search.

The Rolling Plan is a Commission document, which is collaboratively and regularly reviewed based on input from the EU Services and the advice of the MSP, on an annual or by-need basis. In between two versions of the Rolling Plan, factual updates in chapter 3 are provided as needed in the form of Addenda to the Rolling Plan.

The Rolling Plan is based on broad stakeholder input on ICT standardisation topics and strategies. All stakeholders represented in the MSP provide regular input and feedback and thus contribute to the development of a concise picture on ongoing standardisation activities as well as on standardisation needs and market and policy needs in general.

6 The term "standards" is used in this document in a generic way for all such deliverables from both recognised standards organisations and from standardisation fora and consortia – or the terms "standards and technical specifications" are used. Yet, whenever required in this document the terms are specified in a more detailed way drawing on the definitions given in the Regulation on European standardisation (1025/2012/EU).

7 COM(2016) 176

The Rolling Plan does not claim to be comprehensive or complete. It provides a perspective at a given point in time and subject to the contributions received and integrated.

The term "standards" is used in this document in a generic way for all deliverables from both recognised standards organisations and from standardisation fora and consortia – or the terms "standards and technical specifications" are used. Yet, whenever required in this document the terms are specified in a more detailed way, drawing on the definitions given in the Regulation on European standardisation (1025/2012/EU).

PROMOTING THE IMPLEMENTATION OF STANDARDS

THE USE OF STANDARDISATION IN SUPPORT OF POLICY MAKING

An important objective of this Rolling Plan is to create awareness of the importance of ICT standards in the context of policy making and to promote the use and uptake of standards in general in order to increase ICT interoperability in those policy areas that were identified as needing ICT standardisation activities. To this end, the Rolling Plan may look at the full spectrum of available instruments for promoting awareness about standardisation and standards; for identifying and mapping standards, finding standardisation gaps and kicking off new activities in ICT standardisation; and for making use of standardisation, standards and technical specifications in policies. International cooperation regarding ICT standardisation may also be addressed.

The proposed actions around standardisation in this Rolling Plan may, therefore, directly address standard developing organisations (SDOs), but they may also be directed to public authorities and to the various stakeholders, suggesting some activities which are considered important in the context of specific policy making and of promoting the uptake and implementation of standards.

In some instances standardisation or the availability of standards can be helpful or even a precondition to implement a policy or a piece of legislation. Standards and technical specifications in ICT ensure interoperability and promote open ICT ecosystems. Standardisation may, therefore, play an important role in promoting the uptake of new technologies or the transformation of technologies and systems into new, innovative complex systems including ICT technologies and combining them with other technologies and technology layers. In this respect, the availability of a standard or technical specification may also facilitate legislation enforcement and allow the target users to actually implement the policy.

Once standardisation activities or specific standards or technical specifications have been identified as needed in support of a policy or legislation, it is, however, important that the respective activities or standards are well known and get broadly accepted, used and implemented. Different instruments can be pursued in promotion of the uptake of standards. Some of these instruments are generic, i.e. independent of the standard concerned. Examples are guidance of public procurement on how to ask for standards in general; conferences to raise awareness on the importance of ICT standards; or the Catalogue of ICT Standards for public procurement, an initiative of the European Commission[8]. It may also be important that the respective policy contexts in which specific standards are to be used are highlighted, best with broad stakeholder involvement, and awareness is raised on the importance, benefit and need of using the standards within the policy contexts.

In general, adoption instruments can be classified according to the nature of the instruments (communication/education or mandating/comply or explain/procurement) or to the development phase of the standard (preliminary, creation, drafting, adoption).

Of course, not all instruments are available for all stakeholders and are not relevant in all phases of policy making. Obliging standards by law is, for example, only possible for public authorities and only when it concerns an international, European or national standard. Providing free and easy insight in the specifications documents is up to the SDO concerned and is relevant in all development phases of a standard.

8 See next section

PUBLIC PROCUREMENT

Governments can promote the uptake and implementation of standards and specifications via public procurement.

The Regulation on European Standardisation 1025/2012, which came into force in January 2013, offers the possibility to identify relevant ICT specifications under conditions defined in Articles 13 and 14. Identified ICT technical specifications get the status of common technical specifications and may be referenced by public procurers.

To strengthen the Single Market and as part of the continuous effort to stimulate investment in the EU, in October 2017 the Commission adopted the Public Procurement Package, an initiative[9] to carry out procurement more efficiently and in a sustainable manner, while making full use of digital technologies to simplify and accelerate procedures.

The EU Catalogue of ICT Standards for Public Procurement, one of the recommendations included in the Package, aims to streamline and organise a multitude of procurement guidelines and technical requirements from a contracting user point of view, helping them procure systems which are more sustainable and interoperable.

The Catalogue is a web portal, which is currently being piloted. It will be designed around specific procurement sectors and procurement stages to provide relevant guidance (such as guidelines, reusable tender specification fragments, referenceable technical specifications and standards) to public procurers for the drafting and executing of tenders.

RESEARCH AND INNOVATION

Research is a rich source for new standards or standards components and for applying available standards in advanced technology contexts. The new knowledge resulting from publicly funded research and innovation programmes can be included in new or improved standards, contributing both to the implementation of the research outcomes and the usage of standards. Historically, many European ICT research projects under EU R&D Framework Programmes have used standards or contributed to their development. EU funded pilot projects are also an important tool to test standards and provide feedback to standardisation development organisations for improvement.

Initiatives linking ICT standardisation and ICT R&I appear to be most effective when carried out at the research planning stage. Standardisation awareness is therefore essential in the research life cycle. Standardisation bodies have partially set up links into research activities for facilitating the uptake of standardisation deliverables in research projects and the transfer of research results into standardisation. Research support actions can also contribute to support standardisation activities, liaison between R&I projects and standardisation organisations, awareness and international cooperation.

Similar programmes have been set up to address the needs of innovative small and medium enterprises (SMEs). The objectives are to promote the use and implementation of standards by SMEs but also to encourage and facilitate their participation in standardisation. Failing to support innovative SMEs could seriously restrict the market impact of these SMEs, and their long-term growth prospects.

Standards, in particular when set at European or international level, can contribute to the integration of the single market**,** also for services, by helping companies improve quality of their offer and providing customers with a wider choice and better prices.

TESTING AND QUALITY IMPROVEMENT IN STANDARDS

If standards are to be successful in terms of widespread deployment, it is necessary to ensure that there are products and services implementing them and that they are truly interoperable.

Therefore, one of the main aims of European and global standardisation is to enable interoperability in a multi-vendor, multi-network, multi-service environment. Interoperability gives users a much greater choice of products and services, and enables manufacturers and service providers to benefit from economies of scale in a wider market. There is a broad stakeholder demand in the marketplace to ensure interoperability.

The validation of standards and products through open interoperability events is an example of how to achieve this in a pragmatic and efficient manner. Organising such events in the earlier phases of the development of standards can give quality assurance and facilitates the development of commonly agreed standardised solutions.

9 http://ec.europa.eu/docsroom/documents/25612

Interoperability testing leads not only to better products but to better standards, suited to the user needs. It gives stakeholders confidence to implement standards and to release products in a timely manner.

Standards bodies, governments and other organisations regularly organise interoperability events, e.g. in the form of plug tests, plug fests, etc. One example is, for instance, the ETSI "Plugtests™ events". Typically these interoperability events gather different vendors (often competitors) in order to check whether their products properly implement standards and are interoperable between them. This approach has proven to be a practical way to boost interoperability further to the development of standards, and has been applied with some success to standards and specifications issued by other organisations, including formal standards bodies and industry consortia.

Some fora and consortia also have internal interoperability and conformance testing requirements applied to specifications as a quality control matter prior to their finalisation as standards.

NEW ACTIONS

In summary, new standardisation related initiatives to further support the effective take up and implementation of standards in the priority domains identified by the Rolling Plan could cover:

- awareness, promotion, conferences, information and education to all stakeholders including societal stakeholders, paying particular attention to the cooperation with R&I and SMEs involvement
- implementation of field operational tests, pilot projects and interoperability testing
- exchange of good practice between Member States and between standardisation organizations, including international cooperation
- guidelines for procurers on how to mention standards
- monitoring the use of standards in IT systems and in IT procurement. Monitoring is an effective way to get insight in the adoption of a standard and makes it possible for standards users to learn from each other (higher ranking countries/organisations could teach others how to get a standard adopted)
- Encouraging major IT suppliers to implement selected standards in their products.


1234 5678 1234 5678

EU POLICY AREAS SUPPORTED BY ICT STANDARDISATION

KEY ENABLERS AND SECURITY

5G

POLICY AND LEGISLATION

POLICY OBJECTIVES

The 2015 digital single market (DSM) strategy and the communication "Towards connectivity for a European gigabit society" identify very high-capacity networks like 5G as a key asset for global competitiveness. 5G is not fully standardised yet but its key specifications and technological foundations are already being developed and tested. The Commission launched a 5G public-private-partnership (the 5G-PPP) to that end in 2013[1]. In addition to fibre-like performance for mobile networks, the benefits of adopting 5G go beyond the telecom sector to enable a fully mobile and connected society and to empower socio-economic transformations in a variety of ways (many of which are not possible at present). These transformations include higher productivity, sustainability, well-being[2] and innovation opportunities for smaller actors and start-ups. 5G makes possible a new wave of convergence possible through digital business models reaching non-ICT-native industrial sectors. In that context, the EU sees 5G as a core infrastructure to support the DSM strategy's wider objectives for the digitisation of the industry.

EC PERSPECTIVE AND PROGRESS REPORT

The Communication on ICT standardisation priorities[11] identifies 5G standards as key to competitiveness and the interoperability of global networks, with stakeholders from different standardisation cultures called upon to collaborate. It also details the actions required.

The standardisation agenda of 5G has largely been set out. The aim is early availability of standards for 'super' broadband solutions. Special focus is given to ultra-reliability and low latency, which are also targets for the first 5G wave. The second phase should deliver the standards for other use-cases, such as those related to industrial applications. Here, availability of standards promoting open innovation and opportunities for start-up is also key.

The European Commission has called on Member States and industry to commit to the following objectives:

- a standardisation approach that preserves future evolution capabilities and aims at availability of 5G global standards by end of 2019;
- a holistic standardisation approach encompassing both radio access and core networks as coordinated activities within global standardisation bodies, encompassing disruptive use-cases and promoting open innovation;
- establishment of cross-industry partnerships by 2017, at the latest, to support timely standard-setting, partly by leveraging international cooperation partnerships, in particular towards the digitisation of industry.

REFERENCES

The strategy for Digitising European Industry[3] and the Communication on ICT standardisation priorities for the digital single market[4] announced the European Commission's intention to develop a 5G action plan for EU-wide deployment, which was adopted in September 2016[5]. The communication draws on multiple consultations, events[6] with stakeholders, a targeted survey[7], several studies[8], a 5G industry manifesto[9] and early results[10] of the 5G-PPP. It presents a set of targeted actions for a timely and coordinated deployment of 5G networks in Europe through a partnership between the Commission, Member States, and industry. It leverages the new opportunities offered by the revised telecommunication regulatory framework by putting it in the context of a concrete European project of high added value for businesses and citizen.

Furthermore, Member States, in the Ministerial Declaration of Tallinn of July 2017[12] have identified the objective of preserving 5G global interoperability as key in order to make 5G a success for Europe. Standards are of paramount importance to ensure the competitiveness and interoperability of global telecommunication networks. Therefore Member States endorse a "comprehensive and inclusive approach to 5G standardisation as a priority for the DSM". Member States promote "cross-industry partnerships to support the timely definition of standards backed by industrial user experiments, including through the leveraging of international cooperation partnerships, in particular for the digitisation of industry. Encouraging innovation and development of products and services making use of 5G networks across the EU should be a priority"

REQUESTED ACTIONS

The Communication on ICT standardisation priorities for the digital single market proposes priority actions on 5G, some of which are reflected under the heading *Additional information*.

ACTION 1 Global industry standards. Foster the emergence of global industry standards under EU leadership for key 5G technologies (radio access network, core network) and network architectures notably through the exploitation of 5G public-private partnership results in key EU and international standardisation bodies (3GPP, ITU, ETSI NFV)

ACTION 2 High-level events. Ensure that 5G standards are compatible with innovative use-cases of vertical industries, notably through broader participation of industries with sector-specific needs and in close collaboration with other industry specific standards developing organisations, in 5G standardisation organisations.

ACTIVITIES AND ADDITIONAL INFORMATION

RELATED STANDARDISATION ACTIVITIES

ETSI (3GPP)

3G PP, the key standardisation global body for mobile communication network standardisation, officially started the standardisation process in September 2015, with an inception workshop in Phoenix that brought together more than 500 participants. Since then, it has laid down the timetable. 3G PP plans to deliver a first release, release 15 (mainly focused on broadband and including ultra-reliability and low latency) in mid 2018, while a second release covering the complementary use-cases, related to industry applications, should be available by the end of 2019 under 3G PP release 16.

Network Functions Virtualisation (NFV) is a key technology enabler for 5G: ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://etsi.org/nfv/.

The NFV Industry Specification Group (ISG) is developing a report aimed at documenting how 5G network slicing use cases can be mapped to current NFV concepts and supported by the ETSI NFV architectural framework. 5G networks are anticipated to take advantage of Cloud-native principles for the design of some of their network functions (e.g. to facilitate scaling and healing) and the ISG is developing a specification of criteria to help characterize such functions.

ETSI has initiated a project to develop an Open Source NFV Management and Orchestration (MANO) software stack aligned with ETSI NFV - ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://osm.etsi.org/

ETSI (DECT)

ETSI TC DECT, which has developed the IMT-2000 FDMA/TDMA radio interface, has started with the standardisation of the new DECT-2020 system. The work item on DECT evolution was approved September 2015 and the corresponding Technical Report TR 103 422 was published in June 2017. The completion of the Technical Report TR 103 514 'DECT-2020 New Radio' is planned in mid 2018 and the completion of the Technical Specifications for DECT-2020 is planned in 2020 and is planned to fulfil the IMT-2020 requirements.

IEEE

IEEE has many efforts underway to develop and mature standards in support of the next generation communications technologies for enhanced mobile broadband, massive machine type communications, and ultra-reliable and low latency communications. These include both licensed and unlicensed band initiatives. Next generation wireless standards for unlicensed spectrum include the following:

- IEEE P802.11ax is an extension of the current WLAN standards by improving aggregated throughput with high user density. P802.11ax targets Mid Band, sub 6GHz unlicensed spectrum
- IEEE P802.11ay targets bonding 2GHz channels to achieve extremely high point to point throughput in excess of 20Mbps. P802.11ay is implemented in the unlicensed millimeter wave band (60GHz)
- IEEE 802.11ax implementation of new energy saving options and the implementation of the frequency range 5925-6425 MHz
- In addition, IEEE developed 802.11p/1609 to enable V2X communication for the automotive sector.
- IEEE standards and ongoing activities in support of various wireless technologies include:
- Packet-based fronthaul transport networks in support of dense deployments of very small cells (IEEE P1914.1)
- Radio over Ethernet (IEEE P1914.3) in support of backhaul and fronthaul over ethernet
- Precision Timing Protocol (IEEE 1588) which enables phase synchronous wireless networks such as LTE TDD
- IEEE 802 access network (IEEE P802.1CF) and time sensitive networking for fronthaul (P802.CM)
- Tactile networking: P1918.1 covering application scenarios, architecture and functions, P1918.1.1 specifies Haptic Codecs
- Radio Regulatory Technical Advisory Group (802.18) and Wireless Coexistence (802.19)

For a list of these and other IEEE standardization activities related to 5G and next generation communications technologies, please see: ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://standards.ieee.org/develop/msp/5G.pdf

ITU

In ITU, 5G technologies are discussed under the IMT-2020 banner.

In November 2015 the ITU-T Focus Group on IMT-2020 delivered a Gap Analysis document "overview of technical developments at the network part of the 5G networks" including 85 technical areas for future 5G standardization and nine deliverables in the following areas:

- terms and definitions for IMT-2020;
- high-level network architecture for 5G; network softwarization;
- Information Centric Networking (ICN);
- Fixed and Mobile Convergence.

See a related flipbook at:

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.itu.int/en/publications/Documents/tsb/2017-IMT2020-deliverables/mobile/index.html#p=1

Since then, ITU-T SG13, SG11, SG15 and SG5, complemented by ITU-R WP5D are driving the 5G standardization in ITU and have already approved 11 technical Recommendations, 3 Supplements and 8 Reports with about 37 open work items covering the following topics: Information Centric Networking (ICN); Network Sofwarization/MANO; Definitions; Slicing; Quality of Service (QoS); Network Architecture; Network Capability Exposure; Fixed- Mobile Convergence (FMC); Disaster Relief Applications; Spectrum Management; Transport Networks (e.g. Fronthaul, Middlehaul, Backhaul); Radio-Over-Fibre (RoF); Signalling, Control and Protocols as well as Environmental Aspects of IMT-2020/5G.

For more details see ▸ http://www.itu.int/en/ITU-T/studygroups/2017-2020/13/Documents/5G

EC

There are several projects funded by the European Commission, dealing with 5G standardisation. Also, the 5G PPP deals with some issues connected to 5G standardisation.
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://5g-ppp.eu/

ADDITIONAL INFORMATION

Interactions between IETF and 5G developments fall into several categories:

- New dependencies on existing IETF technology. For instance, introducing a flexible authentication framework based on EAP (RFC 3748, RFC 5448).
- Dependencies on ongoing IETF work. The IETF DETNET working group defines mechanisms to guarantee deterministic delays for some flows across a network. As one of the 5G use cases is time-critical communication and low-latency applications, this is a component technology that is being looked at. Similarly, IETF routing-related work such as traffic engineering, service chaining and source routing are likely tools for managing traffic flows in 5G networks, as they are for other large service provider networks.
- During the IETF 99 meeting in Prague there was a lunch session on the topic of 3GPP & IETF collaboration on 5G. There was a also a BoF meeting on the topic of Network Slicing. There are many IETF tools already for dealing with virtualisation and separation of networks (see 3.1.2 Cloud computing, below), so first order of business is mapping what can be done with those tools for the 5G use case.

[1] https://5g-ppp.eu
[2] Next Generation Mobile Networks Alliance 5G White Paper, https://www.ngmn.org/de/5g-white-paper.html
[3] https://ec.europa.eu/digital-single-market/en/digitising-european-industry
[4] COM(2016) 176 final, page 8
[5] COM(2016) 588 final 5G for Europe: An Action Plan and accompanying Staff Working Document SWD(2016) 306 on 5G Global Developments.
[6] see: e.g. https://5g-ppp.eu/event-calendar/#
[7] https://ec.europa.eu/digital-single-market/en/news/have-your-say-coordinated-introduction-5g-networks-europe
[8] see footnotes 4 & 5 above
[9] Industry Manifesto 7 July 2016: http://ec.europa.eu/newsroom/dae/document.cfm?action=display&doc_id=16579;
[10] White paper 5G Empowering Vertical Industries: https://5g-ppp.eu/roadmaps/
[11] COM(2016) 176 final
[12] Ministerial Declaration "Making 5G a success for Europe" signed during the informal meeting of competitiveness and telecommunications ministers on 18 July in Tallinn

CLOUD COMPUTING

POLICY AND LEGISLATION

POLICY OBJECTIVES

Establishing a coherent framework and conditions for cloud computing was one of the key priorities of the digital agenda for Europe. The digital single market strategy confirmed the importance of cloud computing, which is driving a paradigm shift in the delivery of digital technologies, enhancing innovation, digital single market and access to content.

EC PERSPECTIVE AND PROGRESS REPORT

The key role of cloud computing is established through the European Cloud Initiative and through the initiative on Building a European Data Economy. Cloud computing is developing fast. Estimates indicate that these developments could lead to the growth of the European cloud market from €9.5bn in 2013 to €44.8bn by 2020, i.e. almost five times the market size in 2013. The latest Eurostat data available (end of 2014) shows the current state of play in the European Union regarding the use of cloud computing by enterprises. The main findings are summarised below:

- 19 % of EU enterprises used cloud computing in 2014, mostly for hosting their e-mail systems and storing files in electronic form.
- 46 % of those firms used advanced cloud services relating to financial and accounting software applications, customer relationship management or to the use of computing power to run business applications.
- Four out of ten enterprises (39 %) using the cloud reported the risk of a security breach as the main limiting factor in the use of cloud computing services.
- A similar proportion (42 %) of those not using the cloud reported insufficient knowledge of cloud computing as the main factor that prevented them from using it.
- The development of the cloud computing market and the efficient delivery of cloud services particularly depend on the ability to build economies of scale. The establishment of a Digital Single Market will unlock the scale necessary for cloud computing to reach its full potential in Europe.
- In 2012, the Article 29 data protection working party issued on opinion on cloud computing . This opinion has outlined how the wide scale deployment of cloud computing services can trigger a number of data protection risks, mainly a lack of control over personal data as well as insufficient information with regard to how, where and by whom the data is being processed/ sub-processed.

- The proposed actions follow the direction as outlined in the EU Communication on ICT standardisation priorities which identified cloud as a key priority for Europe. The actions include a follow-up of cloud standards coordination started in 2012/2013 when the Commission asked ETSI to coordinate stakeholders to produce a detailed map of the necessary standards (e.g. for security, interoperability, data portability and reversibility).
- The Cloud Select Industry Group (C-SIG) is open to all organisations, groups and individuals having a professional interest in cloud computing matters and are active in the European cloud market. The Communication "Unleashing the Potential of Cloud Computing in Europe" (2012) identified key actions to be supported by Cloud Select industry Groups. *See section below.*
- The Commission is also pursuing international cooperation in the field of cloud computing, and a number of policy and joint research initiatives have been put in place with Japan, Brazil and South Korea.
- The Commission has also funded the CloudWatch2 project which, among others, reported on the status of interoperability and security standards, developed a catalogue of cloud services, mapped EU cloud services and providers.
- When it comes to certification and ways for customers to know and be assured that their data is equally safe no matter where they are located or who provides the service, the Commission launched the study Certification Schemes for Cloud Computing (SMART 2016/0029) and a public consultation which ended in October 2017.
- In the view of facilitating a fair market for the consumers, the Commission also launched a study on Switching cloud providers (SMART 2016/0032) to collect evidence on legal, economic, and technical issues when switching from provider .

REFERENCES

- COM(2016)176 "ICT Standardisation priorities for the digital single market"
- COM(2016)178 "European cloud initiative — building a competitive data and knowledge economy in Europe" (Along with SWD(2016)106 and SWD(2016)107)
- COM(2012)529 "Unleashing the potential of cloud computing in Europe"
- COM(2015)192 "A digital single market strategy for Europe"
- Directive (EU) 2016/1148 of the European Parliament and of the Council of 6 July 2016 concerning measures for a high common level of security of network and information systems across the EU (NIS Directive).
- 'ICT Strategy of the German Federal Government: Digital Germany 2015' (TFRP011_DE_ict-strategy-digital-germany-2015.pdf), p.10.
- 'The new cloud computing action programme comprises four fields of activity: harnessing innovation and eIDAS market potential (research programme for secure Internet services, cloud computing for small and medium-sized enterprises and the public sector — trusted cloud); creating a pro-innovative framework (security and legal framework, standards, certification); co-shaping international developments; providing informational guidance'.

REQUESTED ACTIONS

The Communication on ICT Standardisation Priorities for the digital single market proposes priority actions in the domain of Cloud. Actions mentioned below reflect some of them.

ACTION 1 Identify needs for ICT standards to further improve the interoperability, data protection and portability of cloud services and start respective development activities.

ACTION 2 Promote the use of the ICT standards needed to further improve the interoperability, data protection and portability of cloud services.

ACTION 3 Further strengthen the interlock between standardisation and open source in the area of Cloud and establish and support bilateral actions for close collaboration of open source and standardisation.

ACTION 4 Promote international standards on service level agreements (SLAs) and usage of the cloud code of conduct (CoC).

ACTION 5 ESOs are asked to update the mapping of cloud standards and guidelines for end-users (especially SMEs and the public sector), in collaboration with international SDOs, cloud providers and end users. This action could also draw on the material developed, e.g. to update the standards mapping carried out by cloud standards coordination phases 1 & 2.

ACTION 6 Promote the use of the ISO/IEC JTC 1 reference cloud architecture and define generic cloud architecture building blocks. Map available standards to the generic cloud architecture building blocks. Define privacy, security and test standards for each building block. This will also help determine which standards can be used for open cloud platforms and architectures taking into account the key role of open source for cloud infrastructure design and implementations.

ACTIVITIES AND ADDITIONAL INFORMATION

RELATED STANDARDISATION ACTIVITIES

ETSI

Cloud standards coordination.

In January 2016, the (now closed) ETSI Cloud Standards Coordination (CSC) Task Force has produced four reports on user's needs, on standards an open source, on interoperability and security, and on standards maturity assessment, available under http://csc.etsi.org/.

The Network Functions Virtualization (NFV) Industry Specification Group (ISG) has initiated, within the framework of the Release 3 specification effort, a report on the enhancements of the NFV architecture for providing "PaaS"-type capabilities and supporting VNFs which follow "cloud-native" design principles. It is also developing a specification of criteria to help characterize cloud-native virtualised network functions, .

Related to NFV, Multi-access Edge Computing (MEC) provides IT and cloud computing capabilities within the access segments of network infrastructure, in close proximity to network users. To application developers and content providers, the access network offers a service environment with ultra-low latency and high bandwidth and direct access to real-time network information that can be used by applications and services to offer context-related services. ETSI ISG NGP is investigating communications and networking protocols to provide the scale, security, mobility and ease of deployment required for a connected society. The industry has reached a point where forward leaps in the technology of the local access networks (such as LTE-A, G.FAST, DOCSIS 3.1 and 5G) will not deliver their full potential unless, in parallel, the entire infoComms protocol stacks evolve more holistically. The driving vision is a considerably more efficient Internet that is far more attentive to user demand and responsiveness — whether "the user" is human or millions of things. Therefore, the ISG will stimulate closer cooperation over standardisation efforts for generational changes in communications and networking technology.

ISO/IEC

ISO/IEC JTC 1/SC 38: Cloud computing and distributed applications

A full suite of standards is available and in progress in ISO/IEC JTC 1 SC 38 on cloud computing technologies including, most notably, the ISO Cloud Reference Architecture but also work on vocabulary, SLAs, etc. This is complemented by work in ISO/IEC JTC 1 SC27 on cybersecurity and on more specific work as on Virtualisation. Below is a non-exhaustive list of relevant ISO standards. ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.iso.org/iso/jtc1_sc38_home

ISO/IEC 27017 — Code of practice for information security controls based on ISO/IEC 27002 for cloud services

ISO/IEC 27018 — Code of practice for personally identifiable information (PII) protection in public cloud acting as PII processors

ISO/IEC 27036-4 — Information security for supplier relationships — Part 4: Guidelines for security of cloud services

ISO/IEC 19086-1 — Cloud computing — service level agreement (SLA) framework and terminology — Part 1: Overview and concepts [publication imminent]

ISO/IEC 19941 Cloud Computing — Interoperability and portability

ISO/IEC 19944 Cloud Computing — Cloud services and devices: data flow, data categories and data use

ISO/IEC JTC 1/SC 27: Security Techniques: Development of standards for the protection of information and ICT

This includes generic methods, techniques and guidelines to address both security and privacy aspects

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.iso.org/iso/iso_technical_committee?commid=45306

ITU

ITU-T Study Group 13 leads ITU's work on standards for future networks and 5G and is the primary SG working on cloud computing. To this end, it approved 15 recommendations covering different aspects of cloud computing from terminology and overview to reference architecture and functional requirements for technologies supporting XaaS and inter-cloud computing.
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.itu.int/rec/T-REC-Y/e

This work is complemented by SG11 for cloud computing conformance and interoperability testing (Approved Q.Supplement 65 on Cloud computing interoperability activities and Recommendation ITU-T Q.4040 "The framework and overview of Cloud Computing interoperability testing") and SG17 for cloud computing security. The cloud computing roadmap, maintained by SG13, lists and points to cloud computing standardisation efforts deliverables across telco/IT industry.
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://extranet.itu.int/sites/itu-t/Roadmaps/SitePages/JCA-Cloud-Standard.aspx

Also, SG13 is progressing the work on distributed cloud, cloud service brokerage, data storage federation, containers and micro-services requirements for physical machinery, requirements for inter-cloud data management and inter-cloud trust management.
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://itu.int/ITU-T/go/sg13

SG17 started approval of Data security requirements for the monitoring service of cloud computing (X.dsms), and is working on Security requirements of public infrastructure as a service (IaaS) in cloud computing (X.SRIaaS) and Security requirements of Network as a Service (NaaS) in cloud computing (X.SRNaaS).
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://itu.int/ITU-T/go/sg17

IEEE

The IEEE Intercloud Testbed ("Testbed" for short) is creating a global lab — to prove and improve the intercloud, based on IEEE P2302 draft standard for Intercloud interoperability and federation. To that end, IEEE is partnering with companies, universities, and research institutions around the world to create a well-connected standards-based platform for the intercloud. The IEEE cloud computing testbed also could be used to experiment with other IEEE cloud computing products and services such as eLearning education modules.
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://standards.ieee.org/develop/msp/cloudcomputing.pdf.

IETF

The IETF has multiple groups working on standards for virtualisation techniques, including techniques used in cloud computing and data centers.

The L2VPN working group produced specifications defining and specifying solutions for supporting provider-provisioned Layer-2 Virtual Private Networks (L2VPNs). They are also addressing requirements driven by cloud computing services and data centers as they apply to Layer-2 VPN services.

The L3VPN working group is responsible for defining, specifying and extending solutions for supporting provider-provisioned Layer-3 (routed) Virtual Private Networks (L3VPNs). These solutions provide IPv4, IPv6, and MPLS services including multicast.

The Layer Three Virtual Private Network Service Model (L3SM) working group is tasked with creating a YANG data model that describes a L3VPN service (an L3VPN service model) that can be used for communication between customers and network operators, and to provide input to automated control and configuration applications.

The Interface to Network Security Functions (I2NSF) working group is focused on the management of external network security functions (NSFs), typically hosted in cloud and/or NFV environments. NSFs ensure integrity, confidentiality and availability of network communications, detect unwanted activity, and block it or at least mitigate its effects. The primary goal of I2NSF is to define an information model, a set of software interfaces and data models for controlling and monitoring aspects of such NSFs.

The NVO3 working group develops a set of protocols and/or protocol extensions that enable network virtualization within a data center (DC) environment that assumes an IP-based underlay. An NVO3 solution provides layer 2 and/or layer 3 services for virtual networks enabling multi-tenancy and workload mobility, addressing the issues described in the problem statement (including management and security).

The System for Cross-domain Identity Management (SCIM) working group works on standardising methods for creating, reading, searching, modifying, and deleting user identities and identity-related objects across administrative domains, with the goal of simplifying common tasks related to user identity management in services and applications.

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://trac.tools.ietf.org/group/iab/trac/wiki/Multi-Stake-Holder-Platform#Cloud.

OGF

Open Grid Forum (OGF) is a leading standards development organisation operating in the areas of grid, cloud and related forms of advanced distributed computing. The OGF community pursues these topics through an open process for development, creation and promotion of relevant specifications and use-cases.
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.ogf.org/

OMG

Object Management Group (OMG): the OMG's focus is always on modelling, and the first specific cloud-related specification efforts have only just begun, focusing on modelling deployment of applications & services on the clouds for portability, interoperability & reuse. ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.omg.org/

Hosted by the OMG is the Cloud Standards Customer Council, which has produced a series of customer-oriented white papers on diverse topics related to cloud computing, all of which are publicly accessible at: ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.cloud-council.org/resource-hub.htm

OASIS

OASIS hosts multiple standardisation projects for cloud computing management, interoperability and functionality, including

Cloud Application Management for Platforms (CAMP)
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://www.oasis-open.org/committees/camp,

Cloud Authorisation project, the OASIS Identity in the Cloud project
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://www.oasis-open.org/committees/id-cloud,

OASIS Open Data Protocol (Odata) Protocol
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://www.oasis-open.org/committees/odata,

Topology and Orchestration Specification for Cloud Applications (TOSCA)
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://www.oasis-open.org/committees/tosca.

The OASIS TOSCA TC and ETSI NFV ISG are cooperating to provide comments on each other's specifications, and sharing content, so as to align their Network Functions Virtualisation (NFV) service models and specifications.
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://www.oasis-open.org/committees/tc_cat.php?cat=cloud

C-SIGS

The cloud select industry groups as a contribution from Europe to the global cloud standardisation community.

Cloud Select Industry Group on Code of Conduct: the European Commission has been working with industry to finalise a code of conduct for cloud computing providers. The code of conduct supports a uniform application of data protection rules by cloud service providers. The Code of Conduct for Protection of Personal Data in cloud services has been published in June 2016. Strong relationship with ISO/IEC 27018 standard.

Cloud Select Industry Group on Service Level Agreements: the goal of this subgroup is to work towards the development of standardisation guidelines for SLAs for cloud services. Work was submitted to ISO/IEC SC38 committee as input to the work on the 19086 standards.

Cloud Select Industry Group on Certification Schemes: the Digital Single Market Strategy 2015 (DSM) committed the European Commission to delivering a European Cloud Initiative, including certification.

GICTF

Global Inter-Cloud Technology Forum (GICTF) is promoting standardisation of network protocols and the interfaces through which cloud systems inter-work with each other, to promote international interworking of cloud systems, to enable global provision of highly reliable, secure and high-quality cloud services, and to contribute to the development Japan's ICT industry and to the strengthening of its international competitiveness.

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.gictf.jp/index_e.html.

OCC

The Open Cloud Consortium (OCC) supports the development of standards for cloud computing and frameworks for interoperating between clouds; develops benchmarks for cloud computing; and supports reference implementations for cloud computing, preferably open source reference implementations. The OCC has a particular focus in large data clouds. It has developed the MalStone Benchmark for large data clouds and is working on a reference model for large data clouds.

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://opencloudconsortium.org/

TM FORUM

TM Forum: The primary objective of TM Forum's Cloud Services Initiative is to help the industry overcome these barriers and assist in the growth of a vibrant commercial marketplace for cloud-based services. The centrepiece of this initiative is an ecosystem of major buyers and sellers who will collaborate to define a range of common approaches, processes, metrics and other key service enablers.

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.tmforum.org/DigitalServices/13907/home.html

SNIA

Storage Networking Industry Association (SNIA): The Cloud Work Group exists to create a common understanding among buyers and suppliers of how enterprises of all sizes and scales of operation can include cloud computing technology in a safe and secure way in their architectures to realise its significant cost, scalability and agility benefits. It includes some of the industry's leading cloud providers and end-user organisations, collaborating on standard models and frameworks aimed at eliminating vendor lock-in for enterprises looking to benefit from cloud products and services.

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.snia.org/cloud

ADDITIONAL INFORMATION

Open source projects address particular aspects of cloud computing (e.g. OpenStack (IaaS), the Open Networking Foundation (ONF), Cloud Foundry (PaaS) and Docker (Container technology)) and as such, open source communities should be encouraged to collaborate with standardisation and submit their APIs for standardisation.

PUBLIC SECTOR INFORMATION, OPEN DATA AND BIG DATA

POLICY AND LEGISLATION

POLICY OBJECTIVES

With the continuously growing amount of data (often referred to as 'big data') and the increasing amount of open data, interoperability is increasingly a key issue in exploiting the value of this data.

Standardisation at different levels (such as metadata schemata, data representation formats and licensing conditions of open data) is essential to enable broad data integration, data exchange and interoperability with the overall goal of fostering innovation based on data. This refers to all types of (multilingual) data, including both structured and unstructured data, and data from different domains as diverse as geospatial data, statistical data, weather data, public sector information (PSI) and research data (see also the rolling plan contribution on 'e-Infrastructures for data and computing-intensive science'), to name just a few.

EC PERSPECTIVE AND PROGRESS REPORT

Overall, the application of standard and shared formats and protocols for gathering and processing data from different sources in a coherent and interoperable manner across sectors and vertical markets should be encouraged, for example in R&D&I projects and in the EU open data portal (https://data.europa.eu/euodp) and the European data portal (https://data.europa.eu/europeandataportal).

Studies conducted for the European Commission showed that businesses and citizens were facing difficulties in finding and re-using public sector information. The *Communication on Open data* states that "the availability of the information in a machine-readable format and a **thin layer of commonly agreed metadata** could facilitate data cross-reference and interoperability and therefore considerably enhance its value for reuse". [3]

A common standard for the referencing of open data in the European open data portals would be useful. A candidate for a common standard in this area is the data catalog vocabulary (DCAT) in collaboration with FIWARE open stack-based specification and open standards APIs[4] (see heading *Related standardisation activities*)

The DCAT Application Profile has been developed as a common project from the ISA programme, the Publications Office (PO) and CNECT to describe public-sector data catalogues and datasets and to promote the specification to be used by data portals across Europe. Agreeing on a common application profile and promoting this among the Member States will substantially improve the interoperability among data catalogues and the data exchange between Member States. The DCAT-AP is the specification used by the European Data Portal, which is part of the Connecting Europe Facility infrastructure. The DCAT-AP and GeoDCAT-AP work also highlighted the need for further work on the core standard. These are topics for the W3C smart descriptions & smarter vocabularies (SDSVoc) under the VRE4EIC Project ▸ https://www.w3.org/2016/11/sdsvoc/ .

The mapping of existing relevant standards for a number of big data areas would be beneficial. Moreover, it might be useful to identify European clusters of industries that are with sufficiently similar activities to develop data standards. Especially for open data, the topics of data provenance and licensing (for example the potential of machine-readable licences) need to be addressed, as encouraged in the revised PSI Directive *(see next section)*.

The revised PSI Directive encourages the use of standard licences which must be available in digital format and be processed electronically (Article 8(2)). Furthermore, the Directive encourages the use of open licences available online, which should eventually become common practice across the EU (Recital 26). In addition, to help Member States transpose the revised provisions, the Commission adopted guidelines[5] which recommend the use of such standard open licences for the reuse of PSI.

REFERENCES

- COM(2014) 442 Towards a thriving data-driven economy
- COM(2016) 176 ICT Standardisation Priorities for the Digital Single Market
- COM(2017) 9 final Building a European Data Economy: A Communication on Building a European Data Economy was adopted on 10 January 2017. This Communication explores the following issues: free flow of data; access and transfer in relation to machine generated data; liability and safety in the context of emerging technologies; and portability of non-personal data, interoperability and standards. Together with the Communication the Commission has launched a public consultation.
- Decision (EU) 2015/2240 on interoperability solutions and common frameworks for European public administrations, businesses and citizens (ISA2 programme) as a means for modernising the public sector (ISA2)
- The revised PSI Directive (2013/37/EU) on the re-use of public sector information (Public Sector Information Directive) was published in the Official Journal on 27 June 2013. The Directive requests to make available for reuse PSI by default, preferably in machine-readable formats. All Member States transposed it into national legislation.
- COM(2011) 882 on Open data
- COM(2011) 833 on the reuse of Commission documents
- COM(2015)192 "A Digital single market strategy for Europe"

REQUESTED ACTIONS

The Communication on ICT Standardisation Priorities for the Digital Single Market proposes priority actions in the domain of Big Data. Actions mentioned herein below reflect some of them.

ACTION 1 Invite the CEN to support and assist the DCAT-AP standardisation process. DCAT-AP is based on the data catalogue vocabulary (DCAT). It contains specifications for metadata records to meet the specific application needs of data portals in Europe while providing semantic interoperability with other applications on the basis of reuse of established controlled vocabularies (e.g. EuroVoc[1]) and mappings to existing metadata vocabularies (e.g. SDMX, INSPIRE metadata, Dublin Core, etc.). DCAT-AP and its extensions have [CC(1] been developed by multi-sectorial expert groups. Experts from international standardisation organisations participated in the group together with open data portal owners to ensure the interoperability of the resulting specification and to assist in its standardisation. These mappings have provided already a DCAT-AP extension to cover geospatial datasets, called GEO/DCAT-AP. The specification was developed under the coordination of the JRC team working on the implementation of the INSPIRE Directive[CC(2] . Another extension to describe statistical datasets, called STAT/DCAT-AP[2], was published end 2016. This work has been coordinated by EUROSTAT and the Publications Office.

ACTION 2 Promote standardisation in/via the open data infrastructure, especially the European Data Portal[CNECT3] being deployed in 2015-2020 as part of the digital service infrastructure under the Connecting Europe Facility programme,

ACTION 3 Support of standardisation activities at different levels: H2020 R&D&I activities; support for internationalisation of standardisation, in particular for the DCAT-AP specifications developed in the ISA programme (see also **ACTION 2** under eGovernment section C[CNECT4]), and for specifications developed under the Future Internet public-private-partnership, such as FIWARE NGSI and FIWARE CKAN.

ACTION 4 Bring the European data community together, including through the H2020 Big Data Value public-private partnership, to identify missing standards and design options for a big data reference architecture, taking into account existing international approaches[CNECT5] .

ACTION 5 Encourage the CEN to coordinate with the relevant W3C groups on preventing incompatible changes and on the conditions for availability of the standard(s), to standardise the DCAT-AP.

ACTIVITIES AND ADDITIONAL INFORMATION

RELATED STANDARDISATION ACTIVITIES

ITU-T

Recommendation Y.3600 provides requirements, capabilities and use-cases of cloud computing based big data together with the system context. Cloud computing-based big data provides the capability to collect, store, analyse, visualize and manage varieties of large volume datasets, which cannot be rapidly transferred and analysed using traditional technologies. ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://itu.int/ITU-T/workprog/wp_item.aspx?isn=9853

SG13 published a roadmap for big data standardization in ITU-T under the name of Y.3600-series Supplement 40 "Big Data Standardisation Roadmap" that includes the standardisation landscape, identification/prioritization of technical areas and possible standardisation activities. The work is progressing on big data exchange framework and requirements, requirements for data provenance, big data metadata framework and conceptual model, requirements for data integration, data storage federation, data preservation, functional architecture of big data and BDaaS and some aspects of big data-driven networking like requirement of big data-driven networking mobile network traffic management and planning and application of DPI technology. ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://itu.int/itu-t/workprog/wp_search.aspx?sg=13

ITU-T SG20 "Internet of things (IoT) and smart cities & communities (SC&C)" is studying big data aspects of IoT and SC&C. For example Recommendation ITU-T U.4114 "Specific requirements and capabilities of the IoT for big data" complements the developments on common requirements of the IoT described in Recommendation ITU-T Y.4100/Y.2066 and the functional framework and capabilities of the IoT described in Recommendation ITU-T Y.4401/ Y.2068 in terms of the specific requirements and capabilities that the IoT is expected to support in order to address the challenges related to big data. This Recommendation also constitutes a basis for further standardization work such as functional entities, application programming interfaces (APIs) and protocols concerning big data in the IoT.
The Focus Group on Data Processing and Management to support IoT and Smart Cities & Communities was set up in 2017. The Focus Group plays a role in providing a platform to share views, to develop a series of deliverables, and showcasing initiatives, projects, and standards activities linked to data processing and management and establishment of IoT ecosystem solutions for data focused cities. This Focus Group is expected to develop a standardization roadmap for data management, taking into consideration the activities currently undertaken by the various standards developing organizations (SDOs) and forums. ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://itu.int/en/ITU-T/focusgroups/dpm

SG17 is working on Security guidelines for Big Data as a Service and Security guidelines of lifecycle management for telecom Big Data. ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://itu.int/ITU-T/go/sg17

W3C

DCAT vocabulary (done in the linked government data W3C working group) ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.w3.org/TR/vocab-dcat/

After a successful Workshop on Smart Descriptions & Smarter Vocabularies (SDSVoc) (www.w3.org/2016/11/sdsvoc/) W3C created the Dataset Exchange Working Group ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://www.w3.org/2017/dxwg to revise DCAT, provide a test suite for content negotiation by application profile and to develop additional relevant vocabularies in response to community demand

Work on licence in ODRL continues and has reached a very mature state: ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://www.w3.org/TR/odrl-model/ and ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://www.w3.org/TR/vocab-odrl/

The Data on the web best practices WG has finished its work successfully ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://www.w3.org/TR/dwbp also issuing data quality, data usage vocabularies ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://www.w3.org/TR/vocab-dqv ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://www.w3.org/TR/vocab-duv

OASIS

The project addresses querying and sharing of data across disparate applications and multiple stakeholders for reuse in enterprise, cloud, and mobile devices. Specification development in the OASIS OData TC builds on the core OData Protocol V4 released in 2014 and addresses additional requirements identified as extensions in four directional white papers: data aggregation, temporal data, JSON documents, and XML documents as streams. OData 4.0 and OData JSON 4.0 have been approved as ISO/IEC 20802-1:2016 and ISO/IEC 20802-2:2016 ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://www.oasis-open.org/committees/odata
OpenDocument Format (ODF) is an open, standardised format for reports, office documents and free-form information, fully integrated with other XML systems, and increasingly used as a standard format for publicly-released government information. ODF was originally approved as ISO/IEC 26300:2006, and ODF v1.2 has been approved as ISO/IEC 26300:2015. Link: ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://www.oasis-open.org/committees/office

OASIS XML Localisation Interchange File Format (XLIFF): XLIFF is an XML-based format created to standardize the way in which localizable text, metadata and instructions are passed between tools and services during a localization process ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://www.oasis-open.org/committees/xliff

ISO/IEC JTC1

WG 9 — Big Data. This working group was formed at the November 2014 JTC1 Plenary. They have begun working on requirements, use-cases, vocabulary and a reference architecture for big data

IEEE

IEEE has a series of new standards projects related to Big Data (mobile health, energy efficient processing, personal agency and privacy) as well as pre-standardisation activities on Big Data and open data:
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://standards.ieee.org/develop/msp/open-big-data.pdf

CEN CENELEC

CEN/WS (Workshop) ISAEN "Unique Identifier for Personal Data Usage Control in Big Data" seeks to operationalize the bourgeoning policy initiatives related to big data, in particular in relation to personal data management and the protection of individuals' fundamental rights. It is set against the backdrop of the rapidly expanding digital era of big data. The unique identifier that will be described in the resulting CWA will serve as a measurement tool to empower individuals, help them take control of their data, and make their fundamental right to privacy more actionable.
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://www.cen.eu/news/workshops/Pages/WS-2016-005.aspx

CEN/WS (Workshop) BDA: This workshop will develop a CWA that will aim at defining some technical requirements that will enable innovation in the aquaculture sector, turning the available local and heterogeneous large volumes of data in a universally understandable open repository of data assets. These requirements are the results of the research project AQUASMART of which main objective is to enhance innovation capacity to the aquaculture sector, by addressing the problem of global knowledge access and data exchanges between aquaculture companies and its related stakeholders.
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://www.cen.eu/News/Workshops/Pages/WS-2016-14.aspx

OGC

The Open Geospatial Consortium (OGC) defines and maintains standards for location-based, spatio-temporal data and services. The work includes, for instance, schema allowing description of spatio-temporal sensor, image, simulation, and statistics data (such as "datacubes"), a modular suite of standards for Web services allowing ingestion, extraction, fusion, and (with the web coverage processing service (WCPS) component standard) analytics of massive spatio-temporal data like satellite and climate archives. OGC also contributes to the INSPIRE project.
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.opengeospatial.org

ISA AND ISA SQUARE PROGRAMME OF THE EUROPEAN COMMISSION

The DCAT application profile (DCAT-AP) has been defined. DCAT-AP is a specification based on DCAT (a RDF vocabulary designed to facilitate interoperability between data catalogues published on the web) to enable interoperability between data portals, for example to allow metasearches in the European Data Portal that harvests data from national open data portals.

Extensions of the DCAT-AP to spatial (GeoDCAT-AP:
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://joinup.ec.europa.eu/node/139283) and statistical information (StatDCAT-AP: ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://joinup.ec.europa.eu/asset/stat_dcat_application_profile/home) have also been developed. ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://joinup.ec.europa.eu/asset/dcat_application_profile/description
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://joinup.ec.europa.eu/asset/dcat_application_profile/asset_release/dcat-ap-v11

CEF

Under the framework of the Connecting Europe Facility programme support to the interoperability of metadata and data at national and EU level is being developed through dedicated calls for proposals

SHARE-PSI 2.0, PROJECT FUNDED BY CNECT AND LED BY GEIE ERCIM (EUROPEAN HOST OF W3C)

Developed a set of high-level policy-related best practices for sharing public sector information that complement the more technical W3C data on the web best practices, see ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://www.w3.org/2013/share-psi/bp/.

The project also created and collated a set of 40 implementation guides from different Member States and beyond.

EU COMMISSION

A smart open data project by DG ENV led directly to the establishment of the Spatial Data on the Web Working group, a collaboration between W3C and the OGC.

G8 OPEN DATA CHARTER

In 2013, the EU endorsed the G8 Open Data Charter and, with other G8 members, committed to implementing a number of open data activities in the G8 members' collective action plan (publication of core and high-quality datasets held at EU level, publication of data on the EU open data portal and the sharing of experiences of open data work).

FUTURE INTERNET PUBLIC PRIVATE- PARTNERSHIP PROGRAMME

Specifications developed under the Future Internet public-private-partnership programme (FP7):

FIWARE NGSI is an API for context information management that provides a lightweight and simple means to gather, publish, query and subscribe to context information. FIWARE NGSI can be used for real-time open data management.

FIWARE CKAN: Open Data publication Generic Enabler. FIWARE CKAN is an open source solution for the publication, management and consumption of open data, usually, but not only, through static datasets. FIWARE CKAN allows its users to catalogue, upload and manage open datasets and data sources. It supports searching, browsing, visualising and accessing open data

BIG DATA VALUE CPPP TF6 SG6 ON BIG DATA STANDARDISATION:

In the big data value contractual public-private-partnership, a dedicated subgroup (SG6) of Task Force 6: Technical deals with big data standardisation.

ISÆN

At the CEN workshop on a "Unique identifier for personal data usage control in big data" which took place on 27/06/2016, the design of an algorithmic-based indicator called ISAEN was proposed.

ADDITIONAL INFORMATION

Existing standards should be checked to take account of the protection of individuals with regard to personal data processing and the free movement of such data in the light of data protection principles. Specific privacy by design standards should be identified and when necessary developed.

Since early 2014, French companies and public bodies have been working in the French association for standardisation AFNOR on a white paper on expectations regarding standards for big data; see ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.afnor.org/liste-des-actualites/actualites/2015/juin-2015/big-data-impact-et-attentes-pour-la-normalisation-decouvrez-le-livre-blanc-afnor

The report identified several priorities:

- Data access including open data and **governance of data within companies** (enhanced exploitation, data quality, security): mix the requirements of big data into the existing management standards. The development of a standard regarding data management could be considered.
- Data transformation, where three elements are identified:
    - Processes and methods of reversibility in pseudonymisation algorithms, evaluation of system performance (ex: Hadoop), NoSQL query language, or visualisation and manipulation process of big data results ;
- Adapt infrastructures to big data, like cloud computing for storage and massively parallel architectures;
- Data quality and data identification
    - criteria and methods for characterising sources and information, in terms of perceived quality and trust in a specific context ;
    - indexing of unstructured data coming from social networks and data associated with mobility and sensors ;
    - Identifying the use-cases for big data is essential. Highly visible issues for end-users should be addressed: technical interoperability, SLAs, traceability of treatment, data erasure, regulatory compliance, data representation, APIs, etc.

[1] http://eurovoc.europa.eu/drupal/
[2] https://joinup.ec.europa.eu/asset/stat_dcat_application_profile/home
[3] http://ec.europa.eu/information_society/policy/psi/docs/pdfs/report/final_version_study_psi.docx for an overview and http://ec.europa.eu/information_society/policy/psi/docs/pdfs/opendata2012/open_data_communication/en.pdf
[4] http://www.europeandataportal.eu/en/content/edp-and-fiware-launch-new-partnership
[5] http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.C_.2014.240.01.0001.01.ENG
[CC(1]Suggested specification [CC(2]Suggested addition (this information on the extension GEO/DCAT-AP was included in the wiki and is worth mentioning so that the sentence "another extension…" makes sense) [CNECT3]As the 'European Data Portal' and the 'EU Open Data Portal' are two different portals, the exact name (without 'Open') is important here [CNECT4]Should be C with the new structure [CNECT5]Suggested update that was included in the wiki version, to align with the ICT Priority Plan actions

INTERNET OF THINGS

POLICY AND LEGISLATION

POLICY OBJECTIVES

The Internet of Things (IoT) is a key priority area of the digital single market. The IoT is an emerging technology that connects more objects to the internet — including industrial processing machines and the items industrially processed (cyber-physical systems) , household equipment, wearable electronics, vehicles, and sensors. The number of such connected devices is expected to exceed 20 billion by 2020. Besides the innovation potential in many industrial sectors, the IoT also has the potential to help address many societal challenges including climate change, resource and energy efficiency and ageing.

A large number of proprietary or semi-closed solutions to address specific problems have emerged, leading to non-interoperable concepts, based on different architectures and protocols. Consequently, the deployment of truly IoT applications, i.e. where information of connectable "things" can be flexibly aggregated and scaled, has been limited to a set of "intranets of things — or goods".

In the emerging IoT economy, voluntary global standards can accelerate adoption, drive competition, and enable cost -effective introduction of new technologies. 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. Interoperability between IoT networks operated by different companies along the value chain opens up 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.

Industry is in the best position to develop the technological standards and solutions to address global IoT ecosystem opportunities and challenges. Therefore, there is a need for a secure solution that is interoperable and scales across a global IoT ecosystem. In this context, the European large-scale pilots (LSP), which were the subject of a call for proposals in 2016. The LSPs will support the deployment of IoT solutions, by enhancing and testing their acceptability and adoption by users and the public, and by fostering new market opportunities for suppliers to the EU.

Large-scale pilots should provide the opportunity to demonstrate actual IoT solutions in real-life settings and should make it possible for providers to test business.

EC PERSPECTIVE AND PROGRESS REPORT

The proposed actions on IoT follow the direction as outlined in the EU communication on ICT standardisation priorities which identified the cloud as a key priority for Europe.

ETSI has been asked to map standards for IoT. As many relevant standards already exist, a gap analysis is the next step, taking into account the most promising business models and use-cases.

The need is to correctly position IoT standardisation vis-à-vis existing initiatives such as ISO/IEC JTC 1/SC 41 Internet of Things and related technologies, oneM2M, and the ITU Study Group 20.

IoT standards will notably support the emergence of business models unleashing the commercial capabilities of systems and devices integrations. Beyond identifying standards, it is also important to identify reference models of implementation that businesses can share. This approach was followed in the Future Internet PPP (FI-PPP).

REFERENCES

- COM(216) 176: ICT standardisation priorities for the digital single market
- COM(2016) 180: Digitising European industry reaping the full benefits of a digital single market
- SWD(2016) 110/2: Advancing the internet of things in Europe
- COM(2009)278: "Internet of Things — An action plan for Europe": Standardisation will play an important role in the uptake of IoT, by lowering entry barriers to newcomers and operating costs for users, by being a prerequisite for interoperability and economies of scale and by allowing industry to better compete at international level. IoT standardisation should aim at rationalising some existing standards or developing new ones where needed.
- BEREC BoR (16)39, Report on enabling the Internet of Thin
  ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://berec.europa.eu/eng/document_register/subject_matter/berec/reports/5755-berec-report-on-enabling-the-internet-of-things

REQUESTED ACTIONS

The Communication on ICT standardisation priorities for the digital single market proposes priority actions in the domain of internet of things. Actions mentioned below reflect some of them.

ACTION 1 SDOs to complement ongoing gap analysis by analysis of gaps in wireless technologies required by IoT, including URLL (Ultra Reliable Low Latency) technologies required by Industry Automation.

ACTION 2 SDOs to continue ongoing work in the area of semantic standards for better data interoperability.

ACTION 3 SDOs to provide standards that can be used for compliance for IoT products, systems, applications and processes.

ACTION 4 Develop a European standard for cyber security compliance of products that is aligned with the current compliance framework of organisations based on ISO 270xx and the GDPR regulation. Preferably the standard could be used to harmonise the requirements set out in the NIS directive.

ACTION 5 Promote the development and foster the adoption of the international Reference Architecture for IoT developed in ISO/IEC JTC 1 SC41.

ACTIVITIES AND ADDITIONAL INFORMATION

RELATED STANDARDISATION ACTIVITIES

CEN

CEN/TC 225 works in the field of automatic identification and data capture techniques such as 1D and 2D optical data carriers, RFID and RTLS. These technologies are widely used as end points, allowing today the connection of billions of objects. Most IoT applications rely on these technologies, and an increasing number of scenarii involve capturing and processing sensitive and personal data. Any information leakage or misuse could seriously compromise user's privacy or security.

CEN/TC225 draws its expertise and legitimacy in IoT cutting-edge technologies and privacy from mandate M/436 (Privacy and public awareness of RFID applications). It has set up a dedicated ad hoc group to discuss the revision of EN 16570 (public awareness) and EN 16571 (Privacy Impact Assessment) for there are new consumer privacy and security issues linked to upcoming IoT applications.

ETSI

In ETSI, IoT — in its strictest definition — is mainly developed in ETSI Technical Bodies of the ETSI Connecting Things Cluster. ETSI is addressing the issues raised by connecting potentially billions of smart objects into a communications network, by developing standards for data security, management, transport, and processing. This will ensure interoperable and cost-effective solutions, open up opportunities in new areas such as eHealth and smart metering, and allow the market to reach its full potential.

Machine-to-Machine (M2M) communications will form the foundation for:

- smart devices
- smart appliances smart homes
- smart buildings
- smart cities

ETSI's work focuses on services and applications, especially aspects of the IoT and smart appliances. It addresses an application-independent 'horizontal' service platform which is capable of supporting a very wide range of services including smart metering, smart grids, eHealth, city automation, consumer applications and

connected vehicles.

As one of the founding partners of oneM2M, the global M2M Partnership Project, ETSI plays a key role in ensuring the most efficient deployment of M2M communications systems.

ETSI, with the support of the Commission, has developed the SAREF standard ETSI TS 103 264 V1.1.1, which is a first ontology standard in the IoT ecosystem and sets a template and a base for development of similar standards for the other verticals to unlock the full potential of IoT.

The new standard and SAREF allow appliances, of any type, make or manufacturer, to exchange energy related information, with any energy management system (at home or in the cloud) for energy management and keeping the user informed.

ETSI is developing Digital Enhanced Cordless Telecommunications (DECT) Ultra-Low Energy (ULE) (ETSI TS 102 939-1 and TS 102 939-2), a low-power wireless technology providing optimal radio coverage in indoor scenarios for data services suitable for many home automation applications, from security and safety to Climate Control and Energy Management.

ETSI has started the developing of DECT-2020, a 5G radio interface operating on license exempt spectrum that will support Ultra Reliable and Low Latency use cases required by Industry Automation scenarios. The Technical Report TR 103 515 'Study of URLLC use cases" is planned for January 2018 and the TR 103 514 "DECT-2020 New Radio" will follow in mid 2018. Complete specification will be ready for 2020 and is planned to fulfil the IMT-2020 requirements.

IEEE

IEEE has a number of existing standards (current and under development), activities, and events that are directly related to creating the environment needed for a vibrant IoT, recognising the value of the IoT to industry and the benefits this technology innovation brings to the public. Some key standards activities are:

- Architectural framework: The focus of IEEE P2413 is to develop a standard for the architectural framework for the Internet of Things, which includes descriptions of various IoT domains, definitions of IoT domain abstractions, and identification of commonalities between different IoT domains. The architectural framework defined in this standard will promote cross-domain interaction, aid system interoperability and functional compatibility.
- Harmonization and security of IoT: The IEEE 1451-99 is focused on developing a standard for harmonization of Internet of Things (IoT) devices and systems. This standard defines a method for data sharing, interoperability, and security of messages over a network, where sensors, actuators and other devices can interoperate, regardless of underlying communication technology.
- Sensor Performance and Quality: Sensors are fundamental to IoT ecosystem with large volume of different sensors integrated into a complex framework. IEEE 2700 proposes a common framework for sensor performance specification terminology, units, conditions and limits is provided. IEEE P2510 defines quality measures, controls, parameters and definitions for sensor data related to Internet of Things (IoT) implementations.

For a list of these and other IEEE standardization activities on IoT, please see: ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://standards.ieee.org/develop/msp/iot.pdf

IETF

The IETF has a number of working groups working on IoT.
The 6LOWPAN working group developed standards to ensure interoperability between smart object networks and defining the necessary security and management protocols and constructs for building such networks.

6LO WG is applying IPv6 adaptation mechanisms, similar to those developed by the 6LOWPAN WG, to a wider range of radio technologies, including "bluetooth low energy" (RFC 7668), ITU-T G.9959 (as used in Z-Wave, RFC 7428), and the digital enhanced cordless telecommunications (DECT) ultra-low energy (ULE) cordless phone standard and the low-cost wired networking technology master-slave/token-passing (MS/TP), which is widely used over RS-485 in building automation.

The Lightweight Implementation Guidance (LWIG) Working group focuses on helping implementers of the smallest devices. The goal is to be able to build minimal yet interoperable IP-capable devices for the most constrained environments.

The ROLL working group is developing standards to support the routing of communications within low-power and lossy networks.

The Constrained Restful Environments (CoRE) working group is specifying protocols that allow applications running in resource-constrained environments to interoperate with each other and the rest of the Internet. CoRE is still one of the most active IoT groups. Its main output centres around the "Constrained Application Protocol" (CoAP, RFC 7252), a radically simplified UDP-based analogue to http. Extensions to CoAP enable group communications (RFC 7390) and low-complexity server-push for the observation of resources (RFC 7641). This is complemented by a discovery and self-description mechanism based on a web link format suitable for constrained devices (RFC 6690). Current WG activities focus on extensions that enable transfer of large resources, use of resource directories for coordinating discovery, reusable interface descriptions, and the transport of CoAP over TCP and TLS. The CoRE WG is being retasked to include RESTCONF-style management functions and publish-subscribe style communication over CoAP. CoRE is also looking at a data format to represent sensor measurements, which will benefit from the "Concise Binary Object Representation" (CBOR) (RFC 7049), a JSON analogue optimised for binary data and low-resource implementations.

Security aspects of the IoT are being addressed in the following WGs:
The Authentication and Authorisation for Constrained Environments (ACE) WG ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://tools.ietf.org/wg/ace/charters is working on a standardized solution for authentication and authorisation to enable authorised access to resources on a device in constrained environments. In such environments, typical for the IoT, the network nodes are limited in CPU, memory and power. This work is supported by the COSE WG that is building simplified CBOR analogues for the JSON object signing and encryption methods that were developed in the JOSE WG.

The DTLS In Constrained Environments (DICE) WG ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://tools.ietf.org/wg/dice/charters focuses on supporting the use of DTLS transport-layer security in these environments. Such constrained environments, including constrained devices (e.g. memory, algorithm choices) and constrained networks (e.g. PDU sizes, packet loss) are typical for the IoT,

Smart grids, etc.

While the IoT-oriented IETF working groups have already produced the first wave of mature standards for IoT, new research questions are emerging based on the use of those standards. The IRTF Thing-to-Thing Research Group (T2TRG) was chartered in 2015 to investigate open research issues in IoT, focusing on issues that exhibit standardisation potential at the IETF.

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://trac.tools.ietf.org/group/iab/trac/wiki/Multi-Stake-Holder-Platform#IOT

ISO/IEC JTC 1

ISO/IEC JTC 1 WG 10 (Internet of Things): developing ISO/IEC 30141 — IoT reference architecture

WG 10 work is ongoing on the following work areas:

Terms and definitions for JTC 1 IoT Vocabulary (ISO/IEC 20924)

IoT reference architecture which is flexible and easily extended to various types of applications (ISO/IEC 30141)

Support for interoperability of IoT systems in terms of framework, networking, syntactic and sematic interoperability (ISO/IEC 21823-1)

Diverse use-cases covered by IoT

Monitoring the ongoing regulatory, market, business and technology IoT requirements

IoT standards that build on the foundational standards in relevant JTC 1 subgroups

Documents from JTC 1/WG 10 can be found here:

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://isotc.iso.org/livelink/livelink?func=ll&objId=16911907&objAction=browse&viewType=1

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020

▸JTC1ISO/IEC JTC 1/SC 41 Internet of Things and related technologies has also performed a standards gap analysis, and an IoT vocabulary.

SC27 deals with a broad set of standards in the areas of security and data protection ("privacy"). Many of the existing standards can be applied to IoT systems, such as the ISO/IEC 27001 standard on information security management.

SC27 is currently running two separate study groups, one looking at the security of IoT systems and the other examining privacy as applied to IoT systems. It is expected that any new proposed standards for security and for privacy of IoT systems will emerge from these study groups. ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.iso.org/iso/jtc1_home.html

ITU

ITU-T Study Group 20 is responsible for studies relating to Internet of things (IoT) and its applications, and smart cities and communities (SC&C). This includes studies relating to big data aspects of IoT and SC&C, e-services and smart services for SC&C. It is also the lead study group for Internet of things identification. ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://itu.int/go/tsg20

Definition of IoT in Recommendation ITU-T Y.4000/Y.2060 "Overview of the IoT" ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://itu.int/itu-t/Y.4000

IoT-relevant recommendations have been developed in various ITU-T study groups and are now wound under the Y.4000 sub-series.

Among the approved standards are ITU-T Y.4111 "Semantics-based requirements and framework of the IoT", ITU-T Y.4112 "Requirements of the plug and play capability of the IoT", ITU-T Y.4113 "Requirements of the network for the Internet of Things", ITU-T Y.4115 "Reference architecture for IoT device capabilities exposure", ITU-T Y.4451 "Framework of constrained device networking in the IoT environments", ITU-T Y.4453 "Adaptive software framework for IoT devices" , ITU-T Y.4552 "Application support models of the IoT" and ITU-T Y.4553 "Requirements of smartphone as sink node for IoT applications and services".

The ITU-T joint coordination activity on IoT and smart cities and Communities (JCA-IoT and SC&C) continues its role of promoting international coordination among SDOs in this area of standardization. ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://itu.int/en/ITU-T/jca/iot

JCA-IoT and SC&C maintains the global online IoT standards roadmap

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://itu.int/en/ITU-T/jca/iot/Documents/deliverables/Free-download-IoT-roadmap.doc

A new Focus Group (FG) on Data Processing and Management to support IoT and Smart Cities & Communities was set up in 2017. The FG provides a platform to develop deliverables, share views and showcase initiatives, projects, and standards activities linked to data processing and management and establishment of IoT ecosystem solutions for data focused cities.

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://itu.int/en/ITU-T/focusgroups/dpm

ITU-T SG11 continues its role in developing testing specifications of IoT, its applications and identification systems.

ITU-T SG17 approved Supplement to ITU-T X.660 - Guidelines for using object identifiers for IoT, and is working on Security framework for IoT and Technical framework of PII (Personally Identifiable Information) handling system in IoT environment.

OASIS

OASIS runs a TC on message queuing telemetry transport (MQTT) ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://www.oasis-open.org/committees/mqtt.
It has produced a standard for the MQTT protocol compatible with MQTT V3.1, together with requirements for enhancements, documented usage examples, best practices, and guidance for use of MQTT topics with commonly available registry and discovery mechanisms. As an M2M/IoT connectivity protocol, MQTT is designed to support messaging transport from remote locations/ devices involving small code footprints (e.g. 8-bit, 256KB ram controllers), low power, low bandwidth, high-cost connections, high latency, variable availability, and negotiated delivery guarantees. MQTT also has been approved as ISO/IEC 20922:2016

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://www.oasis-open.org/

committees/tc_home.php?wg_abbrev=mqtt

OASIS has produced the Advanced Message Queuing Protocol (AMQP), a ubiquitous, secure, and reliable internet protocol for high-speed transactional messaging. AMQP also has been approved as ISO/IEC 19464:2014
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://www.oasis-open.org/committees/amqp.

3GPP

GERAN group is in charge of 2G standardisation and the RAN group, of 3G-4G standardisation (including the subgroup for connected objects in 4G, called LTE MTC).

ONEM2M

oneM2MoneM2M was launched in 2012 as a global initiative to ensure the most efficient deployment of Machine-to-Machine (M2M) communications systems and the Internet of Things (IoT) and it includes several SDOs and representatives of different industry sectors. The latest technical specifications can be found on their website ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.onem2m.org/technical/latest-drafts

The initial goal of oneM2M is to create a common M2M Service Layer which can be readily embedded within different hardware and software, connecting the numerous devices in the field with M2M application servers worldwide.

oneM2M has published its Release 2 in August 2016. The first oneM2M release includes specifications covering requirements, architecture, protocols, security, and management, abstraction and semantics and Release 2 added new functionality, particularly by expanding management, abstraction and semantics.

Release 2 published in August and freely available at www.oneM2M.org It is made up of 17 Technical Specifications and 9 Technical Reports. In ETSI SmartM2M, cooperation with AIOTI is foreseen to support 2017-2020 H202 IoT LSP on (semantic) interoperability, cross sector shared IoT reference architecture, security and privacy.

OIC

OIC works on defining the connectivity requirements for devices including the definition of the specification, certification and branding to deliver reliable interoperability; IP protection; and providing an open source implementation of the standard.
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://openconnectivity.org/developer

W3C

W3C's web of things ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://www.w3.org/WoT/ is to support overcoming the fragmentation of the IoT by introducing a web-based abstraction layer capable of interconnecting existing IoT platforms and complementing available standards

OGC

The Open Geospatial Consortium (OGC) defines and maintains standards for location-based, spatio-temporal data and services. Some of the work is related to IoT, e.g. a modular suite of standards for web services allowing ingestion, extraction, fusion, and (with the web coverage processing service (WCPS) component standard) analytics of massive spatio-temporal data like satellite and climate archives. ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.opengeospatial.org

AIOTI

The Alliance for Internet of Things Innovation (AIOTI) was initially created under the Commission's auspices in 2015. Its goals are to promote interoperability and convergence between standards, to facilitate policy debates and to prepare a Commission's initiative for large scale testing and experimentation, tabled for 2016. AIOTI has meanwhile been transformed and set up as a stand-alone organisation. Forging new alliances between IoT sectors, stakeholders, large companies, SMEs and start-ups help Europe get a global lead in this field and will foster a digital single market for IoT.

AIOTI Working group 3 focuses on standardisation.

The Commission published a EUR 51 million call (H2020 ICT-30). The initiative cuts across several technological areas (smart systems integration, cyber-physical systems, smart networks, big data), and targets SME and IoT innovators for to create an open IoT environment.

Among AIOTI's European largest technical and digital companies are:

- Alcatel, Bosch, Cisco, Hildebrand, IBM, Intel, Landis+Gyr, Nokia, ON Semiconductor , Orange , OSRAM, Philips, Samsung , Schneider Electric, Siemens, NXP Semiconductors, STMicroelectronics, Telecom Italia, Telefonica, Telit, Vodafone, Volvo, and start-ups (SIGFOX)…
- Representatives of different industries: nanoelectronics/semiconductor companies, telecom companies, network operators, platform providers (IoT/Cloud), security, service providers,
- sectors: energy, utilities, automotive, mobility, lighting, buildings, manufacturing, healthcare, supply chains, cities etc.

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://ec.europa.eu/digital-agenda/en/news/launch-alliance-internet-things-innovation

EC

Several projects funded by the European Commission, integrated in the Internet of Things Research in Europe Cluster (IERC), deal with aspects of standardisation in IoT: CALIPSO, GAMBAS, IOT.EST, OPENIOT, UIOT6, SPRINT and PROBE-IT. In particular:

OPENIOT deals with standardisation of open source solution for creating utility/cloud-based environments of internet-connected objects,

SPRINT has an active contribution to W3C (web services), OMG (e.g. on exchange formats, APIs) and OASIS (data exchange formats),

PROBE-IT validates standards or pre-standards at European and international level and performs pre-standardisation research work on standardisation requirements.

The Future Internet PPP (FI-PPP) also deals with some issues connected to standardisation for the IoT.

IVA

IVA is a subproject of ´ICT for Sweden´, with the objective of supporting the entire value chain, from business benefits to sensors.

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.iva.se/IVA-seminarier/Internet-of-Things-IoT---fran-affarsnytta-till-sensorer/

UK

The KTN (Knowledge Transfer Network) has an IoT interest group

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://connect.innovateuk.org/web/internet-of-things

FINLAND

An IoT cluster supports investment in IoT

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.investinfinland.fi/industries/rd-and-innovation/internet-of-things-in-finland/124

LORA ALLIANCE

Specifications intended for wireless battery-operated things in regional, national or global networks. LoRaWAN targets key requirements of the IoT such as secure bi-directional communication, mobility and localisation services

IIC

Works on promoting the uptake of technologies around the industrial internet including:

building confidence around new and innovative approaches to security;

developing use-cases and test beds;

influencing global standards development; and

facilitating open forums to share and exchange best practices.

DENMARK

The Nordic IoT center is supported by the Danish Agency for Science and Higher Education, to enable partnerships in the Nordic region and completing the value chain for IoT products and services and documenting compliance to international standards ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.nordiciotcentre.com/

ADDITIONAL INFORMATION

There are a number of global activities ongoing in the area of IoT standardisation. In particular there are: the oneM2M partnership project, to which ETSI contributes; relevant standardisation activities in IEC; a focus group in ISO/IEC JTC 1; the standards project on MQTT in OASIS; the IoT reference architecture; and the IoT Interoperability standards at ISO/IEC JTC/1 WG10.

The IoT requirements of e.g. from retail manufacturing, the automotive, aeronautics, pharmaceutical, and medical equipment industries and the medical sector in general should be taken fully into consideration. Security, privacy, and management of control of the access to and ownership of data are essential for the development of IoT. Without acceptance by commercial users and consumers, the role of IoT would be limited to specific vertical markets. Wide acceptance is essential in commoditising IoT mechanismes and make them accessible e.g. to manufacturing and for manufactured products, or into m/e/Health applications.

IoT requires the interlinking of often disparate standards. These standards are often the product of different SDOs. There is a need to bring these bodies and their standards together to achieve the often small changes needed to allow products and services to interoperate.

Existing standards should be checked to take account of the protection of individuals with regard to personal data processing and the free movement of such data in the light of the proposal for a General Data Protection Regulation. Specific privacy by design standards should be identified and where necessary developed.

CYBERSECURITY / NETWORK AND INFORMATION SECURITY

POLICY AND LEGISLATION

POLICY OBJECTIVES

The European cybersecurity strategy and the Directive on network and information security provide for action to promote the development and take-up of ICT security standards.

A network and information security public-private platform (NIS Platform) has been set up by the Commission with representation from various stakeholders.

The communication setting up ICT standardisation priorities for the DSM refers to cybersecurity as a priority domain for Europe.

EC PERSPECTIVE AND PROGRESS REPORT

The Communication on ICT standardisation priorities for the digital single market proposes actions on cybersecurity, considered as priority domain for Europe

- For security and notification requirements for operators of essential services, the focus will be on establishing a number of reference standards and/or specifications relevant to network and information security, including, where relevant, harmonised standards, to serve as a basis for encouraging the coherent adoption of standardisation practices across the EU.
- For security and notification requirements for digital service providers, in line with the objectives of the Digital single market strategy, the Directive aims to establish a harmonised set of requirements so that they can expect similar rules wherever they operate in the EU.
- It is important that all levels of an organisation –particularly the strategic level and the management board - are aware of the need for standards and frameworks for cybersecurity. Moreover, between organisations that are partners in (vital) online chains, clear agreements will have to be made on the different standards.

REFERENCES

- Cybersecurity Strategy of the European Union: An Open, Safe and Secure Cyberspace — JOIN(2013) 1 final — 7/2/2013
- COM(2017)477 Proposal for a Regulation of the European Parliament and of the Council on ENISA, the "EU Cybersecurity Agency", and repealing Regulation (EU) 526/2013, and on Information and Communication Technology cybersecurity certification ("Cybersecurity Act")
- Directive (EU) 2016/1148 of the European Parliament and of the Council of 6 July 2016 concerning measures for a high common level of security of network and information systems across the EU (NIS Directive)
- Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to personal data processing and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation)
- COM(2016)176 ICT Standardisation Priorities for the Digital Single Market
- COM(2015)192 A Digital single market strategy for Europe
- COM(2017)228 Communication on the Mid-Term Review on the implementation of the Digital Single Market Strategy - A Connected Digital Single Market for All and accompanying Staff Working Document SWD(2017)155
- European Cybersecurity Organisation (ECSO) - the contractual PPP (cPPP) will be instrumental in structuring and coordinating digital security industrial resources in Europe. WG1 focuses on standardisation, certification, labelling and supply chain management. ▸ https://ec.europa.eu/digital-single-market/en/cybersecurity-industry

REQUESTED ACTIONS

ACTION 1 SDOs to continue working on ensuring privacy and improving existing standards regarding the protection of individuals with regard to personal data processing.

ACTION 2 SDOs to develop standards for critical infrastructure protection, e.g. CEN-CLC-ETSI Coordination Group on Smart Energy Grids as laid out in mandate 490, to account for cybersecurity and privacy, where possible taking existing standards such as the ISO/IEC 270xx family into account.

ACTION 3 SDOs to investigate needs for further improvements of standards and specifications in the area of network security. This may include recommendations on further development of DNSSEC DOTS and I2NSF within IETF. In addition the NIST cybersecurity framework may provide some background for further progress on achieving better cybersecurity.

ACTION 4 SDOs to investigate the issue of malware on personal computers. ENISA (the European union agency for network and information security) has concluded that many personal computers contain malware that is can monitor (financial) transactions. As we are becoming increasingly dependent on eBusiness and e-transactions, a European initiative should investigate this topic.

ACTION 5 SDOs to investigate options for collaboration to defeat and remedy attacks. No single organization has enough information to create and maintain accurate situational awareness of the threats facing itself or its users. This limitation can be overcome by sharing relevant cyber-threat information among trusted partners and communities consistent with the agreed interests of their users.

ACTION 6 SDOs to investigate requirements for secure protocols for networks of highly constrained devices and heavily constrained protocol interaction (low bandwidth/ ultra-short session duration (50ms)/low processing capabilities).

ACTION 7 Create awareness of available international and global standards and frameworks on cybersecurity and promote their use and implementation

ACTION 8 SDOs to investigate the availability of standards as regards to the security and incident notification requirements for digital service providers as defined in the NIS Directive.

ACTION 9 SDOs to develop a "guided" version of ISO/IEC 270xx series (information security management systems including specific activity domains) specifically addressed to SMEs, possibly coordinating with ISO/IEC JTC1 SC27 WG1 to extend the existing guidance laid out in ISO/IEC 27003. This guidance should be 100% compatible with ISO/IEC 270xx and help SMEs to practically apply it, including in scarce resource and competence scenarios.

ACTION 10 SDOs are encouraged to work on standards related to the specification and assessment of security properties in ICT products and services as well as those related to security in processes related to the design, development, delivery and maintenance of an ICT product or service

ACTIVITIES AND ADDITIONAL INFORMATION

RELATED STANDARDISATION ACTIVITIES

CEN, CENELEC

The Focus group on cybersecurity (CSCG) is the follow-up to the cybersecurity coordination group, after ETSI withdrawal. It supports CEN and CENELEC to explore ways and means for supporting the growth of the Digital Single market.

The group focuses on drafting a European roadmap on cybersecurity standardisation and will actively support global initiatives on cybersecurity standards, in compliance with EU requirements and with a view to develop trustworthy ICT products, systems and services.

Based on the CSCG white paper Recommendations for a strategy on European cybersecurity standardisation, published in April 2014, the group continued to develop recommendations to its parent bodies for international standard-setting, ensuring a level playing-field for businesses and public authorities. Via CSCG recommendations, seven ISO/IEC standards on IT-forensics were recently adopted as EN to enhance the required admissibility of e-evidence and therefore support the fight against cybercrime. ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.cscg.focusict.de

End 2014, the Smart Grid Coordination Group finalized several mandated reports, including on cybersecurity.

In June 2017, CEN and CENELEC created a new Technical Committee on "Cybersecurity and data protection" (CEN-CLC/TC 13). The lack of interoperable solutions, practices (process standards) and trustworthy IT solutions are, among other, affecting the European single market. On this basis, cybersecurity was identified as one of the ICT standardization priorities for the Digital Single Market and the creation of CEN-CENELEC/TC 13 aims to address the growing demand for standards in this field.

In 2018, CEN-CLC/TC 13 will develop standards for data protection, information protection and security techniques with specific focus on cybersecurity covering all concurrent aspects of the evolving information society, including:

- Organizational frameworks and methodologies, including IT management systems
- Data protection and privacy guidelines
- Processes and products evaluation schemes
- ICT security and physical security technical guidelines
- Smart technology, objects, distributed computing devices, data services

This includes identification and possible adoption of standards already available or under development which could support the EU Digital Single Market, the implementation of the Data Protection Reform (GDPR), the Directive on the Security of Network and Information Systems (NIS Directive), and the proposal for

a Regulation on Privacy and Electronic Communications Code (ePrivacy). Special attention will be paid to ISO/IEC JTC 1 standards, but will not be limited to this. Other SDOs and International bodies will also be taken into account, such as ISO, IEC, ITU-T, IEEE, NIST or industrial fora.

ETSI

ETSI's work on cybersecurity ranges from general and transversal guidelines and standards, to securing complete technological systems/areas, down to specific security topics.

ETSI has already published a report containing an analysis of the main threats to personally identifiable information in online services. ETSI TC CYBER is working on technical specifications to i) exploit attribute-based encryption for data access control in the cloud, 5G networks and IoT (TS 103 458), ii) provide data unlinkability in mobile networks and IoT (TS 103 486); and iii) enable assurance of privacy and verification of assurance by ad hoc protocols and policy mechanisms (TS 103 485)

TC CYBER coordinates ETSI cybersecurity work and develops standards mostly of general or transversal applicability. In particular, ETSI TC CYBER published TR 103 306 which describes the global cybersecurity ecosystem providing an overview of cybersecurity work occurring in multiple technical forums worldwide.

ETSI TC CYBER, in collaboration with ETSI NFV SWG (Network Function Virtualisation Security Working Group), published technical specifications on baseline security requirements regarding sensitive functions for NFV and on security aspects for lawful interception and retained data interfaces. It also published reports which provide guidance on critical security controls and security by default for products and services. Other published reports or guides address critical infrastructure protection, cybersecurity issues related to NFV and Lawful Interception, post quantum computing, security design requirements, and threat information sharing.

TC CYBER started new work to support the network and information security Directive; the TC will identify where new standards are needed in support of the Directive, particularly in the area of critical infrastructure protection. The TC also works on gateway cyberdefence and on a common interface to transfer sensitive functions to a trusted domain. (TC CYBER work programme).

ISG ISI (Information Security Indicators) works on measurement of information security risks (see ISG ISI published standards, ISG ISI work programme).

ETSI works on securing overall systems and technologies such as mobile communications (3GPP SA3), network functions virtualisation (ETSI NFV SWG), intelligent transport systems (ITS WG5), digital enhanced cordless telecommunications (DECT™), M2M/IoT communications (oneM2M published standards, latest drafts), reconfigurable radio systems (RRS WG3) and emergency telecommunications (including terrestrial trunked radio (TETRA)).

Finally ETSI works on specific security topics, including smart cards and secure elements (SCP), cryptography and lawful interception and data retention. In terms of cryptography, ETSI develops security algorithms, it works on quantum safe cryptography (QSC) and quantum key distribution (QKD).

IEC

IEC/TC 65 WG 10 Security for industrial process measurement and control - Network and system security

This WG develops the series IEC 62443 Industrial communication networks - Network and system security, dealing with the prevention of illegal or unwanted penetration, intentional or unintentional interference with the proper and intended operation, or inappropriate access to confidential information in industrial automation and control systems.

ISO/IEC

ISO/IEC 19770-2 on Software Identification (SWID) tags is a standard for the identification of software which is important for improving both the management of software, and for improving cybersecurity, in particular for the automation of cybersecurity.

ISO/IEC 19770-1 is a management system standard for IT asset management, a revised edition of which is due to be published in the near future. These standards have significant take-up, for example in the US."

ISO/IEC 62443: procedures for implementing electronically secure Industrial Automation and Control Systems (IACS)

ISO/IEC 15408: Common Criteria for Information Technology Security Evaluation

IECEE/ICAB

IECEE/ICAB: System of Conformity Assessment Schemes for Electrotechnical Equipment and Components

OASIS

For the PKCS 11 standardisation project for cryptographic tokens controlling authentication information (such as personal identity), see

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://www.oasis-open.org/committees/pkcs11

Key management interoperability protocol (KMIP) for enterprise encryption key administration and deployment. ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://www.oasis-open.org/committees/kmip

Cyber Threat Intelligence (CTI) TC
A committee defining a set of information representations and protocols to support automated information sharing for cybersecurity situational awareness, real-time network defence, and sophisticated threat analysis. The Structured Threat Information eXpression (STIX) language provides a common set of descriptors for security threats and events, and the Trusted Automated Exchange of Indicator Information (TAXII) specification provides common message exchange patterns.

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.oasis-open.org/committees/cti

SAML TC

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://www.oasis-open.org/committees/tc_home.php?wg_abbrev=security

ISO/IEC JTC 1

SC 27 work is ongoing on the following work areas

1. Security requirements capture methodology

2. Management of information and ICT security; in particular information security management systems (ISMS), security processes, security controls and services

3. Cryptographic and other security mechanisms, including but not limited to mechanisms for protecting the accountability, availability, integrity and confidentiality of information

4. Security management support documentation including terminology, guidelines and procedures for the registration of security components

5. Security aspects of identity management, biometrics and privacy

6. Conformance assessment, accreditation and auditing requirements in the area of information security

7. Security evaluation criteria and methodology

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.iso.org/iso/home/standards_development/list_of_iso_technical_committees/iso_technical_committee.htm?commid=45306

ISO 29115 entity authentication framework.

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm? csnumber=45138

Ongoing projects and deliverables:

ISO/IEC 27001 — Information security management systems — Requirements

ISO/IEC 29101 — Privacy architecture framework

ISO/IEC 29151 — Code of practice for PII protection

ISO/IEC 29190 — Privacy capability assessment model

ISO/IEC 19770-2 on Software Identification (SWID) tags is a standard for the identification of software which is important for improving both the management of software, and for improving cybersecurity, in particular for the automation of cybersecurity.

ISO/IEC 19770-1 is a management system standard for IT asset management, a revised edition of which is due to be published in the near future. These standards have significant take-up, for example in the US."

IEC 62351 standards series. The different security objectives of this series include authentication of data transfer through digital signatures, ensuring only authenticated access, prevention of eavesdropping, prevention of playback and spoofing, and intrusion detection.

ISO/IEC 62443: procedures for implementing electronically secure Industrial Automation and Control Systems (IACS)

ISO/IEC 15408: Common Criteria for Information Technology Security Evaluation

IECEE/ICAB: System of Conformity Assessment Schemes for Electrotechnical Equipment and Components

ITU-T

In the standardisation sector of the ITU, the UN specialized agency for ICTs, ITU-T Study Group 17 (Security) develops globally harmonized standards on telecommunication and information security, application security, cyberspace security, identity management and authentication. On application security, currently ITU-T SG17 works specifically on software defined networking, cloud computing, intelligent transport systems, distributed ledger technologies etc. Nearly 200 ITU-T Recommendations have been developed including the security Recommendations under the ITU-T X-series.

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://itu.int/ITU-T/go/sg17

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.itu.int/ITU-T/recommendations/index_sg.aspx?sg=17.

SG17 / Q10/17 — Identity management architecture and mechanisms

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.itu.int/itu-t/workprog/wp_block.aspx?isn=2048

Study Group 20 under question Q6/20 studies aspects related to Security, Privacy, Trust and Identification for IoT and SC&C. In August 2017, it approved Recommendation ITU-T Y.4805 Identifier service requirements for the interoperability of Smart City applications which specifies a set of requirements for identifier services in smart city.

W3C

W3C runs several group in the area of Security :

- Web Cryptography working group, which is defining an API that lets developers implement secure application protocols for web applications, including message confidentiality and authentication services, by exposing trusted cryptographic primitives from the browser.
- Web Application Security "WebAppSec" working group, which is developing standards to ensure that web applications are delivered free from spoofing, injection, and eavesdropping.
- Hardware-based secure services community group, which analyses use-cases where browser (and web application)'s developers could benefit from secure services in the field of cryptographic operation, citizen identity and payment to native applications.
- Web bluetooth community group, which is developing a specification for bluetooth APIs to allow websites to communicate with devices in a secure and privacy-preserving way.
- Web NFC community group, which is creating a near field communication API that is browser-friendly and adheres to the web's security model.

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://www.w3.org/Security

IEEE

Standardisation activities in the network and information security space and in anti-malware technologies, including in the encryption, fixed and removable storage, and hard copy devices areas, also applications of these technologies and cybersecurity in smart grids.

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://standards.ieee.org/develop/msp/nis.pdf.

IETF

The Managed Incident Lightweight Exchange (MILE) WG (▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://tools.ietf.org/wg/mile/charters) develops standards to support computer and network security incident management. The WG is focused on two areas: (1) IODEF (incident object description exchange format, RFC5070), the data format and extensions for representing incident and indicator data, and (2) RID (real-time inter-network defence, RFC6545), the policy and transport protocol for structured data.

The security automation and continuous monitoring (SACM) WG ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://tools.ietf.org/wg/sacm/charters is working on standardising protocols to collect, verify, and update system security configurations that allow high degree of automation. This makes it easier to secure information and the systems that store, process, and transmit that information. The focus of the WG is assessment of network endpoint compliance with security policies so that corrective measures can be taken before they are exposed to those threats.

The aim of the DDoS Open Threat Signalling (DOTS) WG (▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://tools.ietf.org/wg/dots/charters) is to develop a standards-based approach for the real-time signalling of DDoS-related telemetry and threat-handling requests and data between elements concerned with DDoS attack detection, classification, traceback, and mitigation.

The goal of I2NSF is to define a set of software interfaces and data models for controlling and monitoring aspects of physical and virtual NSFs (A network security function (NSF) is a function used to ensure integrity, confidentiality, or availability of network communications, to detect unwanted network activity, or to block or at least mitigate the effects of unwanted activity. The hosted, or cloud-based, security service is especially attractive to small and medium size enterprises who suffer from a lack of security experts to continuously monitor networks, acquire new skills and propose immediate mitigations to ever increasing sets of security attacks), enabling clients to specify rulesets.

The Source Address Validation Improvements (savi) WG develops standardized mechanisms that prevent nodes attached to the same IP link from spoofing each other's IP addresses

3GPPP

SA WG3 is responsible for security and privacy in 3GPP systems, determining the security and privacy requirements, and specifying the security architectures and protocols. The WG also ensures the availability of cryptographic algorithms which need to be part of the specifications.

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.3gpp.org/specifications-groups/sa-plenary/sa3-security

OIDF

Risk and incident sharing and coordination working group [RISC] RISC (chartered 2015) provides data sharing schemas, privacy recommendations and protocols to share information about important security events in order to thwart attackers from using compromised accounts with one service provider to gain access with other service providers. RISC focuses on peer to peer sharing of information related to the state of individual accounts.

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://openid.net/wg/risc/charter/

NIST

NIST has started work in several areas, active documents with two reports already published which provide guidance on critical security controls and security by default for products and services. Other areas of work include critical infrastructure protection, privacy matters, cybersecurity issues.

- Cyber-Physical Systems for Global Cities Project
- Cybersecurity for Smart Grid Systems
- Cybersecurity for Smart Manufacturing Systems
- National Institute of Standards and Technology Initiates Development of New Cybersecurity
- Reference Architecture for Cyber-Physical Systems Project Framework

CYBER SECURITY PPP

The cPPP will be instrumental in structuring and coordinating digital security industrial resources in Europe

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://ec.europa.eu/digital-single-market/en/cybersecurity-industry

ADDITIONAL INFORMATION

The Dutch government has selected a group of security specifications for its comply-or-explain policy: DNSSEC, DKIM, TLS, SPF, DMARC, STARTTLS, DANE, SAML, ISO 27001/2, and is actively using different adoption strategies to get the specifications implemented. A very useful tool is te website www.internet.nl . Organisations and individuals can, by entering a domain name of a website or email service, easily test whether websites offer support for the modern Internet Specifications. The result is a test report with detailed explanations. The website is available in English, Dutch and Polish. In addition business, industry and government collectively established the 'Safe Email Coalition' to fight abuse such as phishing and eavesdropping in e-mail.

In Germany, the Federal Agency for Information Security (BSI) bases several national cyber-security standards -concerning both critical infrastructures and SMEs- on the ISO/IEC EN 270xx family and the Federal Network Agency (BNetzA) mandates the use of ISO/IEC 27019 (with a few additional requirements in the national IT Security catalog) for grid network operators with mandatory certification.

In addition to the actions and objectives addressed so far there may be further work on cyber resilience within the broad scope of topics under discussion, in particular on real-time availability; availability architecture; availability management; threat management/intelligence; data breach notification; security breach notification; data centric security; code scanning; and the APT control maturity model of framework.

There are also some overlaps with the Rolling Plan item covering electronic identification and trust services such as electronic signatures (M460) which contribute to the building of trust in the European digital environment. The output of the CRISP project (evaluation and certification schemes for security products) will allow further standardisation activities in this area.

Stakeholder alliances like CSA (the Cloud Security Alliance) and others in addition provide best practices in the area of cybersecurity.

The Source Address Validation Improvements (savi) WG develops standardized mechanisms that prevent nodes attached to the same IP link from spoofing each other's IP addresses

ELECTRONIC IDENTIFICATION AND TRUST SERVICES INCLUDING E-SIGNATURES

POLICY AND LEGISLATION

POLICY OBJECTIVES

This relates to Regulation (EU) No 910/2014 of the European Parliament and of the Council of 23 July 2014 on electronic identification and trust services for electronic transactions in the internal market and repealing Directive 1999/93/EC.

EC PERSPECTIVE AND PROGRESS REPORT

In the context of the e-signatures Directive, in January 2010, the Commission mandated the ESOs to rationalise the standards for e-signatures and related trust services to form a coherent and up-to-date framework (mandate M/460).

The eIDAS Regulation adopted on 23 July 2014 addresses in one comprehensive piece of legislation, electronic identification, electronic signatures, electronic seals, time stamping, electronic delivery, electronic documents and website certificates as core instruments for electronic transactions. To support the implementation of this highly technical regulation, further standardisation work will be needed. In the case of trust services, the planned secondary legislation refers extensively to the availability of standards as possible means to meet the regulatory requirements. Existing standards should be checked to take account of the protection of individuals with regard to personal data processing and the free movement of such data. Specific privacy by design standards should be identified and where needed developed. The accessibility needs of persons with disabilities should also be taken into account.

REFERENCES

- Regulation (EU) No. 910/2014 of the European Parliament and of the Council of 23 July 2014 on electronic identification and trust services for electronic transactions in the internal market and repealing Directive 1999/93/EC
- Commission Implementing Regulation (EU) 2015/1501 of 8 September 2015 on the interoperability framework
- Commission Implementing Regulation (EU) 2015/1502 of 8 September 2015 on setting out minimum technical specifications and procedures for assurance levels for

electronic identification means

- Commission Implementing Decision (EU) 2015/1984 of 3 November 2015 defining the circumstances, formats and procedures of notification
- Commission Implementing Regulation (EU) 2015/806 of May 2015 laying down specifications relating to the form of EU trust mark for qualified trust Services
- Commission Implementing Decision (EU) 2015/1506 of 8 September 2015 laying down specifications relating to formats of advanced electronic signatures and advanced seals to be recognised by public sector bodies
- Commission Implementing Decision (EU) 2015/1505 of 8 September 2015 laying down technical specifications and formats relating to trusted lists
- Commission Implementing Decision (EU) 2016/650 of 25 April 2016 laying down Standards for the security assessment of qualified signature on seal creation devices

REQUESTED ACTIONS

ACTION 1 Complete and complement the work done under Mandate M/460, e.g. in the following way: address the trust service providers (TSP) providing signature creation services, the TSPs providing signature validation services, and standards for trust application service providers (current work is limited to an ETSI Special Report (to be ETSI SR 019 530), which will propose a rationalised and well organised set of standards for electronic registered delivery applying electronic signatures). .

ACTION 2 The Commission intends to request the ESOs (for instance via standardisation requests) and other relevant bodies to update existing standards and to develop additional ones in order to address the new requirements and the innovations of the eIDAS Regulation (EU) N°910/2014 adopted by the European Parliament and Council, and related Implementing Regulations. Alternatively or additionally, ESOs may autonomously submit requests for Commission support for these standardisation activities. Further domains of interest include eIdentification, eDelivery, and website authentication certificates.

ACTION 3 Take ongoing EU policy activities into account in standardisation, e.g. in ISO/IEC JTC 1 SC 27 WG5 (identity management and privacy technologies) and other working groups of ISO/IEC JTC 1 SC 27. Furthermore, in order to promote the strengths of the European approach to electronic trust services at global level and to foster mutual recognition of trust services with non-EU countries, European and international standards should be aligned wherever possible. The "internalisation" and promotion of related European standards should be favoured.

Finally, e-signatures standards ensure accessibility for people with disabilities (see mandate 376 on European accessibility requirements for public procurement of products and services in the ICT domain).

ACTION 4 Support and improve the development of interoperable standards by facilitating the organisation of plugtests (interoperability events) and developing and enhancing conformity testing tools. Such interoperability events may address CAdES, XAdES, PAdES, ASiC, use of trusted lists, signature validation, etc.

ACTION 5 Disseminate information to raise awareness and promote the uptake of standards, in particular encourage the industry to develop new solutions and use trust services embedded in sector applications.

ACTIVITIES AND ADDITIONAL INFORMATION

RELATED STANDARDISATION ACTIVITIES

CEN

CEN/TC 224 develops standards for strengthening the interoperability and security of personal identification and its related personal devices, systems, operations and privacy. CEN/TC 224 multi-sectoral environment involves sectors such as Government/ Citizen, Transport, Banking, e-Health, as well as Consumers and providers from the supply side such as card manufacturers, security technology, conformity assessment body and software manufacturers. In 2018, CEN/TC 224 will continue to develop European Standards notably on Trustworthy Systems Supporting Server Signing (prEN 419241-1), Protection Profile for Trust Service Provider Cryptographic modules (prEN 419221-5) , Biometrics multilingual vocabulary (prEN 17054), Breeder documents.

CEN, ETSI

Under the standardisation mandate M/460 on e-signatures, CEN (TC224) and ETSI TC ESI have undertaken activities to update and rationalise their standards on e-signatures and related trust services (see ETSI TR 119 000). Also, the adoption by citizens/ consumers and SMEs and accessibility of electronic signatures and other related electronic identification services shall be carefully taken into account by standardisation. CEN is producing guidelines for that purpose which will be used as reference documents by a public with no expertise in this area. With the adoption of the new Regulation, all ongoing standards under development are being re-assessed to comply with the Regulation.

Five grant agreements were running until June 2016, supporting CEN and ETSI to carry out the above rationalisation work. ETSI published a set of standards for trust services providers (TSP), trusted lists, digital signatures (supporting electronic signatures and electronic seals) and electronic time-stamps (ETSI ESI standards). These deliverables aim at supporting Regulation (EU) No 910/2014 and supporting the general requirements of the international community to provide trust and confidence in electronic transactions. ETSI is now working on complementing this set of standards with specifications on registered eDelivery trust

services, registered email trust services, signature creation and signature validation by trust service providers, support for evidence records by digital signatures, and signatures preservation (ETSI ESI work programme).

In line with the new Regulation (EU) No. 910/2014, CEN/TC 224 is working on new standards particularly on eSeal and Server Signing. eSeal functionalities in a further edition of EN 419212 "Application Interface for smart cards used as secure signature creation devices" will cover the need for mass-signing. With regard to Server Signing, CEN/TC 224 will publish two European Standards on "Trustworthy systems supporting server signing" (prEN 419241-1: General System Security Requirements; prEN 419241-2: Protection profile for QSCD for Server Signing), in compliance with the European requirements of Regulation (EU) 910/2014.

ISO

ISO/TC 154: Processes, data elements and documents in commerce, industry and administration ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.iso.org/iso/iso_technical_committee%3Fcommid%3D53186

Ongoing work:

- Requirements and roles & responsibilities for fulfilling trusted e-communications in commerce, industry and administration
- Qualified trust services for long-term signature of kinds of electronic documents
- Validation of long-term signature
- Trusted (or qualified) electronic registered delivery services (or platform)
- Dematerialisation and proof of dematerialisation
- Requirements for providing trusted e-communications in the mobile environment
- Requirements for providing trusted e-communications in the cloud environment

Projects include:

ISO 14533-1:2014 — Processes, data elements and documents in commerce, industry and administration -- Long term signature profiles -- Part 1: Long term signature profiles for CMS Advanced Electronic Signatures (CAdES)

ISO 14533-2:2012 — Processes, data elements and documents in commerce, industry and administration -- Long term signature profiles -- Part 2: Long term signature profiles for XML Advanced Electronic Signatures (XAdES)

ISO/DIS 14533-3 — Processes, data elements and documents in commerce, industry and administration -- Long term signature profiles -- Part 3: Long term signature profiles for PDF Advanced Electronic Signatures (PAdES)

ISO JTC1 SC27 is responsible for international IT security standards and therefore one of the primary stakeholders affected.

ISO/IEC JTC 1

TC 37 is responsible for the standardisation of generic biometric technologies pertaining to human beings to support interoperability and data interchange among applications and systems. Generic human biometric standards include: common file frameworks, biometric application programming interfaces, biometric data interchange formats, related biometric profiles and other standards in support of technical implementation of biometric systems, evaluation criteria to biometric technologies, methodologies for performance testing and reporting, cross-jurisdictional and societal aspects of biometric implementation.

SC 37 Biometrics home page: ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.iso.org/iso/home/standards_development/list_of_iso_technical_committees/jtc1_home/jtc1_sc37_home.htm. The complete list of standards published or under development can be found in ISO Standards Catalogue of ISO/IEC JTC 1/SC 37 — Biometrics

Published standards and ongoing projects related to the topics include the series of biometric data interchange standards for different biometric modalities, biometric technical interfaces, related biometric profiles and other standards in support of technical implementation of biometric systems, and cross jurisdictional and societal aspects of biometric implementation. Representative projects: amendments of ISO/IEC 19794-x: 2011/Amd. 2:2015 data format standards specifying XML encoding, extensible biometric data interchange formats ISO/IEC 39794-x. e.g., generic extensible data interchange formats for the representation of data: a tagged binary data format based on an extensible specification in ASN.1 and a textual data format based on an XML schema definition (both capable of holding the same information), ISO/IEC 30107-x Biometric presentation attack detection multi-part standard and ISO/IEC 24779-x — Cross-Jurisdictional and societal aspects of implementation of biometric technologies — pictograms, icons and symbols for use with biometric systems multi-part standard.

ITU-T

Study Group 3 is responsible, inter alia, for studying international telecommunication/ICT policy and economic issues and tariff and accounting matters (including costing principles and methodologies), with a view to informing the development of enabling regulatory models and frameworks. SG3 is also tasked with a study on the economic and regulatory impact of the Internet, convergence (services or infrastructure) and new services. SG3 is currently working on a guideline for digital identity under the new *Question 9/3* - economic and policy aspects of big data and digital identity in international telecommunications services and networks.

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://itu.int/en/ITU-T/studygroups/2017-2020/03

SG13 published three technical reports on trust provisioning for future ICT infrastructures and services and two Recommendations ITU-T Y.3051 "The basic principles of trusted environment in information and communication technology infrastructure" and Y.3052 "Overview of trust provisioning for information and communication technology infrastructures and services". There are currently three more work items under development covering areas such as trustworthy networking, trust-based media services and trust index for ICT infrastructures and services. These studies will contribute to the development of more reliable techniques to cope with the risks of knowledge sharing thus moving towards a knowledge society. To complement this work from the infrastructure perspective, SG13 approved Recommendation ITU-T Y.3514 "Cloud computing - trusted inter-cloud computing framework and requirements" and is working on overview of inter-cloud trust management.

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://itu.int/en/ITU-T/studygroups/2017-2020/13

Study Group 17 is responsible for the study of the appropriate core questions on identity management. In addition, in consultation with other relevant study groups and in collaboration, where appropriate,

with other standards bodies, SG17 has the responsibility to define and maintain the overall framework and to coordinate, assign (recognising the mandates of other study groups) and prioritise the studies to be carried out by the study groups, and to ensure the preparation of consistent, complete and timely recommendations.

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://itu.int/en/ITU-T/studygroups/com17

Study Group 20 is the lead study group for IoT identification. SG20 is studying what the identification systems are capable of in terms of fulfilling the requirements of IoT and SC&C including security, privacy and trust; how authentication technologies can work with identification systems; what options or measures are available for identification of IoT objects; how identification mechanisms can support interoperability in IoT and SC&C and mitigate risks, among others.

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://itu.int/en/ITU-T/studygroups/2017-2020/20

OASIS

Projects for e-signature management and functionality, including standards for Digital Signature Services (DSS) and the Key Management Interoperability Protocol (KMIP).

Identity management and access control functions include standards for the eXtensible Access Control Markup Language (XACML, also approved as ITU-T Recommendation X.1144); the Security Assertion Markup Language (SAML, also ITU-T Recommendation X.1141); cross-enterprise security and privacy authorisation (XSPA); the Authentication Step-Up Protocol and Metadata (Trust Elevation) for identity trust level elevation, and the extensible resource identifier (XRI) and XRI data interchange (XDI) standards, as well as a suite of web services specifications including Web Services Federation (WS-Fed); Web Services Trust (WS-Trust) and Web Services Secure Exchange (WS-SX).

OASIS' Biometric Services TC also hosts specifications for standardized biometric device service calls compatible with standard media types and the biometric data formats of ISO/IEC 19785 and 19794.

OIDF

Set of standards and related certification profiles addressing identity transactions over the internet. Active working groups in this area include: the OpenID Connect WG, AccountChooser WG, Native Applications WG, Mobile operator Discovery, Registration and Authentication WG (MODRNA), Health Related Data Sharing WG (HEART), and Risk and Incident Sharing and Coordination WG (RISC)

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://openid.net/wg/

IETF

The OAUTH (▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://tools.ietf.org/wg/oauth/charters) working group developed a protocol suite that allows a user to grant a third-party web site or application access to the user's protected resources, without necessarily revealing their long-term credentials, or even their identity. It also developed security schemes for presenting authorisation tokens to access a protected resource.

The ongoing standardisation effort within the OAUTH working group is focusing on enhancing interoperability of OAUTH deployments.

The Public Notary Transparency (TRANS) WG (▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://tools.ietf.org/wg/trans/charters) develops a standards-track specification of the Certificate Transparency protocol (RFC6962) that allows detection of the mis-issuance of certificates issued by CAs or via ad-hoc mapping by maintaining cryptographically verifiable audit logs.

The Automated Certificate Management Environment (ACME) WG (▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://tools.ietf.org/wg/acme/charters) specifies conventions for automated X.509 certificate management, including validation of control over an identifier, certificate issuance, certificate renewal, and certificate revocation. The initial focus of the ACME WG is on domain name certificates (as used by web servers), but other uses of certificates can be considered as work progresses.

There is the non-WG Vectors of Trust (VoT) work which may or may not develop into a WG at some point ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://www.ietf.org/mailman/listinfo/vot

W3C

The Web Authentication Working group (▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.w3.org/2015/12/web-authentication-charter.html) is tasked with reducing the use of shared secrets, i.e. passwords, as authentication credentials, facilitating instead multi-factor authentication support and hardware-based key storage while respecting the 'same origin policy'.

W3C also runs a community-driven group (not standard track) on WebID: ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://www.w3.org/wiki/WebID and has in the past run a workshop on Identity in the Browser (▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://www.w3.org/2011/identity-ws/report.html).

The W3C Credentials Community Group discusses credential storage and exchange systems for the web. Some of their ideas are being discussed in the Web Payments Interest Group via the Verifiable Claims Task Force (as of January 2016).

IEEE

The IEEE has standards and pre-standards activities relevant to Electronic Identification and Trust Services, including dealing with blockchain technology and biometric identification. More information can be found at:
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://standards.ieee.org/develop/msp/eidentification.pdf

E-SENS

e-SENS (Electronic Simple European Networked Services) is a large-scale pilot launched within the ICT policy support programme (ICT PSP), under the competitiveness and innovation framework programme (CIP). The aim of the project is to develop an infrastructure for interoperable public services in Europe. It builds upon and consolidates building blocks such as eID, e-Documents, e-Delivery, and e-Signature etc. from previous pilot projects and integrates them into a European digital platform for cross-sector, interoperable eGovernment services.
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.esens.eu/home.html.

STORK

EU co-funded project to establish a European eID interoperability platform that will allow citizens to establish new e-relations across-borders, just by presenting their national eID.

The STORK 2.0 project was the continuation of STORK and has worked on extending the specification to roles and mandates.

In the context of the eIDAS Regulation and the implementing act on the interoperability framework for eID technical specifications are being developed for the eIDAS nodes. These technical specifications will provide further details on technical requirements as set out in the Regulation. The specifications for the eIDAS were developed through Member State collaboration in a technical sub-committee of the eIDAS Expert Group.
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://www.eid-stork.eu/.

SSEDIC

Scoping the single European digital identity community –SSEDIC
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.eid-ssedic.eu

FIDIS

Future of identity in the information society — FIDIS
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.fidis.net

PRIME

Privacy and identity management for Europe — PRIME
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://www.prime-project.eu

EPRIVACY

POLICY AND LEGISLATION

POLICY OBJECTIVES

The enforcement of the EU data protection and privacy legal framework would be made easier if data processing products and processes are designed and built from the beginning with legal requirements in mind. This is referred as 'data protection by design'. Standards may lay out the basic requirements for data protection by design for products and processes, minimising the risk of (i) divergent national approaches, with their related risks to freedom of movement of products and services, and (ii) the development of several, potentially conflicting, private de-facto standards.

This could be combined with the emergence of certification services: businesses who want their products and processes audited as being "privacy by design"-compliant, would have to fulfil a set of requirements defined through appropriate EU standards and robust, independent third-party certification mechanisms.

Article 17 of the data protection Directive 95/46/EC requires that data controllers implement appropriate technical and organisational measures to prevent unlawful data processing. Instruments like privacy by design and privacy risk assessment by controllers may help minimise these risks, though the cooperation of processors also is required.

The principles of data protection by design and by default , as well as the need to undergo a data protection impact assessment for data protection and privacy are included in the recently adopted General Data Protection Regulation 2016/679/EU (GDPR). This regulation replaces the Data Protection Directive 95/46/EC and will apply from 25 May 2018. In the meantime, national laws implementing the Directive 95/46/EC remain valid.

EC PERSPECTIVE AND PROGRESS REPORT

The focus will be on establishing a number of reference standards and/or specifications relevant to privacy in the electronic communications environment, including, where relevant, harmonised standards, to serve as a basis for encouraging the consistent adoption of standardisation practices across the EU.

The Commission has recently proposed a mandate to European standards organisations seeking to routinely include privacy management methodologies in both the design and production phases of cybersecurity technologies generally.

REFERENCES

The following legal instrument should be considered at European level:

- The Directive 2002/58/EC of the European Parliament and of the Council of 12 July 2002 concerning the processing of personal data and the protection of privacy in the electronic communications sector (ePrivacy Directive). This Directive is under revision with the Commission that adopted on 10 January 2017 a proposal a Regulation on privacy and electronic communications that will replace the old directive and address its flaws to ensure an increased level of protection of citizens' confidentiality of communications[1].
- Regulation (EU) 2016/676 on the protection of natural persons with regard to personal data processing and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation). Article 253 calls for data protection by design and by default.
- The Directive 2014/53/EU on the harmonization of the laws of the Member States relating to the making available on the market of radio equipment and repealing the Radio Equipment and Telecommunications Terminal Equipment (R&TTE) Directive 1999/5/EC. Article 3(3)(c) of this Directive requires that radio equipment within certain categories or classes shall be so constructed that it [...] incorporates safeguards to ensure that the personal data and privacy of the user and of the subscriber are protected". The Commission is empowered to adopt delegated acts specifying which categories or classes of radio equipment are concerned by each of the requirements.
- In June 2015, the Commission published a study on the "ePrivacy Directive: assessment of transposition, effectiveness and compatibility with the proposed data protection regulation, SMART 2013/0071". It contains an in-depth analysis of the national implementation of several key provisions (namely Article 1 and 3 on the scope, Article 5 on confidentiality of communications, Article 5(3) on cookies and similar technologies, Article 6 and 9 on traffic and location data and Article 13 on commercial communications. See the study: ▸ http://ec.europa.eu/digital-agenda/en/news/eprivacy-directive-assessment-transposition-effectiveness-and-compatibility-proposed-data
- The internet architecture board (IAB) provides a list of the national transpositions of Article 5.3 of the ePrivacy Directive, see ▸ http://www.iabeurope.eu/policy/e-privacy.

REQUESTED ACTIONS

In the light of the accountability and privacy by design principles, ICT standards generally should be created in order to ensure a high-level of protection of individuals with regard to personal data processing, and the free movement of such data, and the application of privacy by design methodologies. Privacy and data protection standards should thus be examined, developed or improved if necessary, so as to provide standardised methods that support that review and improvement in due respect of EU data protection rules.

Proposed specific areas for SDOs to focus on are:

ACTION 1 Continuing work on standardising browser functionalities and defaults to enable users to easily control whether they want to be tracked.

ACTION 2 Location data used by mobile applications.

ACTION 3 SDOs to support compliance with GDPR and possible other EU data privacy requirements via standardisation.

ACTION 4 Promote EU-wide attention to standardisation of privacy statements and terms & conditions, given that there is mandatory acceptance of diverse, ambiguous and far-reaching online privacy conditions, and taking into account the new data protection Directive. The Kantara CIS work and the data use statements described in ISO/IEC 19944 could be used as a basis for this action.

ACTION 5 SDOs to continue investigating technical measures apt to make personal data anonymous or pseudonymised (and therefore unintelligible by those who are not authorised to access them).

ACTION 6 SDOs to continue investigating how to warrant a user-centric approach in privacy & access management: see ▸ http://www.laceproject.eu/blog/give-students-control-data/ and ▸http://www.lvm.fi/julkaisu/4440204/mydata-a-nordic-model-for-human-centred-personal-data-management-and-processing.

ACTION 7 SDOs to prevent unwarranted pervasive monitoring by default when developing standards. This is not only relevant in the context the internet but also the IoT.

ACTION 8 SDOs to developsecure coding standards for secure application development: EU-wide attention to standardisation of privacy statements and terms & conditions, given the existing state of mandatory acceptance of diverse, ambiguous and far-reaching online privacy conditions, taking into account the new data protection directive and the emergence of the IoT, where (embedded) devices process the device owner's personal data, creating additional challenges to transparency and informed consent.

ACTIVITIES AND ADDITIONAL INFORMATION

RELATED STANDARDISATION ACTIVITIES

Various activities are in place, as detailed in the table below. Due account should also be taken of the activities of the DG GROW working group on "Privacy by Design", which includes standardisation participants and other stakeholders. The Commission issued in October 2014 the standardisation request M/530 "Standards for privacy & personal data protection management", in support of privacy management in design, development, production, and service provision processes of security technologies. The goal is that manufacturers & providers manage privacy & personal data protection issues through privacy-by-design. At the beginning of 2015, CEN-CENELEC JWG 8 "Privacy management in products and services" was set up to execute M/530. A work programme should be elaborated in the second half of 2015 with work started in 2016".

ETSI

In co-operation with CEN and CENELEC, ETSI is responding to M/530. Following the Commission's acceptance of the ESO's proposals on developing standards to manage privacy and personal data protection issues from the earliest stages in the design and development of security technologies and services, and during production and provision, the ESO expect to complete up to 11 standards in response to M/530. In particular, the cybersecurity TC (TC CYBER) has begun work on a practical introductory guide to privacy and a technical report outlining a high-level structured ecosystem of security design requirements for communication and IT networks and attached devices.

In addition, TC CYBER works on the protection and retention of personally identifiable information (PII) and defines the technical means to enable the assurance of privacy and the verification of that assurance. It also addresses identity management and naming schema protection mechanisms, with the aim of establishing a means to prevent identity theft and resultant crime.

CYBER work programme

CEN/CENELEC

CEN-CENELEC/TC 13 "Cybersecurity and Data protection" has been created in 2017, to develop standards for data protection, information protection and security techniques with specific focus on cybersecurity covering all concurrent aspects of the evolving information society, including privacy guidelines. The TC will adopt international standards (such as JTC 1) as ENs, with additional specific European requirements in the context of the GDPR and the NIS directive, to support privacy protection in the European context.

In 2017, CEN and CENELEC created the CEN-CENELEC/TC 8 'Privacy Management in Products and Services", as a continuation to CEN-CENELEC Joint Working Group 8. The scope of CEN-CLC/TC 8 covers privacy and personal data protection in products and services. The TC will aim at developing standards on Privacy protection by design and by default in products and services. CEN and CENELEC will decide in 2018 whether to keep the CEN-CLC/TC 8, or to transfer its activities within CEN-CLC/TC 13.

Moreover, CEN/TC 224 develops standards for strengthening the interoperability and security of personal identification and its related personal devices, systems, operations and privacy. In 2018, CEN/TC 224 will continue to develop European Standards notably on Trustworthy Systems Supporting Server Signing (prEN 419241-1), Protection Profile for Trust Service Provider Cryptographic modules (prEN 419221-5), Biometrics multilingual vocabulary (prEN 17054), Breeder documents. CEN/TC 224 will continue to support the eIDAS regulation.

CEN/CLC/ETSI FOCUS GROUP ON CYBERSECURITY

The Group actively supports initiatives on cybersecurity standards that are compliant with EU requirements in view of development of trustworthy ICT products, systems and services.

IEEE

IEEE is working on a recommended practice to specify a privacy threat model for IEEE 802 technologies and provide recommendations on how to protect against privacy threats. This is important as IEEE 802 technologies play a major role in Internet connectivity. As an outcome of the IEEE Global Initiative for Ethical Considerations in Artificial Intelligence and Autonomous Systems, a number of projects have been initiated in the area of personal data privacy. A new pre-standardization activity will develop a framework towards solutions that facilitate digital inclusion, trust, personal data agency and security. IEEE also has other new projects for privacy in consumer wireless devices and drones.

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://standards.ieee.org/develop/msp/eprivacy.pdf

W3C

An initiative to develop specifications by which Internet users may exress their permission (or the withholding of their permission) to have their presence and activities on websites tracked (the "Do Not Track" concept), and to help Internet users to express their consent or refusal to be tracked on the internet.

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.w3.org/2011/tracking-protection/

OASIS

Privacy by design documentation for software engineers standards project (PbD-SE):
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://www.oasis-open.org/committees/pbd-se

Privacy management reference model (PMRM)
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://www.oasis-open.org/committees/pmrm

IETF

The SIP Best-practice Recommendations Against Network Dangers to privacY (sipbrandy) WG will define best practices for establishing two-party, SIP-signaled SRTP sessions with end-to-end security associations, including a single, preferred SRTP key exchange mechanism. These practices are expected to be deployable across typical SIP networks, without the sharing of SRTP keying material with intermediaries or third parties. These practices should protect against man-in-the-middle attacks.

The DNS PRIVate Exchange (dprive) WG develops mechanisms to provide confidentiality to DNS transactions, to address concerns surrounding pervasive monitoring (RFC 7258). The set of DNS requests that an individual makes can provide an attacker with a large amount of information about that individual. DPRIVE aims to deprive the attacker of this information.

The Internet Architecture Board has established a Privacy Program to serve as a forum for synthesizing privacy thinking within the technical standards community and to create privacy design considerations for use within the IETF. RFC6973 "Privacy Considerations for Internet Protocols" offers guidance for developing privacy considerations for inclusion in protocol specifications.

ISO/IEC JTC1

Subcommittee 27 on IT Security Technologies published a Code of Practice for the protection of personally identifiable information (PII) in the public cloud (ISO/IEC 27018:2014), and is developing a draft international standard privacy capability assessment model (ISO/IEC DIS 29190)

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.iso.org/iso/iso_technical_committee?commid=45306

ITU-T

The ITU, through a variety of activities, is examining matters related to building confidence and security in the use of ICT, including stability and measures to combat spam, malware, etc., and the protection of personal data and privacy (ref. Plenipotentiary Conference, Guadalajara 2010, Resolution 130). ITU-T has been developing ITU-T standards which address protection of personally identifiable information such as in Recommendations ITU-T

H.233, H.234, H.235.0, H.235.9, J.93, J.96, J.125, T.807, X.272, X.1081, X.1086, X.1092, X.1142, X.1144, X.1171, X.1250, X.1252, X.1275, X.1580, Y.2720, and Y.2740

KANTARA

User-Managed Access (UMA)
UMA is an OAuth-based protocol designed to ensure the privacy of websites by giving web users a unified control point for authorising access toonline personal data, content, and services, no matter where they are hosted.
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://kantarainitiative.org/confluence/display/uma/Home

Consent & Information Sharing Workgroup (CIS)
People's capacity to manage their privacy is increased if they are able to aggregate and manage consent & information sharing relationships with consent receipts. Standardised consent receipts also provide the opportunity for organisations to advertise trust. The core receipt specification addresses general, or regulatory, consent requirements. More elaborate consent receipts can become a vehicle for trust networks, federations, trust marks, privacy icons, assurances, certifications and self-asserted community and industry reputations.
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://kantarainitiative.org/confluence/display/infosharing/Home

ADDITIONAL INFORMATION

Management of controls over the access to and ownership of data should be considered essential for effective implementation of privacy measurements.

Proposal for a Regulation of the European Parliament and of the Council concerning the respect for private life and the protection of personal data in electronic communications and repealing Directive 2002/58/EC (Regulation on Privacy and Electronic Communications), 10.01.2017, COM (2017)10 final ▸ https://ec.europa.eu/digital-single-market/en/news/proposal-regulation-privacy-and-electronic-communications

E-INFRASTRUCTURES FOR RESEARCH DATA AND COMPUTING INTENSIVE SCIENCE

POLICY AND LEGISLATION

POLICY OBJECTIVES

Research data and computing infrastructures fostering a paradigm shift in science (digital science/eScience).

The emergence of data driven science reflects the increasing value of a range of observational, sensor, simulation, streaming and experimental data in every field of science. Data e-Infrastructures link knowledge territories, which blur geographical and disciplinary boundaries.

The present European and global research data landscape is highly fragmented, by disciplines or by domains (oceanography, life sciences, health, agriculture, space, climate, etc.). A variety of institutions, some national, some international, strive to deal with some aspects of data, but there is no effort to seek or achieve some degree of coherence.

Some research domains are experiencing exponential growth in data produced with the rate doubling in a timeframe that can be as short as a few months (seven months in the case of second generation sequencing of genes), while others plan new instruments that will suddenly produce enormous amounts of data.

To create a competitive European research area, Europe has already invested a significant amount of resources into modernising the European landscape of research infrastructures and facilities of excellence.

The ESFRI roadmap stretches across a range of scientific disciplines in different European nations and includes recommendations for a suite of ambitious initiatives in areas such as biological and medical sciences, environment, social sciences and humanities, geophysics and astronomy, physical and engineering.

Underpinning the efforts of the research communities, e-infrastructures foster innovation and scientific progress across disciplines and between the private and public sector. A large number of data e-Infrastructures, mixing the capabilities of scientific communities and technology providers, have been launched in domains of astronomy, earth and ocean observation, climate, environment and biodiversity, etc. Moreover, pan European e-Infrastructures initiatives were launched across disciplinary domains providing a participatory network of open access repositories at European scale. These initiatives fill the gap between user-application and generic e-Infrastructure layers for high-volume storage, data interoperability, high-performance computing and connectivity layers.

Building on these existing EU-funded e-Infrastructures, the European Open Science Cloud and the European Data Infrastructure, as presented in the Communication "European Cloud Initiative", will consolidate the efforts to accelerate and support the transition to more effective open science and open innovation in the digital single market. In this context, the implementation of standards and recommendations will be of utmost importance in order to allow for interoperability, avoid fragmentation and improve the efficiency and effectiveness of research by optimizing resources and encouraging economies of scale.

EC PERSPECTIVE AND PROGRESS REPORT

Research/science funders have a common problem when tackling the area of research data infrastructure. The landscape is geographically fragmented and different disciplines have different practices. It is difficult to build critical mass and provide common services to different scientific disciplines and to take advantage of economies of scale. Some scientific communities are pushing the envelope and adopting new technologies while others are lagging behind. Scientists are, at the end of the day, the generators and users of research data in their experiments, simulations, visualization of complex data arrays, etc. There is a need to bring together capabilities from different scientific fields and also the competences of technology and service providers to use the potential of ICT.

Interoperable data infrastructures will allow researchers and practitioners from different disciplines to access and process the data they need in a timely manner. They can collaborate across different domains of science and engineering. The innovative power of industry and enterprise will be used trough by clear and efficient arrangements for data exchange between private and public sectors.

Today, EU-funded e-Infrastructures play a fundamental role in the life of European researchers and innovators. E-Infrastructure projects funded under the Horizon 2020 work programme 2014-2015 and 2016-2017 are helping researchers tackle the challenges posed by one specific societal challenge.

REFERENCES

The European Commission adopted in April 2016 the digital single market technologies and public service modernisation package in which the following Communication was included:

COM(2016) 178 final Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: "European Cloud Initiative — Building a competitive data and knowledge economy in Europe". This Communication sets out a strategy to strengthen the EU's position in data-driven innovation, improve its cohesion, and help create a digital single market. This is a fundamental step towards the reinforcement of the EU's competitiveness in digital technologies and in innovation. The European Cloud Initiative will provide European science, industry and public authorities with world-class data infrastructures, high-speed connectivity and increasingly powerful high performance computers. It will make it easier for researchers, businesses and public services to fully exploit the benefits of big data by making it possible to move, share, re-use and process data seamlessly across global markets and borders, and among institutions and research disciplines.

The initiative will establish the European Open Science Cloud (EOSC) as a virtual environment to store and process large volumes of information generated by the big data revolution. This will be supported by the European Data Infrastructure (EDI), deploying the high-bandwidth networks and the supercomputing capacity necessary to access and process large datasets stored in the cloud.

Both the EOSC and the EDI will build on existing EU-funded e-infrastructures and will bring networking, data and computing services closer to European researchers and innovators.

Together with the European Cloud Initiative, the package includes also the following Communications which are relevant within the e-infrastructure context:

- COM(2016) 180 final: Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: Digitising European Industry - Reaping the full benefits of a Digital Single Market.
- COM(2016) 176 final: Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: ICT Standardisation Priorities for the Digital Single Market.
- Back in 2012, the European Commission adopted in July 2012 a package consisting of a Communication and a Recommendation on aspects of open access, preservation and e-Infrastructures for scientific information. It outlines a framework to optimise the incentives for scientific discovery and support collaboration across disciplinary and geographical boundaries, and to further develop the European innovation capacity.
- COM(2012) 401 final: Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions — Towards better access to scientific information: Boosting the benefits of public investments in research.
- COM(2012) 4890 final: Commission Recommendation on access to and preservation of scientific information.

REQUESTED ACTIONS

EU funded projects and initiatives are actively working with recommendations, models and standards. An example of this could be the work of OpenAIRE and EuroCRIS initiatives to expand the CERIF model to also include research outputs. CERIF was initially conceived to document and exchange research information (funding programmes and projects, researchers and research institutions, etc.) and has since been adopted by many Member States and institutions.

Moreover, the Research Data Alliance has been approached and has engaged in the process of identifying Technical Specifications as ICT specifications for public procurement within the EU. These might come from existing initiatives in specific research fields or from established general purpose initiatives.

ACTION 1 SDOs to work closely with service providers, RDA and other similar initiatives on identifying standards needs and developing them in the area of research data in the context of the European Open Science Cloud.

ACTIVITIES AND ADDITIONAL INFORMATION

RELATED STANDARDISATION ACTIVITIES

The Research Data Alliance (RDA) is not a standardisation body but is a mechanism to speed-up the adoption of standards for research data and computing infrastructures. The Commission with the advice of the Multi-Stakeholder Platform on ICT standardisation has engaged in the process of identifying four RDA Technical Specifications as ICT specifications for public procurement within the EU.

In order to facilitate and improve the process of developing recommendations that are relevant and have the potential of becoming ICT specifications, there is an ongoing effort of promoting industrial participation within the RDA processes.

RESEARCH DATA ALLIANCE (RDA)

Supports the Commission's strategy to achieve global scientific data interoperability in a way that real actors (users and producers of data, service providers, network and computing infrastructures, researchers and their organisations) are in the driving seat.
It has memorandums of understanding (MoUs) with related standardisation activities/organisations: IETF, W3C, ICSU/CODATA. Synergies with other organisations/activities will need to be identified in the future.

ITU-T

Regarding the global e-Infrastructure, the ITU is using the digital object architecture (DOA), on which the recommendation ITU-T X.1255 "Framework for discovery of identity management information" is based.

SG11 is studying the global problem of combating counterfeiting. Within this activity, SG11 developed the Technical Report on Counterfeit ICT Equipment. SG11 continues developing a new Recommendation Q.FW_CCF "Framework for solution to combat counterfeit ICT Devices" and two technical reports such as "Guidelines on Best Practice and Solutions for Combating Counterfeit ICT Devices"and "Technical Report on use of anti-counterfeiting technical solutions relying on unique and persistent mobile device identifiers".

SG11 has a mandate to study issues related to combating stolen ICT equipment. Currently, SG11 is developing a framework for Combating the use of Stolen Mobile ICT Devices.
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://itu.int/ITU-T/go/sg11

SG5 (Question 7) is studying and analyzing the effects of counterfeit equipment in relation with e-waste and their environmental impact.

SG20 is working on a Recommendation on Information Management Digital Architecture to combat counterfeiting in IoT. The intent of this Recommendation is to provide solutions to deter the spread of counterfeit IoT devices worldwide.

SG13 approved new standards on trust for ICT infrastructures and services:

Recommendation ITU-T Y.3051 "The basic principles of trusted environment in ICT infrastructure" provides the definition, common requirements and the basic principles of creating trusted environment.

Recommendation ITU-T Y.3052 "Overview of trust provisioning for information and communication technology infrastructures and services" describes the key characteristics of trust. In addition, the trust relationship model and trust evaluation based on the conceptual model of trust provisioning are introduced.

SG13 continue working on the attributes that can represent trustworthiness, which can be applied to ICT infrastructures and services. There are several on-going work on Y.turstworthy-media (Trustworthy smart media services), Y.trustnet-fw (Trustworthy networking), etc. From the perspectives of standardization, trust should be quantitatively and/or qualitatively calculated and measured, which is used to evaluate the values of physical components, value-chains among multiple stakeholders, and human behaviors including decision making. Accordingly, a new work on trust index to evaluate and quantify trustworthiness has also been started.

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://itu.int/ITU-T/go/sg13

Related topics in H2020 WP on research infrastructures including e-Infrastructures (proposals selected within these calls may contribute to standardisation):

EINFRA-1-2014

Managing, preserving and computing with big research data

EINFRA-3-2014

Towards global data e-Infrastructures — research data alliance

EINFRA-8-2014

Research and education networking — GÉANT

INFRASUPP-7-2014

e-Infrastructure policy development and international cooperation

EINFRA-22-2016

User driven e-infrastructure innovation

EINFRA-21-2017

Platform-driven e-infrastructure innovation

EINFRA-12-2017

Data and Distributed Computing e-Infrastructure for Open Science

INFRASUPP-02-2017

Policy and International cooperation measures for research infrastructures (RDA)

ADDITIONAL INFORMATION

RDA will be a good support to turn the proposed framework for action for data infrastructures into practice. The Commission run a public consultation on the key priority areas for H2020 on data Infrastructures which received an excellent feedback. Stakeholders are motivated and, above all, ready to come together and turn the identified priorities into real action. Europe will consolidate its role of a global partner and a global leader in research data infrastructures.

BROADBAND INFRASTRUCTURE MAPPING

POLICY AND LEGISLATION

POLICY OBJECTIVES

The digital single market[1] must be built on reliable and trustworthy data. In this context, the European Commission has launched a project to map fixed and mobile quality of broadband services in Europe. This tool, currently under deployment, consists of an interactive online mapping application that aggregates and visualizes various dimensions of quality of service (QoS) delivered by broadband networks (fixed and mobile) in the European Union. The project constitutes a crucial instrument to assess and monitor the achievement of the new connectivity goals as described in the Communication on Connectivity for a Competitive Digital Single Market – Towards a European Gigabit Society[2]. In November 2016, the first data collection campaign started, 22 Member States have already provided data sets to the Platform and 4 more will do so in the next months.

In 2017, in order to complement the deployment of the EU broadband mapping platform, the Commission has launched a new study on Fixed and Mobile Convergence in Europe (SMART 2016/0046). On the basis of the datasets collected in the EU broadband mapping platform, the study will support the EU policy-making process by assessing the technical/political/economic obstacles that prevent the definition of common (fixed and mobile) network performance measurements in the Union.

EC PERSPECTIVE AND PROGRESS REPORT

Telecom manufacturers, operators and other stakeholders have an interest in assuring a minimum of interoperability of broadband infrastructure mapping to facilitate the deployment of next-generation networks, simplify their operation, reduce cost and finally open up a single market dimension.

In order to achieve the EU broadband objectives of the Digital Agenda Europe, it is fundamentally important that there is reliable and valid data on existing and planned broadband infrastructures, services offered; and demand and investment. A standardised mapping of broadband infrastructures and other related data will help identify gaps of broadband coverage and take-up in the EU and identify suitable areas of investment. Additionally, it will avoid duplication of financing as subsidies can be allocated to areas truly affected by market failure.

REFERENCES

- Directive 2002/22/EC of the European Parliament and of the Council on universal service user's rights relating to electronic communication networks and services (Amended by Directive 2009/136/EC)
- Directive 2002/ 21/EC of the European Parliament and of the Council on a common regulatory framework for electronic communications networks and services (amended by Directive 2009/140/EC)
- Directive 2007/2/EC of the European Parliament and of the Council establishing an Infrastructure for Spatial Information in the European Community (INSPIRE)
- BEREC Net Neutrality Guidelines (August 2016)
- BEREC Common Position on monitoring of mobile network coverage (December 2016)
- RSPG and BEREC joint report on mobile connectivity in 'challenge areas' (December 2016)

REQUESTED ACTIONS

ACTION 1 SDOs to develop an inventory of existing standards or standardisation in progress related to the broadband infrastructure mapping activity (e.g. Recommendations ITU-T Y.1545.1, Q.3960).

ACTION 2 SDOs to develop standardised ways and guidelines to map broadband infrastructures (including availability and quality of fixed and wireless/mobile broadband services), services offered, demand status and (future) investments.

ACTIVITIES AND ADDITIONAL INFORMATION

RELATED STANDARDISATION ACTIVITIES

CEN/CENELEC

CLC/TC 209 has developed and maintains a complete set of European standards in the field of cable networks for television signals, sound signals and interactive services. This EN series, EN 60728, deals with cable networks, including equipment and associated methods of measurement for headend reception, processing and distribution of television and sound signals and for processing, interfacing and transmitting all kinds of data signals for interactive services using all applicable transmission media. These signals are typically transmitted in networks by frequency-multiplexing techniques.

These include:

a) regional and local broadband cable networks (i.e. based on optical fibre and coaxial cables)

b) extended satellite and terrestrial television distribution networks or systems

c) individual networks or systems that receive satellite and terrestrial television, and all kinds of equipment, systems and installations used

in such cable networks, distribution and receiving systems.

The extent of this standardisation work is from the antennas and/or special signal source inputs to the headend or other interface points to the network up to the terminal input of the customer premises equipment.

The standardisation takes into account coexistence with users of the RF spectrum in wired and wireless transmission systems.

Typical data rates for internet access in these kind of networks range from 30 Mbit/s to 200 Mbit/s, with cable network operators now starting to introduce gigabit services to their customers.

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://www.cenelec.eu/dyn/www/f?p=104:7:327929463237701::::FSP_ORG_ID,FSP_LANG_ID:1258287,25

CLC/TC 215 have published, among others, EN 50173-4 on broadband cabling of private homes (both copper and optical fibre cabling) and EN 50700 on fibre optic access network cabling design. CLC/TC 46X 'Communication cables' have published and will maintain cable standards to support those different systems (e.g. EN 60966 series, EN 50117 series, EN 50288 series, EN 50441 series, EN 50407 series).

ITU-T

Study Group 12, the lead ITU-T study group on Quality of Service (QoS) and Quality of Experience (QoE), approved new Recommendation ITU-T Y.1545.1 "Framework for monitoring the quality of service of IP network services". This Recommendation is a diagnostic reference for IP network QoS monitoring, and is primarily a guide used to assist regulators in monitoring the QoS of Internet provided by service providers (although subscribers and network service providers may also benefit). ITU-T Y.1545.1 highlights the necessity of testing the QoS of network services offered by ISPs, from a diagnostic and regulatory point of view. Italso addresses QoS evaluation scenarios, sampling methodology and testing tools for regulators. This Recommendation gives guidance to regulators about minimum QoS parameters for evaluating the quality of Internet services. ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://itu.int/ITU-T/Y.1545.1

SG12 continues studying performance of packet-based networks and other networking technologies, including updates and maintenance on Y.1540 IP performance parameters and Y.1541 IP-based network objectives.

SG11 approved a new Recommendation ITU-T Q.3960 on a "Framework for Internet related performance measurements" which describes a framework for Internet related performance measurements which can be established at the national or international level. These give public telecom networks' customers the chance to estimate the access related performance.
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.itu.int/itu-t/q.3960

Based on the framework ITU-T Q.3960, SG11 is currently developing a companion draft Recommendation ITU-T Q.3961 "Testing methodologies of Internet related performance measurements including e2e bit rate within the fixed and mobile operator's networks ". It describes the testing procedures of data transmission speed within the fixed and mobile operator's networks.
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://itu.int/ITU-T/workprog/wp_item.aspx?isn=13819

SG11 developed ITU-T Q.3713 "Signalling requirements for broadband network gateway pool" which describes the scenarios, architecture and signalling for Broadband Network Gateway (BNG) pool in order to achieve the following outstanding benefits: high reliability for broadband access services, resource sharing and load balancing among multiple BNG devices which composed a pool, simplified OAM and reduction of OPEX&CAPEX. Also, SG11 is developing standards on signalling requirements for dynamic bandwidth adjustment on demand on broadband network gateway implemented by SDN technologies.

Study Group 15 is responsible in ITU T for the development of standards for the optical transport network, access network, home network and power utility network infrastructures, systems, equipment, optical fibres and cables. This includes related installation, maintenance, management, test, instrumentation and measurement techniques, and control plane technologies to enable the evolution toward intelligent transport networks, including the support of smart-grid applications.
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.itu.int/ITU-T/go/sg15

IETF

IETF has some relevant work in this area, such as RFC 3432 on Network performance measurement or RFC 6703 on Reporting IP Network Performance Metrics

The following WGs are active in this area:

The Large-Scale Measurement of Broadband Performance (LMAP) working group (▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://datatracker.ietf.org/doc/charter-ietf-lmap/) standardises the LMAP measurement system for performance measurements of broadband access devices such as home and enterprise edge routers, personal computers, mobile devices, set top box, whether wired or wireless.

Measuring portions of the Internet on a large scale is essential for accurate characterizations of performance over time and geography, for network diagnostic investigations by providers and their users, and for collecting information to support public policy development. The goal is to have the measurements (made using the same metrics and mechanisms) for a large number of points on the Internet, and to have the results collected and stored in the same form.

INSPIRE

Thematic working group utility and government services from European Commission Joint Research Centre set out on 2013 "Data Specification on Utility and Government Services — Technical Guidelines", a "non-paper" document.

SMART 2012/2022

A "Broadband and infrastructure mapping study" contracted by the European Commission.
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.broadbandmapping.eu.

SMART 2016/0046

"Study on Fixed and Mobile Convergence in Europe"

The project is expected to facilitate the identification of key elements to define a common European standard to measure network performance taking into account on-going international standardisation activities for network performance measurements with a view to align European and international efforts in this domain while ensuring the involved of relevant stakeholders.

VIRGO

In the context of standards-based infrastructure mapping, a European project VIRGO (Virtual Registry of the Ground Infrastructure) began in 2014 with a focus on mapping cloud computing. It is coordinated by Infratel Italia which is active in broadband mapping in Italy.

ECC REPORT 195

The Electronic Communications Committee (ECC) drafted Report 195, ´Minimum Set of Quality of Service Parameters and Measurement Methods for Retail Internet Access Services´.
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.erodocdb.dk/Docs/doc98/official/pdf/ECCREP195.PDF

ECC recommendation (15)03, ´Provision of Comparable Information on Retail Internet Access Service Quality´.
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.erodocdb.dk/Docs/doc98/official/pdf/REC1503.PDF

ITU-T PROJECTS

The ITU-T reference guide G.1011: ITU-T has a suitable recommendation for the QoS of different types of most important services in its reference guide G.1011, Table 9-1.

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://www.itu.int/rec/T-REC-G.1011/en

ITU-T interactive transmission maps of backbone broadband connections worldwide. The scope of this ITU project is to research, process and create maps of core transmission networks (optical fibres, microwaves, submarine cables and satellite links) for the following ITU regions: Arab region, CIS region, the EUR region, the Asia-Pacific region, the North America region, Latin America and the Caribbean region, and the Africa region.

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.itu.int/en/ITU-D/Technology/Pages/InteractiveTransmissionMaps.aspx

SMART 2012/0046

The internet is important basic infrastructure, but public efforts to monitor this complex system have been somewhat scattered. This study is analysing existing internet monitoring tools and methodologies. It provides concrete recommendations about the needs and the next steps that Europe should take in this area. ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://internet-monitoring-study.eu/

SMART 2014/0016

The Commission launched the project SMART 2014/0016 — Mapping of broadband services in Europe on 05/07/2015. This mapping project aims at the development of an EU integrated monitoring platform that will gather and benchmark mapping measurements of the services provided by broadband networks, notably from two dimensions: quality of service (QoS — data on marketed speeds/quality) and quality of experience (QoE — actual data from user experiences to be pulled from crowdsourcing applications). The contractor will build a sustainable database which can be easily updated and be statistically relevant doing data pulling and collection from existing sources while designing the qualification process of the self-reporting applications and an associated mapping application. This will allow the mapping of broadband at EU, national and regional levels using GIS-based state of the art applications.
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://etendering.ted.europa.eu/cft/cft-display.html?cftId=747

[1] COM (2015) 192 final A Digital Single Market Strategy for Europe
[2] COM (2016)587 final Connectivity for a Competitive Digital Single Market – Towards a European Gigabit Society

ACCESSIBILITY OF ICT PRODUCTS AND SERVICES

POLICY AND LEGISLATION

POLICY OBJECTIVES

Accessibility of ICT products and services includes telecommunications, TV and broadcasting, the web and new emerging technologies both mainstream and in assistive technology, including interoperability of the two.

This area is related to EU implementation of the UN Convention on the Rights of Persons with Disabilities to which the EU and Member States are a party.

The Commission adopted the European disability strategy 2010-2020[1] with the aim of supporting the implementation of the Convention in the EU. Regulation 1025/2012[2] states:

"(24) The European standardisation system should also fully take into account the United Nations Convention on the Rights of Persons with Disabilities. It is therefore important that organisations representing the interests of consumers sufficiently represent and include the interests of people with disabilities. In addition, the participation of people with disabilities in the standardisation process should be facilitated by all available means".

In this specific policy area, the Directive on the accessibility of public sector bodies' websites is covered through the use of a harmonised standard based on globally agreed web accessibility guidelines. This area also relates to the proposal for a Directive on accessibility of products and services, also referred to as the European Accessibility Act.

EC PERSPECTIVE AND PROGRESS REPORT

Standardisation needs arise, for instance from the UN Convention, Article 9 of which requires the development of accessibility standards, and from the general obligations to promote universal design when drafting standards. Work on this area needs to advance at European level in coordination with related work at international level, to support harmonised market requirements within Europe.

The Directive on the accessibility of public sector bodies' websites and mobile application includes a presumption of conformity that websites and mobile applications which meet the relevant harmonised standards will comply with the Directive's essential requirements. It also states that until references to harmonised standards have been published, the European standard EN 301 549 V1.1.2 (2015-04) (result of Mandate M/376 on accessibility requirements for products and services in the ICT domain suitable for public procurement purposes) should provide a presumption of conformity. Regarding mobile applications, the Directive includes the task of setting technical specifications that meet the Directive's accessibility requirements, until the harmonised standards include the specification needed. The Directive also requires drafing of a methodology for monitoring the conformity of websites and mobile applications with the requirements.

There is therefore a need to adapt EN 301 549 to include provisions on the accessibility of mobile applications, and to develop methodologies to test compliance with the essential requirements of perceivability, operability, understandability and robustness set in the Directive.

On 27 April 2017, the European Commission issued the standardisation request M/554 to the European standardization organizations in support of Directive (EU) 2016/2102 of the European Parliament and of the Council on the accessibility of the websites and mobile applications of public sector bodies. M/554 requests the development of a Harmonized Standard (hEN) covering the essential requirements included in the Directive on the accessibility of the websites and mobile application of public sector bodies, based on the EN 301 549 V1.1.2 (2015-04). CEN, CENELEC and ETSI accepted this standardization request in June 2017. EN 301 549 will be revised accordingly by the CEN-CENELEC-ETSI Joint Working Group on eAccessibility.

REFERENCES

On 2 December 2015, the Commission adopted a proposal for a Directive on the approximation of the laws, regulations and administrative provisions of the Member States as regards the accessibility requirements for products and services (the 'European Accessibility Act COM(2015) 615 final) to improve the functioning of the internal market of accessible goods and services. Some ICT goods and services are among the areas under examination to be covered.

COM(2012)721 3/12/12: Proposal for a Directive on the accessibility of public sector bodies' websites, aiming to make sure that public sector websites and mobile applications are accessible.

Accessibility of ICT relates to the following documents:

- The Commission's eGovernment Action Plan 2011-2015 to develop eGovernment services that ensure inclusiveness and accessibility
- ▸ https://ec.europa.eu/digital-agenda/en/european-egovernment-action-plan-2011-2015
- The Disability Strategy 2010-2020
- ▸ http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2010:0636:FIN:EN:PDF
- The UN Convention on the Rights of Persons with Disabilities (UN CRPD) ▸ http://www.un.org/disabilities/convention/conventionfull.shtml or ▸ http://www.un.org/disabilities/default.asp?navid=14&pid=150
- NOTE: The Audiovisual Media Services Directive (AVMS), as well as the draft European Electronic Communication Code, both currently under discussion, may include additional requirements in terms of eAccessibility, which may have an impact on future standardisation work.
- The UN Convention establishes accessibility as one of its general principles, which also applies to ICT and systems, including internet and electronic services; Article 9, on accessibility, requires the State Parties to take the necessary measures to ensure to persons with disabilities have access on an equal basis with others. Under the Convention, this includes measures related to all services open or provided to the public.

REQUESTED ACTIONS

ACTION 1 ESOs to finalise the standardisation requiest extending EN 301 549 to include additional specifications for accessibility of mobile applications to comply with the essential requirements of perceivability, operability, understandability and robustness set out in the Directive on the accessibility of the websites and mobile applications of public sector bodies. Close collaboration with W3C is important to keep EU developments and the global developments on WCAG in sync.

ACTION 2 SDOs to develop a live consolidated inventory of accessibility standards, improving the information in existing lists such as ▸http://standards.cen.eu/dyn/www/f?p=204:105:0. Among others, this may include coverage of potential causes of problems reported by hearing impaired people, and identification of areas where the standard models for predicting speech quality may need to be updated.

ACTION 3 SDOs to produce a technical report, based on the relevant European projects, delivering quality of service parameters addressing intelligibility of telecommunication as perceived by people with disabilities.

ACTION 4 SDOs to produce a technical report describing requirements for ICT products and services to be designed to meet the needs of persons with cognitive and learning disabilities; the report should propose enhancements to relevant existing standards and identify needs for further standardisation.

ACTION 5 SDOs to continue work on M/473, providing the deliverables agreed including the European standard and methodology for mainstream accessibility in standardisation processes and the revision of existing standards as agreed in the Mandate deliverable 3.1

ACTION 6 Stimulate further global cooperation on web accessibility standardisation based on work by the World Wide Web Consortium (W3C) on web content accessibility guidelines (WCAG) work, in regards to the adoption of the upcoming WCAG 2.1, in order to overcome fragmentation in meeting user needs with accessible products within the existing structures.

ACTION 7 EDF to produce a report on the principles to be followed by emerging technologies, such as Internet of Things, Artificial Intelligence, wearables, and virtual and augmented reality, to be accessible for persons with disabilities.

ACTIVITIES AND ADDITIONAL INFORMATION

RELATED STANDARDISATION ACTIVITIES

M/554

M/554 has been issued in April 2017 and requests the development of a Harmonized Standard (hEN) covering the essential requirements included in the Directive on the accessibility of the websites and mobile application of public sector bodies, based on the EN 301 549 V1.1.2 (2015-04). CEN, CENELEC and ETSI accepted this standardization request in June 2017. EN 301 549 will be revised accordingly by the CEN-CENELEC-ETSI Joint Working Group on eAccessibility.

M/376

This addresses ICT accessibility standardisation at European level; it takes into consideration relevant national and international standards on accessibility, e.g. those adopted by the US Access Board, W3C WAI and some related ISO work. The resulting EN 301 549 standard and other related deliverables have been published and contains the requirements of WCAG 2.0 Level AA. The possibility of proposing it as an international standard is under consideration within the JWG on eAccessibility which decided to wait until the US has published its revised standards under Section 508 in order to consider further possible alignments to the EN standard. ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://ec.europa.eu/enterprise/standards_policy/mandates/database/index.cfm?fuseaction=search.detail&id=333#; ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://webapp.etsi.org/WorkProgram/Report_WorkItem.asp?WKI_ID=30873

M/473

This is ongoing standardisation work aiming to mainstream accessibility following `design for all' principles in relevant European standardisation initiatives (other than M/376); in addition it requires the development of standards to support manufacturers and service providers including accessibility following design for all, and to facilitate the implementation of the accessibility provisions in European standards, which could cover the majority of the standardisation work covered by this Rolling Plan.
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.etsi.org/images/files/ECMandates/m473.pdf

M/420

This mandate, while focusing on accessibility of the built environment, might also include ICT that is used in that context
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://ec.europa.eu/enterprise/standards_policy/mandates/database/index.cfm?fuseaction=refSearch.search#

CEN-CENELEC-ETSI

CEN-CENELEC-ETSI have started working on the revision of EN 301 509, that relates to the accessibility of ICT products and services. The revised EN will be developed to meet the essential requirements included in the Directive on the accessibility of the websites and mobile application of public sector bodies.

CEN-CENELEC

CEN-CENELEC/TC 11 is working on the standardization deliverables in relation with M/420, which will include the following standards:

- Accessibility and usability of the built environment - Functional requirements (EN)
- Accessibility and usability of the built environment - Technical performance criteria and specifications (TR)

A Technical Report on the conformity assessment for the accessibility and usability of the built environment will also be developed.

BSI

BS 8878:2010 is the first British standard to outline a framework for web accessibility when designing or commissioning web products
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.ihs.com/products/industry-standards/organisations/bsi/index.aspx

W3C - ISO/IEC JTC 1

The W3C WCAG-EM project has published a stable "working group note": ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://www.w3.org/TR/WCAG-EM/. See also ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://www.w3.org/WAI/eval/

The work ISO/IEC JTC1 SWG-A was doing (TR 29138-2) was passed to JTC1 SC35.

A framework for personalization and adaptation of user interfaces at runtime, based on the context of use (consisting of a user's needs and preferences, their envisioned tasks, their equipment, and environmental parameters of interaction). The framework is based on the well-known REST protocol, and JSON and XML formats. A registry-based approach is employed for the definition of terms describing a user's personal preferences and needs.

Currently, the following standards are being developed as part of this framework:

ISO/IEC CD 24571-1 Information Technology – Individualised adaptability and accessibility in e-learning, education and training – Part 1: Framework and reference model

ISO/IEC DIS 24752-8 Information technology -- User interfaces -- Universal remote console -- Part 8: User interface resource framework

CEN

CEN formed a Strategic Advisory Group on Accessibility (SAGA) to consider how to address accessibility throughout the standardisation process; this group includes representatives of national standards bodies, CENELEC and ETSI, and organisations representing disabled and older persons
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.cencenelec.eu/standards/Sectors/Accessibility/Pages/default.aspx

ETSI

ETSI continues to produce accessibility standards on specific ICT topics and is planning to produce a guide to user-centred terminology for existing and upcoming devices and services and recommendations for the design of ICT devices for persons with cognitive disabilities; initial early investigations are being made into transmission quality and its possible link to reported intelligibility problems for some hearing impaired people; see also EG 202 952, a set of guidelines to identify "Design for All" aspects in ETSI deliverables
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.etsi.org/technologies-clusters/technologies/human-factors/accessibility; ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://webapp.etsi.org/WorkProgram/Report_WorkItem.asp?WKI_ID=35174; ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://webapp.etsi.org/WorkProgram/Report_WorkItem.asp?WKI_ID=37153; ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://webapp.etsi.org/WorkProgram/Report_WorkItem.asp?WKI_ID=35796

IEC

IEC TC 100/TA 16 is producing international publications addressing aspects of active assisted living (AAL), including issues related to accessibility, usability and specific user interfaces related to audio, video and multimedia systems and equipment within the scope of TC 100.
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.iec.ch/dyn/www/f?p=103:7:0::::FSP_ORG_ID,FSP_LANG_ID:11009,25

IETF

Relevant work may be found in the RAI area, e.g. RFC 3551 identifies the requirements for SIP to support the hearing impaired and RFC 4103 defines the RTP payload for text conversation; RFCs 4103 and 5194 are referenced in various accessibility draft regulations being proposed in the US

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://trac.tools.ietf.org/area/rai/;

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://trac.tools.ietf.org/group/iab/trac/wiki/Multi-Stake-Holder-Platform#ICTAccess;
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.rfc-editor.org/rfc/rfc3551.txt;
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.rfc-editor.org/rfc/rfc4103.txt;
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.rfc-editor.org/rfc/rfc5194.txt;
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.section508.gov/section-508-standards-guide

ISO

ISO/IEC Guide 71, Guidelines for standards developers to address the needs of older persons and persons with disabilities was published in 2014 and adopted by CEN and the CENELEC as CEN/ CENELEC guide 6:2014. ITU also adopted it as H-Series Supplement 17.

JTC1 SWG-A (special working group on accessibility) has been disbanded. Work has been transferred to ISO/IEC/JTC1 SC35 (User Interfaces). ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://www.iso.org/standard/57385.html

ITU

ITU produced relevant work on accessibility and human factors, a sample of which is found in the ITU Accessibility Portal.

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://itu.int/en/ITU-T/accessibility

Related technical groups include Question 26/16 on accessibility and Question 24/16 on human factors, which include various experts with disabilities and cooperate with advocacy organizations (such as the G3ict, WFD and RNIB), in addition to other technical groups such as ITU-T, D, R Study Groups and ISO/IEC JTC1 SC35.

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://itu.int/itu-t/workprog/wp_search.aspx?Q=26/16

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://itu.int/itu-t/workprog/wp_search.aspx?Q=24/16

Recommendation ITU-T F.790 on accessibility guidelines for older persons and persons with disabilities is complemented by ITU H-series Supplement 17 (2014), which mirrors the new edition of ISO/IEC Guide 71 containing guidelines for standards developers to address the needs of older persons and persons with disabilities.
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://itu.int/rec/T-REC-F.790
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://itu.int/rec/T-REC-H.Sup17
ITU-T F.791 contains recommended terminology for accessibility for use in the international context and assists in defining context for procurement activities of accessible systems and services.

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://itu.int/rec/T-REC-F.791

The checklist in ITU-T FSTP-TACL on how to prepare ICT standards that include accessibility from their inception is also available. Two other ITU-T technical papers describe arrangements for accessible meetings and for accessible remote participation in meetings (FSTP-AM — Guidelines for accessible meetings; and FSTP-ACC-RemPart — Guidelines for supporting remote participation in meetings for all) that aim at increasing the participation of persons with disabilities at real and virtual meetings.
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://itu.int/pub/T-TUT-FSTP

In addition to the work for mainstreaming accessibility recent completed work includes ITU-T F.921 (03/2017) "Audio-based network navigation system for persons with vision impairment", ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://itu.int/rec/T-REC-F.921.

W3C

Develops and maintains the internationally recognized "web content accessibility guidelines (WCAG) 2.0": ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://www.w3.org/WAI/intro/wcag and ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://www.w3.org/TR/WCAG20
WCAG 2.0 is also available as ISO/IEC 40500:2012, and is partially included in EN 301 549 (only Level A and Level AA requirements).

Currently W3C is working on improvements to WCAG for the following areas: mobile accessibility, cognitive and learning disabilities, low vision, conformance testing. Some of these improvements are expected for WCAG 2.1, which is currently being pursued by W3C. W3C is also exploring the development of the third-generation version of WCAG.

The Authoring Tool Accessibility Guidelines (ATAG) 2.0 is a W3C standard ("Recommendation") that addresses the accessibility of code editors, content management systems (CMS), and other software used to create web content, include some types of social media websites; and support for production of accessible content by these tools. ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://www.w3.org/WAI/intro/atag ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://www.w3.org/TR/ATAG20

The User Agent Accessibility Guidelines (UAAG) addresses accessibility aspects of web browsers, media players, and some types of assistive technologies. It also addresses some types of mobile applications. UAAG 2.0 is currently at a normative Working group Note. ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://www.w3.org/WAI/intro/uaag ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://www.w3.org/TR/UAAG20

The Website Accessibility Conformance Evaluation Methodology (WCAG-EM) 1.0 is currently at a working group note status. It addresses aspects of website evaluation. ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://www.w3.org/WAI/eval/conformance ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://www.w3.org/TR/WCAG-EM

AALIANCE2

Next Generation European Ambient Assisted Living Innovation; FP7 repository of existing standards
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.aaliance2.eu/

WAI ACT

A cooperation framework for guidance on advanced technologies, evaluation methodologies, and research agenda setting to support eAccessibility.
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.w3.org/WAI/ACT/

WAI DEV

Developing strategies to support mainstream production of inclusive components and services and showcasing good practice in inclusive design.
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.w3.org/WAI/DEV/

EACCESS+

Hub providing resources notably on standards and guidelines for web accessibility (CIP ICT PSP)
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://hub.eaccessplus.eu/wiki/Category:Standards

EIII

European Inclusion Internet Initiative: partners among others Dutch, Danish, Italian and Island governments. The initiative is now completed
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://eiii.eu/

PROSPERITY4ALL

Develops the infrastructure and ecosystem that will allow for a ubiquitous auto-personalisation of interfaces and materials, based on user needs and preferences, to grow; it builds on the infrastructure provided by Cloud4All in order to create more parts of the GPII
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.prosperity4all.eu; ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.cloud4all.info/; ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://gpii.net/

RAISING THE FLOOR CONSORTIUM

Mission is to make the web and mobile technologies accessible to everyone with disability, literacy and ageing-related barriers, regardless of their economic status
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://raisingthefloor.org

SMART 2014 /0061

Monitoring methodologies for web accessibility in the European Union. The objective of the study is to collect information on the monitoring methodologies for verification of compliance with web accessibility requirements in the different Member States.
▸ www.monitor-wa.eu

THE NETHERLANDS, 'SIMPLY ACCESSIBLE'

Other countries are invited to participate in this initiative which is the first European initiative involving all relevant stakeholders (government, market parties that build websites and market parties that test websites) to working together on continuously improving the accessibility of government websites by supporting both governments and market parties with proper instruments, e.g. an accessibility plug-in to support content managers and monitor: accessibility of public websites on organisational and product levels, software conformity with the WCAG standard, any mismatch found with the WCAG standard, and suggestions to improve compliance

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://www.gewoontoegankelijk.nl/en

ADDITIONAL INFORMATION

Accessibility needs to be reflected in ICT and many other areas (like emergency communication, digital cinema, health, public transport, tourism, and learning) both for users with disabilities in the general public and for staff/entrepreneurs with disabilities in industry or public administration.

The following list has been compiled from views expressed by some Member States and experts in the field. The list is intended to trigger further discussion with all stakeholders on possible future actions:

- Investigating how mobile devices are useful to people with dexterity problems and reduced mobility and other type of disability when interacting with other ICT products and services; widening the scope (i.e. beyond mobile devices) of guidelines related to diminished motor control e.g. people with advanced Parkinson or similar disorders who can hardly or no longer write is also needed
- Applying standardisation of broadcasters accessible interfaces to IP (and other) systems.
- Convergence and interoperability of video relay services.
- Accessible hybrid TV services.
- Specification of requests for translation among languages, image and text representations, particularly those overcoming accessibility issues, e.g voice to text like automation of relay services for telephony and capturing/subtitling TV transmissions for hearing-impaired people.
- Interoperability of the most common text transmission techniques like IM — SMS- and email for hearing impaired people.
- Text to voice, like automatically generated audio description for blind citizens.
- Text to sign language, like automatically generated sign language for deaf and hearing-impaired people.
- Identification of accessibility issues, requirements and associated standardisation needs related to:
    - non-literate and dyslexic users; these requirements may turn out to be equally applicable for foreign users unable to understand available user interface languages.
    - security and privacy features of ICT services and devices (see below and sections security and ePrivacy) .
- Users have to use increasingly complex security procedures to access the services that they rely on. Attempts to increase security frequently include mechanisms that many users, particularly those with physical and cognitive disabilities, are unable to successfully handle without adopting highly insecure strategies such as writing down complex usernames and passwords. There is a need to provide standards and guidance on accessible security mechanisms that are compatible with human abilities,

and appropriate to the type of service being used. In this context the benefit of using of new technologies like biometrics or RFID could be evaluated.

- This accessibility component of privacy and security issues could be addressed in general development following M/473 or, preferably, be mainstreamed in general privacy and security work.
- Standards could be evaluated to produce a guide to user-centred terminology for all potential users in several EU languages, focusing on the benefits for those with learning and cognitive disabilities. The preponderance of different names for the same ICT features and functions is confusing for all people, but this can be a significantly more important problem for older users or users with learning and cognitive disabilities. This has a negative impact on individual citizens and on the size of the ICT market. This would provide benefits for all potential users, particularly older users and users with learning and cognitive impairments who are currently partly excluded from benefiting from the use of modern ICT.

[1] http://ec.europa.eu/justice/discrimination/disabilities/disability-strategy/index_en.htm

[2] http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2012:316:0012:0033:EN:PDF or http://ec.europa.eu/enterprise/policies/european-standards/standardisation-policy/#h2-1

SOCIETAL CHALLENGES

EHEALTH, HEALTHY LIVING AND AGEING

POLICY AND LEGISLATION

POLICY OBJECTIVES

One of the major challenges that Europe faces today is to ensure the sustainability and quality of healthcare provision. This is caused mainly by demographic changes[1], the associated rising prevalence of chronic diseases and the re-emergence of infectious diseases. The White Paper on the Future of Europe identifies some of the drivers of Europe's future, noting that by 2030 Europe will be the oldest region in the world. Through Digital technologies, citizens' health and quality of life can be improved while the challenges of how to provide modern healthcare and healthcare systems are addressed. Moreover, technology can offer effective tools to advance research, support the transition from a hospital-based health care model to a citizen-centric model and contribute to the sustainability and resilience of healthcare provision. New approaches could be enabled in order to support personalised medicine, independent living or integrated health and social care, accelerate scientific progress for early diagnosis, prevention of diseases and proactive re-design of working and living environments as well as more effective treatments.

Thus, there is a clear need to move forward by ensuring Citizens' access to their own electronic health records anywhere in the EU, developing a secure EU-wide digital infrastructure that allows the pooling of electronic health records and other health data in compliance with data protection legislation and support the aggregation of investment plans across Member States and regions to deploy large scale digital health and care programmes (such as mobile health, telemedicine and connected care).

In 2015, the Digital Single Market (DSM) Strategy highlighted the need to make progress on standardisation and interoperability of eHealth solutions in support to health system reforms. Moving towards this direction, several steps have already been taken and the relevant actions include: (i) the adoption of new guidance on interoperability and standards for digital health and care, (ii) strengthening of the digital infrastructure for cross border exchange of health data through the Connecting Europe Facility (CEF), and (iii) new investment commitments in large scale implementation of in digital health and social care programmes from national and regional authorities grouped under the European Innovation Partnership on Active and Healthy Ageing.

More specifically, on 28 July 2015 the Commission has adopted the Decision on the identification of 'Integrating the Healthcare Enterprise' profiles for referencing in public procurement. In 2016 a total of 74 European regions from 18 Member States were awarded the title of 'Reference Sites of the European Innovation Partnership on Active and Healthy Ageing' (EIP on AHA). Moreover, under the Framework set-up by the eHealth Network, Member States have worked together with the Commission to build the eHealth Digital Service Infrastructure (DSI) for cross-border exchange of Patient Summaries and ePrescription.[FN1] Co-funded by CEF, the first Member States should go live in 2018, and then the number of participants to the exchange will grow. Also, in 2017, the Commission launched 24 European Reference Networks, which will provide an unprecedented capacity for cross-border collaboration to diagnose and treat rare diseases, using online consultation tool built with Connecting Europe Facility co-funding. They will pool knowledge and expertise, and offer an opportunity for clinical and scientific innovation.

Moreover, the digital transformation of health and care is one of the priority areas in the modernisation of public services identified in the midterm Review of the DSM strategy. Towards this direction, the Commission will adopt a Communication in 2017 addressing the need and scope for further measures in the area of digital health and care, in line with legislation on the protection of personal data, patient rights and electronic identification, in particular as regards:

- Citizens ´ secure access to electronic health records and the possibility to share it across borders and the use of e-prescriptions.
- Supporting data infrastructure, to advance research, disease prevention and personalised health and care in key areas including rare, infectious and complex diseases.
- Facilitating feedback and interaction between patients and healthcare providers, to support prevention and citizen empowerment as well as quality and patient-centred care, focussing on chronic diseases and on a better understanding of the outcomes of healthcare systems.

Notwithstanding this substantial progress, there are still challenges that need to be addressed in order to reap all the benefits of a fully mature and interoperable eHealth environment in Europe. Also, barriers continue to exist and need to be addressed in order to unlock all the benefits from active and healthy living and ageing environments in Europe. Among the main issues to be tackled are the need for interoperability between the solutions provided in both eHealth and active and healthy living and ageing domains, which shall be addressed on all concerned levels including a strong contribution from standardisation and harmonisation.

- FN1
- 1- the keyword CBEHIS (Cross Border eHealth Information Services) which is the abbreviation used by experts to describe their activity. CBeHIS is the infrastructure with the operations used to exchange real patient related data, in particular health data, between its members.
- (these short explanations can be in a foot note or introduced in the table of 'current activities')
- 2- the link to DSI (as a foot note or including as a reference)
- DSI: ▸ https://ec.europa.eu/cefdigital/wiki/display/EHOPERATIONS/eHealth+DSI+Operations+Home

EC PERSPECTIVE AND PROGRESS REPORT

Following the review of the Digital Single Market there were needs arising and identified in order to achieve the identified goals including the necessity for a European Electronic Health Record format enabling the exchange of health information across the single market in a federated system, embedding security (secure ledgers) (Pillar 1), further enhanced semantics for the data infrastructure (pillar 2), the IoT interoperability ontology for smart environments (pillar 3).

Interoperability of ICT-enabled solutions and of data exchange is the precondition for achieving better health of the European citizen and improved delivery of healthcare services unlocking the EU digital single market in that field and including active and healthy ageing with ICT and the data exchange surrounding it.

The use of European and international standards is a way to ensure the interoperability of ICT solutions in general. In eHealth however, such standards have often not been specific enough. The eHealth network identified more detailed specifications, which could be used for public procurement, in the framework of the new EU standardisation regulation, contributing to the technical and semantic levels of the eHealth Interoperability Framework. One example is the IHE set of specifications identified for use in procurement by Commission Decision (EU) 2015/1302 of 28 July 2015[2] under Article 14 of the EU Regulation 1025/2012.

A new European Interoperability Framework (EIF) was presented in the context of the implementation of the Interoperability Solutions for European Public Administrations (ISA^2) programme (2016-2020) and as part of the Communication (COM(2017)134) from the European Commission, adopted on 23 March 2017. The framework gives specific guidance on how to set up interoperable digital public services. It offers public administrations 47 concrete recommendations on how to improve governance of their interoperability activities, establish cross-organisational relationships, streamline processes supporting end-to-end digital services, and ensure that both existing and new legislation do not compromise interoperability efforts. The new EIF is undertaken in the context of the Commission priority to create a Digital Single Market in Europe. The EIF is accompanied by the Interoperability Action Plan, which outlines priorities that should support the implementation of the EIF from 2016 to 2020. The Interoperability Action Plan is comprised of five focus areas, addressing issues related to the identification of mechanisms to govern interoperability, collaboration between organisations, engagement of stakeholders, and raising awareness of the benefits of interoperability.

A refined eHealth European interoperability framework (ReEIF) was adopted by the eHealth Network in November 2015. It represents a common refined framework for managing interoperability and standardisation challenges in the eHealth domain in Europe, offering a framework of terms and methodologies for reaching a common language, and a common starting point for the analysis of problems and the description of eHealth solutions throughout Europe.

In addition to European and international standards and specifications, interoperability testing, labelling and certification processes are also essential. Several projects are successfully testing and implementing standards, open and secure architecture, clinical workflows and subsets of terminologies and making policy recommendations, to prepare the deployment of eHealth services on a large scale.

With the purpose of implementing Patient Summary and ePrescriptions data exchange among Member States, the eHN adopted three guidelines on cross-border exchange of health data: the guidelines on a minimum/non exhaustive patient summary dataset for electronic exchange (2013, revised in 2016), on an ePrescription dataset for electronic exchange (2014, revised in 2016); and on an Organisational Framework for eHealth National Contact Points (2015). In addition, a recommendation to promote the use of patients' registries has been adopted in 2015, and a guideline on the electronic exchange of health data under Cross-border directive 2011/24/EU was adopted in 2016.

The Commission is working on the setting up of European reference networks (ERN) on rare diseases pursuant to Article 12 of Directive 2011/24 on patients' rights in cross-border healthcare. The main aim is to provide health care in a networking environment. Such cooperative work requires an IT setup that allows healthcare providers to discuss and share knowledge and clinical information on concrete and real-time patient cases (a virtual consultation system) including the use of the use of EHR PACS systems.

The eHealth Interoperability Framework Study[3] identifies a representative set of the most relevant use-cases within the eHealth environment and initiating the specification of requests to foster ICT products and services. Further citizen-centred work is needed to cover different forms of actor/user involvement. The use of European and international standards is a way to ensure the interoperability of ICT solutions in general. In the area of ICT for an active and healthy ageing, however, such standards are often not specific enough. In addition, standards in response to identified needs could apply across different environments, e.g. smart homes, smart workplaces, smart cities and synergies should be further enhanced.,

Two promising, currently parallel, interoperability strategies are the 'concurrent use initiative' standards with the IEEE 11073™' family of `Health Informatics/Personal Health Device Communication' , and the CEN/TC 251 'Concurrent use initiative', which has developed a set of health informatics standards (ContSys, EHRcom, and HISA) that links the digitalization of health care processes with the (open) electronic health record and the medical devices, proposing a set of harmonised standards for architecture and interoperability of health information data communication.

Several projects are successfully testing and implementing standards, open and secure architecture and subsets of terminologies and making policy recommendations, to prepare the deployment of ICT services for an active and healthy ageing on a large scale. It is proposed to boost interoperability by further developing and validating specifications and components, partly through the launch of standardisation mandates, projects or direct grants, the definition of interoperability profiles and certification, if deemed necessary. Coordination with the JIC and other SDOs will be pursued. The availability of new infrastructure for the Internet of Things (IoT), such as Lora and Zigbee provides promising new opportunities for the development of ICT applications for monitoring care of people living at home.

On 5 April 2017, two new Regulations on medical devices were adopted. These replace the existing Directives.

Regulation (EU) 2017/745 of the European Parliament and of the Council of 5 April 2017 on medical devices, amending Directive 2001/83/EC, Regulation (EC) No 178/2002 and Regulation (EC) No 1223/2009 and repealing Council Directives 90/385/EEC and 93/42/EEC,

Regulation (EU) 2017/746 of the European Parliament and of the Council of 5 April 2017 on in vitro diagnostic medical devices and repealing Directive 98/79/EC and Commission Decision 2010/227/EU.

The new rules will only apply after a transitional period. Namely, 3 years after entry into force for the Regulation on medical devices (spring 2020) and 5 years after entry into force (spring 2022) for the Regulation on in vitro diagnostic medical devices.

Moreover, four H2020 projects on eHealth standardisation, harmonisation and interoperability were finalised or close to finalisation providing concepts and proposed approaches for standards and standardisation roadmap development:

- OpenMedicine, supporting a common EU, standards-based, database of medicinal products;
- eStandards to support the optimisation of standardisation processes and development of roadmaps;
- AssessCT to assess SNOMED CT[4] terminology.
- VALUeHEALTH addresses how interoperability of health information can consistently create, capture and deliver value for all stakeholders.

Three projects on eHealth standardisation are ongoing:

- EURO-CAS, a European eHealth Interoperability Conformity Assessment Scheme aiming at maintaining and developing the adoption and take-up of testing the interoperability of ICT solutions.
- Trillium-II, advancing further the global Electronic Health Record (EHR) interoperability with activities surrounding the International Patient Summary (IPS) standards
- PROGRESSIVE will provide a dynamic and sustainable framework for standards and standardisation on ICT related to active and healthy ageing.

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- COM(2010) 245: "A Digital Agenda for Europe", actions 76, 77 and 78
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  ▸ http://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/lsa/134097.pdf
- Guiding Principles for Active Ageing and Solidarity between Generations
  ▸ http://ec.europa.eu/social/main.jsp?langId=en&catId=89&newsId=1743&furtherNews=yes
- Decision 940/2011/EU of the European Parliament and of the Council of 14 September 2011 on the European Year for Active Ageing and Solidarity between Generations (2012)
  ▸ http://eur-lex.europa.eu/legal-content/EN/ALL/;ELX_SESSIONID=qpQzJ3rKbByvsdtqBxK2p41dV8f25pHvG8TknfSjGkNd3QxnC5pr!1323026245?uri=CELEX:32011D0940
- Directory for eHealth policies, World Health Organisation,
  ▸ http://www.who.int/goe/policies/en
- WHO guidelines on age friendly cities
  ▸ http://www.who.int/ageing/publications/Global_age_friendly_cities_Guide_English.pdf

REQUESTED ACTIONS

Addressing key aspects of identification (citizens, workforce actors, hospitals, clinics, doctors, diseases, medicinal products, etc.) and required interoperability should be considered at European level as a priority for work on eHealth, since many other areas depending on these. In particular, agreement should be reached on the categories of workforce actors in order to enable access management of citizens' health information. This includes the needs related to secure authentication of these professionals and their authorisations. The eIDAS Regulation (EU) No 910/2014 may solve parts of the issues on identification and authentication processes. Work is ongoing in the Member states to finalise the transposition of the eIDAS Regulation.

ACTION 1 For the further development of the citizens' electronic health records, evaluate and address standardisation needs of high relevance for the citizen in technical reports and beyond regarding terminological and technological profiles for the cross-border digital single European market.

ACTION 2 Evaluate the needs, produce a report on necessary key types of identifiers and identification processes needed as components in a European eHealth digital single market. In this context, a special emphasis on the items listed below, which go beyond the key types of identifiers and identification processes, should be provided.

Standardised medicinal products identifiers to support national and international interoperability of health services (online or other), while complying with the legislation protecting patients, and including specific rules of enforcement of delivery on medical prescriptions[2]. Agreements on standards in this field should take into account the needs of cross-border exchange of electronic health records since their medication part faces similar terminological challenges.

1. Agreements on a terminological profile for 1. minimum sets of fields included in the patient summary, and 2. on technical profiles for the cross-border exchange of electronic health record information with identified socioeconomic importance, and a European dimension in the context of the IPS (International Patient Summary) project. The consent of patient and the citizen must carefully be accounted in the standard to develop.
2. The needs for standards supporting the ICT services provided through the European reference networks (ERNs) for rare diseases regarding communication and data sharing addressing areas such as fast and easy sharing of digital medical images through picture archive and communication systems (PACS) in the context of the eStandards project and its focus area description for ERN, as well as the ValueHealth project with its use case for Chronic Diseases;
3. Agreements on a terminological profiles for Telemedicine application, allowing healthcare providers to share real-time knowledge and decisions; sharing of best practices and clinical decision-making tools (i.e. guidelines); solutions to support collaborative research between healthcare providers, through the development of clinical trials and/or epidemiological studies; and establishment of shared databases and registries.
4. The move towards personalised medicine requires standardisation of data related to the field of biology and biomarkers. In particular, clinical laboratories are subject to a process of accreditation according to ISO 15 189 that should be supplemented by standardisation processes in ICT.
5. Establishment of Quality criteria for the development of health and wellness apps. Taking into account the fast growing market of health and wellness applications and the concerns about their quality and reliability, there is a need for technical specifications at the European level that would provide guidance to app developers by setting out quality criteria and principles to be followed throughout the app development life cycle. These technical specifications could be based on the publicly available specification PAS:277 published by the British Standards Institution (BSI). First steps have been taken to start working on the development of a European Technical Specification, based on PAS 277 (new work item proposal at CEN level).

ACTION 3 Evaluate and report on the opportunities and needs for standardisation supporting active living and ageing with special emphasis on:

1. Open service platforms APIs taking into account progress made under H2020 on the topics of smart homes and smart cities
2. Service robotics for assisted working, and independent living including regulatory acceptance:

3. Identify standardisation needs to support specific issues, e.g. occupational health and safety, memory deficiency, mental health issues.
4. Ensuring interoperability of devices to enable plug-and-play connectivity of the different devices and services for personal management and delivery of the actual services for an active and healthy ageing.

Whereas:

- it is necessary to Facilitate the involvement of societal stakeholders in the development of standards in the field of active and healthy ageing; ensure user participation from the beginning to avoid purely technical-driven innovation.
- given the challenge of the aging population, the standardisation work must also take into account aspects of personal services dedicated to the autonomy including ICT solutions in order to promote secure and harmonised solutions at the European level;
- it is important to consider the synergies between standardization and active and healthy ageing with similar standards in the areas of ambient assisted living and eHealth as proposed by the H2020 PROGRESSIVE project and referenced in the eStandards project and activities undertaken by the Task Force 'Ageing in community' in ISO/TC 215;
- all the standardisation work on active and healthy ageing should ensure a high-level of privacy protection and of security.

ACTION 4 'Data protection by design' (GDPR, Article 25) in eHealth products and services

- It is recommended to check whether a standardisation request might be needed pursuant to Regulation 1025/2012 for one or more European standardisation deliverable(s) concerning data protection by design for the development of eHealth products and services.

ACTIVITIES AND ADDITIONAL INFORMATION

RELATED STANDARDISATION ACTIVITIES

GUIDELINES, CODE OF CONDUCT

The following links provide additional information of ongoing work.

Guidelines on:

On the electronic exchange of health data under Cross Border Directive 2011/24/EU revised in 2016

on an Organisational Framework for eHealth National Contact Points (2015)

▸ http://ec.europa.eu/health/ehealth/key_documents/index_en.htm

Report of the Working Group on mHealth assessment guidelines

https://ec.europa.eu/digital-single-market/en/news/report-working-group-mhealth-assessment-guidelines

Code of Conduct on privacy for mobile health apps,
▸ https://ec.europa.eu/digital-single-market/en/news/code-conduct-privacy-mhealth-apps-has-been-finalised

Consultation on safety of apps

▸ https://ec.europa.eu/digital-single-market/en/news/public-consultation-safety-apps-and-other-non-embedded-software

BSI

PAS 277:2015 Health and wellness apps — Quality criteria across the life cycle — Code of practice

CEN

CEN/TC 251 provides a focal point for the development of standards in the Health Informatics domain, in close collaboration with ISO/TC 215. CEN/TC 251 is taking forward the eHN guidelines, contributing to international standardization solutions, while providing Europe with a Patient Summary standard and an implementation guide. The technical committee is also responsible for the development, publication and maintenance of the ISO-EN IDMP series (Health informatics - Identification of medicinal products): EN-ISO 11238, 11239, 11240, 11615 and 11616 (and their accompanying implementation guides, as CEN ISO/TS 20440, 20443, 20451, 19844), which also refer to the openMedicine results: ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.open-medicine.eu/downloads.html CEN/TC 251 maintains the "DICOM" standards (and notably EN ISO 12052: Health informatics - Digital imaging and communication in medicine (DICOM) including workflow and data management).

In the frame of the standardization request M/530 on privacy and personal data protection management, CEN/TC 251 will liaise with CEN-CLC/TC 8 (Privacy in products and services) and CEN-CLC/TC 13 (Cybersecurity and data protection) to address the particular requirements of eHealth.

CENELEC

CENELEC has adopted as European Standards IEC 62304 (Medical device software -- Software life cycle processes) and IEC 82304-1 (Health software – Part 1: General requirements for product safety).

CEN, CENELEC, ETSI

CEN-CENELEC-ETSI are starting to work on the revision of EN 301 509, which deals with the accessibility of ICT products and services (CEN-CENELEC-ETSI Joint Working Group on eAccessibility). The purpose of this revision is to meet the essential requirements included in the Directive on the accessibility of the websites and mobile application of public sector bodies. This work will have an impact on the life of older people, easing the use of ICT products and services.

ISO

The European Medicines Agency is part of a project to finalise the implementation guides to support the adoption of the ISO standards for the identification of medicinal products (IDMP).

This set of standards and implementation guides are being developed jointly by ISO/TC 215 and CEN/TC 251, where this work started originally.

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.ema.europa.eu/ema/index.jsp?curl=pages/regulation/general/general_content_000645.jsp&mid=WC0b01ac058078fbe2

ISO/IEC JTC 1

A framework for personalization and adaptation of user interfaces at runtime, based on the context of use (consisting of a user's needs and preferences, their envisioned tasks, their equipment, and environmental parameters of interaction). The framework is based on the well-known REST protocol, and JSON and XML formats. A registry-based approach is employed for the definition of terms describing a user's personal preferences and needs.

Currently, the following standards are being developed as part of this framework:

ISO/IEC CD 24571-1 Information Technology – Individualised adaptability and accessibility in e-learning, education and training – Part 1: Framework and reference model

ISO/IEC DIS 24752-8 Information technology -- User interfaces -- Universal remote console -- Part 8: User interface resource framework

ISO/IEC

The standard 62304 Health software - Software life cycle processes is being updated, by ISO and IEC. One of the issues to be addressed is about the improvement of the security aspects that relate to health software. This may also lead to a new project focusing on security in health software.

ETSI

ETSI is developing digital enhanced cordless telecommunications (DECT) ultra-low energy (ULE), a low-power wireless technology providing optimal radio coverage in indoor scenarios for reliable audio and data services suitable for many eHealth applications, e.g. health monitoring, emergency alarms for vulnerable people and remote medical monitoring.

It is also working on smart body area networks. Standards for a dedicated radio technology for these networks are being developed.

EP eHealth provides a focus point in ETSI on issues such as mHealth and telemedicine. Currently, there is the development of standards to facilitate telemedicine and the "Internet Clinic".

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.etsi.org/technologies-clusters/technologies/medical

IEC

IEC SC 62B is developing standard IEC 61910-1, which describes a high-level data exchange language between systems making medical imagery.

IEEE

The IEEE has unique standards programmes supporting the eHealth area, extending from body area networks to 3D modelling of medical data, and integrating the IEEE 11073™ family of informatics/personal health devices communication standards for data interoperability and architecture.

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://standards.ieee.org/develop/msp/ehealth.pdf

ITU

The ITU published the Continua Design Guidelines in the ITU-T H.810 series (2016), Interoperability design guidelines for personal health systems (which is complemented by 46 conformity testing specifications); ITU-T H.860 (4/2014), Multimedia e-health data exchange services; Y.4110/Y.2065, Service and capability requirements for e-health monitoring services; Y.4408/Y.2075, Capability framework for e-health monitoring services; technical papers HSTP-H810 (7/2014) and HSTP-H810-XCHF (2017) with an introduction to the H.810 series and data exchange within it. Updated editions of the ITU-T H.810 series architecture are produced regularly (annually or so).

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://itu.int/en/ITU-T/e-Health

ITU-T Study Group 16 on multimedia aspects and Study Group 20 on smart cities and communities applications and services are developing further standards addressing e-health services and systems.

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://itu.int/itu-t/workprog/wp_search.aspx?Q=28/16

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://itu.int/itu-t/workprog/wp_search.aspx?Q=7/20

The ITU Product Conformity Database contains information on health devices that passed conformance tests against the corresponding ITU-T Recommendations.

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://itu.int/go/tcdb

JIC

Joint Initiative on SDO global health informatics standardisation in which CEN/TC 251, ISO/TC 215, HL7, GS1, IHTSDO, CDISC, IHE and DICOM participate as members.

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.jointinitiativecouncil.org/

STAKEHOLDER GROUPS, TECHNOLOGY PLATFORMS, AND RESEARCH PROJECTS EHEALTH

ACT PROJECT

(PHILIPS / LONDON HOSPITAL)

Advancing Care Coordination and Telehealth Deployment
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www2.med.auth.gr/act/news.php

ASSESS CT

Investigating the fitness of the clinical terminology SNOMED CT as a potential standard for EU-wide eHealth deployments, scrutinising clinical, technical, financial, and organisational aspects.
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://assess-ct.eu/

JASEHN

Joint Action to Support the eHealth Network (Member States)
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://jasehn.eu/

EESSI

Electronic exchange of social security information (EESSI). EESSI is an IT system that will help social security bodies across the EU to exchange information more rapidly and securely, as required by EU regulations on social security coordination.
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://ec.europa.eu/social/main.jsp?catId=869&langId=en

ENGAGED

European innovation partnership on active and healthy ageing; thematic network on innovative and sustainable active and healthy ageing services that make best use of new technologies.
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.engaged-innovation.eu/

EUROPEAN INNOVATION PARTNERSHIP ON ACTIVE AND HEALTHY AGEING

Action plan B3 (integrated care)
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://ec.europa.eu/research/innovation-union/pdf/active-healthy-ageing/b3_action_plan.pdf

Action plan C2 (independent living)
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://ec.europa.eu/research/innovation-union/pdf/active-healthy-ageing/c2_action_plan.pdf

Action plan D4 (innovation for age-friendly buildings, cities & environments)
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://ec.europa.eu/research/innovation-union/pdf/active-healthy-ageing/d4_action_plan.pdf#view=fit&pagemode=non

EHEALTH GOVERNANCE INITIATIVE — SEHGOVIA

Supporting the European eHealth Governance Initiative and Action
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://ec.europa.eu/information_society/apps/projects/factsheet/index.cfm?project_ref=270941

EHR4CR PROJECT

IMI project with a focus on the use of electronic Health Records for Clinical Research
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.ehr4cr.eu/

E-SENS

Electronic Simple European Networked Services is a new large-scale project that embodies the idea of European digital market development through innovative ICT solutions.
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.esens.eu/home/

EURECA

Enabling information re-Use by linking clinical REsearch and Care
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://eurecaproject.eu/about/

EXPAND

aims to exploit a number of selected eHealth assets developed in various initiatives
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.expandproject.eu/

NB: The EXPAND project is also a continuation of esSOS which created a pilot (www.epsos.eu)

HAIVISIO

European project which aims to identify and enhance awareness of the results generated by eHealth, active ageing and independent living European projects.

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://haivisio.eu/

LINKED2SAFETY

A next-generation, secure linked data medical information space for semantically-interconnecting electronic health records and clinical trials systems advancing patients safety in clinical research
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.linked2safety-project.eu/node/23

MOMENTUM

Momentum is a platform where key players in telemedicine share their knowledge and experience in deploying telemedicine services in routine care.
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://telemedicine-momentum.eu/

PHS FORESIGHT (PERSONAL HEALTH SYSTEMS FORESIGHT PROJECT)

This ongoing project has been researching indicators and milestones for key areas of transformation required by the implementation of eHealth systems
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.phsforesight.eu/

PONTE PROJECT

Efficient Patient Recruitment for Innovative Clinical Trials of Existing Drugs to other Indications
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.ponte-project.eu/

RENEWING HEALTH

REgioNs of Europe WorkINg toGether for health (Renewing health): a European project which aims at implementing large-scale real-life test beds for the validation and subsequent evaluation of innovative telemedicine services using a patient-centred approach and a common rigorous assessment methodology.
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.renewinghealth.eu

SALUS PROJECT

Scalable, standard-based interoperability framework for sustainable pro-active post market safety studies
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.salusproject.eu/

SEMANTICHEALTHNET

Network of excellence in semantic interoperability
▸ www.semantichealthnet.eu

TRANSFORM PROJECT

Translational research and patient safety in Europe
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.transformproject.eu/

TRILLIUM BRIDGE

The Trillium Bridge support action extends the European patient summaries used in epSOS and Meaningful Use II, Transitions of Care in the United States, to establish an interoperability bridge between the EU and the US systems.
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.trilliumbridge.eu/

UNITED4HEALTH

European project which aims to adapt and tailor telehealth services from regions and institutions in Europe to large scale deployment within other regions and institutions and maximise the transferability of services and knowledge among European healthcare providers at large scales and in collaboration.
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://ec.europa.eu/information_society/apps/projects/factsheet/index.cfm?project_ref=325215

Other ongoing projects in the context of eHealth and healthy aging are:

- **OpenMedicine**, supporting a common EU, standards-based, database of medicinal products;
- **eStandards** to support the optimisation of standardisation processes and development of roadmaps;
- **AssessCT** to assess SNOMED CT[4] terminology.
- **VALUeHEALTH** addresses how interoperability of health information can consistently create, capture and deliver value for all stakeholders.

ADDITIONAL INFORMATION

Earlier comments on previous rolling plan:

Coexistence arrangements and the interoperability of medical devices (including application aspects), need to be improved to enable devices and services for personal health management and healthcare delivery to be easily installed (plug-and-play connectivity) and fully functional.

This aspect is currently handled by the international Personal Connected Health Alliance (PCHA), maker of the Continua Guidelines, which the ITU has adopted as official standards (Recommendation ITU-T H.810).

ESOs should be encouraged to investigate the implications for coexistence and interoperability of lessons from the experiences of the US Initiative experts taking also into consideration the identified IHE set of specifications they identified.

There may be needs for further actions after appropriate analysis and experience gained from the eHealth Interoperability Framework Study, e.g. for the identification of further gaps in standardisation and regulation (including 'mobile health') and for the creation of an appropriate glossary of terms and definitions. Future actions should be treated in line with the principles of a multidisciplinary standardisation approach (incl. linkage to common clinical professional standards), covering:

- home health monitoring devices using optimised low-power wireless technologies, covering all aspects of the problem, from application semantics to radio reliability considerations.
- European interoperable health alarm devices (such as battery-powered pendants for vulnerable people), including the provision of reliable audio, video and data services (radio or not) in home scenarios, interoperability between manufacturers, interworking to other networks (internet, mobile), security considerations, reliable "stay-alive" checking and ultra-low power consumption.
- security, privacy (e.g. privacy by design) and accessibility aspects (see section §3.2.3).

It is essential to support the creation of interoperable eHealth by developing common initiatives/standards that improves citizen's private lives, and developing sensitive health data, that people can collect themselves for use during treatment.

These measures need to consider the protection of the practitioner who is responsible for collecting and storing the data, and also the approval of the devices used for data collection, under the Medical Device Regulation and the national rules on data protection.

Considering the demographic change occurring in Europe, standardisation work should contribute to the development of accessible and supportive environments reducing the demand for care and assistance for the ageing population. Promoting accessibility through standardisation will benefit society and the economy in general, making life easier for everyone and supporting active and productive labour market participation by people with disabilities, including older people. ICT products supporting active and healthy ageing should be built upon older users' needs, expectations and abilities; a 'design for all' approach and the involvement of older users and consumers in the relevant standardisation processes are essential.

Given the challenge of the ageing population, the standardisation work might also take into account aspects of personal services dedicated to the autonomy including ICT solutions in order to promote secure, safe, accessible, affordable, human friendly (for elderly and less ICT-educated users) and harmonised solutions at the European level. In general, this aspect should also be taken into consideration in eHealth and the proposed work items, as should accessibility aspects like design guidelines for reduced motor control and guidelines on accessibility for people with disabilities from illnesses related to their ageing process, e.g. memory, sight and hearing loss. All the standardisation work on e-health should ensure a high-level of accessibility, privacy protection and security. In this context, the Health On the Net Foundation (HON) established a code of conduct for medical and health web sites (HONcode)[5].

Aspects such as interoperability, testing and implementing standards, open and secure architecture and subsets of terminologies, as well as making policy recommendations need to be seen in close connection with 'eHealth' and in a technology-neutral context as mentioned in the first action of 'eHealth' (C.1). Coordination with 'eGovernance', 'eAccessibility', 'eLearning' and the other areas that concern older people should also be considered.

[1] People aged 50+ account for 37% of the population, i.e. 190 million European citizens. Eurostat population projections foresee that the number of people aged over 60 will increase by about two million a year in the coming decades, while the working-age population, as a result of lower fertility rates among post-baby-boom generations, will start to shrink. The number of very old persons, 80 years and older, who are most likely to be in need of care, will increase. At the same time fewer young people will be available to provide informal and formal support and care.
[2] http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=OJ:JOL_2015_199_R_0011
[3] http://ec.europa.eu/digital-agenda/en/news/ehealth-interoperability-framework-study
[4] http://www.snomed.org/snomed-ct
[5] http://www.hon.ch/HONcode/

E-SKILLS AND E-LEARNING

POLICY AND LEGISLATION

POLICY OBJECTIVES

The development and promotion of ICT professionalism, ICT skills and e-learning require a strong consensus and cooperation among Member States and stakeholders.

EC PERSPECTIVE AND PROGRESS REPORT

Pan-European e-competence frameworks and tools and efficient and interoperable e-learning solutions are indispensable to reduce e-skills shortages, gaps and mismatches. Similar activities are under development in the US, Russia, Japan, Australia, Canada, South Africa and Latin America, and other parts of the world. In the early 2000s the development of national frameworks had already begun in the UK, Germany, France, and other countries. In the Council Conclusions of 23 November 2007, Member States supported the Commission's intention to continue to provide a platform for the exchange of best practices, and to promote a regular dialogue on e-skills and develop a European e-Competence Framework.

REGARDING E-LEARNING:

Efficient and interoperable e-learning solutions are necessary to promote the development of a large e-learning and technology-enhanced learning market in Europe.

Progress has been made over the last year with e-Competence Framework 3.0 being available and with the establishment of a CEN technical committee. CEN TC 428 published standard EN 16234. See details in D.2 below.

REFERENCES

- COM(2016) 381. On 10 June 2016 the European Commission published "A new skills agenda for Europe — Working together to strengthen human capital, employability and competitiveness". It presents a number of actions and initiatives aiming to tackle the digital skills deficit in Europe. One of these actions is the launch in December 2016 of the Digital Skills and Jobs Coalition to develop a large digital talent pool and ensure that individuals and the labour force in Europe are equipped with adequate digital skills. This new coalition builds on the work already done under the Grand Coalition for Digital Jobs and the EU e-skills strategy, and will bring together a broader set of stakeholders beyond ICT-sector, including ICT-using sectors, training organisations, academia, social partners and Member States.
- COM(2016) 180. On 18 April 2016 the European Commission published the Communication Digitising European industry, which introduced a set of coherent policy measures as part of a digital single market technologies and public service modernisation package. Part of the communication is devoted to digital skills. In particular, it calls for human capital ready for the digital transformation with the necessary skills.
- COM(2013)654 Communication Open up education: innovative teaching and learning for all through new technologies and open educational resources".
- IP/13/182 Grand coalition for digital jobs
- SWD(2012) 446: Digital agenda for Europe — a good start and stakeholder feedback"
- COM(2012) 173: Toward a job-rich recovery and SWD(2012) 96: Exploiting the employment potential of ICTs
- Recommendation 2009/C 155/01 on the establishment of a European quality assurance reference framework for vocational education and training (EQAVET).
- COM(2007) 496 e-skills for the 21st century: fostering competitiveness, growth and jobs

REQUESTED ACTIONS

REGARDING E-SKILLS:

General recommendation: Standardisation proposals must be based on clear and well-defined market needs and be developed in full coherence with multi-stakeholder initiatives and public policies (such as the EU e-skills strategy, the New skills agenda for Europe, the Digital agenda and the Grand coalition for digital jobs) aiming at reducing e-skills shortages, gaps and mismatches and at fostering ICT professionalism in Europe.

In support of the objectives set out in the Communications COM(2016) 381 final "A new skills agenda for Europe", COM(2015) 192 final "A digital single market strategy for Europe and COM(2007) 496 "e-Skills for the 21st century: Fostering competitiveness, growth and jobs", the Commission will issue in 2018 a standardisation request to develop standards for a comprehensive European framework for the ICT profession by 2025, which will complement and build on the existing European e-Competence framework.

REGARDING E-LEARNING:

ACTION 1 European e-learning standards to ensure harmonisation, usage and implementation. The focus should be on specifications and guidelines for e-learning opportunities designed for all kinds of users, learning outcomes, credit points, assessment and e-portfolios.

REGARDING E-SKILLS:
The public and private sectors need to collaborate on the following topics :

ACTION 2 SDO to further develop the European e-competence framework (e-CF) for and progress towards a comprehensive framework for ICT professionals: Maintain the e-CF and continue work on job profiles, Body of Knowledge, qualifications and certifications, and methods and tools for the development, promotion, implementation and maintenance of the e-CF to promote and strengthen ICT professionalism in Europe (including international cooperation);

The standard EN 16234-1:2016 provides an efficient and broadly accepted common European language about knowledge, skills and competences of the ICT professional workforce and it has proved to be a useful benchmark for all EU industry sectors and HR companies. Taking into account that information and communication technologies are evolving continuously and therefore also the competences and skills required by the European ICT professional workforce, the European standard consisting of 40 competences needs regular and systematic review". To boost consistent standard implementation, it is important to maintain supporting Technical reports and previous CEN Workshop Agreements related to the implementation of EN 16234-1:2016. The primary objective is to provide up-to-date and easily accessible user guidance to European stakeholders including ICT service, user and supply organisations, multinationals and SMEs, ICT managers, HR departments and individuals, and educational institutions on how to apply EN 16234-1, the European e-Competence Framework (e-CF). Methodology documentation is required on EN 16234-1 development and maintenance. It is also necessary to provide case studies of typical implementations of the e-CF standard to illustrate its practical use. The activity is planned to work in conjunction with the recently started CEN/TC 428 'e-Competences and ICT professionalism' project (SA 2017-03) aiming at a first revision of the EN 16234-1 published in 2016 in line with current business needs, framework development, digitization of industry and ICT market trends.

ACTION 3 SDOs to develop curriculum guidelines on e-skills and ICT industry training and certification: development, promotion and implementation of e-competence curriculum guidelines and quality labels to facilitate transparency and the recognition of learning outcomes between formal, non-formal and industry education and training.[1] As e-skills and e-competences are relevant to all ICT users and board members (see C1) this action is not specifically aimed at the ICT industry (see D3)

ACTION 4 Organisational capability: take stock of ongoing assessments, initiatives and their impacts regarding the capability of organisations in the context of the e-skills/e-competence of the personnel. Match personnel competence with organisational processes and procedures to ensure best return on investment in ICT.

ACTION 5 e-Competence assessment methodology: The purpose of the activity is to analyse and define how to assess and recognise that a candidate really has the e-competences he/she declares to possess, whenever/wherever such competences have been acquired/developed. This result will also promote transparency and provide guidance on the relation between EN 16234-1 "e-Competence Framework (e-CF)") and the field of ICT trainings and certifications. The project focuses on recognition and validation of e-competences acquired by experience (non-formal, informal learning), beyond any educational background. It addresses enterprises interested in assessing e-competences of theirs employees, consulting organisations, ICT professional associations, ICT training centres, certification bodies adopting the e-CF scheme, and the Accreditation authorities recognised at national level. The results achieved by the project will be formalized as a Technical Report (TR).

ACTION 6 International cooperation: European SDOs active in the field of professionalism need to have a satisfactory degree of visibility and cooperate at international level, No mechanism is in place to communicate with other non-European bodies . The two JTC Technical Bodies where a liaison does take place have only few, episodic meetings. This chasm between Europe and the rest of world may eventually lead to isolation. ISO/IEC JTC 1 is mapping the characteristic of the main existing platforms (among which e-CF) in order to find a suitable basis for future developments. The action will aim to raise in national regional and international SBs the awareness of what is being done now in CEN; influence the positions of the SBs with the goal of promoting the acceptance and use of e-CF; inform the European SDOs of the developments in the SBs.

REGARDING E-LEARNING:

ACTION 7 Standardisation potential around e-learning: SDO to investigate e-learning courses, content repositories and exchange mechanisms with a focus on metadata, learning design and structure, technical and semantic interoperability supported by agreed protocols, exchange formats and vocabularies. Interoperability should include context-aware, adaptable and mobile/ambient e-learning systems and also cross-domain aspects. This may include the learning trajectory or learning route including, e.g. the didactic approach, aimed learning & learner's profiles and the availability of additional tools that support e-learning.

ACTION 8 Standardisation potential around interoperability and transfer of learners' data: SDO to investigate the possible standardisation of the exchange of learning & learners data which may be generated in the different learning spaces. By the use of a Caliper or xAPI-like framework, the exchange and therefore effective usage might be facilitated.

ACTION 9 Connecting detailed curricula on a pan-European basis: Start a programme, beginning with mathematics and English. It is very important that the semantics, i.e. the terminology being used for the data being exchanged is first described clearly and standardised for the whole educational sector. Best practices that exist globally should be taken into account. This includes but is not limited to the US Common Core State Standards and the Dutch Onderwijsbegrippenkader, the Dutch database for detailed curriculum for primary and secondary education.

ACTIVITIES AND ADDITIONAL INFORMATION

RELATED STANDARDISATION ACTIVITIES

REGARDING E-SKILLS:

CEN/TC 428

CEN/TC 428 is responsible for the standardisation of a common language of professional digital and ICT competences, skills and knowledge applied in all domains. A non-exhaustive list of areas where CEN/TC 428 can develop its activity follows:

- • EN 16234:2016 (e-CF) maintenance and evolution
- • interaction with different Frameworks
- • curricula guidance
- • professional profiles
- • provide guidance for the assessment against EN 16234 (e-CF)

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.cen.eu/cen/Sectors/Sectors/ISSS/CWAdownload/Pages/ICT-Skills.aspx ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.ecompetences.eu/e-cf-3-0-download/

See also the previous CEN workshop agreements and the e-CF at

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.cen.eu/cen/Sectors/Sectors/ISSS/CWAdownload/Pages/ICT-Skills.aspx

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.ecompetences.eu/e-cf-3-0-download/

The CEN workshop on ICT Skills will continue with relevant projects including the updating of the European Job Profiles CWA.

Additionally the CEN workshop on ICT skills provides a suitable forum for initial work on standards to support ICT professionalism. In particular it provides expertise in the area of curriculum guidelines, professional ethics, ICT certification and related activities and competences.

ISO/IEC JTC1

SC 27 Competence requirements for information security management systems professionals

SC 7/WG 20 Software and Systems Bodies of Knowledge and Professionalisation and related activities

SC 36 on Information Technology for Learning, Education and Training (ITLET) runs activities in the following areas Business planning and communications; vocabulary collaborative and intelligent technology; learner information; management and delivery; quality assurance and descriptive frameworks; platform, services and specification integration; culture, language and individual needs; learning analytics interoperability

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://isotc.iso.org/livelink/livelink?func=ll&objId=8917700&objAction=browse&viewType=1

REGARDING E-LEARNING:

CEN/TC 353

Information and Communication Technologies for learning, education and training. It has been dormant for a while.

CEN/TC 428

Professions for ICT. See also the previous CEN workshop agreements and the e-CF at framework for ICT professionalism:

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.cepis.org/index.jsp?p=940&n=3016

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.cen.eu/cen/Sectors/Sectors/ISSS/CWAdownload/Pages/ICT-Skills.aspx

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.ecompetences.eu/e-cf-3-0-download/

IEEE

Activities in several eLearning areas, including digital rights expression languages, computer managed instruction, learning object metadata, resource aggregation models for learning, education and training, competency data standards
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://standards.ieee.org/develop/msp/elearning.pdf

ISO/IEC JTC 1 SC 36

Subcommittee (SC) 36 on Information Technology for Learning, Education and Training (ITLET) has the following work programme underway:
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.iec.ch/dyn/www/f?p=103:22:0::::FSP_ORG_ID:3410

Standards to ensure interoperability between information technology systems used in ITLET;

The identification of generic LET requirements for information technology systems and services used in ITLET situations (example: types of digital content)

Standards projects being addressed:

- The description of metadata for learning resources
- - ITLET vocabularies
- - the personalization of the IT-enabled educational environment (individualized accessibility)
- - models for describing competency
- - the creation of an ITLET quality framework
- - the advancement of e-Assessments, e-textbooks and related learning services, virtual experiments

Future work planned

- - learning analytics
- - massive open online course (MOOC) standardisation
- - how existing standards and specifications may work together to better the LET environment
- - ISO TR 20514: EHR Definition scope and context

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.iso.org/iso/home/standards_development/list_of_iso_technical_committees/iso_technical_committee.htm?commid=45392

ITU-T

Study Group 16 on multimedia has produced a series of standards that enable remote collaboration, e.g. Recommendation ITU-T F.742 on service description and requirements for distance learning services.
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://itu.int/en/ITU-T/studygroups/2017-2020/16

The Recommendation ITU-T Y.2241 on a ubiquitous self-directed learning (u-learning) framework was consented by Study Group 13 in July 2017. A draft Recommendation (Y.sfes) is under development on application of a u-learning environment to the smart farming.

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://itu.int/en/ITU-T/studygroups/2017-2020/13

The ITU also published a technology watch report on technology-based learning
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://itu.int/en/ITU-T/techwatch/Pages/learning-standards.aspx

ADDITIONAL INFORMATION

REGARDING E-SKILLS:

Such a topic is suitable for standardisation for well-documented needs. Fostering ICT professionalism is a challenging task that should reach the whole population, including those who usually find more barriers in accessing ICT, such as old people and people with disabilities, that is why efforts should be made in creating accessible e/learning environment, such as accessible MOOCs. As new technologies and new areas of application of technologies emerge rapidly, establishing standardised skill sets is a great challenge requiring timely and regular updates. Since the 1990s, this topic has primarily been addressed by Public-private partnerships with the ICT industry playing a leading role (e.g. in the Career Space initiative). More recently, many countries around the world have launched standardisation efforts. There is a need to maintain a European platform for exchanging best practices, implementing a master plan and coordinating across Europe. The existing structure of the CEN TC 428 and CEN ICT skills workshop constitute a good place for such a piece of work — following the already successful development of the e-CF.

The e-skills manifesto also contains contributions from various stakeholders, see http://ec.europa.eu/enterprise/sectors/ict/documents/e-skills/index_en.htm

EN 16234-1 is the only existing standard in the field of e-Competences at the European and national level. Tough several European organisations have started promoting and using the e-CF, those local implementations do not always comply with EN 16234-1. Many new initiatives in the area of digital competences are ongoing e.g. body of knowledge, ESCO, the quality label project, e-Leadership projects, e-CF/ SFIA convergence, and the ICT professionalism framework project. At the same time, new initiatives on ICT competences are ongoing internationally as well, e.g. in ISO/IEC JTC 1/SC 7 and ISO/IEC JTC 1/SC 27. New standards may be available, which might conflict with European standards. The fragmentation of the global market could undermine interoperability which so far has led the European action. There is the need to support initiatives which assure European governance and influence in the ISO.

[1] As e-Skills and competences are relevant for all ICT-users and board-room-members (see D1) this action is not specifically aimed at the ICT-industry. (see C3)

EMERGENCY COMMUNICATIONS

POLICY AND LEGISLATION

POLICY OBJECTIVES

Emergency communications are defined primarily as communication by individual citizens to public safety answering points (PSAPs), using individual electronic communication devices, with a view to requesting and receiving emergency relief from emergency organisations. Reverse services (i.e. communication between PSAPs and individuals) may also be considered.

This service should be independent of the network and access technologies used and the individual's physical and mental abilities.

EC PERSPECTIVE AND PROGRESS REPORT

The lack of commonly agreed standards in support of electronic communications networks for the emergency call service in Europe is a barrier to implementing future proof solutions which meet the requirements of the amended Universal Service Directive (Directive 2002/22/EC).

Standards for total conversation access to 112 are required to meet special needs for users' rights under Directive 2009/136/EC.

The lack of harmonised values for location accuracy and reliability hampers Member State's efforts to develop adequate solutions.

REFERENCES

- Directive 2009/136/EC of the European Parliament and of the Council of 25 November 2009 amending Directive 2002/22/EC on universal service and users' rights relating to electronic communications networks and services, Directive 2002/58/EC concerning the processing of personal data and the protection of privacy in the electronic communications sector and Regulation (EC) No 2006/2004 on cooperation between national authorities responsible for the enforcement of consumer protection laws.
- Directive 2009/140/EC of the European Parliament and of the Council of 25 November 2009 amending Directives 2002/21/EC on a common regulatory framework for electronic communications networks and services, 2002/19/EC on access to, and interconnection of, electronic communications networks and associated facilities, and 2002/20/EC on the authorisation of electronic communications networks and services
- Directive 2002/21/EC of the European Parliament and of the Council of 7 March 2002 on a common regulatory framework for electronic communications networks and services (Framework Directive)
- Directive 2002/58/EC of the European Parliament and of the Council of 12 July 2002 concerning the processing of personal data and the protection of privacy in the electronic communications sector (Directive on privacy and electronic communications)
- Directive 2002/22/EC of the European Parliament and of the Council of 7 March 2002 on universal service and user's rights relating to electronic communications networks and services (Universal Service Directive)
- Recommendation 2003/558/EC of the Commission of the European Communities of 25 July 2003 on the processing of caller location information in electronic communication networks for the purpose of location-enhanced emergency call services
- P7_TA (2011)0306, European Parliament Resolution of 5th July 2011 on Universal Service and the 112 emergency number (2010/2274(INI))
- Mandate M/493 — Standardisation request in support of the location-enhanced emergency call service

REQUESTED ACTIONS

ACTION 1 SDOs to address data protection and privacy requirements (privacy by design) in ongoing standardisation activities concerning location accuracy.

ACTION 2 Identify standardisation needs for the deployment of 112 smartphone applications enhanced with caller location and multimedia features accessible for the widest range of users.

ACTION 3 SDOs to complete the M/493 standards to support the location-enhanced emergency call service. Global standards bodies are invited to contribute taking into account next-generation networks and location accuracy and reliability.

ACTION 4 SDOs to identify the standardisation needs for the transmission of the GNSS location data from the handset to the PSAPs by mobile network operators.

ACTION 5 SDOs to define dictionaries for warning messages for emergency communication service based on the input of various civil protection agencies.

ACTION 6 SDOs to add rich media to the EU-Alert.

ACTION 7 SDOs to define requirements for communications involving IoT devices in all types of emergency situations.

ACTION 8 SDOs to describe the architecture (currently named Next Generation Emergency Communication architecture), the core elements and corresponding technical interfaces for network independent access to emergency services.

ACTION 9 SDOs to set requirements, functional architecture, protocol and procedures specification for a Pan European mobile emergency application.

ACTIVITIES AND ADDITIONAL INFORMATION

RELATED STANDARDISATION ACTIVITIES

ETSI

ETSI is performing work in response to M943 and has developed the single functional architecture (ES 203 178). It is currently working on the protocols to be applied and their exact specification. Work on total conversation access to emergency services resulted in the publication of TR 103 201, total conversation for emergency communications, implementation guidelines.

ETSI will perform work to define the requirements for communications involving IoT devices in all types of emergency situations, including operational requirements.

ETSI performs work to describe the architecture (currently named Next Generation Emergency Communication architecture), the core elements and corresponding technical interfaces for network independent access to emergency services.

ETSI performs work on requirements and functional architecture, data flow, protocol definitions and procedures for a Pan European mobile emergency application.

ITU-T

The Focus Group on "Disaster relief systems, network resilience and recovery" produced several technical specifications that were published (▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.itu.int/pub/T-FG/e) and are being refined for further standardization in ITU-T SG2 and SG15.

- Recommendation ITU-T L392 "Disaster management for improving network resilience and recovery with movable and deployable ICT resource units'was approved by ITU-T SG15 in April 2016.
- Supplement ITU-T Suppl.35 "Framework of disaster management for network resilience and recovery" was approved by ITU-T SG15 in June 2017.
- Recommendation ITU-T E.108 "Requirements for a Disaster Relief Mobile Message Service" was approved by ITU-T SG2 in January 2016.
- Recommendation ITU-T E.119 (ex. E.rdr-scbm) "Requirements for Safety Confirmation and Broadcast Message Service for Disaster Relief" was approvedby ITU-T SG2 in April 2017.
- Draft new Recommendations ITU-T E.TD-DR "Terms and definitions for DR&NRR" and ITU-T E.RDR "Requirements for Disaster Relief Systems" are being developed in ITU-T SG2.

ITU-T SG2 also produced an amendment to its E.123 standard for quickly identifying next-of kin (or other emergency contact) in a mobile handsets' directory, for use in case of emergency, and has established a framework for international emergency call priority (ITU-T E.106 and E.107). Recommendation ITU-T E.161.1 was also produced by SG2 which is on "Guidelines to select Emergency Number for public telecommunications networks".

OASIS Common Alerting Protocol versions 1.1 and 1.2 were transposed into ITU-T X.1303 and X.1303bis by ITU-T SG17.

ITU-T SG13 developed a numbers of Recommendations ITU-T Y.2074, Y.2222, Y.2705, Y.1271, Y.2205 and Supplement 19 to the ITU-T Y.2200-series —covering different aspects of emergency communication operation.

SG11 approved ITU-T Q.3615 which describes the Open GeoSMS Standard, which was developed by the Open Geospatial Consortium (OGC); geo-localisation is a key part of rapid and effective emergency responses. SG11 also drafted a number of Supplements to the Q-series Recommendations (e.g. Supplements 47, 53, 57, 61, 62, 63 and 68) to support emergency telecommunications.

SG11 is currently developing a new Recommendation which describes signalling requirements for interconnection between VoLTE-based network and other networks supporting emergency telecommunications service (ETS). Also, SG11 is working on a new Recommendation dealing with signalling requirements for interconnection between NGN and GSM/UMTS networks supporting priority calls.

The ITU's radio communication sector (ITU-R) is also carrying out studies on emergency communications.

CEPT/ECC/WG NAN/PT ES

Are investigating criteria for location accuracy and reliability.

W3C

WebRTC, the web's real-time communication service is currently being developed and specified jointly between the IETF and W3C. The IETF is working on the protocol level. The group heading this effort is called RTCweb.

W3C specifies the necessary API to connect the service to the web — application framework created by, among others, by HTML5. The group working on this part is called WebRTC. A good overview of the technology developed can be found in the STREWS project's security report on WebRTC.

IETF

<The ECRIT working group in the IETF has developed a general architecture for enabling IP applications to discover and connect to emergency services. The GEOPRIV working group has developed protocols that allow IP networks to in- form end devices about their geolocation, a pre-requisite for emergency calling. The application-specific working groups in the IETF (for example, the SIPCORE working group) have developed extensions to support emergency calling as required.

A secure telephone identity revisited (STIR) WG (▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://datatracker.ietf.org/wg/stir/charter/) is developing internet-based mechanisms

that allow verification of the calling party's authorisation to use a particular telephone number for an incoming call. The main focus is on the SIP as one of the main VoIP technologies used by parties that want to misrepresent their origin, in this context the telephone number of origin. See, for example, RFC7375 "Secure telephone identity threat model" (▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://datatracker.ietf.org/doc/rfc7375/)>>

ISO

<ISO/TC 204: intelligent transport systems (ITS). This covers standardisation of information, communication and control systems in the field of urban and rural surface transportation, including intermodal and multimodal aspects thereof, traveller information, traffic management, public transport, commercial transport, emergency services and commercial services in the intelligent transport systems (ITS) field.

Projects include:

ISO/AWI 19083-2: ITS — Public transport — Emergency evacuation and disaster response and recovery — Part 2: Data flow

ISO/PRF TR 19083-1: ITS — Public transport — Emergency evacuation and disaster response and recovery Part 1: Framework

ISO/NP 20530: ITS — Information for emergency service support via personal ITS station — General requirements and technical definition

ISO/PWI 21344: ITS– Public transport — Emergency services E-Call device for emergency on connected vehicles using ITS station

ISO 22951:2009 (Ed. 1): Data dictionary and message sets for preemption and prioritisation signal systems for emergency and public transport vehicles (PRESTO)

ISO 24978:2009 (Ed. 1): ITS Safety and emergency messages using any available wireless media — Data registry procedures

ISO/DTR 18317: ITS — Pre-emption of ITS communication networks for disaster relief and emergency communications

▸ http://www.iso.org/iso.iso_technical_committee%3Fcommid%3D54706>>>

EGOVERNMENT

POLICY AND LEGISLATION

POLICY OBJECTIVES

In the digital single market strategy, interoperability appears as an important enabler for boosting competitiveness. Cross-border interoperability is also considered key for modernising public administrations.

In addition to the multilingual challenge, semantic interoperability is compromised by the lack of commonly agreed and widely used data models, divergent interpretations of the same data and the absence of common reference data (e.g. code-lists, identifiers, taxonomies, references to organisations, geospatial references, license collections, etc.).

The European Commission, in the context of the ISA and ISA^2 programmes (Interoperability solutions for European Public Administrations, Businesses and Citizens), is undertaking a number of initiatives to achieve semantic interoperability in Europe.

The ISA^2 programme is contributing in this area through several streams of work, focusing on the development, promotion and management of common data specifications, further described in the relevant subsections: DCAT-AP as a data standard to describe open data catalogues and datasets; ADMS as metadata description of reusable solutions, such as legal templates, data specifications and standards, technical protocols and open source software; and Core Vocabularies as generic, simplified and reference data models of important master data types used across public administration information systems and applications, such as persons, businesses, locations, public organisations and public services.

In all of these work streams, care should be taken to ensure compatibility between the public sector and what the private sector can achieve, noting existing standards and specifications.There are accordingly some main technology areas that need to be addressed further and where standards are important for supporting the implementation of EU Policy objectives:

- DCAT — This is addressed in detail in the section on Public Sector Information (PSI), Open Data and Big Data including a number of proposed actions;
- Exchange of metadata on re-usable interoperability assets among national and international repositories: The Asset Description Metadata Schema (ADMS) is a metadata description of interoperability solutions;

- Core Vocabularies to facilitate the development of interoperable IT solutions by ensuring a minimum level of interoperability for public administration master data usually stored in base registries.
- The CPSVP-AP aims at describing public services in a the same way across different Service Catalogues, to enable federation and search across such catalogues.

EC PERSPECTIVE AND PROGRESS REPORT

DCAT-AP

DCAT-AP is a specification based on W3C's Data Catalogue vocabulary (DCAT) for describing public sector datasets in Europe. For more information, see chapter 3.1.2 Public sector information

EXCHANGE OF METADATA ON RE-USABLE INTEROPERABILITY ASSETS (EGOVERNMENT)

Public administrations, businesses, standardisation bodies and academia are already producing interoperability solutions that, if (re)used, can facilitate interoperability among public administrations' services. However, these are not always easy to find. ADMS is a common way to describe interoperability solutions making it possible for everyone to search and discover them once shared through the forthcoming federation of repositories containing solutions for promoting interoperability.

With the intention to facilitate the visibility and re-usability of interoperability solutions across-borders and sectors, the Commission has made available a large set of interoperability solutions described using ADMS, through a federation of asset repositories of Member States, standardisation bodies and other relevant stakeholders. Through this federation, accessible through the Joinup[1] platform, semantic interoperability solutions may be searched and are made available through a single point of access.

CORE VOCABULARIES TO FACILITATE THE DEVELOPMENT OF INTEROPERABLE IT SOLUTIONS

The Commission's ISA programme is reducing semantic interoperability conflicts in Europe.

Agreement on definitions for the fundamental concepts should come firstly. These concepts are simplified data models which capture the minimal, global characteristics/attributes of an entity in a generic, country- and domain-neutral manner. Using a different terminology, these specifications are data models for important master data types used by numerous information systems and applications. These specifications are called "Core Vocabularies" in the ISA Programme.

Working together with relevant stakeholders from public administration, industry and academia, thee Commission has made available a series of core vocabularies with high reusability potential: , the core business, the core location, the core public service, the core public organisation, the core criterion and core evidence, and the core public service vocabularies.

In 2015, the core public service vocabulary application profile (CPSV-AP) became also available. Activities on financial reporting are under consideration.

REFERENCES

- Decision (EU) 2015/2240 on interoperability solutions and common frameworks for European public administrations, businesses and citizens (ISA2 programme) as a means for modernising the public sector (ISA2)
- Communication 2017/134 on the European Interoperability Framework - Implementation Strategy
- Directive 2003/98/EC of the European Parliament and of the Council of 17 November 2003 on the re-use of public sector information (public service information directive)
- National eGovernment strategies are in place in many EU Member States and the EFTA countries. Please also see Annex I.

REQUESTED ACTIONS

Actions with relevance for all the three streams of work described above (DCAT, ADMS and core vocabularies):

ACTION 1 organise a workshop on ISA² topics. In order to promote standardisation in this area the organisation of a workshop via an ESO involving European organisations (e.g. the Publications Office and DG DIGIT/ISA unit), Member States representatives, industry and relevant research institutes and universities to frame the issue is considered to be a key starting point.

ACTION 2 contribution of specifications developed under ISA programme to international standardisation. In order to leverage the applicability of data specifications which are or have been developed under the ISA and ISA² programmes, it might be advisable to promote them across and beyond Europe by proposing them as international standards via ISO, IEC or ITU, as relevant, e.g. ISO/IEC JTC1 SC32 (data management and interchange), ITU-T study group 16 (multimedia), and study group 17 (security).

ACTIVITIES AND ADDITIONAL INFORMATION

RELATED STANDARDISATION ACTIVITIES

EXCHANGE OF METADATA ON RE-USABLE INTEROPERABILITY ASSETS (EGOVERNMENT):

W3C

ADMS specification has been published as a W3C note by the WC3 Linked Government Data Working group. Moreover, the ADMS specification has been extended by the ISA Programme to describe technical, legal and organisational interoperability solutions and thus to facilitate their re-usability. This extended specification has already been implemented in the Joinup platform.

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://dvcs.w3.org/hg/gld/raw-file/default/adms/index.html

CORE VOCABULARIES TO FACILITATE THE DEVELOPMENT OF INTEROPERABLE IT SOLUTIONS:

W3C

The Registered Organization Vocabulary which is based on the Business Core Vocabulary has been published as a W3C Note by the W3C Linked Government Data Working group.

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.w3.org/TR/vocab-regorg/

ADDITIONAL INFORMATION

Exchange of metadata on re-usable interoperability assets (eGovernment):

Several Member States already use ADMS to export interoperability solutions from national catalogues (e.g. Germany).

The Open Geospatial Consortium (www.opengeospatial.org) has also standardisation work available relevant to e-Government.

[1] https://joinup.ec.europa.eu/asset/dcat_application_profile/asset_release/dcat-application-profile-data-portals-europe-draft-1

ECALL

POLICY AND LEGISLATION

POLICY OBJECTIVES

The pan-European in-vehicle emergency call, 'eCall', is an interoperable service to be available in all vehicles in order to reduce the consequences of accidents, i.e. fatalities and severity of injuries.

EC PERSPECTIVE AND PROGRESS REPORT

In the event of an accident, in-vehicle sensors will automatically trigger an eCall. An audio connection is made with the European emergency number 112 and routed to the PSAP. At the same time, an emergency message is sent, providing information (the minimum set of data, or MSD) including the time, location and driving direction. The emergency call can also be triggered manually.

The next generation of standards on eCall service (already in development) take into account future developments in mobile communication networks and the IP environment, in particular LTE and IPv6 networks. Standards for the extension to other vehicles types and services are also being developed taking into account requirements from type-approval regulation and the results of other initiatives in this area (pilots, the CEF, etc). Conformance, performance and periodic tests need to be developed and innovative solutions found for situations (such as low cost, low power P2WVs) where normal full eCall provisions are not practical.

The European eCall Implementation Platform is making recommendations to ensure the best operation of the service and to take full advantage of all its possibilities.

Recognising that introducing the service via new vehicle models will mean taking considerable time to equip all cars, EU regulation has already encouraged automotive manufacturers to voluntarily introduce eCall in existing models. However, once the public land mobile network (PLMN) and PSAP support networks are in place and operational, there is a considerable aftermarket opportunity to bring the benefits of eCall to the current stock of light vehicles throughout Europe, and several equipment vendors (both from within Europe and abroad) have already shown interest to fill this market niche, in some cases directly for 112-eCall, and in others for third-party service-supported eCall. Other entrants are expected. However, as it will prove more difficult to control the performance and quality of such aftermarket devices, there is an urgent need to develop standards for the physical parameters, installation and operational performance of such aftermarket devices, to enable adequate certification. This will be essential to avoid PSAPs to be potentially inundated with false messages from such devices, and to increase the reliable and safe operation of such devices.

REFERENCES

- Regulation (EU) 2015/758 of the European Parliament and of the Council of 29 April 2015 concerning type-approval requirements for the deployment of the eCall in-vehicle system based on the 112 service and amending Directive 2007/46/EC
  ▸ http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2015.123.01.0077.01.ENG
- Commission delegated regulation (EU) of 26 November 2012 305/2013 supplementing Directive 2010/40/EU of the European Parliament and of the Council with regard to the harmonised provision for an interoperable EU-wide eCall
- COM 2011/750/EU: Commission Recommendation of 8 September 2011 on support for an EU-wide eCall service in electronic communication networks for the transmission of in-vehicle emergency calls based on 112 (eCalls)
- Directive 2010/40/EU of the European Parliament and of the Council of 7 July 2010 on the framework for the deployment of Intelligent Transport Systems in the field of road transport and for interfaces with other modes of transport
- COM(2009) 434 final: eCall: Time for Deployment
- Directive 2002/22/EC of the European Parliament and of the Council of 7 March 2002 on universal service and users' rights relating to electronic communications networks and services (Universal Service Directive).
- Decision 585/2014
  ▸ http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=OJ:JOL_2014_164_R_0002

Note: As an eCall is an emergency call, all relevant regulations applicable to emergency communication apply as well. See emergency communications section.

REQUESTED ACTIONS

ACTION 1 SDOs to develop technical specification and standards for the implementation of eCall in vehicles of categories other than M1 and N1 and for other user types, taking into account requirements included within type-approval regulation and ongoing activities in this area (pilots, the Connecting Europe Facility (CEF), etc).

ACTION 2 SDOs to lay down physical and operating requirements for aftermarket in-vehicle devices

ACTION 3 SDOs to draft guidelines on certification of eCall Systems including aftermarket in-vehicle devices

ACTION 4 SDOs to provide conformance and performance tos to the recently developed standards for packet-switched networks (HLAP E-UTRAN — LTE/4G and migration to further generations by use of an IMS sublayer).

ACTION 5 SDOs to develop conformance and performance tests for recently developed technical specifications / standards for the provision of the eCall service eCall via shared vehicle platforms (C-ITS).

ACTION 6 SDOs to produce detailed conformity test specifications in support of certification schemes and periodic testing on IVS equipment.

ACTION 7 SDOs to carry out plugtest interoperability events [1].

ACTION 8 SDOs to collect feedback about the early versions of the standards and their implementation with technical representatives from vendors and implementers.

ACTIVITIES AND ADDITIONAL INFORMATION

RELATED STANDARDISATION ACTIVITIES

CEN

CEN/TC 278 WG15 has developed several technical specifications (TS), EN standards, and other deliverables to define the MSD structure and the application protocols to transfer it from the vehicles to the PSAP, and the E2E test suites.

ETSI

ETSI TC MSG (via 3GPP) has defined the transport protocol to send MSD from the vehicle system to the PSAP, via the GSM/UMTS network in several ETSI TS along with the service principles.

Its STF 456 has looked at the issue of the migration of the Networks and has adopted and published ETSI TR 103 140.

ETSI TC MSG (via 3GPP) has defined the mechanism to send MSD from the vehicle to the PSAP via LTE using IMS.

ETSI TC MSG has produced interoperability and conformance testing specifications for the eCall HLAP and in-band modem, and is developing guidelines for eCall IVS conformity assessment.

ETSI has support the organisation of several eCall Test Fests.

PILOTS

CIP Pilots HeEROs (Harmonised eCall European Pilot) tested the standards in real conditions.

The iHeERO pilof under the 2014 CEF call for proposals is expected to produce relevant contributions for eCall standardisation.

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://iheero.eu/

ITU

Study Group 12 approved Recommendation ITU-T P.1140 (ex. P.emergency): "Speech communication requirements for emergency calls originating from vehicles".

The revised Recommendation ITU-T E.212 "The international identification plan for public networks and subscriptions" was issued by ITU-T Study Group 2. Under the revised E.212, mobile network code may be assigned to other applicants (e.g. for GSM-R networks) and these assignments are to be made according to procedures and criteria set by the national numbering plan administrator. It also encourages applications to the ITU's shared mobile country and network codes if networks and services are provided in more than one country. Use of global numbering resources for In Car Emergency Communication is under discussion in ITU-T Study Group 2.

ISO

ISO/TC 204: ITS. These cover standardisation of information, communication and control systems in the field of urban and rural surface transportation, including intermodal and multimodal aspects, traveller information, traffic management, public transport, commercial transport, emergency services and commercial services in the intelligent transport systems (ITS) field.

The project includes:

ISO/DIS 15638-10: ITS– Framework for cooperative Telematics Applications for Regulated commercial freight Vehicles (TARV) — Part 10: Emergency messaging system/eCall (EMS)

ISO/PWI 21344: ITS– Public transport — Emergency services eCall device for emergency on connected vehicles using ITS station

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.iso.org/iso/iso_technical_committee%3Fcommid%3D54706

IETF

Work in progress — IETF is working on an IP based next-generation eCall

internet draft: ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://tools.ietf.org/html/draft-ietf-ecrit-ecall

ADDITIONAL INFORMATION

The Commission wants all new vehicle types placed on the market after 31 March 2018 to implement eCall, and the PSAPs to be upgraded to handle the eCalls as from 1 October 2017, and the Commission is making recommendations to Member States to draw up detailed rules on handling eCalls for public mobile network operators operating in their countries.

As part of HeERO, EUCARIS (the European car and driving licence information system) has developed a module with which vehicle information can be exchanged internationally.

On the basis of the vehicle identification number (VIN) this module enables a link between the national vehicle registration authorities of the participating countries. When a foreign vehicle is involved in an accident, this module enables an instant Europe-wide search via EUCARIS to support the respective national 112 emergency centre(s).

[1] such as the eCall Testfest interoperability event which was held in Ostrava, Czech Republic, in November 2015 http://www.etsi.org/news-events/events/1002-4th-ecall-tesfest-2015

INNOVATION FOR THE DIGITAL SINGLE MARKET

E-PROCUREMENT PRE- AND POST AWARD

POLICY AND LEGISLATION

POLICY OBJECTIVES

Public procurement must be modernised, including pre-award and post-award, and e-procurement (the procurement of goods, services and works by electronic means).

EC PERSPECTIVE AND PROGRESS REPORT

The 2014 Public Procurement Directives aimed to make e-Procurement the mainstream method for carrying out public procurement to achieve broader competition (even across-borders), increased transparency, value for money on procurement expenditure and savings on procedural costs, and creating opportunities for innovation.

These Directives specifically mention that tools and devices used for communicating electronically should be non-discriminatory, generally available, and interoperable. The 2014 Public Procurement Directives have made the use of e-Procurement progressively mandatory, as follows:

- Electronic notification and electronic access to tender documents became mandatory by April 2016;
- by April 2017, electronic submission of tenders (e-Submission) have become mandatory for central purchasing bodies (public buyers buying on behalf of other public buyers); and
- by October 2018, e-Submission will become mandatory for all contracting authorities.

At the same time, contracting authorities will have to turn primarily to the e-Certis information portal (for public contracts tenders and submissions to ask for certificates and other documents: e-Certis was transitioned from a voluntary listing service to a mandatory clearing house for these documents, beginning in 2014. From 2016 onwards Member States are required to keep e-Certis up-to-date. As Member States implement the new public procurement Directives, the European single procurement document (ESPD) will be the standard document used to ask businesses about the exclusion and selection criteria. Together with national registers and national prequalification services, e-Certis and ESPD will support the `once only' principle.

The EU's e-Procurement internal market is facing several types of barriers, including cross-border interoperability, interface complexity, and particularly, a proliferation of platforms for e-Tendering, which makes it complicated for a company to respond to multiple calls for tenders run on different platforms. To achieve a true single market, bidders including SMEs should ideally communicate and participate in multiple markets across various systems through their favourite or a common system. E-Procurement technology, interoperability and standardisation are key elements for removing technical barriers or extra costs when supplier bid on a plurality of systems. The intention of the 2014 Directives and the e-Certis system is to use interoperability and standardisation to make transactional data exchanges easier, via a standardised syntax and/or defined infrastructure. Methods of proving conformance of e-Procurement platforms (either pre- or post-award) to the relevant standards also are important in this context.

The Directives therefore empower the Commission to adopt delegated acts in a number of specific areas to ensure that specific technical standards are mandated, to ensure widespread interoperability.

The need for standardisation in the e-Procurement domain was strongly reaffirmed by the eTEG group, set up by the Commission, as envisaged in the 2012 Communication, to advise on the actions needed to achieve interoperable, accessible and SME-inclusive systems.

A multi-stakeholder expert group on e-Procurement (EXEP) assists and advises the Member States and the Commission on implementing the provisions of the new public procurement Directives relating to electronic procurement. It contributes to monitoring the uptake of e-Procurement across the EU, sharing best practices, following new developments in the field, and addressing interoperability issues. The EXEP liaises closely with the European multi-stakeholder forum on e-invoicing (EMSFEI) and with national forums, to further promote the uptake of end-to-end e-Procurement across the EU, including in the post-award phase. The group is responsible for ensuring the coherence between the recommendations arising from the EMSFEI and broader policies on end-to-end e-Procurement. In addition, EXEP provides governance and support for initiatives like CEF and e-SENS, and governs the standardisation process in the area of e-Procurement.

REFERENCES

- COM(2012) 179 final — Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on a strategy for e-Procurement
- COM(2013) 453 final on end-to-end e-Procurement to modernise public administration
- Directive 2014/55/EU of the European Parliament and of the Council on electronic invoicing in public procurement (especially the part on contract management

which is linked to e-Procurement; please note there is a separate chapter on e-Invoicing).

- Directive 2014/23/EU of the European Parliament and of the Council on the award of concession contracts
- Directive 2014/24/EU of the European Parliament and of the Council on public procurement and repealing Directive 2004/18/EC.
- Directive 2014/25/EU of the European Parliament and of the Council on procurement by entities operating in the water, energy, transport and postal services sectors and repealing Directive 2004/17/EC
- (Directives 2014/23/EU, 2014/24/EU and 2014/25/EU sometimes are referred to collectively as the "2014 Public Procurement Directives.")

REQUESTED ACTIONS

ACTION 1 CEN/TC440 was created for electronic public procurement to facilitate efficient and effective exchange of electronic information in the (public) procurement processes, between the buyer and the seller. A roadmap and an e-Procurement business term vocabulary including European standards that implement business interoperability, e-notification, e-tendering, e-catalogue, e-ordering, and e-fulfilment is available on the CEN website[1]. These deliverables will be based on the equivalent deliverables from CEN workshop on business interoperability interfaces (CEN WS BII) in alignment with the deliverables of the CEN/TC 434, to support the electronic information exchange in public procurement and in business-to-business (B2B) transactions.

CEN/TC440 was established to enable a focused and coordinated approach to development of appropriate European standards that:

1. build upon and complement existing initiatives, such as CEN WS/BII3 and CEN/TC 434, and be part of a wider eBusiness standardisation portfolio coordinated by the CEN eBusiness coordination group.
2. provide standards that facilitate end-to-end e-procurement and thus support European Policy objectives expressed in the Digital Agenda for Europe and A strategy for e-procurement (COM(2012) 179 final), End-to-end e-procurement to modernise public administration (COM(2013) 453 final), the public procurement directive and Directive 2014/55/EU on e-invoicing in public procurement.
3. recognise the rather ambitious timeline envisaged for implementing the e-procurement Directive, stressing the importance of available European standards as a basis for compliant software solutions to be available in the market.
4. allow for user engagement and participation and effective production of the standards required by being focused on public procurement needs (but take generic applicability for 'business-to-business' into account as and when relevant).
5. facilitate improved efficiency and cost reduction in both public and private sector entities.
6. focus on cross-border and cross–platform interoperability in order to allow businesses to select the platform of their choice and still be able to participate in procurement opportunities across the full European market

ACTION 2 To create an e-Procurement ontology (this action which is part of the ISA2 work programme). The action owner for the ontology is the Publications Office of the EU (Publications Office).

ACTION 3 To work on aligning the CEN/TC440 and TC434 efforts with the ISA core vocabularies to develop a common semantic model for the e-procurement domain. This joint working group is under establishment between the two TCs. This work should build synergies with the ontology being developed by the Publications Office.

The Commission's expert group on e-Tendering (e-TEG) identified the actions below. To a large degree those are expected to be accomplished through the CEN/TC440 deliverables. Aspects of cross-border and cross-platform interoperability are also being piloted in initiatives such as e-SENS and OpenPEPPOL, based on the pre-standard deliverables provided by CEN WS/BII3. SDOs to develop standards on:

- **ACTION 4** the qualification of suppliers (eAttestations/certificates/virtual company dossier);
- **ACTION 5** a process model for procurement procedures in compliance to the Public Procurement Directives, including on negotiated procedures and competitive dialogue;
- **ACTION 6** system models that may achieve interoperability among and across multiple differing e-tendering platforms without necessarily requiring a business to change its favourite system;
- **ACTION 7** structures for de-materialisation of tenders.

ACTIVITIES AND ADDITIONAL INFORMATION

RELATED STANDARDISATION ACTIVITIES

CEN/TC440

CEN/TC 440 — "Electronic public procurement" — established to standardise e-procurement in support of the electronic public procurement process and the related information flows in the physical and financial supply chain. This facilitates end-to-end e-procurement, including both pre- and post-award processes. It succeeded the CEN workshop WS/BII3, which was closed on the 9 March 2016.

ISA² ACTIONS

SEMIC action on CCEV (Core Criteria/Evidence Vocabulary) to help making the ESPD data model domain independent like the other Core Vocabularies

E-Procurement ontology to enable the rationalisation and interoperability within the public procurement workflow for the various actors concerned and thus will facilitate the creation, exchange, dissemination and reuse of the resulting data. See the work programme ▸ http://ec.europa.eu/isa/library/documents/isa2-work-programme-2016-detailed-action-descriptions_en.pdf

PEPPOL

PEPPOL was a EU large-scale pilot project (LSP) from 2008-2012. It provided a set of technical specifications that can be implemented in existing e-Procurement solutions, and enables trading partners to exchange standards-based e-Procurement documents over a PEPPOL network. ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.peppol.eu.

OPENPEPPOL

Following the closing of the PEPPOL-project, OpenPEPPOL AISBL took over governance of the solutions developed. The PEPPOL transport infrastructure is now implemented by hundreds of service providers throughout Europe, servicing thousands of public and private entities, including the post-award processes of e-procurement: ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.peppol.eu/about_peppol/about-openpeppol-1 ; ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.peppol.eu/about_peppol/openpeppol-communities

E-SENS

The 'Electronic Simple European Networked Services' (e-SENS), is an EU LSP project integrating results from PEPPOL and other eGovernment LSPs. The e-SENS Work Package 5.1 focuses on e-Procurement. There is an e-Tendering pilot which addresses the interoperability issue between the platforms. An important milestone was reached in January 2015. Phase I in work package 5.1 was processed successfully, allowing for the first time, to interchange a publication and an application for participation between the Netherlands (Tendernet), Denmark (ETHICS) and Germany (XVergabe) Gateway to e-Vergabe from BeschA) with PEPPOL infrastructure, consisting of access points from IBM Denmark and the University of Priaeus Greece. Part of the work is based on specifications from CEN WS/BII3. ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.esens.eu/home/

EXEP

See end of section D2.

ADDITIONAL INFORMATION

OpenPEPPOL has provided a set of existing specifications and methods sufficient for production implementation of e-Procurement and e-Invoicing business functions. These will be added to by e-SENS. An appropriate long-term community feedback, updating and maintenance structure for these assets is preferred, as any network of transacting parties will evolve and discover new needs over time. It is envisaged that the timeline for CEN/PC440 will be adopted to allow for feedback from OpenPEPPOL and e-SENS as well as other implementation initiatives. This is because the deliverables of OpenPEPPOL and e-SENS are based to a large extent on the workshop agreements provided by CEN WS/BII. These agreements will be further enhanced by CEN/PC440. The long-term governance and maintenance of these agreements, leading to a stable set of public contracting shared tools, data structures and semantic information, is expected to be managed by CEN.

The next-generation e-Procurement platforms are expected to enforce a model in which the platform used by the contracting authority to run a tendering process that collaborates with independent "tender response preparation" platforms used by the EO, by sharing a unique view of the process and document structures being exchanged as part of the e-Tendering transactions, potentially including these features:

- product/services catalogues and classifications;
- code lists, identification schemes;
- accessibility standards for user interfaces (see the separate section on web accessibility above);
- registration / authentication standards for e-Procurement platforms (standards in this area would enable to set up federations of e-Tendering platforms to share company information or even single sign-on services, making things easier for businesses which currently have to go through complex procedures on each of the platforms that they work on);
- digital signature and use of public key infrastructure, which may leverage current ETSI work on trusted lists and signature formats;
- data models and processes for e-Tendering performance measurement.

The different CEN Technical committees should liaise with Recommendations developed in European Multi-Stakeholder Forum on e-Invoicing, the work carried out under ISA² Action: the European public procurement initiative (which includes the ontology, ePrior, the once-only principle, the ESPD and e-Certis) and the EXEP.

[1] https://standards.cen.eu/dyn/www/f?p=204:22:0::::FSP_ORG_ID,FSP_LANG_ID:1976650,25&cs=1E026AD4CB03AEF2261F2F13227B40F25

E-INVOICING

POLICY AND LEGISLATION

POLICY OBJECTIVES

Electronic invoicing (e-Invoicing), i.e. an invoice that has been issued, sent and received in a structured electronic format which allows for its automatic and electronic processing, brings numerous benefits to all users (senders and recipients). By automating the relevant business processes, e-Invoicing leads to cost savings, increased efficiency, faster payments, and a reduced environmental impact especially if other business documents like order and dispatch advice are also available in electronic format. Its deployment is a strong tool in support of enterprise and financial policies as it makes enterprises more efficient and generates potentially significant savings for Member States' governments. Therefore, e-Invoicing is highlighted in the EU's digital agenda as one of the key actions of its first pillar ("A vibrant digital single market"). Additionally, it contributes significantly to the EU's digital agenda by promoting the development of eGovernment, and ready accessibility to users with disabilities (see the separate section on accessibility of ICT products and services and web accessibility).

EC PERSPECTIVE AND PROGRESS REPORT

In the last decade or so, many e-invoicing standards/formats have been developed, based mostly on different versions of XML. Many of these are proprietary formats, and are only used by one multinational company and its suppliers, or embed proprietary unique identifiers that may require licensing from a single source. As Member States developed their own national standards, some of these also differed from anything already on the market, resulting in further divergence and a lack of interoperability. As a consequence, market players, such as companies or financial and IT service providers need to support multiple formats, requiring substantial mapping and conversion exercises to cope with data expressed in different syntaxes.

The published EN16931-1 is intended to tackle the fragmentation that is created by the vast number of e-invoicing standards, data formats, and usage requirements exist across the EU and globally. It is important is to promote the standards in order to interoperability while respecting different sector needs and practices.

The Commission has addressed the issues around e-Invoicing also on the political and legal level:

Communication COM(2012)573 identified 12 key actions, one of which is to "adopt legislation to make e-invoicing standard billing mode in public procurement".

- Directive 2014/55/EU obliges central government bodies of the Member States to accept electronic invoices in public procurement.

Further standardisation may be generated by the requirement of contracting authorities to turn primarily to the e-Certis portal to ask for certificates and other public contracting documents: e-Certis has been designated a mandatory clearing house for these types of documents from 2014 on. Member States are required to keep e-Certis up-to-date starting from 2016. As Member States implement the new public procurement Directives, the European single procurement document (ESPD) will become the standard document used to ask businesses about the exclusion and selection criteria. Together with national registers and national prequalification services, e-Certis and ESPD will support the once-only principle.

A European Multi-stakeholder Forum on e-Invoicing (EMSFEI) has been set up by the Commission with Commission Decision C(2010)8467. Article 5 of C(2014) 4142 confirmed it would advise the Commission on e-Invoicing matters. On 1 October 2013, EMSFEI unanimously adopted and endorsed the Recommendation on the use of a Semantic Data Model to support Interoperability for Electronic Invoicing that has been taken up by the European Commission and is a central focal point for Directive 2014/55/2014.

Universal Business Language (UBL) 2.1 was identified by the Commission[1] for referencing in public procurement according to the provisions of Regulation (EU) 1025/2012 on European standardisation.

[1] Commission Implementing Decision (EU) 2014/77 of 31 October 2014.

REFERENCES

- Directive 2014/55/EU of the European Parliament and of the Council on electronic invoicing in public procurement. This Directive obliges central government bodies of the Member States of the European Union to accept electronic invoices in public procurement from 27 November 2018 onwards; and local authorities from 27 November 2019 onwards. These electronic invoices must comply with a European standard on electronic invoicing and with one of the syntaxes on a limited list of syntaxes.
- Council Directive 2010/45/EU amending Directive 2006/112/EC on the common system of value added tax as regards the rules on invoicing.

- SWD(2013) 222 — Impact Assessment accompanying the document `Proposal for a Directive of the European Parliament and of the Council on electronic invoicing in public procurement´
- COM(2013) 453 final on end-to-end e-Procurement to modernise public administration
- Communication COM(2012)573 "Single Market Act II: Together for new growth"
- Explanatory Notes on VAT-invoicing rules (Council Directive 2010/45/EU)[1].
- Council Directive 2006/112/EC on the common system of value added tax.
- COM(2010) 245: "A Digital Agenda for Europe", which gives a prominent role to achieving a single digital market and calls for removing the regulatory and technical barriers which prevent mass adoption of e-invoicing.
- COM(2010)712 "Reaping the benefits of electronic invoicing for Europe" describes a number of actions in different areas, including standardisation, needed to facilitate the deployment of e-invoicing in Europe.
- Member States called for measures to promote e-invoicing at the Informal competitiveness Council of February 2012 and in the European Council Conclusions of June 2012.
- The European Parliament called for making e-invoicing compulsory in public procurement by 2016 in a resolution adopted in April 2012.
- COM(2012)179 "A strategy for e-procurement" states that the ultimate goal is "straight through e-procurement" with all phases of the procedure from notification (e-notification) to payment (e-payment) being conducted electronically.
- Commission Implementing Decision (EU) 2017/1870 of 16 October 2017 on the publication of the reference of the European standard on electronic invoicing and the list of its syntaxes pursuant to Directive 2014/55/EU
- Expert Group on e-Invoicing, Final Report, 2009
- German ZUGFeRD 1.0 structured e-Invoice format ▸ www.zugferd.de
- Danish legal e-Invoice mandate: Executive Order No. 354 of 26 March 2010: ▸ http://www.oioubl.info/documents/en/OIOUBLStatute.pdf
- Several European countries already introduced rules whereby public authorities could only accept electronic invoices from suppliers and all these initiatives will need to align with the ongoing standardisation activities carried out by CEN/TC 434 according to the Annex of the standardisation request M/528.
- Italian FatturaPA is based on a centralized hub that accepts eInvoices from a defined number of channels in a XML format[2].
  The usage of FatturaPA is mandatory in all the transactions towards the Italian public administration since 31 March 2015.
- 4 corner e-invoicing network in the Netherlands[3]

REQUESTED ACTIONS

The deliverables defined in the standardisation request M/528 have been published. EN16931-1 and its complementary technical specifications and reports are available. TC/434 should discuss further follow up activities leading to wider adoption and implementation.of e-Invoices / automated processes.

ACTION 1 Continue the work in CEN TC/434 which includes the following aspects and standardisation deliverables, currently under development:

- investigation of future activities (the TC has already agreed on the topics to be addressed
- maintenance activities
- development of future documents that encourage the uptake of the European Norm and its ancillaries
- communication activities (Capacity building)
- deliverables that describe the governance and rules framework for Core Invoice Usage Specifications (CIUS) and extensions to the core invoice management
- a specification to the creation and management of a registry

ACTION 2 Develop the generic container [body] of data for all types of invoices (possibly investigating how to include tax requirements on a European level); for industry specific purposes specific containers of data standardised sector specific extensions in addition to the generic container might be devised and standardised at a European level: i.e. for energy and human resources management purposes in line with the guidelines on the optional use of sector or country extensions developed by CEN/TC 434. There needs to be a registry for such standardised extensions whose development should be in line with centrally defined rules.

General remark: Overall, the actions should be part of an agreed standardisation strategy shared by the Commission, the ESOs, MSP, consortia and standards bodies supplying specifications in use, and Member States which actively implement them. The Commission may launch further broad, neutral fact-finding inquiries (perhaps via the MSP and EMSFEI) to identify appropriate shared needs and goals.

ACTIVITIES AND ADDITIONAL INFORMATION

RELATED STANDARDISATION ACTIVITIES

CEN

CEN/TC 434 was established provide standardisation for e-Invoicing and undertakes the standardisation activities required by the Directive 2014/55/EU

CEN/TC 440 — "Electronic public procurement" — established in order to provide standardisation in the field of e-procurement including Post-award processes.

OASIS

OASIS' Universal Business Language Version 2.1 (UBL v2.1), used in several member state implementations and the PEPPOL project, was adopted as ISO/IEC 19845:2015.

UN/CEFACT

Cross-Industry Invoice (CII) v.2 adopted as a UN/CEFACT standard, consistent with the methodologies of ISO 15000-5:2014 ebXML Core Components Specification ("CCS").

OPENPEPPOL

E-Invoice developer community to implement the PEPPOL (and e-SENS) programmes. The PEPPOL transport infrastructure is today implemented by hundreds of service providers throughout Europe, servicing thousands of public and private entities, specifically in the post-award processes of e-procurement, where e-Invoicing is predominantly used.
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.peppol.eu/about_peppol/about-openpeppol-1

ADDITIONAL INFORMATION

The French government devised rules for e-Invoicing. This action is part of a simplification programme for businesses. The goal is to dematerialise invoicing between public bodies and suppliers. E-invoicing will be introduced progressively from 1 January 2017 it will apply to big firms and from 2020 to small and medium businesses. Public bodies must be ready to use e-Invoicing by 2017.

For SMEs to also benefit from e-invoicing, the German Forum on electronic Invoicing (FeRD) has developed a uniform data format called ZUGFeRD, the "Central User Guide of the Forum for Electronic Invoicing in Germany" (Zentraler User Guide des Forums elektronische Rechnung Deutschland, for further information: http://www.zugferd.de; English version available at: http://www.ferd-net.de/zugferd/specification/zugferd-abruf-1.0-englisch.html). Structured invoices can be exchanged electronically between different companies and between companies and the public administration. Currently, FeRD is preparing an updated version (ZUGFeRD 2.0 / FACTUR-X) in order to provide a fully compliant Core Invoice Usage Specification (CIUS) with the European Standard EN1693. Thus, ZUGFeRD 2.0 and XRechnung are equal standards in their own right. FeRD plans to launch ZUGFeRD 2.0 in September 2017. ZUGFeRD 2.0 /FACTUR-X forms part of the German-French cooperation in the field of electronic invoicing, which has been initiated in the German-French Digital Conference in October 2015 and reinforced in the following conference in December 2016. Therefore, ZUGFeRD 2.0 / FACTUR-X is based on ZUGFeRD 1.0 and corresponding French standards in electronic invoicing.

The German Government project "eRechnung" on behalf of the IT Planning Council is directed by the Federal Ministry of the Interior and the IT Standards Coordination Office (KoSIT). One of the project's goals is to develop a national standard "XRechnung", which fulfills the requirements of the German public sector on electronic invoices. This national standard includes a core invoice usage specification that provides additional explanations and business rules compared to the CEN Semantic Data Model. A second goal is to offer recommendations on infrastructure components for federal, state and local governments.

In Italy 100% of the suppliers for central and local authorities have been obliged to issue e-Iinvoices in FatturaPA format since March 31, 2015 semantically aligned with CEN/BII WS core invoice. This broad-scale project has led to between 2 and 2.5 million suppliers to send invoices electronically and has enabled the Italian government to reap the benefits of digital invoicing to the full extent.

In the Netherlands, the central government received 53% of its invoices from companies through digital channels in the first two quarters of 2014. An increasing number of departments are able to process digital invoices automatically. Full digital processing either on the basis of scanning/OCR, PDF, XML and/or HRXML messages will be in place in the coming years in all departments. The government has developed a semantic e-invoice standard (SMEF) which has a comply or explain status. Choosing a semantic e-invoice standard gives more freedom in selecting e-invoice syntax standards. A Dutch profile on HRXML (SETU) follows comply or explain rules, whereas UBL 2.1 is chosen as the preferred standard if there is no dominant sector standard available. The Dutch government is very glad that the European Commission is using a similar approach with one semantic and several syntax standards. This will enable the central government to reap the benefits of digital invoicing to the full extent and Billing Service Providers to link up their invoicing networks, thus facilitating for pan-European digital invoice interchanges, be it based on Simplerinvoicing or similar solutions. ▸ http://www.simplerinvoicing.org/

The emergence of an abundance of internet and mobile based payment services for both online and over-the-counter purchases makes it increasingly important to also standardize formats and delivery methods for business-to-consumer (B2C) e-billing. Business-to-government (B2G) and business-to-business (B2B) e-invoicing formats are not directly applicable to invoices and receipts issued to consumers. Most importantly there are privacy issues to be considered with respect to content and delivery. Standardised e-billing for B2C commerce could have a number of benefits including faster and simpler payments and reduced environmental impact for mobile over-the-counter purchases; more readily accessible to users with disabilities; consumers can collect invoices in a single location, easily accessible for warranty and ODR purposes; easily accessible and portable e-invoices may be used to increase trust in relation to second-hand C2C trading. However, e-invoicing in multiple formats, where the consumer would have to register in many different ways with various vendors and/or data mining third-party services to receive invoices in various formats or become embedded in proprietary apps, would be detrimental to the objectives of the digital single market.

Commission Implementing Decision (EU) 2017/1870 of 16 October 2017 on the publication of the reference of the European standard on electronic invoicing and the list of its syntaxes pursuant to Directive 2014/55/EU of the European Parliament and of the Council

[1] http://ec.europa.eu/taxation_customs/resources/documents/taxation/vat/traders/invoicing_rules/explanatory_notes_en.pdf
[2] http://www.fatturapa.gov.it
[3] http://www.simplerinvoicing.org

CARD, INTERNET AND MOBILE PAYMENTS

POLICY AND LEGISLATION

POLICY OBJECTIVES

While there is no globally accepted definition of a mobile payments (m-payment), payments made using a mobile phone seem to be gaining importance. Mobile payments can be based on card payments, credit transfers, direct debits, or through pre-funded cards and accounts.

In general, the Commission strives to promote an interoperable European market for card, internet and mobile payments for the benefit of consumers and merchants.

EC PERSPECTIVE AND PROGRESS REPORT

There will be 947 million mobile-connected devices by 2020. Whether it is for shopping, moving, buying concert tickets, paying bills or accessing banking services, the mobile is device is becoming the preferred access path to online services. The market for mobile payments at European level is fragmented. The current landscape is characterised by applications for niche users and by numerous pilot projects, mostly at domestic or local level. The advent of an integrated system of mobile payments in the EU is hampered by the lack of cross-border standardised and interoperable technical solutions.

The absence of shared standards, standardisation gaps and the lack of interoperability between the various market players is delaying the mass market adoption of this innovative payment method. While certain solutions, such as near field communication (NFC), seem to emerge as possible lead technologies for proximity mobile payments, common standards for mobile payments at the point of sale (POS) do not exist or are in a very early stage of development.

Provided that the market factors are duly taken into account, resolving the issue of missing standards will make it easier for payment services providers and merchants alike to reach critical mass by making use of the digital single market and committing to make the necessary investments.

It requires a coordinated and pragmatic approach by the public authorities and the various players in order to favour the deployment of the service. The cooperation among the players is key, and should be supported by a real willingness and commitment to achieve concrete results.

The European Commission does not plan yet to proceed with specific legislation since it requires a more mature market. However, it will continue the cooperation and discussion with the institutional players and the ESOs. It will launch/support

appropriate standardisation initiatives as soon as gaps and needs are identified. The CEN has confirmed its interest in supporting the European Commission initiatives regarding payment standards. It will use its multiple experts from both demand and supply sides already involved in the many organisations addressing standards covering the entire chain of payments in the card, internet and mobile environment. DG GROW will pursue its work on the mapping of the market for mobile payments.

The Euro retail payments board (ERPB) working group should work in cooperation with relevant players that are not represented in the ERPB (e.g. telecom operators). It is expected to enhance the consumers' confidence in m-payments.

Future standardisation work in the m-payments field should pay particular attention to security for apps, access and accessibility, management and portability of customer data, and transparency. Certification of equipment and solutions should also be addressed as well by the competent bodies.

In order to foster and accelerate innovation and to create a level playing field, a certain degree of standardisation is vital to secure compatibility in the mobile payments value chain. Changing handset (version), OS, card, wallet, provider, or any other service or product in the chain, must be a seamless and secure experience for the consumer.

Standardisation could include making a distinction between mobile platforms (e.g. secure element, mobile handset) and their functions/security which are generic in nature and provide support to all mobile services / applications and mobile payment applications (running on these platforms).

REFERENCES

- Revised Directive on Payment Services. In 2015, the European Parliament and the Council agreed on the European Commission proposal to create safer and more innovative European payments (Payments Service Directive 2). The new rules aim to better protect consumers when they pay online, promote the development and use of innovative online and mobile payments, and make cross-border European payment services safer. Member states will have two years to incorporate the directive into their national laws and regulations.
- Regulation (EU) 2015/751 of the European Parliament and of the Council of 29 April 2015 on interchange fees for card-based payment transactions
- French strategy : ▸ http://proxy-pubminefi.diffusion.finances.gouv.fr/pub/document/18/17780.pdf#page=7

REQUESTED ACTIONS

ACTION 1 SDOs are to develop standards, including use-cases and a clear definition of mobile payment, on different ways of payment covering the whole purchase process (from checking the price to receiving the confirmation of payment), reflecting requirements for accessibility, interoperability, security, personal data protection and privacy. These are needed for a clearer definition and scope of what m-payments are.

ACTION 2 CEN/TC224 will work on accessibility, guideline for users, European profiles of standards and specification for describing/featuring European solutions

ACTION 3 Assess landscape of existing standards. The Commission, in cooperation with the European Central Bank, intends to facilitate the merging of ongoing standardisation activities in the area of card payments and spur the emergence of pan-European standards for m-payments and internet payments. As a first step the Commission will invite the ESOs and other relevant bodies such as the single euro payments area (SEPA) council to map out business and user requirements and assess existing standardisation gaps. The CEN has already confirmed its interest for this mapping exercise. Taking as a starting point the requirements of businesses and consumers, there is a need to assess the existing standards, to identify interoperability gaps, and to develop a work programme that will help develop missing standards and to fix the existing problems.

In particular the following issues (especially in the m-payment domain) should be addressed: security for apps, access and accessibility, management and portability of customer data, and transparency. Certification of equipment and solutions should be addressed as well by the competent bodies.

ACTIVITIES AND ADDITIONAL INFORMATION

RELATED STANDARDISATION ACTIVITIES

CEN

CEN/TC 224 develops standards for strengthening the interoperability and security of personal identification and its related personal devices, systems, operations and privacy. CEN/TC 224 multi-sectoral environment involves sectors such as Government/ Citizen, Transport, Banking, e-Health, as well as Consumers and providers from the supply side such as card manufacturers, security technology, conformity assessment body and software manufacturers. In 2018, CEN/TC 224 will continue to develop European Standards notably on Trustworthy Systems Supporting Server Signing (prEN 419241-1), Protection Profile for Trust Service Provider Cryptographic modules (prEN 419221-5), Biometrics multilingual vocabulary (prEN 17054), and on breeder documents. Moreover, CEN/TC 224 will continue to support the eIDAS regulation.

ISO

Mobile payments WG — ISO TC68/SC7/WG10 and ISO/IEC JTC1 SC 17- Cards and personal identification. ISO 12812 have been published. This includes five parts:

- ISO 12812-1: General Framework
- ISO 12812-2: Security and data protection for Mobile Financial Services
- ISO 12812-3: Financial Application Management
- ISO 12812-4: Mobile Payments to Persons
- ISO 12812-5: Mobile Payments to Businesses

ETSI

Following the Commission-ETSI jointly organised workshop on m-Payments held in July 2014, ETSI will set up an open and inclusive "Smart Secure Platform" (SSP) that will bring together all relevant players and experts (industry, standards-making, public authorities) and will aim at identifying existing standardisation gaps and needs, bearing in mind the requirements to be set by ERPB. The objective is to define a generic (i.e., technology agnostic) standardised security platform to enable secure and interoperable service delivery of mobile devices for a series of industry sectors. The results of the analysis and the proposed standardisation work will lead to the launch of specific and coordinated standardisation activities at European and international level.

ITU-T

ITU-T SG3 is responsible, inter alia, for studying international telecommunication/ICT policy and economic issues and tariff and accounting matters (including costing principles and methodologies), with a view to informing the development of enabling regulatory models and frameworks. SG3 has launched work in the area of tariffs, economic and policy issues pertaining to Mobile Financial Services (MFS) over the past couple of years, including charging for MFS, Mobile Financial Services Transaction Cost Model, Consumer Protection in MFS and Interoperability for Competition in Mobile Financial Services.

Focus Group Digital Financial Services (FG DFS) has completed its work on the barriers to mobile payments and mobile financial services in developing countries. The deliverables address the DFS ecosystem challenges and provide best practices for consumer protection regulators, key performance indicators for quality of service for DFS and merchant acceptance for DFS. There are also deliverables related to:

- the interoperability of DFS payment systems,
- architecture for DFS payments,
- the definitions used in DFS (see glossary on DFS)
- security for DFS,
- best practices for regulators for competition issues with regard to fair access to telecommunication infrastructure for DFS providers,
- data privacy issues in DFS,
- role of postal networks in DFS
- competition issues in Digital Financial Services
- enhancing digital credit to avoid cashing out.

In addition FG DFS produced some 85 recommendations for policymakers and DFS stakeholders to address the challenges in order to scale up DFS services and create a level playing field for the growth of DFS ecosystem.
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://itu.int/en/ITU-T/focusgroups/dfs/Pages/deliverables.aspx

The Financial Inclusion Global Initiative (FIGI) was set up jointly by ITU, World Bank, Bank for International Settlements (BIS) and the Bill & Melinda Gates Foundation. The main objective of FIGI is to implement the recommendations of the FG DFS, the high level principles of the Payment Aspects of Financial Inclusion (PAFI) report of the World Bank and the BIS at a country level over the next three years.Three working groups have been set up under FIGI to support the country implementations and develop technical guidelines and requirements for standards for digital financial services:

- Security, Infrastructure and Trust
- Digital Identity
- Electronic Merchants Payment Acceptance

A new ITU-T Focus Group on Digital Currency including Digital Fiat Currency (FG DFC) has been set up to consider the use of distributed ledger technology to support digital fiat currency for financial inclusion. The FocusGroup will investigate the network security andprotocol requirements for DFC, security measures for prevention of counterfeiting as well as interoperability of digital fiat currencywith other digital currencies and payment systems.
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://itu.int/en/ITU-T/focusgroups/dfc ITU-T SG13 approved two Recommendations on secure mobile payments and mobile banking solutions.–Recommendation ITU-T Y.2740 elaborates on approaches to develop system security for mobile commerce and mobile banking . It describes the security requirements for the mobile commerce and the mobile banking systems, based on four specified security levels.–Recommendation ITU-T Y.2741 specifies the general architecture of a security solution for mobile commerce and mobile banking in modern telecommunication networks.

W3C

The open web platform offers tremendous potential as the driver behind the transformation of the web Payments industry. The platform forms the foundation of how online and in-store payments can be made easy on the web in the future. See ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://www.w3.org/Payments/

The web payments working group , chartered to make payments easier and more secure on the web, through the development of new web standard protocols and APIs related to the initiation, confirmation, and completion of a payment. This serves to increase interoperability between payer and payee systems. The group is chartered to standardise programming interfaces, not user interfaces and not a new digital payment scheme. See ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://www.w3.org/Payments/WG/

The web payments interest group, chartered to provide a forum for web payments technical discussions to identify use-cases and requirements for existing and/or new specifications to ease payments on the web for users (payers) and merchants (payees). It is also chartered to establish a common ground for payment service providers on the web platform. See ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://www.w3.org/Payments/IG/

Other chartered groups (doing standards) are of course coordinated closely with web payments, such as security, crypto, privacy or authentication (also accessibility and internationalisation) and a number of other community-driven groups at W3C are doing work related to payments, or that will improve the web overall including payments. These include:

the Interledger payments community group, which seeks to connect the many payment networks (ledgers) around the world via the web,

the financial industry business ontology (FIBO) community group, which

is developing extensions to schema.org related to financial industries,

the Blockchain Community Group, which is studying and evaluating technologies related to blockchain, and use-cases such as interbank communications.

NEXO AND EPCNEXO

NEXO and EPCNEXO and the European Payment Council (EPC) currently focus on the protocols for card payment protocols in the Eurozone and aim to replace the current mess of proprietary protocols. The EPC is also involved in SEPA and sees iteself as the decision-making and coordination body for the European banking industry in relation to payments

ADDITIONAL INFORMATION

In general regarding card, internet and mobile payments, some stakeholders believe that the following issues should in particular be addressed: security, access and accessibility, management and portability of customer data, and transparency.

Card, internet and mobile payments are already standardised by a large number of organisations. This creates a diversity which may prevent the use of common infrastructures and common security standards. A common series of standards would be beneficial to all players in the market. A global view on standards in these areas is important as the payment market is global as are most existing standards.

PRESERVATION OF DIGITAL CINEMA

POLICY AND LEGISLATION

POLICY OBJECTIVES

The 2005 European Parliament and Council Recommendation on film heritage recommended Member States to ensure preservation of cinematographic works. The fourth application report on this recommendation, published on 3 October 2014, shows that very few Member States are implementing digital workflows to preserve digital or digitised cinema. Those that have done it have used diverging standards.

EC PERSPECTIVE AND PROGRESS REPORT

The film heritage sector would benefit from European standards that describe the most efficient digital workflows and data formats for preservation of digital films. The resulting standards for digital preservation of films could also be of interest for digital preservation of other type of documents in public administrations. Some Member States, as Germany and France, are planning to adopt national standards.

REFERENCES

- Recommendation of the European Parliament and of the Council of 16 November 2005 on film heritage and the competitiveness of related industrial activities, OJ L 323 of 9.12.2005, p.57.
  ▸ http://eurlex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32005H0865:EN:NOT
- Council Conclusions on "European film heritage, including the challenges of the digital era", adopted in November 2010
  ▸ http://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/educ/117799.pdf
- Council conclusions on "European Audio-visual Policy in the Digital Era" adopted on 25 November 2014
  ▸ http://www.consilium.europa.eu/homepage/highlights/council-addresses-european-audiovisual-policy-in-the-digital-era?lang=en
- 4th Application report of the Film Heritage Recommendation, from 2.10.2014
  ▸ https://ec.europa.eu/digital-agenda/en/news/european-commissions-report-film-heritage

- Archival Policy of the Swedish Film Institute ▸ http://www.sfi.se/Global/Filmarkivet/Policy%20of%20the%20Archival%20Film%20Collections%20of%20the%20Swedish%20Film%20Institute%20(2012).pdf
- British Film Institute Strategy "2012-2017" Film forever
  ▸ http://www.bfi.org.uk/about-bfi/policy-strategy/film-forever
- Results of the EU-funded research project EDCine
  ▸ ftp://ftp.cordis.europa.eu/pub/ist/docs/ka4/au_concertation_1006_edcine_en.pdf
  http://ec.europa.eu/avpolicy/docs/reg/cinema/june09/edcine.pdf
- Recommendations from the International Federation of Film Archives (FIAF):
- FIAF Technical Commission Recommendation on the deposit and acquisition of D-Cinema elements for long-term preservation and access
  ▸ http://www.fiafnet.org/commissions/TC%20docs/D-Cinema%20deposit%20specifications%20v1%200%202010-09-02%20final%201.pdf
- FIAF Technical Commission Recommendation on the Principles of Digital Archiving
  ▸ http://www.fiafnet.org/commissions/TC%20docs/Digital%20Preservation%20Principles%20v1%201.pdf

REQUESTED ACTIONS

ACTION 1 SDOs to develop and adopt a European standard and the related guidelines on preservation of digital films, based on existing standardisation activities at national and international level.

The proposal from the German standards body (DIN) about an establishment of a new CEN Technical Committee for preservation of digital cinema to develop Standards and accompanying guidelines in 2017 should be considered. The new Committee should develop a European standard specifying a data structure and a set of file formats for long term archiving of digital movies. The project will be based on existing standards as the data structure will be organized as archive information package (AIP) according to the Open Archival Information System (OAIS) standard defined in ISO 14721:2012. The objective is to ensure integrity of data and quality of the structures to preserve digital information.

ACTION 2 SDOS to promote awareness and implementation of the European standard among relevant stakeholders (e.g. European film heritage institutions)

ACTIVITIES AND ADDITIONAL INFORMATION

RELATED STANDARDISATION ACTIVITIES

OAIS

OAIS (Open Archive Information System) — ISO 14721:2012

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.iso.org/iso/iso_catalogue/catalogue_ics/catalogue_detail_ics.htm?csnumber=57284

GERMANY

Germany has started standardization activities at national level to produce one technical report on preservation of digital films (DIN SPEC 15587 "Guidelines for digitization of cinematographic film").

CST/FRAUNHOFER

CST/Fraunhofer started a new "Society of Motion Picture and Television Engineers" (SMPTE) activity for a mezzanine file format of digitised movies based on the interoperable master format (IMF) which can be extended to a preservation format of digital films

FINTECH AND REGTECH STANDARDIZATION

POLICY AND LEGISLATION

The way financial data is exchanged across institutions and companies worldwide is becoming more and more automated and complex. The financial sector is playing a crucial and systemic central role, being affected by new and emerging trends such as digitalisation and new business models. The financial services and insurance industries have seen profound technology-led changes over the past few years.

"Fintech" innovators and entrepreneurs are redefining the way we save, borrow, invest, spend and protect our money. They not only bring new financial services to the market, but also pioneer an innovative culture, introducing software, technology and business practices beyond those traditionally associated with the financial services sector. These changes again impact business operation communication flows on financial data.

Business operations benefit from standardised solutions to support and foster a more competitive and innovative European financial sector. The use of standards and technical specifications enables seamless information exchange among financial service providers, lowers barriers, underpins trust of consumers, boosts innovation and enables compliance with financial laws in a cost-effective way.

It's a challenge to find the right standardisation axis in such a rapidly transforming industry.

In parallel, regulatory efforts are trying to keep pace with the impact of digitalisation on systemic risk management, resulting in supervisory reporting obligations imposed on the entire financial sector, while stock listed companies are guided into transparency reporting obligations to leverage transparency for investors. In general, "reporting" is summarizing in various ways the recording of what happened in business operations.

Access to standardised data is essential to perform supervision of financial institutions, monitoring of systemic risk, and market oversight and ensure orderly markets, financial stability, investor protection and fair competition.

Current reporting obligations are perceived as costly and burdensome due to potentially duplicative and overlapping reporting requirements, but in reality, more due to insufficient standardisation and lack of clarity on what needs to be reported.

"Regtech" initiatives are ramping up in this domain, seeking among others digital ways to shrink the time-to-supervisor while maintaining control of business operations and understanding the details of the supervisory reporting obligations. It's imperative to standardise regulatory dictionary definitions on a European level and enable digital linking between regulation and supervisory reporting obligations.

POLICY OBJECTIVES

Traditional financial institutions realize they have a lot to lose or gain from the Fintech revolution and invest huge effort and money to adapt their technology and processes to adjust to a new environment, find a place in this new ecosystem, compete with new business models and respond to new consumer needs and behaviours. Across Europe, there has been considerable uptake of new digital channels: over 58% of Western Europeans (85% for Northern Europeans) prefer to use digital over physical branches, compared to 52% of US bank customers. These trends have grabbed the attention of investors who have made massive investments, growing by 75% in 2015 to $22.3bn, five times higher than in 2013.

Fintech start-ups appear with innovative solutions challenging existing financial services business models, markets and regulation. The existing legal framework is being reviewed at EU level and the concept of regulatory experimentation frameworks (or sandboxes) explored to help address this transformation and enable innovation.

Some regulatory adjustments have already been adopted such as amendments to the Anti-Money Laundering directive and the use of electronic identification. Since July 2016, the Electronic Identification and Trust Services Regulation can give e-transactions and other e-signed documents the same legal status as those that are paper-based. The new Capital Requirement Regulation CRR2 package adopted in 2016 takes technological innovations into consideration, and so is the 2017 Action Plan for Retail Financial Services.

Following several public consultations regarding financial services and the EU Parliament report on blockchain and virtual currencies, the Commission has set-up a horizontal Financial Technology Task Force to explore the impact of new financial technologies on consumers and businesses and the possible risks for financial stability. One of the work streams of the Task Force focuses on Interoperability and Standardisation.

In parallel, and in relation to the need for more harmonised supervisory reporting, in its Communication on the CfE: "EU regulatory framework for financial services" the Commission committed to investigate and address the concerns around the costs and complexity of reporting by undertaking a review of reporting requirements in the financial sector. This work is performed within the ongoing financial data standardisation

(FDS) project which will produce a comprehensive mapping of reporting requirements and aims to develop a common language on financial data. This initiative forms a key contribution to the Commission's Better Regulation agenda and the Regulatory Fitness and Performance (REFIT) programme, which ensures that EU Legislation delivers results for citizens and businesses effectively, efficiently and at minimum cost.

EC PERSPECTIVE AND PROGRESS REPORT

The interoperability and standards work stream of the FinTech task force has kicked off in January 2017. A consultation on FinTech took place from 23 March to 15 June 2017. The results have been published during the summer 2017.

Since 2012, the European securities and market authority (ESMA) defines, on a yearly basis, European common enforcement priorities (ECEP) in order to promote the consistent application of European securities and markets legislation and the IFRS, and especially the provisions of the Transparency Directive. Those priorities are a key focus of the examination of issuers' financial statements. They are made public so that listed companies and their auditors take due account of these areas when preparing and auditing IFRS financial statements.

In terms of regulatory technical standards (RTS), ESMA prepared draft RTS with respect to the operation of a European electronic access point at EU level. The access point will be a web-portal for the provision of easy and fast access to regulated information stored by all officially appointed mechanisms. ESMA is also pursuing the development of a draft RTS to specify the European single electronic reporting format (ESEF) for the preparation of annual financial reports in a single electronic reporting format that will take effect from 1 January 2020. This task is specifically mentioned in Directive 2013/50/EU: "ESMA should develop draft technical regulatory standards, for adoption by the Commission, to specify the electronic reporting format, with due reference to current and future technological options, such as eXtensible Business Reporting Language (XBRL)"..The extensible Business Reporting Language 2.1 was identified by the Commission[1] for referencing in public procurement according to the provisions of Regulation (EU) 1025/2012 on European standardisation.

The Commission launched the Financial Data Standardisation Project in 2016, to quantitatively study the findings of the aforementioned Call for Evidence. The deliverables of the project expose the need to define once and move towards one ' Regtech Data Dictionary'.

The Commission adopted the FinTech Action Plan on 7 March 2018 with a section "Increasing competition and cooperation between market players through common standards and interoperable solutions" detailing different actions.

REFERENCES

- Directive 2013/50/EU (revision of the Transparency Directive 2004/109/EC) aims to ensure transparency of information for investors through a regular flow of disclosure of periodic and ongoing regulated information and the dissemination of such information to the public. Regulated information consists of financial reports, information on major holdings of voting rights and information disclosed pursuant to the Market Abuse Directive (2003/6/EC).
- Commission Communication on the CfE: EU regulatory framework for financial services of 23 November 2016
- Commission Staff Working Document on the Call for Evidence on EU financial services of 23 November 2016 to assess the cumulative effect of the new financial sector rules put in place since the crisis
- The Commission sets up an internal task force on FinTech
- Ministerial Declaration on eGovernment - the Tallinn Declaration ▸ https://ec.europa.eu/digital-single-market/en/blog/european-commission-sets-internal-task-force-financial-technology
- The Parliament has written a report on the influence of technology on the future of the financial sector ▸ http://www.europarl.europa.eu/oeil/popups/ficheprocedure.do?lang=&reference=2016/2243(INI)
- The Commission has launched a public consultation on FinTech ▸ https://ec.europa.eu/info/finance-consultations-2017-fintech_en
- The Commission set up an internal Task Force on Financial Technology ▸ https://ec.europa.eu/digital-single-market/en/blog/european-commission-sets-internal-task-force-financial-technology
- The Commission published a FinTech Action Plan ▸ https://ec.europa.eu/info/publications/180308-action-plan-fintech_en

REQUESTED ACTIONS

ACTION 1 Finalize the mapping of the present standardisation landscape, identify standardisation gaps, develop missing standards, APIs, interoperability services, and reference architectures based on new technologies (such as blockchain).

ACTION 2 Ensure EU level coordination on FinTech standardisation, with CEN/CENELEC, European Supervisory Authorities, Fora Consortia, Industry, and with Standards Setting Organisations (such as ISO). Also ensure proper coordination with Open Source Projects working on Blockchain.

ACTION 3 Develop one 'Regtech Data Dictionary' which is uniquely defined and provides a linking method between Regulation and Supervisory Reporting following the "define once" principle. The EU ISA² Programme Core Vocabularies methodology will be used as a guideline.

ACTION 4 Assessment of how harmonised data definitions (a 'Regtech Data Dictionary') could be used to further streamline and simplify the supervisory reporting process without compromising its objectives.

ACTION 5 Map existing supervisory reporting frameworks to the 'Regtech Data Dictionary'

ACTION 6 Create an external subject matter experts network on Supervisory Reporting, contributing to and validating the Regtech Data Dictionary'.

ACTION 7 Set up a governance structure to maintain the 'Regtech Data Dictionary'.

ACTION 8 ESMA shall continue extending the XBRL-based reporting (actually inline XBRL) of listed companies under the Transparency Directive. In this context, additional (i.e. yet uncovered) parts of the annual financial report and other regulated information of listed companies should be marked up. The taxonomy for these newly marked up parts should be developed in order to achieve standardisation at EU level.

ACTION 9 The Commission shall further explore possibilities of Standard Business Reporting in view of the implementation of the ESMA European Single Electronic Format to make company data comparable, transparent and accessible digitally to reduce administrative burdens, in regard to ACTION 8 and the Tallinn Declaration.

ACTION 10 The Commission encourages and will support joint efforts by market players to develop, by mid-2019, standardised application programming interfaces that are compliant with the Payment Services Directive and the General Data Protection Regulation as a basis for a European open banking eco-system covering payment and other accounts.

ACTIVITIES AND ADDITIONAL INFORMATION

RELATED STANDARDISATION ACTIVITIES

ISO AND IEC

ISO/TC 68 "Financial Services" develop standards in the field of banking, securities and other financial services, relevant to FinTech, with the following sub-committees:

- Financial services, security
- Securities and related financial instruments
- Core banking
- Reference data for financial services
- Information exchange for financial services

ISO/TC 68 is notably responsible for the development and maintenance of ISO 20022 "Financial services - Universal financial industry message scheme". Moreover, ISO/TC 68 has created a new Advisor Group: the FinTech Technical Advisory Group (TAG), to further engage with the FinTech community and provide response to the growing need for data and technology standards.

Furthermore, ISO/IEC JTC 1/SC 27 "IT Security techniques" develops standardization solutions relevant to FinTech, including generic methods, techniques and guidelines to address both security and privacy aspects.

EUROFILING

Eurofiling is a collaborative environment created in 2005, bringing together the public and private sector: Regulators, Supervisors, financial institutions, providers, academic and private individuals. The common theme is European and National regulatory reporting versus the financial ecosystem. Eurofiling's objective is to improve collaboration and awareness to leverage interoperability. The Eurofiling community gathers in "Workshops" dedicated to interoperability in dictionaries, data point modelling, reporting standards, taxonomies, related know-how, academic research, interchange of experiences, future changes, best practices and materials for supervisory reporting frameworks.

Eurofiling is governed by the Board of Eurofiling Foundation p.f.

Standardisation resources on Supervisory Reporting:
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.eurofiling.info.

CEN/WS XBRL

CEN/WS XBRL: CEN workshop on improving transparency in financial and business reporting, including CWA 16744-3:2014 (European DPM-based XBRL taxonomy architecture), CWA 16746-1:2014 (standard regulatory roll-out package for better adoption: XBRL supervisory roll-out guide) and CWA 16746-2:2014 (standard regulatory roll-out package for better adoption: handbook for declarers).

CEN

CEN established the CEN/BT WG 220 'Fintech' in May 2017 to notably map the present standardization landscape. The mapping will provide an opportunity to identify European, international and national standards and other initiatives related to Fintech, with the potential to release growth and innovation in the financial sector, evaluate their market impact and facilitate new paths to increase the competitiveness of the Fintech sector. CEN will further engage with financial services and insurance industries, Fintech start-ups and technology developers to define a comprehensive analysis of Fintech-related topics.

In the follow-up to this study, CEN will look into new standards and supporting protocols for the broad adoption and use of new technologies which contribute to the establishment of industry, consumer and market confidence.

ITU-T

ITU-T Focus Group on Digital Financial Services (FG DFS) for Financial Inclusion (FG-DFS) closed in December 2016 with 85 policy recommendations and 28 supporting thematic reports.

In May 2017, ITU-T created a new Focus Group on Digital Currency including Digital Fiat Currency (FG DFC): ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://itu.int/en/ITU-T/focusgroups/dfc

and a new Focus Group on Application of Distributed Ledger Technology (FG DLT): ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://itu.int/en/ITU-T/focusgroups/dlt

In September 2017, ITU-T SG17 started new work on Security framework of open platform for FinTech services: ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://itu.int/en/ITU-T/studygroups/2017-2020/17

XBRL INTERNATIONAL

Base specifications and related resources:
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.xbrl.org/
XBRL International is currently developing a syntax-independent version of XBRL: the open information model. This will facilitate the exchange of information between different systems, without loss of the agreed semantics.

XBRL EUROPE

XBRL Europe is a non-profit organization and has been set up to foster European XBRL efforts and to implement and share common XBRL projects between its members and to liaise with European authorities and organizations. XBRL Europe has existing working groups on:

- supervisory reporting (Corep/Finrep)
- SBR (tax, annual reports, statistics)

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://xbrleurope.org

IFRS

International Financial Reporting Standards taxonomies and related resources: ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.ifrs.org/XBRL/Resources/Pages/Resources.aspx

IASB

International Financial Reporting Standards taxonomies and related resources: ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.ifrs.org/XBRL/Resources/Pages/Resources.aspx

ADDITIONAL INFORMATION

XBRL allows governments, regulators, institutions, private sector, etc. to build vocabularies and rules (called taxonomies) to report on different subjects, like the financial position, performance and economic viability of businesses, sustainability, gov-to-gov reporting, mortgage reporting and so on. XBRL permits the publication of structured digital financial reports, specifically matching predefined taxonomies. These may then be processed and retrieved by market participants, including analysts, supervisors, enterprise regulators, tax offices, clients, suppliers, creditors and investors.

The Netherlands standard business reporting (SBR) program, using XBRL taxonomies for business-to-government (tax-filings, annual accounts, statistics), business-to-business (especially Banks) and government-to-business interactions: see ▸ http://www.sbr-nl.nl/english/.

BLOCKCHAIN AND DISTRIBUTED DIGITAL LEDGER TECHNOLOGIES

POLICY AND LEGISLATION

POLICY OBJECTIVES

Blockchain has great potential in providing an infrastructure for trusted, decentralised and disintermediated services beyond the financial sector. Blockchain venture capital funding reached $496m in 2016.[1] The financial sector can count on more than 160 blockchain pilot projects (e.g. 28 of the top 30 banks are engaged in blockchain proofs-of-concept).

While the FinTech industry has been an early adopter because of its early awareness of bitcoin, blockchain will benefit many other industries. It is considered a foundational technology that some compare to the raise of the Internet in the early 90s. More than a technology, it could lead to a major political innovation by redefining the way we operate transactions, access information and share data (e.g. empowering patients to securely share e-health records and decide who to grant access to their data).

Blockchain is a promising technology to share data and manage transactions in a controlled manner, with many possible applications to deliver social goods in the field of eHealth and eGovernment, health records, land registries or the security certification of links in an Internet of Things chain of devices, manage intellectual property rights and eID.

It has also great potential for the private sector, in trading, contracting, supply chain management, traceability along industrial supply chains (e.g. on social & environmental conditions of work, on material composition or on the maintenance history of the item) and much more. It may also transform the governance of private organisations and of companies (concept of Decentralised Autonomous Organisation - DAO), and hence impact labour rights. Furthermore, from a regulatory and supervisory point of view, it can provide regulators with the same view into the data as the companies they're regulating, thereby reducing fraud and compliance costs.

However, this process is hindered by a lack of harmonisation and interoperability that constitute obstacles to cross border and cross sector transactions. The responsibility for public policy-makers would be to support innovation within a safe and future-proof technological and regulatory environment, ensuring appropriate transparency, accessibility, monitoring and governance

In the context of a DSM where the amount of online transactions and data is exploding, setting the right conditions for the advent of an open, trustworthy, transparent, compliant and authenticated transaction system is a real challenge for the EU. Existing decentralised environments lack trust, accountability, interoperability, regulatory certainty and mature governance models.

The European Commission has launched on 1st February 2018 an European Observatory and Forum on Blockchain technologies is planned in 2017, to map and monitor developments, build expertise and promote use cases, also regarding standards and interoperability.

EC PERSPECTIVE AND PROGRESS REPORT

The Commission has established a liaison A with ISO Technical Committee 307 on Blockchain and Distributed Ledger Technologies in order to engage in and contribute to the development of the future standards. A policy workshop on blockchain standardisation has been organised on 12 and 13 of September 2017. The EC will also engage and follow the works of the ITU-T Focus Group on Application for Distributed Ledger Technologies.

REFERENCES

- Mid-Term Review on the implementation of the Digital Single Market Strategy, COM(2017) 228 final ▸ https://ec.europa.eu/digital-single-market/en/news/digital-single-market-commission-calls-swift-adoption-key-proposals-and-maps-out-challenges
- EU Blockchain Observatory and Forum ▸https://ec.europa.eu/digital-single-market/en/news/european-commission-launches-eu-blockchain-observatory-and-forum

REQUESTED ACTIONS

ACTION 1 Taking into account the results from the observatory, the standardisation community to analyse possible standardisation needs and reflect on best way to achieve them.

ACTION 2 Publish a white paper on EU perspective on blockchain standardisation.

ACTION 3 Identify use cases which are relevant for the EU and submit them to the standardisatoin process (ISO TC307 and ITU-T FG DLT).

ACTIVITIES AND ADDITIONAL INFORMATION

RELATED STANDARDISATION ACTIVITIES

ISO

ISO/TC 307: Blockchain and distributed ledger technologies: ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://www.iso.org/committee/6266604/x/catalogue/

See the March 2-17 Roadmap for Blockchain Standards contributed to the TC by its secretariat, Standards Australia ▸ www.standards.org.au/OurOrganisation/News/Documents/Roadmap_for_Blockchain_Standards_report.pdf

TC 307 has under development a draft document ISO/AWI 22739: "Blockchain and Distributed Ledger Technologies -- Terminology and Concepts."

IEEE

IEEE has standards and pre-standards activities relevant to blockchain, including a new standards working group on developing a blockchain framework to address IoT security, as well as a pre-standardization project on digital inclusion and agency, which leverages blockchain technology. ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://standards.ieee.org/develop/msp/blockchain.pdf

ITU-T

ITU's standardization activities in the field of distributed ledger technologies are manifold. In early 2017, the membership adopted a report of the ITU-T Focus Group on Digital Financial Services (FG DFS) on distributed ledger technologies and financial inclusion.
▸ http://itu.int/en/ITU-T/focusgroups/dfs/Documents/201703/ITU_FGDFS_Report-on-DLT-and-Financial-Inclusion.pdf

ITU established a new Focus Group on application of distributed ledger technology (FG DLT) with the aim to identify and analyse DLT-based applications and services; draw up best practices and guidance, which support the implementation of those applications and services on a global scale; and propose a way forward for related standardization work in ITU-T Study Groups. FG DLT will develop a standardization roadmap for interoperable DLT-based services, taking into consideration the activities underway in ITU, other standards developing organizations, forums and groups. Participation in FG DLT is open to any interested party, and the first meeting will take place in Geneva, 17-19 October 2017.
▸ http://itu.int/en/ITU-T/focusgroups/dlt

Meanwhile, ITU-T Study Group 20 (Internet of things (IoT) and smart cities and communities (SC&C)) has initiated work on a "Framework of blockchain of things as decentralized service platform" (provisional name: Y.IoT-BoT-fw)[1]. The proposed Recommendation will include a comparative analysis of blockchain advantages, contribute to how the blockchain-related technologies to improve IoT/SC&C applications and services (including IoT devices, processes and data), and study and provide relevant concept, characteristics, high-level requirements, framework, capabilities and use cases.
▸ http://itu.int/ITU-T/workprog/wp_item.aspx?isn=14099

Operating under SG20, ITU-T Focus Group on Data Processing and Management to support IoT and Smart Cities & Communities (FG DPM) has established a Working Group on Data sharing, Interoperability and Blockchain. Its deliverables will include technical reports providing an "Overview of IoT and Blockchain", "Blockchain-based Data Exchange and Sharing Technology", and "Blockchain Based Data Management"

▸ http://itu.int/en/ITU-T/focusgroups/dpm

ITU-T Study Group 16 (Multimedia) established a work item on "Requirements for distributed ledger services" (F.DLS).
▸ http://itu.int/ITU-T/workprog/wp_item.aspx?isn=14071

ITU-T Study Group 13 (Future networks, with focus on IMT-2020, cloud computing and trusted network infrastructures) established a work item on "Scenarios and capability requirements of blockchain in next generation network evolution" (Y.NGNe-BC-reqts).
▸ http://itu.int/ITU-T/workprog/wp_item.aspx?isn=14282

Following a successful workshop on "security aspects of blockchain", ITU-T Study Group 17 (Security) established in September 2017 a new Question 14/17 working on security aspects of distributed ledger technologies (DLT), see its terms of reference at
▸ https://itu.int/en/ITU-T/studygroups/2017-2020/17/Pages/q14.aspx

It has started work on Security architecture for DLT, security threats and requirements for digital payment services based on DLT, Security capabilities and threats of DLT, Security Services based on DLT, Privacy and security considerations for using DLT data in Identity Management, Security assurance for DLT and Security threats to online voting using DLT.

Finally, in the area of financial applications, a new ITU-T Focus Group on Digital Currency including Digital Fiat Currency (FG DFC) is expected to consider the use of distributed ledger technology to support digital fiat currency for financial inclusion. The Focus Group will investigate the network security and protocol requirements for DFC, security measures for prevention of counterfeiting as well as interoperability of digital fiat currency with other digital currencies and payment systems.
▸ http://itu.int/en/ITU-T/focusgroups/dfc/Pages/default.aspx

ITU has category-A liaison status with ISO TC307, and FG DLT, as well as ITU-T Study Groups working on DLT, intend to leverage this relationship.

W3C

W3C has formed a Blockchain Community Group, which is studying and evaluating technologies related to blockchain, and use-cases such as interbank communications.

IETF - IRTF

A proposed Research Group is forming in the IRTF on the topic of Decentralized Internet Infrastructure (DIN). The Decentralized Internet Infrastructure Research Group (DINRG) will investigate open research issues in decentralizing infrastructure services such as trust management, identity management, name resolution, resource/asset ownership management, and resource discovery. The focus of DINRG is on infrastructure services that can benefit from decentralization or that are difficult to realize in local, potentially connectivity-constrained networks. Other topics of interest are the investigation of economic drivers and incentives and the development and operation of experimental platforms. DINRG will operate in a technology- and solution-neutral manner, i.e., while the RG has an interest in distributed ledger technologies, it is not limited to specific technologies or implementation aspects.

More details of the DIN RG are available.

During the IETF 96 meeting, July 2016, a meeting on the topic of connected ledgers was held. "Moving digital assets (making payments) between accounts operating on different payment networks or ledgers is not possible in an open, inter-operable way. Interledger is a protocol stack for doing this (tranfering digital assets) over the Internet." Further details and minutes of the meeting are available. If it becomes a chartered IETF WG it would be relevant.

CEN CENELEC

A proposal has been submitteed to create of a CEN-CENELEC Focus Group on Blockchain and Distributed Ledger Technologies. The objective of the Focus Group would be to identify specific European needs (notably in the context of the GDPR), to map these needs with the current work items in ISO/TC 307 and to encourage further European participation in the ISO Technical Committee on Blockchain (ISO/TC 307).

ADDITIONAL INFORMATION

One direction of block-chains technology innovation in recent years was towards secure persistent public data, eliminating the need for initial trust among involved stake-holders. The potential impact of such a fully decentralized and trust-less distributed ledger is considered enormous.

The clarification and mutual definition of several aspects of block-chain technology (such as blockchain interoperability, governance, trust, security of BC and of the underlying cryptographic mechanisms, BC compliance to legislation, impact of BC on different sectors, etc) are crucial prerequisites to introducing the technology to society .

[1] CoinDesk's State of Blockchain 2017 Report as cited by Bradley Miles, 6 Trends From CoinDesk's New 2017 State of Blockchain Out Today, 6 March 2017

SUSTAINABLE GROWTH

SMART GRIDS AND SMART METERING

POLICY AND LEGISLATION

POLICY OBJECTIVES

The energy domain is entering an era of considerable changes, mainly driven by two major factors: the energy system becomes consumer-centric and the digital transformation of the energy sector is ongoing.

The first factor stems from energy itself and could be summarised as stakeholders becoming smarter. And this is not just about energy traders, producers and network operators trying to do their business more clean and efficient. Important policy milestones for this transformation are the EU's energy and climate targets for 2030 which also underpin Europe's leading role in the fight against climate change: at least 40% domestic reduction in greenhouse gas emissions compared to 1990, at least 27% for the share of renewable energy consumed in the EU, at least 27% improvement of energy efficiency and an electricity interconnection target of 10%. In this context, the electricity networks have a central role to play. In 2012, electricity represented 22% of the EU's energy consumption with renewables making up a share of 24% of gross production i.e. almost a 3% increase on 2011, and will grow up to 50% in 2030[8], in line with the 2030 energy and climate goals and with the Paris Agreement.

Also, the consumer position in the energy value chain is very different now compared to what it used to be. The consumer is not the passive end ring in this chain anymore, paying numbly the bills of incumbent's utilities. Instead, all of a sudden, he/she has the opportunity to choose between many energy suppliers and service providers to obtain the best deal. Also he/she can opt for dynamic pricing and decide when to consume, i.e. when the prices are low. Furthermore, he/she can be really active player by providing services by himself/herself, e.g. flexibility to network operators when they ask either to increase or decrease consumption, if it is needed for system balancing or grid congestion management (demand response). And he/she can be also a (micro) generator itself- the prosumer.

The second factor is the digital transformation of the energy sector. Big Data and the Internet of Things, 5G and artificial intelligence, smart grids and smart meters, smart homes, smart storage and smart charging data sharing platforms, block chain will be key drivers for a successful digitalisation of energy. To succeed, we will need to build on achievement in the three pillars of the Digital Single Market – better access to digital goods and services, an environment where digital networks and services can prosper, and digital as a driver for growth. Energy and digital will come together most closely if we enable European companies to deliver energy intelligent products and services across Europe without undue restrictions and if the energy sector actively contributes to horizontal Digital Single Market policies. The single energy market and the digital single market must go hand-in-hand, as in reality they feed each other.

Smart grids are a clear example of digital meeting energy, as they are about information exchange and making necessary data available to interested parties. Smart grids will enable improved energy efficiency and the integration of vast amounts of Renewable Energy Sources (RES), decentralised generation and new loads such as electric vehicles; provide an opportunity to boost the retail market competitiveness and worldwide technological leadership of EU technology providers, and a platform for traditional energy companies or new market entrants such as ICT companies, including SMEs, to develop new, innovative energy services. That dynamic should enhance competition in the retail market, incentivise reductions in greenhouse gas emissions and provide an opportunity for economic growth.

EC PERSPECTIVE AND PROGRESS REPORT

Standards are needed to cover the communication needs of the grid management, balancing and interfacing with the millions of new renewable sources, as well as standards for the complex interactions of the new distributed energy market, and in special a transparent Demand Response scheme which is accessible for all consumers.

Communication standards will also be crucial for the deployment of electric cars and the building-up of smart cities. Harmonised communication protocols would provide standard components and interfaces giving 'plug-and-play' capability for any new entrant to the network, such as renewables or electric cars, or the use of open architectures based on global communication standards. To further promote interoperability, in addition to standardisation, testing and profiling should also be considered.

A major challenge is engaging the right stakeholders which need to be brought together to conduct the standardisation work taking into account that between smart grid management (of relevance to utility producers, the utility network operators) and smart consumption (involving the end consumer) a seamless environment should be established where interests are not identical and potentially conflicting.

The EC has been working towards interoperability of the solutions and standardisation for several years now. The main coordination reference for smart grids at European level is the Smart Grids Task Force, which was given the mission to advice the European Commission on policy and regulatory directions at European level and to coordinate the first steps towards the implementation of Smart Grids under the provision of the Third Energy Package. Nine DGs are participating: ENER and CNECT (co-chair), CLIMA, GROW, COMP, JUSTICE, JRC, RTD and SANTE, along with more than thirty associations representing all relevant stakeholders, from both sectors – energy and telecommunications, and more than 350 experts from national regulatory agencies and industrial market actors, as well as consumer associations and other relevant stakeholders.

At present mandate M/490 given to CEN-CENELEC-ETSI by the Commission in March 2011 can be considered as completed. In October 2014 the CEN/CENELEC/ETSI's Smart Grid Coordination Group produced the following reports and thus successfully completed the requirements of the M/490 mandate: Extended Set of Standards support Smart Grids deployment; Overview Methodology; General Market Model Development; Smart Grid Architecture Model User Manual and Flexibility Management; Smart Grid Interoperability and its tool; Smart Grid Information Security. The completion of this work was equally confirmed by the conclusions of the validation conference the Commission services organised on 26 February 2015 in Brussels, during which industry representatives confirmed their will to take over and implement the results of the Expert Group 1 work on standards.Consequently, EG1 of the Smart Grids Task Force assessed during 2016 the interoperability, standards and functionalities applied in the large scale roll out of smart metering in Member States and in particular the status of implementation of the required standardised interfaces and of the EC recommended[9] functionalities related to the provision of information to consumers. A report summarising the main findings was published in October 2015[5].

Currently the Task Force work is dedicated to the alignment of energy data formats and procedures with the aim to ensure interoperability and the development of network codes for demand-response, as well as cybersecurity. They are developing a comprehensive energy-sector strategy on how to reinforce the implementation of the NIS directive at energy sector level and also foster synergies between the Energy Union and the Digital Single Market agendas.

The coordination of standardisation efforts related to Smart Meters is in the hands of the Smart Meters Coordination Group, which was created when the European Commission issued the M441 mandate. This multi-stakeholder group overlooks the standardisation related to the Smart Metering Infrastructure. It has produced reference architecture (TR 50572), a glossary of terms, an overview of available standards, Smart Metering Use Cases and an overview of technical requirements including those for privacy and security. SG-CG is now CG-SEG: since end 2016, the CEN-CENELEC-ETSI Smart Energy Grid Coordination Group (CG-SEG) is the focal point and continue to cooperate with EC Smart Grids Task Force (EC SGTF).

In addition to the above, we are currently reviewing the EU Cyber Security strategy that will entail a proposal for the creation of a voluntary, flexible European Certification and Labelling Framework for ICT products and services (including for Internet of Things products and services).

Moreover, benefiting from valuable contributions from our stakeholders, the EC fostered the creation of a common interoperability language called SAREF (Smart Appliances REFerence ontology), which became a standard of ETSI and OneM2M (the Global initiative for Internet of Things standardisation) in 2015. This was a first step and we are now moving forward in order to fully enable, on a technical interoperability level, the smart grid and its demand-response mechanism.

Within the general framework of the Internet of Things and 5G, the EC is looking at all other communication aspects and needs of smart energy and including the necessary conditions in the development of said communication domains as well as aligning with the other domains such as automotive, health, smart cities, etc.

See also the work of the International Agency on Energy, particularly its recommendations in terms of interoperability[6].

REFERENCES

- *COM(2017) 228 final*: **Mid-Term Review on the implementation of the Digital Single Market Strategy - A Connected Digital Single Market for All**
- COM(2016) 861 Proposal for a revised electricity regulation
- COM(2016) 864. Proposal for a revised electricity Directive
- COM(2016) 862 Proposal for a new regulation on risk preparedness in the electricity sector
- Directive 2014/94/EU on the deployment of alternative fuels infrastructure
- Recommendation 2014/724/EU on the data protection impact assessment template for smart grid and smart metering systems
- COM(2014) 356 Benchmarking smart metering deployment in the EU-27 with a focus on electricity; and accompanying SWD(2014) 188 and SWD(2014) 189
- C (2013) 7243 Delivering the internal electricity market and making the most of public intervention; and accompanying SWD (2013) 442 Incorporating demand side flexibility, in particular demand response, in electricity markets
- Recommendation COM 2012/148/EU on preparations for the roll-out of smart metering systems
- COM(2012) 663 Making the internal energy market work
- COM(2011) 202 Smart Grids: from innovation to deployment
- COM(2010) 245 "A Digital Agenda for Europe": actions 71 & 73 address respectively minimum functionalities to promote smart grid interoperability and a common set of functionalities for smart meters and are directly related to the standardisation activities at CEN/CENELEC/ETSI.
- Directives 2009/72/EC and 2009/73/EC: Internal market in electricity and natural gas;
- Directive 2009/29/EC amending Directive 2003/87/EC so as to improve and extend the greenhouse gas emission allowance trading scheme of the Community;
- Directive 2009/28/EC of the European Parliament and of the Council on the Use of Energy from renewable sources.
- Consolidated version of Directive 2003/87/EC of the European Parliament and of the Council establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC[1]
- Mandates M/490[2], M/441[3] and M/468[7] from EU/EFTA to the ESOs
- COM(2015) 192: A Digital Single Market Strategy for Europe
- COM(2015) 339: Delivering a new deal for energy consumers
- Regulation (EU) 2016/679 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation)
- Regulation (EU) 2013/347 on guidelines for trans-European energy infrastructure
- Directive 2012/27/EU on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC
- COM(2016)176: ICT Standardisation Priorities for the Digital Single Market

REQUESTED ACTIONS

ACTION 1 Based on the successful development of smart grids standards at the end of 2014, in May 2017 the Commission has launched three stakeholder working groups (i.a. CEN/CENELEC experts) under the Smart Grids Task Force to prepare the ground for network codes on demand response, energy-specific cybersecurity and common consumer's data format. The Commission will report on the structure, scope and progress of the groups in December 2017 and final results by the end of 2018.

ACTION 2 The EC is developing a comprehensive energy-sector strategy on how to reinforce the implementation of the NIS directive at energy sector level and also foster synergies between the Energy Union and the Digital Single Market agendas. In addition to this, we are currently reviewing the EU Cyber Security strategy that will entail a proposal for the creation of a voluntary, flexible European Certification and Labelling Framework for ICT products and services (including for Internet of Things products and services).

ACTION 3 Benefiting from valuable contributions from our stakeholders, the EC fostered the creation of a common interoperability language called SAREF (Smart Appliances REFerence ontology), which became a standard of ETSI and OneM2M (the Global initiative for Internet of Things standardisation) in 2015. This was a first step and we are now moving forward in order to fully enable, on a technical interoperability level, the smart grid and its demand-response mechanism. This work is supported via an EC funded study, which delivered written results in the summer of 2017 and a live demo in the autumn. The results of the study will be incorporated in the standards along the full demand-side flexibility chain.

ACTION 4 European Catalogue of ICT Standards for Procurement – part on Energy (Efficient use of energy in buildings), The European Catalogue will offer a one-stop-shop for procurers on guidelines for procurement, including on vendor lock-in, on the use of standards, and a lifecycle costing scheme that accounts for the often ne-

glected interoperability costs. It will streamline the numerous guidelines and provide for a platform of exchange and dissemination. Use of standards in procurement is regulated by trade agreements and by EU legislation, but 12% of tenders do not respect rules. The European Catalogue lists standards that can be referred in procurement.

ACTION 5 CEN, CENELEC, IEEE and OASIS to foster their cooperation to ensure complementary parallel standardization efforts, to avoid serious conflicts between their respective standardisation deliverables. This action should notably be undertaken in the context of H2-type standards (the interface used for smart grid communication), distributed energy resources and the smart grids architecture model as developed under M/490.

List of included standards groups:

- Smart Grids
  - Smart grid security certification in Europe - Challenges and recommendations, December 2014
  - CEN-CENELEC-ETSI Coordination Group on Smart Energy Grids (CG-SEG)
    - Final reports of the CG-SEG under M/490 and its iteration;
      - "Set of Standards" and "Privacy and Security" CG-SEG reports https://www.cencenelec.eu/standards/Sectors/SustainableEnergy/SmartGrids/Pages/default.aspx
      - The Interoperability Tool (IOP-Tool) of the CG-SEG, which is an extremely useful tool for finding the standards used;
    - Building energy management system
    - Building automation and control systems (ISO)
  - Smart Meters
    - Interoperability, Standards and Functionalities applied in the large scale roll out of smart metering - European Smart Grids Task Force Expert Group 1 – Standards and Interoperability, October 2015
    - CEN-CENELEC-ETSI Coordination Group on Smart Meters (CG-SM)
      - Final reports of the CG-SM under M/411
      - CG-SM "Privacy and Security approach" reports ▸https://www.cencenelec.eu/standards/Sectors/SustainableEnergy/SmartMeters/Pages/default.aspx
      - CG-SM 2017 Work Programme ▸ftp://ftp.cencenelec.eu/EN/EuropeanStandardization/Fields/EnergySustainability/Management/SmartMeters/Workprogramme2017.pdf
    - European Commission Office for Infrastructure and Logistics – Manual Of Standard Building Specifications

ACTIVITIES AND ADDITIONAL INFORMATION

RELATED STANDARDISATION ACTIVITIES

On the level of technical standardisation and coordination of work, CEN and CENELEC (notably through the CEN-CENELEC-ETSI Coordination Group on Smart Energy Grids), IEEE and OASIS will foster their collaboration including identifying whether there are serious conflicts between their respective standardisation deliverables which may have a negative impact on interoperability and the market adoption of smart grid solutions. This especially concerns the relation between H2-type standards (notably EN 50491-12-1), the EN IEC 61850 series (Distributed Energy Resources), EN IEC 62746, EN IEC 61689-5, EN IEC 62325 with IEEE Std 2030.5-2013 and OASIS OpenADR.

STANDARDS DEVELOPMENT

CEN, CENELEC, ETSI

At present mandate M/490 given to CEN-CENELEC-ETSI by the Commission in March 2011 can be considered as completed. The main outcomes are available at: ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.cencenelec.eu/standards/Sectors/SustainableEnergy/SmartGrids/Pages/default.aspx

The three ESOs have agreed to continue their collaboration in relation to smart grids following the completion of the work under the standardisation request, under the CEN-CLC-ETSI Coordination Group on Smart Energy Grids (CG-SEG). This group will focus on security and interoperability, follow up new developments in the field of smart grids, and actively promote the results of its work at European and international levels.

In this context, two reports have been prepared by the CG-SEG to maintain transverse consistency and promote continuous innovation in the field of Smart Grids:

Set of Standards report ▸ ftp://ftp.cencenelec.eu/EN/EuropeanStandardization/Fields/EnergySustainability/SmartGrid/SmartGridSetOfStandards.pdf: The Smart Grid Set of Standards report is the new release of the original "First set of standards" and proposes an updated framework of standards which can support Smart Grids deployment in Europe. It provides a selection guide setting out, for the most common Smart Grid systems the relevant set of existing and upcoming standards to be considered, from CEN, CENELEC, ETSI and further from IEC, ISO, ITU or even coming from other bodies when needed. It also explains how these are able to be used, where, and for which purpose. Standardization gaps have been identified and the related standardization work program has been defined. The results of these activities will be included in future releases of this report.

Cyber Security and Privacy report ftp://ftp.cencenelec.eu/EN/EuropeanStandardization/Fields/EnergySustainability/SmartGrid/CyberSecurity-Privacy-Report.pdf: In this report, security standardization specific to Smart Energy Grid and security standardization targeting generic standards are further monitored and analysed with the focus on two specific use cases: decentralized energy resource (DER) and substation automation. It shows the applicability and interrelationship between these two groups of standards. Furthermore, the Smart Grid Information Security approach has been followed to show the applicability of different standards on the selected, specific use cases for Smart Energy Grid deployments.

Regarding electromobility, a work programme and a list of relevant standards for the charging of electric vehicles was last updated in November 2014. Regarding charging points for electric vehicles of interest to the eMobility coordination group, and in support of the implementation of the alternative fuels infrastructure Directive 2014/94/EU, a new standardisation request was issued to the ESOs in March 2015. ETSI and the oneM2M Partnership project are active in the area of machine-to-machine (M2M) with some relation to smart grids. ETSI is also developing radio technologies for wireless interconnection in home automation networks with applications such as smart metering and energy control in the scope of the technology.

CENELEC

CLC/TC 57 'Power systems management and associated information exchange' develops European standards, in collaboration with the IEC, for power systems control equipment and systems including EMS (Energy Management Systems), SCADA (Supervisory Control And Data Acquisition). CLC/TC 57 is providing amendments to the ENs on 'Communication networks and systems for power utility automation' (EN 61850 series). CLC/TC 57 will also publish European Standards related to the Application integration at electric utilities (prEN 61968 series), energy management system application program interface (EMS-API) (prEN 61970 series) and on Power systems management and associated information exchange (EN 62351 series).

CLC/TC 205 'Home and Building Electronic Systems (HBES)' is responsible for the development of the EN50491 series "General requirements for Home and Building Electronic Systems (HBES) and Building Automation and Control Systems (BACS)", and notably EN 50491-11 "Smart Metering. Application Specifications. Simple External Consumer Display"

In 2018, CLC/TC 8X (System aspects of electrical energy supply) will continue the development of the EN 50549 series (on Requirements for generating plants to be connected in parallel with distribution networks). The standards developed under that series are important as they could be used as a technical reference for connection agreements between Distributed Networks Operators and electricity producers. In addition, these standards are supporting the Commission Regulation 2016/631/EU (Requirements for Generators). CLC/SR 118 'Smart Grid user interface' will publish European Standards on "Systems interface between customer energy management system and the power management system" (prEN 62746-10-1 and -10-3).

CLC/TC 82 'Solar photovoltaic energy systems', CLC/ 88 'Wind turbines' and CLC/SR 117 'Solar thermal electric plants' will continue to develop European Standards on Electric Generation, in close collaboration with the IEC.

CLC/TC 38 will continue to maintain the EN 61689 series on Instrument transformers.

CLC/TC 17AC is responsible for the maintenance of the EN 62271 series on High-voltage switchgear and control gear.

CLC/TC 13 'Electrical measurement and control' will finalize the revision of the standards on electricity metering equipment and electricity metering data exchange.

CLC/TC 59X 'Performance of household and similar electrical appliances' is responsible for EN 50523:2009 'Household appliances interworking'

CLC/TC 85X develops, in collaboration with the IEC, European Standards for equipment and systems for measuring, testing, monitoring, generating, and analysing simple and complex electrical and electromagnetic quantities, as well as their calibrators. In 2018, CLC/TC 85X will further develop European Standards on Electrical Safety in Low Voltage distribution systems and on Electrical Test after repair of electrical equipment. These standards will apply with the aim to preserve the quality and safety as well as to avoid overheating and malfunction of power supply and the connected equipment.

CEN

CEN/TC 92 (Water meters), CEN/TC 176 (Heat meters) and CEN/TC 237 (Gas meters) develop standards in response to the Standardization Request (M/541) in the frame of Directive on Measuring Instruments (2014/32/EU), relevant to Smart Grid standardization. In 2018, these technical committees will finalize the revisions of standards on the following topics:

CEN/TC 92 – the series on water meters for cold potable water and hot water;

CEN/TC 176 – the series on heat meters

CEN/TC 237 – the standard on ultrasonic domestic gas meters

CEN/TC 294 'Communication systems for meters' deals with the standardization of communication interfaces for systems and remote reading of meters for all kind of fluids and energies distributed by the energy network. CEN/TC 294 will complement the EN 13757 series with standards on Wired and Wireless M-Bus communication, Application protocols and Transport and security services.

IEC

IEC has a number of technical committees dealing with smart grids and smart metering:

TC 8: Systems Aspects for Electrical Energy Supply
SC 8A: Grid Integration of Large-capacity Renewable Energy (RE) Generation
SC 8B: Decentralized electrical energy systems
TC 13: Electrical Energy Measurement and Control (including Smart Metering)
TC 57: Power Systems Management and Associated Information Exchange
PC 118: Smart Grid User Interface
TC17: High-voltage switchgear and controlgear
TC23: Electrical Accessories
TC 23/WG12: Home and Building Electronic Systems (HBES)
TC38: Instrument transformers
TC 57: Power Systems Management and Associated Information Exchange
TC64: Electrical installations and protection against electric shock

TC65: Industrial-process measurement, control and automation
TC69: Electric road vehicles and electric industrial trucks
TC82: Solar photovoltaic energy systems
TC85: Measuring equipment for electrical and electromagnetic quantities
TC88: Wind energy generation systems
TC95: Measuring relays and protection equipment
TC120: Electrical Energy Storage (EES) Systems
TC121: Switchgear and controlgear and their assemblies for low voltage
JTC1: Information technology

The IEC Strategic Group 3 on Smart Grid has been disbanded but the drafted smart grids system roadmap is still available from: ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.iec.ch/smartgrid/downloads/sg3_roadmap.pdf. The IEC SyC Smart Energy will publish a new version of the Smart Grid roadmap as IEC 63097/TR/Ed1.

Systems committee on smart energy (SyC Smart Energy) provides systems level standardisation and coordination in the areas of smart grids and smart energy, including interactions in the fields of heat and gas. ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.iec.ch/dyn/www/f?p=103:186:0::::FSP_ORG_ID,FSP_LANG_ID:11825
The IEC smart grid mapping tool provides a graphical and interactive overview of all smart grid related standards: ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://smartgridstandardsmap.com/

ISO/IEC JTC 1

ISO and IEC have started the review of ISO/IEC TR 27019:2013 'Information technology - Security techniques-- Information security management guidelines based on ISO/IEC 27002 for process control systems specific to the energy utility industry'. ISO/IEC TR 27019:2013 provides guiding principles based on ISO/IEC 27002 for information security management applied to process control systems as used in the energy utility industry.

IEEE

The standardization work of IEEE not only covers ICT but also aspects of electrical power generation and distribution, including demand response, renewable energy sources, security, reliability, and systems engineering. ICT standards work in Smart Grid includes:

- - Smart Grid Interoperability: The IEEE 2030 series is based on an interoperability reference model that defines data flows for reliable, secure, bi-directional flow of electric power and identifies the necessary communication infrastructure, incl. for electric vehicles.
- - Networking and Communications: The IEEE 1901 series of standards addresses broadband/narrowband over powerline; the 802 family of standards addresses many other aspects of networking.
- - Cyber Security for Smart Grid: Multiple standards addressing cybersecurity for Intelligent Electronic Devices (IEEE 1686), Substation Automation (IEEE C37.240, IEEE 1711 series).
- - Smart Metering and Demand Response: Multiple standards including IEEE 170X series and IEEE 1377 for communication protocols, 2030.5 for smart energy profiles, and IEEE 1901 series for smart metering functionality.
- - Substation Automation: Standards include time protocol, synchronization work, and electric power system communication, such as IEEE 1815 (DNP3), IEC/IEEE 61850-9-3, IEEE C37.238, IEEE C37.118 series, etc.

For a list of these and other IEEE standardization activities on Smart Grid, please see: ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://standards.ieee.org/develop/msp/smartgrid.pdf

ITU-T

The ITU smart grid focus group completed its work in December 2011 and adopted deliverables at ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://itu.int/en/ITU-T/focusgroups/smart. The work was taken over by ITU-T SG15, which leads and coordinates this issue within ITU and with other organizations. ITU-T SG15 developed standards on power line communication (PLC, Recommendation ITU-T G.990x-series), which is one of the most important technologies for smart grid.

ITU-T SG5 is working on topics related to achieving energy efficiency and smart energy and is also working on the development of Recommendations on the characterizations and specifications of the energy storage evaluation and power system configurations, architectures and cable distributions of the DC or hybrid AC and DC power feeding system that may include renewable energy and interconnection to smart grids or smart energy solution.

ITU-T SG13 developed Recommendation ITU-T Y.2070 "Requirements and architecture of the home energy management system and home network services", and Recommendation ITU-T Y.2071 "Framework of micro energy grid". In addition, SG13 is working on the distributed and virtualized energy storage systems and energy sharing and trading platform.
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.itu.int/itu-t/workprog/wp_item.aspx?isn=13977

Detailed information is described in the document "smart grid standardisation overview and work plan" developed by ITU-T SG15 and available at
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.itu.int/en/ITU-T/studygroups/Pages/sg15-sg.aspx

ITU-T SG17 started approval of Security guidelines for home area network (HAN) devices in smart grid systems and has ongoing work on Security guidelines for smart metering services in smart grid.

ITU-T SG20 is working on topics related to e/Smart services, applications and supporting platforms and is currently working on the development of a Recommendation on "Application model for energy services on multiple microgrids" This draft Recommendation will provide application model including overview architecture of multiple microgrids energy system, classification of the energy services, requirements and operating procedures for the energy services.

OASIS

OASIS developed a series of transactive energy standards for smart grid information, energy supply transactions and monitoring which have been adopted by some regulators as model specifications for open energy markets.

See OASIS Energy Interoperation: ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://www.oasis-open.org/committees/energyinterop OASIS Energy Market Information Exchange (eMIX): ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://www.oasis-open.org/committees/emix OASIS Web Services Calendar (WS-Calendar): ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://www.oasis-open.org/

committees/ws-calendar OASIS Open Building Information Exchange (oBIX): ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://www.oasis-open.org/committees/obix.

The Open Charge Alliance launched a project at OASIS for standardising their OCPP protocol for certain data transfers used in electric-vehicle-to-grid-to-payment transactions, in open source EV charging station networks: ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://www.oasis-open.org/committees/OCPP

IETF

RFC6272 identifies the key infrastructure protocols of the internet protocol suite for use in the smart grid. The target audience is those people seeking guidance on how to construct an appropriate Internet Protocol Suite profile for the smart grid. In practice, such a profile would consist of selecting what is needed for smart grid deployment from the picture presented here. The EMAN WG ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://datatracker.ietf.org/wg/eman/charter/ has produced several specifications for an energy management framework, for power/energy monitoring and configuration. See ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://datatracker.ietf.org/wg/eman/documents/. The framework focuses on energy management for IP-based network equipment (e.g. routers, switches, PCs, IP cameras, phones and the like).

Many of the IETF working groups listed under section internet of things are developing standards for embedded devices that may also be applicable to smart grids.

NIST

The US government sponsored a Smart Grid Interoperability Panel from 2009-2012 to spur cooperative industry and public agency development of open data standards for smart grid functionality: ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.nist.gov/smartgrid/priority-actions.cfm. In 2013, the management of this project was turned over to industry stakeholders as a continuing standards cooperation project: ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://sgip.org/

JISC

Japanese Industrial Standards Committee (JISC) roadmap for international standardisation for smart grid.

SGCC

The State Grid Corporation of China (SGCC) Framework. A lot of further national activities and roadmaps could be mentioned as well, such as those of Austria, Spain, the United Kingdom, the Netherlands, France, Korea and others.

KNX

KNX Association is a non-profit-oriented organization. Members are manufacturers developing devices for several applications for home and building control based on KNX like lighting control, shutter control, heating, ventilation, air conditioning, energy management, metering, monitoring, alarm/intrusion systems, household appliances, audio/video and lots more. Next to manufacturers, also service providers (utilities, telecom, etc.) can become a member of the KNX Association.

KNX is approved as an International Standard (ISO/IEC 14543-3) as well as a European Standard (CENELEC EN 50090 and CEN EN 13321-1) and Chinese Standard (GB/T 20965) for Home and Building Control.

Demand Side Management white paper: ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://www.knx.org/media/docs/downloads/Marketing/Flyers/KNX-Demand-Side-Management-White-Paper/KNX-Demand-Side-Management-White-Paper.pdf Smart Metering with KNX: ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://www.knx.org/media/docs/downloads/Marketing/Flyers/Smart-Metering-With-KNX/Smart-Metering-With-KNX_en.pdf

ADDITIONAL INFORMATION

Security, privacy and management of control of the access to and ownership of data are essential for the development of smart grids. Without wide acceptance by commercial users and consumers, the role of smart grids would be limited to specific vertical markets only.

Mechanisms that allow users and providers to negotiate optimised usage, including planning and scheduling of availability and use of energy resources are addressed by CG-SEG and covered by CLC TC205 and CLC/TC 57.

- The part of the grid inside the home domain is also an element that has a significant impact on energy efficiency. Several elements are needed: local protocols for home automation networks; a multidisciplinary standardised approach covering all aspects of the problem, from application semantics to indoor interconnection wired or wireless technologies; An extensive semantic-level for building (and possibly applicable for home) already exists and is provided by CENELEC TC 205 within the EN 50491 series.
- Applications such as lighting and energy control, appliances control, power monitoring, smart metering and buildings energy management; provision of elements for a global solution on smart appliances and home energy control, such as suitable radio protocols for indoor coverage.

[1] http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX-:02003L0087-20140430
[2] https://ec.europa.eu/energy/sites/ener/files/documents/2011_03_01_mandate_m490_en.pdf
[3] Standardisation mandate in the field of measuring instruments for the development of an open architecture for utility meters involving communication protocols enabling interoperability.
[4] Commission Recommendation 2012/148/EU
[5] https://ec.europa.eu/energy/en/topics/markets-and-consumers/smart-grids-and-meters/smart-grids-task-force
[6] https://www.iea.org/publications/freepublications/publication/smartgrids_roadmap.pdf
[7] https://ec.europa.eu/energy/sites/ener/files/documents/2010_06_04_mandate_m468_en.pdf
[8] SWD/2016/0412 final - 2016/0379 (COD). Evaluation of the electricity market design and security of supply
[9] Commission Recommendation 2012/148/EU

SMART CITIES / TECHNOLOGIES AND SERVICES FOR SMART AND EFFICIENT ENERGY USE

POLICY AND LEGISLATION

POLICY OBJECTIVES

Smart urban technologies can make a significant contribution to the sustainable development of European cities. 75% of the EU population lives in urban areas, a proportion that is growing as the urbanisation trend continues, both in Europe and worldwide.

A smart city is an entity that uses ICT effectively, to integrate the requirements of its urban community, in terms of energy and other utilities (production, distribution and use), environmental protection, mobility and transport, services for citizens (healthcare, education, emergency services etc.) and with proper regard for security, both of individuals and their personal data, and use it as a driver for economic and social improvements. This would also increase the deployment of smart technologies and solutions in rural communities, contributing to the development of businesses and creating conditions for making smart communities attractive to the population.

In standards terms, there are some over-arching requirements, concerning standards for the way cities are managed, for common terminologies, for citizens' interface with their local authority, etc. But mainly, smart city standards topics relate to the need to ensure commonalities —as far as these are appropriate and cost-effective— between the approaches taken by the different application areas, to enable the city to derive the best horizontal advantage from its overall approach and above all benefit from interoperability. The standards requirements as such for these application areas are specified in the Rolling Plan elsewhere at the appropriate points.

The core components in such a complex system are the frameworks that assist companies, cities and other actors to provide appropriate solutions that prioritise economic, social and environmental outcomes. Solutions should address the whole lifecycle, optimising environmental, social and economic outcomes through the seamless transfer of information.

EC PERSPECTIVE AND PROGRESS REPORT

The Commission has created the SCC EIP which as established a smart cities stakeholder platform, with ESO participation, and a high-level group advising the Commission. The high-level group released in early 2014 a strategic implementation plan (SIP) setting out a joint vision, a common target and proposals for implementation, which contain standardisation aspects.

Benefiting from valuable contributions from our stakeholders, the Commission fostered the creation of a common interoperability language called SAREF (Smart Appliances REFerence ontology), which became a standard of ETSI and OneM2M (the Global initiative for Internet of Things standardisation) in 2015. Since then a new version of the SAREF standard has been released that made SAREF modular and extensible via extensions. The initial SAREF became the first extension for Energy together with two more extensions (Buildings and Environment) and now a host of new extensions are in the pipeline (automotive, health, water, agriculture, etc.) turning SAREF into the IoT smart city ontology.

REFERENCES

- Strategic Implementation Plan, ▸ http://ec.europa.eu/eip/smartcities/files/sip_final_en.pdf
- COM(2012) 4701: Smart Cities and Communities — European Innovation Partnership
- COM(2017) 228 final: Mid-Term Review on the implementation of the Digital Single Market Strategy - A Connected Digital Single Market for All
- COM(2016) 176: ICT Standardisation Priorities for the Digital Single Market
- COM(2015) 192: A Digital Single Market Strategy for Europe
- COM(2016) 176 ICT Standardisation Priorities for the Digital Single Market
- IITU and UNECE "United for smart sustainable cities" (U4SSC) initiative to advocate for public policy to emphasize the importance of ICT in enabling the transition to smart sustainable cities.
- Spanish national plan on smart cities, with a governance model including an innovative advisory board on smart cities ▸ http://www.agendadigital.gob.es/planes-actuaciones/Paginas/plan-nacional-ciudades-inteligentes.aspx

REQUESTED ACTIONS

ACTION 1 Interoperability language with premises. CEN-CENELEC-ETSI smart cities and communities coordination group (SSCC-CG), working on five main objectives:

- promoting an enabling framework for smart cities;
- growing partnerships with key stakeholders;
- developing a reference point for the coordination of consistent smart city standardisation by ESOs;
- communicating and promoting standards on smart cities;
- assessing smart citizen-related standards

The initial phase of the SSCC-CG work had been completed towards end 2016, and an overview white paper from January 2015 is available[1].

SSCC-CG activities are taken over by the CEN-CENELEC-ETSI Sector Forum on Smart and Sustainable Cities and Communities (SF-SSCC). Moreover CLC/TC 205 HBES (Home and Building Electronic Systems) is working on data modelling in the standard series EN60491; in a first step for energy management in home and buildings; in a second step for interaction with the residential and building premises which will benefit to the management of premises within the smart cities architecture.

ACTION 2 An ETSI technical report is needed to clarify whether further standardisation is needed on citizen issues related to smart cities (e.g. on what, where, when etc.), and to take full account is taken of other standards activities under way. The TR would also support the other recommendations at policy level. The EIP SSC recommends to fully respect consumer privacy (EIP on SCC operational implementation plan, page 6) in support of the strategic smart city goals. The Commission and SETIS consider it essential for innovation to build trust, especially concerning energy data security and privacy (SET plan, December 2014, page 7.)

ACTION 3 Standards for the delivery of parcels and packages. SDOs to investigate on the possible optimisation of available ICT standards regarding the delivery of parcels and packages on the last mile. Due to the dramatically increasing e-commerce European cities are overwhelmed with parcel delivery trucks. The number of packages arriving at peoples' homes has increased exponentially over the last couple of years.

ACTION 4 Privacy issues: SDOs to check existing standards for account to the protection of individuals with regard to personal data processing and the free movement of such data. To ensure commitment to the public-interest nature of privacy and data protection, the ESOs should develop specific privacy by design compliant standards.

ACTION 5 The H2020 coordination and support action on smart cities and communities standards (Espresso): CNECT Objective SCC-03-2015 will contribute to standardisation activities, with the objective of building consensus that would lead to the development of the standards needed in this area. It works in close cooperation with the European Innovation Partnership on Smart Cities and Communities and its urban platform initiative.

ACTION 6 Smart city standardisation initiative (European innovation partnership (EIC) on smart cities and communities (SCC) memorandum of understanding (MoU) on urban platforms, EIP demand-side group on urban platforms, open & agile smart cities (OASC)): A concrete proposal is the OneM2M (global partnership project, with the participation of ETSI and other regional SDOs) standardisation process on smart city interoperability. It includes open APIs providing a lightweight and simple means to gather, publish, query and subscribe to reliable real-time urban context information, an interoperability framework/platform for the publication, management, discovery and consumption of urban data, and common data models/ontologies. This action will ensure the necessary standards specifications needed for a global market of open urban service platforms and applications, integrating other standards and complementing protocols and communication standards on lower levels. The work will cooperate with similar initiatives such as the EIP on SCC MoU on urban platforms; it will use the EU funded project Espresso, get high-level requirements from city-led initiatives such as the EIP SCC demand-side group on urban platforms and the global OASC initiative; and it will use these latter two city-led groups as control, advisory, promotion and scale mechanisms. Efforts are underway on several levels to align the work, output and goals of the European and international standards developing organisations and the other initiatives listed above.

ACTION 7 The H2020 coordination and support action on ICT/Energy vocabularies and ontologies (Ready4SmartCities): CNECT Objective ICT-2013.6.4 contributed to the standardisation organisations. There is an interest from the Horizon2020 Smart City Lighthouse projects to adopt the results of Ready4SmartCities. An easy consumable summary of the Ready4SmartCities outcome should be created to facilitate this adoption.

ACTIVITIES AND ADDITIONAL INFORMATION

RELATED STANDARDISATION ACTIVITIES

CEN, CENELEC, ETSI

The SSCC-CG has published a report at ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.cencenelec.eu/standards/Sectors/SmartLiving/smartcities/Pages/SSCC-CG.aspx and is now following up the recommendations, through a series of five specific activities. It proposes to lead in relation to the EIP action cluster on standards. It was proposed that the SSCC-CG activities will be taken over by the new CEN-CENELEC-ETSI Sector Forum on Smart and Sustainable Cities and Communities (SF-SSCC).

The SF-SSCC, created in January 2017, is a long-term joint group of the ESOs that acts as an advisory and coordinating body for the European standardization activities related to Smart and Sustainable Cities and Communities.

Coordination efforts by the SDOs, shown at the World Smart City Forum (July 2016 Singapore), further developed in 2017.

ETSI

ETSI has created a new Industry Specification Group on cross-sector Context Information Management (ISG CIM) for smart cities applications and beyond.

ISO, IEC

ISO Technical Committee 268 "'Sustainable development in communities" is directly working on smart city-relevant issues, including terminology, management systems and indicators.

ISO-IEC/JTC1 WG11 "Smart cities"

IEC Systems Committee (SyC) on Electrotechnical Aspects of Smart Cities has been created to foster the development of standards in the field of electrotechnology to help with the integration, interoperability and effectiveness of city systems (▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.iec.ch/dyn/www/f?p=103:186:0::::FSP_ORG_ID:13073).

IEEE

There are a number of available standards and active standards projects related to Smart Cities through its Smart Grids, IoT, eHealth, and other related topics. These standards and projects cover a broad spectrum of fields, including but not limited to digital information and controls technology, reliability, interconnection of distributed resources including renewable energy sources to the grid, sensors, electric metering, broadband over power line, and systems engineering. ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://standards.ieee.org/develop/msp/smartcities.pdf.

ITU-T

ITU-T FG-SSC developed 21 Technical Specifications and reports including a Technical Report on "Intelligent sustainable buildings for smart sustainable cities" and Technical Specifications on Setting the framework for an ICT architecture of a smart sustainable city". New ITU-T Study Group 20, which superseded FG-SSC, aims to guide cities in upgrading their traditional infrastructures and reimagining processes and models by integrating new digital technologies.

ITU-T SG20 has approved three Recommendations- ITU-T L.Y.4900: Overview of key performance indicators in smart sustainable cities, ITU-T Y.4901: Key performance indicators related to the use of information and communication technology in smart sustainable cities and ITU-T Y.4902: Key performance indicators related to the sustainability impacts of information and communication technology in smart sustainable cities. ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://itu.int/go/tsg20

ITU-T SG20 has determined new Recommendation ITU-T Y.4454 "Platform interoperability for smart cities"

ITU-T Study Group 5 approved (2015/10)ITU-T L.1440, a methodology to assess the environmental impact of ICT in cities, together with many stakeholders including the European Commission

IETF

The EMAN WG ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://datatracker.ietf.org/wg/eman/charter/ has produced several specifications for an energy management framework, for power/energy monitoring and configuration. See ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://datatracker.ietf.org/wg/eman/documents/. The framework focuses on energy management for IP-based network equipment (routers, switches, PCs, IP cameras, phones and the like).

A recently published standards track specification (RFC7603) presents the applicability of the EMAN information model in a variety of scenarios with cases and target devices. These use cases are useful for identifying requirements for the framework and MIBs. Further, it describes the relationship of the EMAN framework to other relevant energy monitoring standards and architectures.

Many of the IETF Working Groups listed under section 3.1.5 above are developing standards for embedded devices that may also be applicable to this section.

OASIS

Transformational Government Framework (TGF) Description: Models and practices for using IT to improve delivery of public services.

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://www.oasis-open.org/committees/tgf, ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://www.oasis-open.org/news/pr/new-british-smart-cities-specification-uses-oasis-transformational-government-framework

AENOR

Over 20 Spanish standards at AENOR's CTN 178 on e.g. platforms interoperability, open data in smart cities, smart ports, rural communities and smart tourist destinations, basis for ITU-T SG20 recommendations on these topics ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.aenor.es/descargasweb/normas/aenor-Spanish-standardisation-on-Smart-Cities-CTN-178.pdf

BSI

BSI's PAS 181:2014 Description: British Smart City Framework. A good practices framework for city leaders to develop, agree and deliver smart city strategies. Uses OASIS TGF (below).

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.bsigroup.com/en-GB/smart-cities/Smart-Cities-Standards-and-Publication/PAS-181-smart-cities-framework/

BSI has adopted and published the deliverables of the Demand-side group on Urban Platforms initiative of the European Innovation Partnership on Smart Cities and Communities:

Leadership Guide: a 'train read' document for city leaders (this now published under BSI logo)

Management Framework: helping integrate across the functional silos (published under BSI logo)

BSI, FUTURE CITIES

Cities Standards Institute (CSI) is a joint activity to develop a strong network of cities, companies and SMEs to develop the next stage of the BSI's Smart City Catapult Framework

DIN/DKE/VDE

The German Standardisation Roadmap Smart City
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://www.dke.de/resource/blob/778248/d2afdaf62551586a54b3270ef78d2632/the-german-standardization-roadmap-smart-city-version-1-0-data.pdf

The DIN PAS Reference Architecture adopted from the Reference Architecture deliverable of the Urban platform initiative of the European Innovation Partnership on Smart Cities and Communities and the ESPRESSO project is anticipated to be complete in summer 2017.

H2020 CITYKEYS

Following the SCC-02-2014 call of H2020, nine partners, among which five cities, developed the first public European framework for the performance measurement of smart cities and smart city projects. A set of around 100 key performance indicators (KPIs) and a framework of open-architecture, interfaces and standards help cities design, select, monitor, evaluate and promote smart city solutions. The smart city KPIs of CITYkeys were used by ETSI SDMC for the creation of TS 103 463, "Key Performance Indicators for Sustainable Digital Multiservice Cities". ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.citykeys-project.eu/

SEMANCO

For the first time developing a semantic energy information framework (SEIF) to model the energy-related knowledge planners and decision makers need

EESEMANTICS

Stakeholder group on energy efficient buildings data models. Building on the standards promoted by building smart alliance.

ADAPT4EE/ READY4SMARTCITIES

Activity related to eeSemantics: group is running a series of vocabulary camps addressing specific sub-areas.

HORIZON 2020 CALL SCC-03-2015

ESPRESSO

Development of system standards for smart cities and communities solutions.

The process for developing smart cities and communities standards should ensure the interoperability of solutions, i.e. the adaptability of solutions to new user requirements and technological change and the avoidance of entry barriers or vendor lock-in through promoting common metadata structures and interoperable/ open interfaces as opposed to proprietary ones, together with open and consistent data. It should making relevant data as widely available as possible —including to third parties for the purpose of applications development— while using common, transparent measurement and data collection standards to ensure meaningfulness and comparability of performance/outcome measurements.

INDUSTRY MEMORANDUM OF UNDERSTANDING ON URBAN PLATFORMS

Over 40 organisations from industry and research have signed a Memorandum of Understanding on interoperable urban platforms. The group is led by SAP and has already given detailed feedback on the requirements document from cities (demand-side group of the EIP SCC urban platform cluster) and is currently producing related technical specifications. They are working to develop a set of principles and a joint reference architecture framework to enable interoperability, scalability and open interfaces to integrate different solutions and to develop a joint data and service ontology to be used by individual Smart cities. And finally they are working to accelerate the adoption of the developed framework by standardisation bodies and other stakeholders.The deliverables of the group (and most notably the reference architecture) are part of a new PAS standard prepared by DIN, which will eventually be brought to the attention of ISO for adoption on international level.

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://ec.europa.eu/digital-single-market/en/news/memorandum-understanding-towards-open-urban-platforms-smart-cities-and-communities

DEMAND-SIDE GROUP (CITY-LED) ON URBAN PLATFORMS (WITHIN THE EUROPEAN INNOVATION PARTNERSHIP ON SMART CITIES AND COMMUNITIES)

A total of 95 cities — individual cities and two city networks — have already agreed to cooperate more strongly in the area of urban platform by signing a Letter of Intent. The group is working within the urban platforms cluster of the EIP on SCC. This group is led by London and has already produced a requirements document for smart city interoperability (urban platform), which is currently being tested. The requirements document is being used by the industry group of the MoU on urban platforms with EIP SCC to create a reference architecture framework and standards landscape. The members of the group are committed to implement commonly agreed open standard urban platforms and foster the deployment of smart city solutions.Two other deliverables of the demand-side group are:

- Leadership Guide: a 'train read' document for city leaders
- Management Framework: helping integrate across the functional silos
- BSI has adopted and published the latter two deliverables under the BSI logo.

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://eu-smartcities.eu/content/urban-platforms

OPEN & AGILE SMART CITIES (OASC)

City-led initiative to create a smart city market which addresses the complex needs of cities in the digital transition, especially interoperability, portability and comparability, in order to avoid vendor lock-in and to support local digital entrepreneurship. OASC consists of three technical mechanisms which are open and free. Launched in March 2015, a current total of 75 cities in 15 countries, mainly in Europe, have already committed on adopting the OASC principles, The OASC mechanisms are directly linked to the existing standardisation processes on national, European and international level, including the SSCC-CG.

▸ www.oascities.org

FUTURE INTERNET PUBLIC PRIVATE PARTNERSHIP

Specifications and technologies developed under the Future Internet Public Private Partnership programme (FP7) that can be used within the context of smart cities:

FIWARE NGSI is an API that provides a lightweight and simple means to gather, publish, query and subscribe to context information. This is an API for context information management. This information can be indeed open data and consumed through the queries and subscriptions APIs (NGSI10). This way, it is possible to publish real-time or dynamic data, typically well structured, and offer it as open data for the reuse by developers. For instance, it is possible to offer in real-time data from sensors or systems to leverage the creation of new applications.

FIWARE CKAN: Open data publication generic enabler. FIWARE CKAN is an open source solution for the publication, management and consumption of open data, usually, but not only, through static datasets. FIWARE CKAN allows to catalogue, upload and manage open datasets and data sources, while supports searching, browsing, visualising or accessing open data. FIWARE CKAN is an Open Data publication platform that is used by many cities, public authorities and organisations. ▸ www.fiware.org/

EUROCITIES AND GREEN DIGITAL CHARTER (GDC)

A strategic, city-led initiative aiming to improve cities and citizens' quality of life through the use of open and inclusive digital solutions. GDC is a EUROCITIES initiative launched in 2009 and currently signed by 52 major European cities. It works at the highest level with CEN/CENELEC SF-SSCC, ETSI SDMC, the MoU on urban platforms and OASC.

Apart from GDC, EUROCITIES works with its member-cities for "Data" and "Standards & Interoperability" through the two respective working groups of its Knowledge Society Forum, a networking and collaboration mechanism for more than 70 European cities.

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.greendigitalcharter.eu

H2020 CITYKEYS

Following the SCC-02-2014 call of H2020, nine partners, among which five cities, developed the first public European framework for the performance measurement of smart cities and smart city projects. A set of around 100 key performance indicators (KPIs) and a framework of open-architecture, interfaces and standards help cities design, select, monitor, evaluate and promote smart city solutions. The smart city KPIs of CITYkeys were used by ETSI SDMC for the creation of TS 103 463, "Key Performance Indicators for Sustainable Digital Multiservice Cities".

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.citykeys-project.eu/

H2020SMART CITIES LIGHTHOUSE PROJECTS

Following the decisions in the Strategic Implementation plan of the European Innovation Partnership on Smart Cities and Communities, a yearly Horizon2020 Smart Cities call for lighthouse innovation projects has been in place since 2014. The yearly budget is fluctuating, but it is in the ballpark figure of 100 M€/year and the funding of the individual calls is around 25 million per project. There are 12 lighthouse projects at the moment. Within each project there are three leading cities implementing smart city solutions in the areas of energy and transport with the help of ICT and a number of follower and observer cities that replicate the solutions developed for the leading cities. The projects are implementing among other things ICT urban platforms and are working together with their sister project ESPRESSO and the urban platform group within the EIP SCC to implement open-standards based interoperable platforms.

ADDITIONAL INFORMATION

There are already many activities going on around smart cities in various standards development organisations around the globe. Industry, therefore, welcomes that the Commission does not see a need to trigger further standards development at this point in time but relies on the industry initiatives which have started in organisations around the globe.

Broad coordination, including stakeholders, Member States, and the Commission, is important for making consistent progress in this area which covers a large field of sub-domains.

The Spanish Secretary of State has identified the need to establish certain requirements for city platforms to allow interoperability. This is an opportunity for specific European standardisation work which could be developed by CEN-CENELEC and ETSI.

[1] ftp://ftp.cencenelec.eu/EN/EuropeanStandardisation/Fields/SmartLiving/City/SSCC-CG_Short_Version_Report_Jan_2015.pdf

ICT ENVIRONMENTAL IMPACT

POLICY AND LEGISLATION

POLICY OBJECTIVES

ICT is currently one of the fastest growing greenhouse gas-emitting and energy management sectors.

At the level of ICT multiple methodologies are available to assess the environmental impact of ICT itself but they do not provide a consistent methodological framework for this assessment. A solution to this is the work developed in various European and International standardisation bodies such as ETSI, ITU-T, IEC, ISO and others, around methodologies to assess this environmental impact, currently focused on energy management including energy consumption and greenhouse gas (GHG) emissions, with the achievement of good consensus. This work is performed in collaboration with industry, standardisation bodies and public authorities. The criteria for measuring the impact of ICT on the environment will be extended to other environmental sectors, like water and raw materials.

A key challenge is achieving transparency around claims relating to the environmental performance of ICT products and services, and setting an effective basis to drive competition.

The Commission is looking at the environmental impact of ICT from various fronts:

- To analyse further the current situation of the ICT-sector and to consider possible options for future action, the Commission, DG CNECT, commissioned a study on the practical application of the new framework methodology for measuring the environmental impact of ICT (including a cost/benefit analysis for companies) and has organised, among other things, a workshop on policy measures, metrics, and methodologies in the context of environmentally-sound data centres.
  Full report: ▸ http://bookshop.europa.eu/en/study-on-the-practical-application-of-the-new-framework-methodology-for-measuring-the-environmental-impact-of-ict-cost-benefit-analysis-pbKK0114640/
  Executive summary: ▸ http://bookshop.europa.eu/en/study-on-the-practical-application-of-the-new-framework-methodology-for-measuring-the-environmental-impact-of-ict-cost-benefit-analysis-pbKK0114642/ and ▸ ▸https://ec.europa.eu/digital-agenda/news-redirect/17261
- With CNECT playing the chief editor role under ITU-T the "ICT in Cities methodology to assess the environmental impact of ICT at city level is now finished (▸ http://www.itu.int/rec/T-REC-L.1440-201510-P)
- With a life cycle approach (or cradle to grave), it provides:
  1. a basis to help cities take the right decisions as regards their ICT infrastructure and the relevant energy costs/environmental effects;
  2. a level playing field for industry to compete and innovate in providing the most sustainable solutions to cities.
- DG ENV launched an ongoing pilot on product environmental footprint on category rules. It is looking at various ICT products such as IT equipment, uninterruptible power sources (UPS) and batteries.
- DG GROW is looking at an ecodesign measure for enterprise servers that are found among others in data centers at potential ecodesign measures for enterprise servers and data storage devices, products that can be normally found in data centres or in server rooms. The definition of global key performance indicators (KPIs) is essential to this objective.

REFERENCES

- COM(2010) 245: A Digital Agenda for Europe, Key Action 12:
  - Assess whether the ICT sector has developed common measurement methodologies
  - Propose legal measures if appropriate Directives 2005/32/EC and 2009/125/EC on ecodesign of products
- Recommendation 2013/105/EC: Mobilising Information and Communications Technologies to facilitate the transition to an energy-efficient, low-carbon economy
- Directive 2012/27/EU on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC
- Directive 2010/31/EU of the European Parliament and of the Council on Energy Performance of Buildings
- Directives 1992/75/EC and 2010/30/EU on Labelling and Information
- Regulation (EU) No. 347/2013 on guidelines for trans-European energy infrastructure
- COM(2009) 7604: Recommendation (9.10.2009) on mobilising Information and Communication Technologies to facilitate the transition to an energy-efficient, low-carbon economy
- COM(2009) 519 final: Investing in the Development of Low Carbon Technologies (SET Plan)
- COM(2008) 30 final: 20 20 by 2020, Europe's climate change opportunity
- COM(2008) 241: Addressing the challenge of energy efficiency through Information and Communication Technologies
- Directive 2003/96/EC of the Council on Energy Taxation

REQUESTED ACTIONS

ACTION 1 Guidelines for the environmental footprinting of ICT networks, products or services.

ACTION 2 Guidelinesfor organisations' ICT footprint reporting.

ACTION 3 Definition of Global KPIs for Energy Management of Fixed and Mobile access, and Core networks

ACTION 4 Guidelines for the use of Global KPIs for Data Centres.

ACTION 5 Guidelines for the definition of Green Data Centres.

ACTION 6 Definition of Global KPIs for Data Services.

ACTION 7 Guidelines for the definition of Green Data Services.

ACTION 8 Definition and guidelines of KPIs for ICT networks

ACTIVITIES AND ADDITIONAL INFORMATION

RELATED STANDARDISATION ACTIVITIES

ESOS

Standardisation request M/462 on efficient energy use within broadband deployment was accepted by the ESOs to provide standards for measurement and monitoring, including definition of energy-efficient KPIs. This standardisation request is not only limited to networks but extends as well to data centres and other ICT nodes associated with broadband deployment. It is entering phase 2.

Energy and more general resource management in data centres is addressed by a cross-ESO coordination group (Coordination Group Green Data Centres – CG-GDC). This group monitors European and international standardisation for data centre resource management (including energy) and maintains a live executive summary of that activity.

▸ ftp://ftp.cencenelec.eu/EN/EuropeanStandardisation/HotTopics/ICT/GreenDataCentres/GDC_report_summary.pdf

CG-GDC encourages standardisation activity to support Commission objectives and has recently asked CENELEC to undertake the conversion of DG JRC best practices into a standards-based format. This represents a more general, and frequently updated, formulation of L.1300 mentioned below. In addition, CENELEC TC 215 is transcribing resource management KPI standards produced by ISO/IEC into European format.

CENELEC

TC 215 is responsible for a holistic series of ENs for the design, operation and efficiency of data centres (including KPIs) from a system point of view. Several CENELEC technical committees are responsible for energy efficient products deployed in data centres.

ITU AND ETSI

Starting at the level of `good, networks and services´, they have approved methodologies for environmental impact assessment. These will make it possible to assess in a transparent, qualitative, accurate and consistent way the footprint and other aspects of various products and services that are part of everyday digital life, such as email, telephone services, laptops, broadband access. In addition, companies, public bodies and other organisations will be able to assess and report their own ICT footprint based on ITU's "ICT in Organisation".

ITU and ETSI have also agreed a new standard to measure the energy efficiency of mobile radio access networks (RANs), the wireless networks that connect end-user equipment to the core network.

The standard (Recommendation ITU-T L.1330) is the first to define energy-efficiency metrics and measurement methods for live RANs, providing a common reference to evaluate their performance. Its application will build uniformity in the methodologies employed by such evaluations, in parallel establishing a common basis for the interpretation of the results

ITU

"L.Cities methodology" (Recommendation ITU-T L.1440): in which the footprint of ICT in cities and the city dimension of ICT projects and services are being considered. The Commission through CNECT H5 acted as chief editor.

ITU-T SG 5 has developed a series of standards aimed at reducing greenhouse gas emissions and energy consumption, including:

- ITU-T L.1300: Best practices for green data centres;
- L.1310: Energy efficiency metrics and measurement methods for telecommunication equipment;
- ITU-T L.1320: Energy efficiency metrics and measurement for power and cooling equipment for telecommunications and data centres;
- L.1340: Informative values on the energy efficiency of telecommunication equipment;
- L.1350: Energy efficiency metrics of base station site (consented);
- L.1430 : Methodology for assessment of the environmental impact of information and communication technology greenhouse gas and energy projects;
- L.1500: Framework for ICT and adaptation to the effects of climate change;
- ITU-T L.1501: Best practices on how countries can utilize ICTs to adapt to the effects of climate change:
- L.1502: Adapting ICT infrastructure to the effects of climate change;
- L.1503: ICT for climate change adaptation in cities

IEC

IEC TC 100/TA 13 deals with environmental aspects of audiovisual and multimedia equipment (in particular with the quantification methodology for greenhouse gas emissions of computers and monitors).
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.iec.ch/dyn/www/f?p=103:7:0::::FSP_ORG_ID,FSP_LANG_ID:7810,25

IEC TC23 WG9. This WG is responsible for a holistic view on energy efficiency within the scope of TC23.

ISO/IEC JTC 1

ISO / IEC JTC 1 SC 39 (Sustainability for and by Information Technology) working group 2 prepares guidance for the development of energy efficient ICT (excluding data centres).

Development of an International Standard for Server Energy Effectiveness Metric (SEEM)
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.iso.org/iso/standards_development/technical_committees/list_of_iso_technical_committees/iso_technical_committee.htm?commid=654019

IEEE

IEEE has standardisation activities that contribute to assessing and reducing the environmental impact of ICT such as the electronic product environmental assessment series, energy efficient Ethernet and a new "Green ICT" series of projects.
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://standards.ieee.org/develop/msp/envr.pdf.

ENERGY SAVING MEASURES

CENELEC

Other ongoing work includes EN50523:2009 Household appliances interworking

ISO

Energy model terminology is specified in

- ISO/IEC CD 13273 (Energy efficiency and renewable energy sources)
- ISO/DTR 16344 (Common terms, definitions and symbols for the overall energy performance rating and certification of buildings)
- ISO/CD 16346 (Assessment of overall energy performance of buildings)
- ISO/DIS 12655 (Presentation of real energy use of buildings)
- ISO/CD 16343 (Methods for expressing energy performance and for energy certification of buildings)
- ISO 50001:2011 (Energy management systems — Requirements with guidance for use).
- ISO/TC 257 General technical rules for determination of energy savings in renovation projects, industrial enterprises and regions` is currently working on a standard on "energy efficiency and savings calculation for countries, regions and cities" (ISO/CD 17742)

ITU-T

Report "Intelligent sustainable buildings for smart sustainable cities", which provides technical guidance on environmentally-conscious design, maintenance, repair and operating principles and best practices from construction through to lifetime use and decommissioning ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.itu.int/en/ITU-T/focusgroups/ssc/Documents/website/web-fg-ssc-0136-r6-smart-buildings.docx and other reports from the FG-SSC: ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.itu.int/en/ITU-T/focusgroups/ssc/Pages/default.aspx

DATA CENTERS

CEN/CENELEC/ETSI

Coordination Group Green Data Centres

CENELEC

TC215 is currently developing recommended practices for environmental sustainability to support the existing practices of energy management. Recognising that their EN 50600 series standards are now being used to assess data centres, TC215 is producing guidance to the application of the standards

ETSI

TC ATTM and former STF 439 working on the definition of Global KPIs for Energy Management of Data Centres

ETSI

ETSI's industrial specification group (ISG) operational energy efficiency for users (OEU) gathers ICT users from the whole industry (all sectors, e.g. aircraft factories, banks, insurances, energy providers) and issues position papers and referential specifications on global KPIs and implementation sustainable standardisation. These position papers are issued to support the development of needed standards by standardisation technical committees.

ISO / IEC JTC 1

ISO / IEC JTC 1 SC 39 (Sustainability for and by Information Technology) working group 1 deals with resource-efficient data centres, including the following tasks:

Development of a data centre resource efficiency taxonomy, vocabulary and maturity model

Development of a holistic suite of metrics and key performance indicators (KPI) for data centres

Development of guidance for resource efficient data centres

Development of an energy management system standard specifically tailored for data centres
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.iso.org/iso/standards_development/technical_committees/other_bodies/iso_technical_committee.htm?commid=654019

The ongoing standardisation activities by CEN/CENELEC/ETSI on data centres and other ICT nodes may be referenced in possible future legislation.

EUROPEAN COMMISSION

With the support of ICT companies, concluding the piloting of various methodologies for goods, networks, services & organisations. Elements such as compatibility and the workability of different standards have been assessed with a positive outcome regarding these two elements. The results can serve as an example, for ITU & ETSI in their common work to further align their methodologies for "goods, networks and services".

CLUSTER COLLABORATION

FP7-SMARTCITIES-2013

OBJECTIVE ICT-2013.6.2.

DATA CENTRES IN AN ENERGY-EFFICIENT AND ENVIRONMENTALLY FRIENDLY INTERNET

Define common KPIs and ratios (metrics) and methodology for measuring them, to characterize the energy & environmental & economic behaviour of data centres. Disseminate the results. Create a proper bidirectional communication channel between the Commission, the standardisation bodies and the cluster, in order to facilitate information sharing and to push a relevant shortlist of KPIs.

H2020 CITYKEYS

H2020 support action which coordinates projects in several cities piloting the L.Cities methodology (Recommendation ITU-T L.1440). Results of these pilots may provide feedback to improve the standard. The project piloted the L.Cities methodology (Recommendation ITU-T L.1440) in Tampere and Rotterdam. Results of these pilots can provide feedback to improve the standard.
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.citykeys-project.eu/

SEMANCO

For the first time developing a Semantic Energy Information Framework (SEIF) to model the energy-related knowledge planners and decision makers need.

EESEMANTICS

Stakeholder group on Energy Efficient Buildings Data Models. Building on the standards promoted by Building Smart Alliance.

WORKING GROUP ON ENERGY CONSUMPTION

In the area of smart appliances (white goods, HVAC systems, lighting, etc.) a working group has been established bringing together energy consuming and producing products (EupP) manufacturers and stakeholders with the objective of creating a roadmap towards agreed solutions for interoperability. Focus is communication with smart appliances at information level in smart homes. Long term perspective is M2M solutions in the context of IoT

EUROPEAN COMMISSION (GROW)

The guidebook "Stimulating industrial innovation in the construction sector through the smart use of ICT: connecting SMEs in digital value chains" (2012)

- provides a market analysis of the construction industry in terms of the current and foresight integration of ICT and eBusiness solutions and systems;
- develops a framework for digital value networks in the construction sector.

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://ec.europa.eu/growth/sectors/digital-economy/ebsn_en

H2020 ICTFOOTPRINT.EU

This support action is the European platform promoting the adoption of carbon footprint methodologies in the ICT sector. Among other activities it has mapped all standards related to ICT energy & environmental efficiency (EN, ETSI, IEC, ITU, GHG, etc.).

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://ictfootprint.eu/

JRC

JRC - Best Environmental Management Practice

This year, a document on Best Environmental Management Practice (BEMPs) for the Telecommunications and ICT services sector will be published, with references to various standards.

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://susproc.jrc.ec.europa.eu/activities/emas/telecom.html

EURECA

EURECA project

The "Data Center EURECA project" provides valuable information on "resource efficient procurement" of data centers.

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://www.dceureca.eu/

The impact will strongly depend on the uptake of these methodologies and associated regulation if defined. Once this point is clarified the progress could be measured in, for instance, the number of companies reporting their footprint calculated using these methodologies.

EUROPEAN ELECTRONIC TOLL SERVICE (EETS)

POLICY AND LEGISLATION

POLICY OBJECTIVES

The European electronic toll service (EETS), as required by Directive 2004/52/EC, will achieve interoperability of the electronic road toll systems in the EU. EETS involves two main stakeholders:

- Toll chargers, which operate either on behalf of the Member State or in the framework of a concession contract with the Member State, manage the infrastructure or levy the tolls for the circulation of vehicles on the network they manage.
- EETS providers, supplying drivers or road hauliers with the necessary equipment and services to access all EU tolled infrastructures and ensuring the payment to the toll chargers of the fees due for use of their network.
- Directive 2004/52/EC provides that Member States having electronic road toll systems are to ensure that operators offer the EETS to heavy goods vehicles at the latest three years after the entry into force of the decision defining EETS and to all other categories of vehicle at the latest five years after.
- In May 2017 the Commission introduced its proposals for a revision of Directive 2004/52/EC and Decision 2009/750/EC.

EC PERSPECTIVE AND PROGRESS REPORT

It is necessary to further develop standards allowing the effective assessment of key performance indicators, conformity to specifications, certification and suitability for use of EETS-related standards (by developing test standards).

REFERENCES

- Directive 2004/52/EC of the European Parliament and of the Council on the interoperability of electronic road toll systems in the Community;
- Commission Decision 2009/750/EC on the definition of the EETS and its technical elements;
- COM(2012)474: Implementation of the EETS.
- M/338[1] Standardisation request to CEN, CENELEC and ETSI in support of interoperability of electronic road toll systems in the EU

REQUESTED ACTIONS

ACTION 1 Technical standards support for EETS-related activities, e.g. references to standards in the forthcoming updating of the EETS Decision, support the preparation of the Recommendations for Use (incl. listing of applicable standards) by the Notified Bodies EETS Coordination Group, updating of the EETS Application Guide, assist the Electronic Toll Committee and the ITS-CG.

ACTION 2 Continuous review and update, when necessary, of technical standards that support the EETS. That includes improvement of technical standards based on feedback from actual implementation in tolling systems and maintaining consistency between these standards.

ACTION 3 Support the European Commission with advice and expertise in technical standards-related activities in the field of EETS and electronic tolling in general. Define more precisely appropriate transition arrangements between different version of technical standards supporting electronic tolling and EETS, in line with the requirements of proposed changes to Directive 2004/52/EC and Decision 2009/750/EC. Support the Notified Bodies Coordination Group in their activities defined in Article 18 of Decision 2009/750/EC, incl. the preparation of Recommendations for Use, incl. listing of applicable standards). Provide assistance to the Electronic Toll Committee and the Intelligent Transport Systems Coordination Group in matters related to technical standards for electronic tolling and EETS.

ACTION 4 Monitor and support relevant activities and update, when necessary, relevant technical standards to ensure long-term availability of DSRC tolling technology and improve its robustness against other radio technologies.

ACTIVITIES AND ADDITIONAL INFORMATION

RELATED STANDARDISATION ACTIVITIES

CEN

CEN/TC278 — standardisation of Intelligent Transport Systems in Europe. CEN/TC278/WG1 standardises EFC. An overview of EFC standards and links to the standardised data structures and test suites may be consulted under ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://tc278.eu/index.php/efc#EFCstandards

ETSI

ETSI TC ITS is the relevant committee in charge of EETS

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.etsi.org/technologies-clusters/technologies/intelligent-transport

ISO

ISO/TC 204 covers standardisation of information, communication and control systems in the field of urban and rural surface transportation, including intermodal and multimodal aspects thereof, traveller information, traffic management, public transport, commercial transport, emergency services and commercial services in the intelligent transport systems (ITS) field. ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.iso.org/iso/iso_technical_committee%3Fcommid%3D54706

Projects include:
ISO/CD 17573: Electronic fee collection — Systems architecture for vehicle-related tolling

ADDITIONAL INFORMATION

It is required to further develop standards to support (i) assessment and monitoring of key performance indicators for EETS (ii) conformity assessment of implementations to standards, EETS suitability for use and product certification (through provision of test standards). It is also necessary to provide support for EFC standardisation activities in form of (iii) targeted technical standards as support for EETS-related activities.

CEN/TC 278 has identified a number of upcoming activities, some also relevant for the EETS. None of the currently identified standards development actions are deemed mature enough for the 2018 Rolling Plan. However, CEN/TC 278 does anticipate that tasks will arise in the future that indeed would fall within the scope of M/338. CEN/TC 278 also identified a potential need for updating the CEN DSRC in order to ensure its continuous suitability and its consistency with the Radio equipment directive, noting that it is currently a little early to progress this topic.

[1] http://ec.europa.eu/growth/tools-databases/mandates/index.cfm?fuseaction=search.detail&id=216

INTELLIGENT TRANSPORT SYSTEMS (ITS)

POLICY AND LEGISLATION

POLICY OBJECTIVES

Intelligent transport systems apply ICT to the transport sector. ITS services and applications can create clear benefits in terms of transport efficiency, sustainability, accessibility, safety and security, whilst contributing to the EU's single market and competitiveness objectives.

EC PERSPECTIVE AND PROGRESS REPORT

To take full advantage of the benefits that ICT-based systems and applications can bring to the transport sector it is necessary to ensure interoperability and continuity of the services among the different systems throughout Europe. The existence of common European standards and technical specifications is paramount to ensure the interoperability of ITS services and applications and to accelerate their introduction and impact. International cooperation aiming at global harmonisation should be pursued.

REFERENCES

- Directive 2010/40/EU of the European Parliament and of the Council on the framework for the deployment of Intelligent Transport Systems in the field of road transport and for interfaces with other modes of transport
- Commission Delegated Regulation (EU) No 305/2013 supplementing Directive 2010/40/EU of the European Parliament and of the Council with regard to the harmonised provision for an interoperable EU-wide eCall
- Commission Delegated Regulation (EU) N° 885/2013 supplementing ITS Directive 2010/40/EU of the European Parliament and of the Council with regard to the provision of information services for safe and secure parking places for trucks and commercial vehicles
- Commission Delegated Regulation (EU) No 886/2013 supplementing Directive 2010/40/EU of the European Parliament and of the Council with regard to data and procedures for the provision, where possible, of road safety-related minimum universal traffic information free of charge to users
- Commission Delegated Regulation (EU) No 962/2015 supplementing Directive 2010/40/EU of the European Parliament and of the Council with regard to the provision of EU-wide real-time traffic information services
- Commission Decision 2008/8455/EC final on the conclusion of an Implementing Arrangement between the European Commission and the Department of Transportation of the United States of America in the field of research on Intelligent Transport Systems and Information and Communication Technologies applications to road transport
- COM(2008)886 final: Commission Communication Action Plan for the deployment of intelligent transport systems in Europe
- Commission Decision 2008/671/EC on the harmonised use of radio spectrum in the 5875-5905 MHz frequency band for safety-related applications of Intelligent Transport Systems (ITS)
- Recommendation C/2006/7125: Safe and efficient in-vehicle information and communication systems: update of the European statement of principles on human machine interface (EsoP).
- COM(2016)787 final: Reporting on the monitoring and assessment of advanced vehicle safety features, their cost effectiveness and feasibility for the review of the regulations on general vehicle safety and on the protection of pedestrians and other vulnerable road users
- Extract from 'ICT Strategy of the German Federal Government: Digital Germany 2015'[1]. Measure listed on page 35 'Implementation of Directive 2010/40/EU of the European Parliament and of the Council of 7 July 2010 on the framework for the deployment of Intelligent Transport Systems in the field of road transport and for interfaces with other modes of transport'.
- Pursuant to Directive 2010/40/EU, Member States have submitted to the Commission information on their national activities and projects on national ITS actions. In addition, several Member States gave their agreement to the publication of their initial contributions: ▸ http://ec.europa.eu/transport/themes/its/road/action_plan/its_national_reports_en.htm
- Extract from 'ITS Action Plan for the Roads - A framework for the coordinated evolution of existing and the accelerated introduction of new Intelligent Transport Systems in Germany over the period to 2020' [2]. Some measures listed in the 'national strategy' from page 22 onwards 'It is to be ensured that road users can access traffic information and ITS services. The public sector will ensure that basic traffic information that has a direct impact on road safety is provided at no additional cost to road users.', 'Intelligent transport systems must not impose inappropriate constraints on any person's right to enjoy mobility.' and 'The public sector and private sector service providers will cooperate to unlock synergies of collective and individual services and, in particular, to ensure their consistency'.

REQUESTED ACTIONS

CO-OPERATIVE SYSTEMS:

- *Co-operative systems for Intelligent Transport* in

the field of information and communication technologies to support interoperability of co-operative systems for intelligent transport in the European Community **(C-ITS): Mandate M/453**

- **ACTION 1** To complete the minimum set of standards required to deploy C-ITS systems and applications, completing the activities foreseen in the M/453, and achieving the Release 2 for C-ITS (including V2V, V2I/I2V and I2I communications).
- **ACTION 2** Plugtest activities for conformity and interoperability testing, including guidelines with methods for assessing the conformity of the identified minimum set of standards.
- **ACTION 3** Taking into account the C-ITS architecture, ICT related standards for applications to support vulnerable road users (VRU, e.g. projects like VRUITS ▸ www.*vruits*.eu). In particular, SDOs should agree on common requirements and relevant communication standards should be identified by ETSI TC ITS.

OPEN IN-VEHICLE PLATFORM ARCHITECTURE:

- Working group 6 ("Access to in-vehicle data and resources") of the C-ITS Platform has identified 3 possible technical solutions (on-board application platform, in-vehicle interface, data server platform) for accessing in-vehicle data. The following related standardisation needs have been identified:
- **ACTION 4** SDOs to develop the missing standards for an advanced physical/electrical/logical interface (e.g. evolution of OBD2), including the necessary minimum level of security (i.e. integrity, authentication and availability) and the minimum data sets and standardised data protocols which enable ITS services, tkaing into account the existing ISO standard for access to in-vehicle data under the concept of Extended Vehicle (ISO 20077-1:2016).

ELECTRIC VEHICLES (EVS):

- **ACTION 5** Taking into account the C-ITS architecture, vehicle-to-grid (V2G) communication protocols, message datasets, interfaces, and back-office platforms.
- **ACTION 6** Regarding in-vehicle systems, integration of EVs communication with car architectures; sub-system partitioning and their interfaces; X-by-wire controls; testing and management of energy storage systems with on-board battery management system, metering and certification.

LOCATION PRECISION:

- It is essential to most safety applications to realize a high precision location reference beyond current global navigation satellite systems enabling more effective and advanced safety applications. To achieve this, all functional and technical methods need to be used (e.g. crowd sourcing, high precision objects and radio communications).
- **ACTION 7** SDOs to standardise of data and communication aspects to ensure interoperable implementation and data sharing system for increased location accuracy (ETSI TC ITS but also ESOs and other standard setting organisations).

DIGITAL MAPS:

- **ACTION 8** SDOs to develop standards / specifications to steer and manage the exchange of accurate (public) road data in navigation-oriented maps, and of the timely integration of such updates in ITS digital maps for navigation and more advanced in-vehicle applications, including cooperative ITS and automated driving, and for non-vehicle ITS applications, and addressing a possible alignment with the technical framework for infrastructure for spatial information in the European community (Inspire).

DIGITAL LOCAL DYNAMIC MAPS (SPECIFICALLY FOR THE SAFETY RELATED APPLICATIONS SUCH AS C-ACC AND VRU)

- **ACTION 9** SDOs to extend the local dynamic map standards to integrate mechanisms supporting the use of high precision positioning and related objects. This may require additional specific object definition standardisation.

• Interoperable fare management (IFM) systems:

- **ACTION 10** SDOs to develop standards supporting the emerging IFM, taking into account the findings from the smart ticketing alliance. This should include the development of:
  - technical specifications and test procedures for the quality assurance of the interoperable fare medium;
  - technical specifications and standards for profiles of information exchange between the operational entities in IFM; and
  - a technical report for a security architecture framework.

TRAFFIC CENTRE AND I2I COMMUNICATION:

- **ACTION 11** Further development of the DATEX II standard taking into account input from road operators. The Commission published on 4 June 2015 a call for proposals for a Programme Support Action (PSA) for Intelligent Transport Services for Road (ITS) in the framework of the connecting Europe facility (CEF). In particular the focus of this call for proposals is on the maintenance and further development of DATEX II for

the provision of interoperable intelligent transport systems and services for road transport.

URBAN ITS:

- **Standardisation request on urban ITS M/546 (Commission Implementing Decision of 12/2/2016)**
- The prestudy on Urban ITS was carried out by CEN/TC 278. The report can be downloaded from: ▸http://tc278.eu/index.php/urban-its. It identified several actions.
- **ACTION 12** ESOs to develop standard s in support of the implementation of Article 8 of the ITS Directive for multi-modal information, traffic management and urban logistics in the urban ITS domain. The objective is to better connect existing networks, foster strong cooperation and creation of interoperable urban-inter-urban interfaces and foster more extensive use of all transport modes. Urban stakeholders should actively participate in this regard. There will be a need to address the full range of user needs, the ranges of environments and the different types of vehicles, modes of transport or mobility services, the diversity of cities, while ensuring the implementation remains simple. The standards should account for the following aspects as far as possible:
  - legacy systems and existing protocols, cost-effective management paths, business models and guidelines for procurers;
  - special needs of consumers, businesses and operators, including SMEs;
  - executable and freely available guidance, code lists, datasets, tools and processes to facilitate operational implementation and conformance tests; and
  - data availability, access, quality, reliability and accuracy.

- The requested European standards and European standard deliverables should reuse, harmonise or interface as far as possible with existing standards, specifications (incl. priority actions A and B within the ITS Directive) and projects (CIVITAS, POSSE and smart cities projects etc.). In the domain of public transport, and particularly with respect to multimodal information and smart ticketing, the need for consistency will affect a broad set of standards and technical specifications, namely:
  - Transmodel, the European Public Transport Reference Data Model (EN 12896) composed of 8 parts, modelling the semantics of the main public transport domains: common concepts (Part 1), network topology (Part 2), timing information & vehicle scheduling (Part 3), operations monitoring and control (Part 4), fare management (Part 5), passenger information (Part 6), Driver management (Part 7), management information (Part 8). Part 2 incorporates concepts of the former standard IFOPT (Identification of Fixed Objects for Public Transport which provides a data model for stop places, sites, points of interest, etc) and Part 4, concepts used by SIRI.
  - SIRI (System Interface for Real-time Information (EN 15531 1-4 & CEN TS 15531-5), largely based on Transmodel, defines standard exchanges of real-time public transport information;
  - NeTEx (Network and Timetable Exchange, CEN TS 16614 1-3), based on Transmodel parts 1,2,3 and 5, it defines a physical data model and standard exchanges of planned public transport information;
  - Standards supporting the emerging interoperable fare management (IFM) systems: Public Transport interoperability (IOPTA) standard ISO EN 15320, currently under revision, defining the functional system architecture and the application scenarios; the EN 1545 standard describing the data elements and the ISO EN 24014-1 standard, currently under revision, defining functional system architecture and the application scenarios.
- Conformity procedures for Multimodal Information Services (MIS). The procedures should verify the completeness, coherence and compliance of data formats.
  - **ACTION 13** SDOs to develop a definition for automated data validation procedures and routines verifying semantic conformity to data standards (e.g. to SIRI or NeTEx XML files).
  - Data quality (standards for refreshment and accuracy). The success of the urban data access portal will depend on the accuracy and coherence of the data that is available from it. Thus, for example, the data will have to be available in units of measurement that are recognised across Europe, additionally, it will almost certainly need a date/time stamp and a location reference. This will impose requirements on the data collection, collation and coherence processes because they will have make any measurement conversions and organise the data by both date/time and location; as well as of course transport mode, plus in some cases transport provider, so that, for example, the data provided by different but competing public transport operators can be differentiated. In order to make accurate and coherent data

available from the urban data access portal it will need to conform to a standard.

- **ACTION 14** SDOs to Define a standard for data accuracy criteria and publication referring to space and time data.
- **ACTION 15** SDOs to develop a standard method (and possibly tool) for the development of data exchange profiles based on NeTEx (e.g. stop place profile based on NeTEx) useful in the context of travel information and associated reference generic description for local agreements referring to the profiles.

LAND TRANSPORT:

- **ACTION 16** In order to implement new legislation on Digital Tachographs and on Weights and Dimensions, ESOs should develop an additional standard on dedicated short-range communications (DSRC) is needed to allow the transmission of data from a moving vehicle to an enforcement police officer on the roadside, through the DSRC interface.
- **ACTION 17** Another issue is related to on board weighing systems for trucks, where different providers may equip the tractor and the trailers that it will tow. ESOs should develop an interface standard between the different suppliers to ensure that the on board weighing computer in the tractor will be able to receive the weights per axle of any trailer, store them, and then calculate the total weight of the vehicle. This standard could be based on ISO 11992.

CO-OPERATIVE SYSTEMS:

- **ACTION 18** To ensure commitment to the public-interest nature of privacy and data protection, the SDOs should account for EU-wide data privacy policies to set legal requirements for cooperative ITS systems and applications in general. To define a uniform pan-European usable trust policy and processes to support multi-stakeholder business cases, including revocation of trust. Following conclusions made by the ITS platform working group on security, SDOs should take into account crypto-agility in a safe way that permits the introduction of new algorithms in a backward compatible manner. Work on revocation should also be started, including lower-level requirements like the format of the CRL and the transmission details. Standards for protocols and profiles for enrolment credential requests or authorisation ticket requests are also a priority. The working group also defined other needs, including privacy aware message handling and certificates. A first release of an Certificate Policy covering these topics related to a European PKI for C-ITS was prepared by the WG security and published by the EU Commission in June 2017.

DATA:

ACTION 19 European standardisation deliverables on reference data models, common data dictionaries and metadata structure across the three domains and specific European standards:

- Multimodal information services: new mobility services, alternative fuels infrastructure;
- Traffic management: static/dynamic road data, traffic and traffic control data, weather data and traffic prioritisation and access regulations; and
- Urban logistics: intelligent parking for light vehicles/commercial vehicles/trucks and loading bays information and reservation services for special freight vehicles and logistic sectors.

OPEN IN-VEHICLE PLATFORM ARCHITECTURE:

- The development, operation and user acceptance of vehicle-based intelligent transport systems and services will benefit from an agreed open in-vehicle platform architecture enabling a 'single platform —multiple services' approach and ensuring interoperability/interconnection with legacy in-vehicle communication networks (CAN-bus) and (generic) infrastructure systems and facilities.
- The issue so far has been addressed in fragmented way, providing building blocks (e.g. the research projects CVIS, GST, OVERSEE, the eSafety working group on SOA and the recommendations of the EeIP Task Force OPEN, and the ITS study) but an overall logical and cost-effective synthesis seems to be lacking. C-ITS standards should also be taken into account. A study launched under the ITS Action plan (action 4.1) focused on synergies among legal provisions and obligations for heavy good vehicles (HGV).

'HUMAN-MACHINE-INTERACTION' (HMI):

- The development and use of novel ITS services and applications need safe integration and use to avoid increasing distraction of the driver. Results of the research project AIDE ("Adaptive Integrated Driver vehicle InterfacE"), the conclusions of the nomadic device forum and the European statement of principles (ESoP) on safe HMI must be taken into consideration.
- **ACTION 20** Guidelines and potentially technical specifications to ensure the correct and safe on-board use of ITS systems and applications,

enabling safe integration and operation of nomadic devices.

INTERNATIONAL COOPERATION

aiming at achieving the necessary global harmonisation of standards is paramount in the field of ITS.

- **ACTION 21** To continue international cooperation in the field of ITS standardisation, in particular with the USA and Japan, but also with other regions, including participation of the relevant SSOs.

AUTOMATED DRIVING:

- The developments in C-ITS and in various European / national / private pilots with autonomously driving cars are generally seen as two converging paths towards so-called "connected automated driving": vehicles being connected to the mobility ecosystem in their immediate vicinity (other vehicles, infrastructure) and to the wider mobility ecosystem (central traffic management systems, other modes of transport, etc..) and to the internet. The aim is to make this convergence as smooth and efficient as possible.
- **ACTION 22** SDOs to assess the standardisation needs of connected automated driving and develop a work programme, based on the expected convergence of developments in C-ITS and in autonomously driving vehicles.

INTELLIGENT TRANSPORT SYSTEMS (ITS)

- **ACTION 23** SDOs are invited to develop and perform a gap analysis with respect to the broad range of services for Cooperative, Connected and Automated Mobility taking into account the existing C-ITS architecture, standards and technical specifications, in particular those developed within the framework of M/453. The analysis should identify missing complementary standards and identify possibly conflicting standards with the overarching objective of full C-ITS service interoperability. The analysis should be based on currently implemented technologies (recognised by Member States within the C-Roads platform and subject to automotive deployment in line with COM (2016) 766) while also considering newly emerging technologies (in line with the 5G Action Plan) and build upon the principles and results of the RSCOM Mandate to CEPT (RSCOM17-26 rev.3) with the aim to enable interoperability between all C-ITS end user services.

ACTIVITIES AND ADDITIONAL INFORMATION

RELATED STANDARDISATION ACTIVITIES

CEN, ISO, ETSI

CEN/TC 278 www.itsstandards.eu with ISO TC 204 and ETSI TC ITS [3]. Cooperation is also ensured through the ITS Standardisation Coordination Group (ITS-CG)

Release 1 has been finalised — see ETSI TC ITS technical report TR 101 067 with the Release 1 standards and the development of ISO TR 17465-3 with the CEN/ISO Release 1 list. A joint document listing Release 1 standards also includes relevant standards from other SDOs such as SAE and IEEE.

The progress of 3GPP and LTE V2X is also relevant, noting the impending completion of Release 14, given that this access technology may also serve C-ITS purposes.

ISO TC22 & ISO TC204 (CEN/TC278 WG16 & TC 301), SAE.

In-vehicle Platform.
HLC & JWG between TC204 and TC22 discussing how to continue activities.
SAE looks at electrical connections related activities.

ETSI, CEN, ISO, SAE, IEEE

Evaluation of the application of existing standards is an ongoing activity.

Harmonisation task groups (HTGs) are looking into harmonisation needs between the standards developed by the different organisations.

CEN, ETSI

CEN and ETSI are working, in consultation with main stakeholders (such as ASECAP and C2C CC) to find an appropriate solution to ensure non-detrimental interference from ITS-G5 to systems using CEN DSRC technology at 5.8 GHz.

See also CEN/TR 16690 on Electronic fee collection — Guidelines for EFC applications based on in-vehicle ITS stations

3GPP and LTE V2X are progressing.

CEN

CEN/TC 278 develop standards in the field of telematics to be applied to road traffic and transport, including those elements that need technical harmonization for intermodal operation in the case of other means of transport. It shall support: vehicle, container, swap body and goods wagon identification; communication between vehicles and road infrastructure; communication between vehicles; vehicle man machine interfacing as far as telematics is concerned; traffic and parking management; user fee collection; public transport management; user information.

ISO/IEC JTC1/SC37

SC 37 is responsible for the standardisation of generic biometric technologies pertaining to human beings to support interoperability and data interchange among applications and systems. Generic human biometric standards include: common file frameworks, biometric application programming interfaces, biometric data interchange formats, related biometric profiles

and other standards in support of technical implementation of biometric systems, evaluation criteria to biometric technologies, methodologies for performance testing and reporting, cross jurisdictional and societal aspects of biometric implementation. SC 37 Biometrics home page: ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.iso.org/iso/home/standards_development/list_of_iso_technical_committees/jtc1_home/jtc1_sc37_home.htm . The complete list of standards published or under development can be found in ISO Standards Catalogue of ISO/IEC JTC 1/SC 37 — Biometrics.

Published standards and ongoing projects related to the topics include the series of biometric data interchange standards for different biometric modalities, biometric technical interfaces, related biometric profiles and other standards in support of technical implementation of biometric systems, and cross jurisdictional and societal aspects of biometric implementation. Representative projects: amendments of ISO/IEC 19794-x: 2011/Amd. 2:2015 data format standards specifying XML encoding, extensible biometric data interchange formats ISO/IEC 39794-x (e.g. generic extensible data interchange formats for the representation of data: a tagged binary data format based on an extensible specification in ASN.1 and a textual data format based on an XML schema definition (both capable of holding the same information), ISO/IEC 30107-x Biometric presentation attack detection multi-part standard and ISO/IEC 24779-x — Cross-Jurisdictional and societal aspects of implementation of biometric technologies — Pictograms, Icons and Symbols for use with Biometric Systems multi-part standard.

ITU

ITU has various standardization activities in the area of ITS communications.

ITU-R:

Approved various Recommendations including "Radio interface standards of V2V and V2I communications for ITS applications" (ITU-R M.2228); "Systems characteristics of automotive radars operating in the frequency band 76-81 GHz for ITS applications"(ITU-R M.2057); "ITS - Guidelines and objectives" (ITU-R M.1890); "ITS - Dedicated short range communications at 5.8 GHz"(ITU-R M.1453); "Millimetre wave vehicular collision avoidance radars and radiocommunication systems for ITS applications" (ITU-R M.1452), and Reports including "Advanced ITS Radiocommunications" (M.2228). Work is progressing toward a new Report "ITS usage in ITU Member States" (ITU-R M.[ITS USAGE]).

ITU-T:

SG16 approved Recommendation ITU-T F.749.2 "Service requirements for vehicle gateway platforms" and is working on two draft new Recommendations on architecture (H.VGP-ARCH) and interfaces (G.V2A) of the vehicle gateway platform that can be used for inter-vehicle communications. Also, studies have started concerning taxonomy of automated driving (F.AUTO-TAX) and gap analysis of vehicle gateways (HSTP-VG-Gap).

SG13 approved Recommendation ITU-T Y.2281 "Framework of networked vehicle services and applications using NGN".

SG17 has created a dedicated group (Question 13/17 on ITS security) which started work on "Security guidelines for V2X communication systems" (X.itssec-2), "Security requirements for vehicle accessible external devices" (X.itssec-3), "Methodologies for intrusion detection system on in-vehicle systems" (X.itssec-4) and "Security guidelines for vehicular edge computing" (X.itssec-5). SG17 has finalized and approved Recommendation ITU-T X.1373 "Secure software update capability for ITS communication devices": ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://itu.int/itu-t/recommendations/rec.aspx?rec=13197

SG20 started working on "Framework of Cooperative Intelligent Transport Systems based on the Internet of Things (Y.IoT-ITS-framework).

List of ITS work items in ITU: ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://itu.int/en/ITU-T/extcoop/cits/Documents/ITS-work-items.xlsx

The ITU established a platform named the Collaboration on ITS Communication Standards (CITS) to provide a globally recognized forum for the creation of an internationally accepted, globally harmonized set of ITS communication standards: ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://itu.int/en/ITU-T/extcoop/cits

Finally ITU organizes various events on ITS communications, notably the Symposium on the Future Networked Car (FNC-series), which is a yearly event (March) organized since 2005 at the Geneva International Motor Show. See previous and current editions at: ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://itu.int/en/fnc

IEEE

As the transportation sector increasingly incorporates autonomous system features and electric vehicles are incorporated into the smart grid, IEEE has standards activities in a number of different aspects of ITS and transportation, including:

Intra-vehicle communication: IEEE 802.3 (Ethernet) standards evolve to support very high bitrates and time-sensitive communication.

Vehicle-to-vehicle and/or vehicle to infrastructure (V2X) wireless communication: IEEE 802.11 (WLAN) standards have been modified and are further improved for ad-hoc V2X communication and networking in the dedicated 5.9 GHz spectrum, as well as the IEEE 1609 family of standards for Wireless Access in Vehicular Environments (WAVE).

Security: IEEE 1609.2 enables secure vehicle-to-vehicle and vehicle-to-infrastructure wireless communication. There is coordination with ETSI.
Ethical considerations: The IEEE P7000 standards family is addressing ethical considerations in a broad range of artificial intelligence/autonomous system uses, including vehicular context.

For a list of these and other IEEE standardization activities on transportation, please see: ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://standards.ieee.org/develop/msp/its.pdf

IETF

The ECRIT working group in the IETF has developed a general architecture for enabling IP applications to discover and connect to emergency services. The GEOPRIV working group has developed protocols that allow IP networks to inform end devices about their geolocation, a critical pre-requisite for emergency calling. The application-specific working groups in the IETF (for example, the SIPCORE working group) have developed extensions to support emergency calling as required.

The IP Wireless Access in Vehicular Environments (ipwave) WG ▸ http://www.iso.org/iso/iso_technical_

committee%3Fcommid%3D45020s://datatracker.ietf.org/wg/ipwave/about/ works on Vehicle-2-Vehicle (V2V) and Vehicle-2-Internet (V2I) use-cases where IP is well-suited as a networking technology and will develop an IPv6 based solution to establish direct and secure connectivity between a vehicle and other vehicles or stationary systems. These vehicular networks are characterized by dynamically changing network topologies and connectivity.

V2V and V2I communications may involve various kinds of link layers: IEEE 802.11-OCB (Outside the Context of a Basic Service Set), IEEE 802.15.4 with 6lowpan, IEEE 802.11ad, VLC (Visible Light Communications), IrDA, LTE-D, LP-WAN. One of the most used link layers for vehicular networks is IEEE 802.11-OCB, as a basis for Dedicated short-range communications (DSRC). Several of these link-layers already provide support for IPv6. However, IPv6 on IEEE 802.11-OCB is yet to be fully defined. Some aspects of the IPv6 over IEEE 802.11-OCB work have been already defined at IEEE 1609 and the specification produced by this working group is expected be compatible with these aspects.

This group's primary deliverable (and the only Standards track item) will be a document that will specify the mechanisms for transmission of IPv6 datagrams over IEEE 802.11-OCB mode.

International cooperation for the development of harmonised global standards is particularly important in these areas. The Commission has concluded agreements with the US Department of Transport and with the Japanese Ministry for Land Transport and Industry. Cross-regional harmonisation task groups (HTGs) have been established in this area. Currently the CAMP/WIIC and the C2C-CC and Japanese OEM are working to solve coordination requirements for Day 1 deployment expected in 2015 in Europe.

ETSI has cooperation and liaison agreements with relevant standards organisations such as IEEE, SAE, ISO, IETF, and standardisation supporting industry groups like TISA. Additionally ETSI have liaisons and contacts with regional and national standards organisations such as ARIB (Japan), CCSA (China) and TTA (Korea) and the Asian Pacific Telecommunication organisation (APT).

ITU has launched the Collaboration on ITS Communication Standards (CITS) aims at providing a globally recognized forum for the creation of an internationally accepted, globally harmonised set of ITS communication standards of the highest quality in the most expeditious manner possible to enable the rapid deployment of fully interoperable ITS communication-related products and services in the global marketplace. See http://itu.int/en/ITU-T/extcoop/cits

C-ITS PLATFORM

Established by the Commission, it brings together representatives of all C-ITS stakeholders to cooperate on legal, organisational, administrative and governing aspects, but also on more technical issues such as standardisation, or security and certification of the system, in view to ensure the interoperability of systems across the Member States.

CAR-2-CAR COMMUNICATION CONSORTIUM (C2C-CC)

The industry organisation represents car manufacturers and actively participates and chairs ETSI TC ITS. It also contributes to CEN working groups.

ERTICO — ITS EUROPE, GSM-A AND THE IMOBILITY FORUM

Stakeholder organisations providing input to ETSI and CEN

"AMSTERDAM GROUP" (AG)

This is an umbrella organisation bringing together the C2C-CC, ASECAP, CEDR and POLIS for smooth alignment of deployment of Cooperative-ITS functionalities and technologies European wide. A strong support for standardisation activities, regulation and harmonisation is provided to the European community directly by the individual AG members as agreed within the AG. Membersalso participate in the spectrum regulation at CEPT and work on harmonisation with IEEE 802.11 TigerTeam to ensure spectrum-sharing with Wi-Fi devices.

UN/ECE WP29

The UNECE transport division provides secretariat services to the world forum for harmonization of vehicle regulations (WP.29). The world forum has incorporated into its regulatory framework technological innovations of vehicles to make them safer and more environmentally sound.

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.unece.org/trans/main/welcwp29.html

GENIVI

GENIVI® is a non-profit industry alliance committed to driving the broad adoption of specified, open source, in-vehicle infotainment (IVI) software.

The alliance develops an open standard for aligning automotive and consumer infotainment cycles.

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.genivi.org/

MIRRORLINK INITIATIVE

The MirrorLink initiative turns the car into a terminal, it has little computing power itself and relies instead on the phone as its processor.

▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.mirrorlink.com/

COMESAFETY2, IMOBILITYSUPPORT

EU funded projects supporting C-ITS standardisation, in particular international cooperation.

▸ www.comesafety.org, www.imobilitysupport.eu/

EU AND NATIONAL FUNDED RTD PROJECTS AND PILOTS

The standardisation activities are supported by RTD projects, pilots and field operational tests in the area of C-ITS, in particular contributing to fine-tuning the standards, such as DriveC2X, FOTSIS, PRESERVE, ITSSv6, ComeSafety2, COMPASS4D, iMobilitySupport, SIM-TD, SCORE@F, eCoMove, EasyWay, SPITS

WCO DATAMODEL

The WCO datamodel (world customs organisation data model) is an important standard for providing alignment for announcements to and from government about transport and trade. It makes communication throughout Europe between governmental parties and between government and commercial parties easier and cheaper.

EU FUNDED RTD PROJECTS AND PILOTS

Projects such as Mobinet, Mobincity, eCo-FEV; E-DASH, eDAS, SmartV2G, ODIN, COSIVU, SafeAdapt, Smart-LIC, VRUITS and the pilots ICT4EVEU, MOBI.Europe, MOLECULES, SmartCEM and green e-motion and the support action smart EV-VC will have outcomes possibly relevant for standardisation.

IEEE

IEEE has standards on charging communication: IEEE 1901 provides broadband over powerline communications to be used in charging, and IEEE 2030.1.1 on DC quick charging.

For a list of these and other IEEE standardization activities on transportation, please see: ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://standards.ieee.org/develop/msp/its.pdf

ICT FOR TRAFFIC MANAGEMENT AND INFRASTRUCTURE TO INFRASTRUCTURE (I2I) RELATED INFORMATION EXCHANGE AND ARCHITECTURES BEYOND SHORT RANGE COMMUNICATIONS.

CEN/TC278/WG8

DATEX data exchange standards. DATEX II is a standardised e-language for traffic and travel data exchange between traffic control centres, traffic information centres and service providers. In 2020 DATEX II is expected to be the information model for road traffic and travel information in Europe. The aim is to get the real mature parts of DATEX II standardised as European standards.

ISO

Standardisation activities are taken up in this area by ISO TC 204, with strong cooperation with CEN/TC 278, but also by ISO TC 22. ISO/TS 15638-19:2013 ITS — Framework for collaborative telematics applications for regulated commercial freight vehicles (TARV Part 19). It is at an early stage of development but not mature enough to serve as standard for reservation at that stage.

ITU

Study groups 12 and 16 both have work items to transform the deliverables of ITU-T focus group on driver distraction (2011-13) into proper ITU-T Recommendations. The mandate of ITU-T study group 17 includes the study of security aspects of ITS communications.

W3C

W3C has several ongoing activities related to automotive/ITS.

The mission of the automotive working group (▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://www.w3.org/auto/wg/) is to develop open web platform specifications for HTML5/JavaScript application developers enabling web connectivity through in-vehicle infotainment systems and vehicle data access protocols. The API is agnostic with regard to the connection used.

The mission of the automotive and web platform business group (▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.w3.org/community/autowebplatform/) is to influence the open web platform on the unique needs of the automotive industry, and to help stakeholders within the automotive industry to build a good and practical understanding on the standardisation processes within the W3C. The initial scope of this business group will be to determine what vehicle data should be exposed through a web API(s).

Several community groups (pre-standardisation open fora) were also started to look at specific ITS issues, e.g. the traffic event ontology community group (▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://www.w3.org/community/traffic/), and automotive ontology (▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://www.w3.org/community/gao/).

TN-ITS (TRANSPORT NETWORK ITS SPATIAL DATA DEPLOYMENT PLATFORM)

Based on the outcome of ROSATTE project (FP7), the working group promotes the integration of accurate (public) road data in navigation-oriented maps, and their timely updating, including possible alignment with the technical framework for the INSPIRE project, including the identification of standardisation needs.
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.imobilitysupport.eu/library/imobility-forum/working-groups/concluded/digital-maps/

EU FUNDED PROJECTS (HORIZON 2020 WG 3.5 CALL)

Projects supporting local dynamic maps standardisation (e.g. HIGHTS)

SMART TICKETING ALLIANCE

The Smart Ticketing Alliance (STA) represents a platform for cooperation and a coordinated approach for establishing ticketing interoperability for the Public Transport sector. ▸ www.smart-ticketing.org

ITXPT

The ITxPT (Information Technology for Public Transport) Initiative aims to further cooperate on the implementation of standards for plug-and-play IT-systems applied to public transport. An integrated testbench offers services to specify, test, qualify and showcase IT solutions. ▸www.itxpt.org

[1] http://www.bmwi.de/English/Redaktion/Pdf/ict-strategy-digital-germany-2015,property=pdf,bereich=bmwi2012,sprache=en,rwb=true.pdf
[2] https://www.bmvi.de/SharedDocs/EN/Documents/LA/its-action-plan-roads.pdf?__blob=publicationFile
[3] https://portal.etsi.org/webapp/WorkProgram/Frame_WorkItemList.asp?SearchPage=TRUE&butExpertSearch=++Search++&qMandate_List=%27M%2F453%27&qSORT=HIGHVERSION&qREPORT_TYPE=SUMMARY&optDisplay=10&titleType=all

ADVANCED MANUFACTURING

POLICY AND LEGISLATION

POLICY OBJECTIVES

Advanced manufacturing addresses the transformation of the manufacturing and automation industry (digitalisation of industry) to a new level of intelligent production and of intelligent process handling and integration. It is driven by the convergence of manufacturing with ICT and includes any optimisation solution improving productivity, quality, and flexibility in the entire manufacturing lifecycle. To enhance sustainability, the manufacturing lifecycle must prolong the life of durable industrial products given the Circular economy objectives. To lower waste and pollution, and use energy in smarter ways, it should take in account operations such as testing and diagnosis, disassembly/repair/upgrade, and recycling.

Work pieces and semi-finished products involved in the manufacturing lifecycle should possess information on themselves and suitable means of communication, e.g. they are cyberphysical systems. These products could control not only their own logistical path, but rather the entire lifecycle workflow from operating to maintenance, dismantling and recycling.Decentralisation of the digitally stored information should logically be followed by a decentralisation of control systems.

Advanced manufacturing as a policy focuses on fostering the development and speeding up of the uptake of advanced manufacturing technologies by European industry. This ambition unfolds in three objectives: accelerate the dissemination and commercialisation of advanced manufacturing technologies, boost the demand for advanced manufacturing technologies, and reduce skills shortages and competence deficits.

European manufacturers would benefit from more automated flexibility and data intelligence in supply chains. Agile manufacturing (e.g. reacting to changes in demand, in labour or in material resources available) would enable smarter logistics and lower production costs. Industrialising and automating the complete manufacturing lifecycle including circular economy operations would enable a smarter use of energy and resources , while maintaining cost and quality competitiveness. Simulations or rapid prototyping methods like 3D printing would enhance the design process. Big data analytics, turning the data stored in clouds to intelligence, would provide insights on achieving cost and carbon emission reductions. Eventually, an internet of manufacturing things would provide for smooth communication between the various machines of an intelligent supply chain, building on the increased presence of sensors and actuators.

There are a number of initiatives around advanced manufacturing in Europe, in the Member States and also outside Europe (see B.2). It is the objective on the European level to coordinate between the different initiatives and to drive the strategic topic of advanced manufacturing at a pan-European level, thus improving the competitiveness of the European manufacturing and automation industry both regarding the Common European market but also on a global scale.

Advanced manufacturing is one of the key enabling technologies (KETs) identified but the Commission as key to competitiveness. In 2015 the global market for KETs was estimated to be more than EUR 1 trillion. KETs have huge potential for growth and employment. According the European Competitiveness Report 2013, depending on the KET, growth potentials of 10 — 20% per year can be expected over the coming years. For particular submarkets, the growth potential is even larger. Countries and regions that fully exploit KETs will be at the forefront of advanced and sustainable economies. KETs deployment will contribute to achieving reindustrialisation, energy, and climate change targets simultaneously, making them compatible and reinforcing their impact on growth and job creation.

EC PERSPECTIVE AND PROGRESS REPORT

Standards can play a key role in accelerating the effectiveness of supply chains in manufacturing systems. In some cases, standardisation can also play a stabilising role of research activities on which real market opportunities may then be built on. The opportunity is to ensure Europe's technological leadership through the massive integration of ICT into advanced manufacturing technologies, systems and processes.

The amount of communication between machines, sensors and actors is increasing and will continue so. The machines will become increasingly organised as well as their supply chains, from design to warehousing until delivery of a product. IoT technologies will play a major role to support this. Securing high-speed communications infrastructures (e.g. broadband infrastructures) is vital. The specific industrial needs and requirements concerning, for example, availability, security and functional safety have to be taken into account in order to make these technologies suitable for advanced manufacturing. Moreover, the supply chains increasingly need flexibility in design to answer to individual customer requirements (mass customisation). Easier and cost-effective product differentiation is a key for growth. Additive manufacturing (3D printing) may push differentiation to a further stage of individualisation, generating a market of crowd-based production and retailing.

There is a need to promote the development of interoperability standards and European reference architectures, as well as open cross-sectorial platforms for the digitisation of European industry, including experimentation, validation, interoperability testing facilities and trusted labels and certification schemes;

Standardisation is of central importance, yet at the same time provides the biggest challenge for the success of advanced manufacturing, which demands an unprecedented degree of system integration across domain borders, hierarchy borders and life-cycle phases. To achieve this, consensus-based standards and specifications form an indispensable basis. Close cooperation between researchers, industry and the standardisation bodies is required to create the necessary conditions for sweeping innovation, methodical soundness and functionality, stability and security of investments, practicability and market relevance.

Existing, but also future consensus-based standards will create a firm basis for technical procurement, support communication through standardised terminology and concepts and ensuring interoperability, fitness for use and market relevance. The drawing up of concepts at an early stage by a consensus-based standardisation process and the close cooperation between researchers, industry and the standardisation bodies are central requirements for the success of innovative manufacturing approaches and for a rapid implementation in industrial practice. These concepts and any related standards should be coherent with existing standards e.g. on machinery, tools, automation, etc., as the take-up of advanced manufacturing concepts would be dramatically speed up if they are compatible with the installed manufacturing base.

Several research oriented activities are currently under way under H2020:

- I4MS (Innovation for Manufacturing SMEs) is a Commission initiative dedicated to the manufacturing sector and in particular to its high-tech SMEs. I4MS is part of the public-private partnership "Factories of the Future" (PPP H2020 FoF). Funded projects currently focus on flexibility and adaptability in the production chain (CloudFlow, INTEFIX, APPOLO), simulation (Fortissimo, CloudSME), robotics (EUROC) and data intelligence (LASHARE).
- The EFFRA (European factories of the future research association) developed a roadmap for the development of Factories of the Future by 2020 in the framework of H2020.
- SPIRE (sustainable process industry through resource and energy efficiency) is a public-private partnership that represents more than 90 industrial and research process industry stakeholders from over a dozen countries across Europe.

In addition lighthouse pilot projects in the framework of the Joint Undertaking on Electronic Components and Systems for European Leadership will provide for validation of standards for future markets, including large scale experimental test-beds

REFERENCES

- COM(2016) 180 final. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: Digitising European Industry Reaping the full benefits of a Digital Single Market
- COM(2016)176 "ICT Standardisation priorities for the digital single market"
- COM(2012)341 A European strategy for key enabling technologies — A bridge to growth and jobs
- COM(2012) 582 final A stronger European Industry for Growth and Economic Recovery
- SWD(2014) 120 Advancing Manufacturing — Advancing Europe, Report of the Task Force on Advanced manufacturing for Clean Production
- COM(2009)512 Preparing for our future: Developing a common strategy for key enabling technologies in the EU ▸ http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:52009DC0512

The following list is a non-exhaustive overview of initiatives on national level:

- French strategy for factories of the future ▸ http://proxy-pubminefi.diffusion.finances.gouv.fr/pub/document/18/17721.pdf#page=47
- The German initiative Industrie 4.0, including the industry association initiative "Plattform Industrie 4.0" in cooperation with with acatech / Forschungsunion ▸ http://www.acatech.de/fileadmin/user_upload/Baumstruktur_nach_Website/Acatech/root/de/Material_fuer_Sonderseiten/Industrie_4.0/Final_report__Industrie_4.0_accessible.pdf
- ▸ http://www.plattform-i40.de/finalreport2013
- R&D initiatives like "Autonomik für Industrie 4.0" (▸ http://www.autonomik40.de/#&panel1-1), "it's OWL" (▸ http://www.its-owl.com/home/news/2-forum-produktion-im-mittelstaendischen-maschinenbau/) or SmartFactory KL (▸ http://smartfactory.dfki.uni-kl.de/en)
- UK Initiative "High Value Manufacturing Catapult" ▸ https://hvm.catapult.org.uk/
- UK Foresight Studie "Future of manufacturing: a new era of opportunity and challenge for the UK" ▸ https://www.gov.uk/government/publications/future-of-manufacturing
- US Advanced Manufacturing National Program Office (AMNPO) ▸ http://manufacturing.gov/amnpo.html
- Diginova's "Roadmap to Digital Fabrication" ▸ http://www.diginova-eu.org/content/dam/diginova/en/

documents/Digital_Fabrication_eBook.pdf

- The strategic research and innovation agenda of Sweden "Made in Sweden 2030" ▸ https://www.teknikforetagen.se/globalassets/i-debatten/publikationer/produktion/made-in-sweden-2030-engelsk.pdf
- "Smart Industry " NL initiative strategy for the future ▸ http://www.smartindustry.nl/

REQUESTED ACTIONS

ACTION 1 Common communications standards and a reference interoperable architecture for connections between machines (M2M) and with sensors and actuators in a supply chain environment are a basic need and a priority. Specific industrial needs must be included, like standards which support communications on broadband infrastructures and data formats in order to allow for the quick transfer of large volumes of data over networked industries. This would ease the ability to switch between platforms. Analysis is required as to how to provide industries with a solution enabling wireless communications without interfering with other wireless networks. In particular, a check should be run on M2M standards against requirements like real-time capability and close to hardware runtime codes.

ACTION 2 As part of the new skills agenda for Europe, ESOs could check whether the e-skills standards sufficiently account for the manufacturing skills of KETs, including future manufacturers, M2M, rapid prototyping and others.

ACTION 3 Review the recommendations for actions in the "German Standardisation Roadmap Industrie 4.0" (▸ https://sci40.com/de/downloads.html).

ACTION 4 A study is needed to identify and analyse opportunities for revisions of existing standards (communications, M2M) or new standards. In particular, the following topics should be analysed:

NEW PRODUCTION TECHNOLOGY

- Additive manufacturing (incl. 3D printing)
- Robotics: Human-machine-interface for "autonomous co-laborative robots"

MANUFACTURING PROCESSES INCLUDING LIFECYCLE OPERATIONS (CIRCULAR ECONOMY)

- Future manufacturing systems (M2M and usage of IoT, agile manufacturing): self-organisation of parts of the supply chain; smart logistics including the management of unexpected changes in products: labour or raw materials; massive customisation along the whole production process; shared infrastructures between sites of production and dismantling;
- Virtualisation and common semantics (smart factory / digital factory), engineering tools, different life-cycle approaches (technology, product development, manufacturing of the product, the manufacturing equipment / plant) and their integration;
- Keeping in mind the circular economy objectives, the manufacturing lifecycle
  - Including disassembly, maintenance, repair, upgrade and dismantling, rapid prototyping, clean manufacturing, availability/resilience of production systems and facilities.
  - Wireless network in the plant, e.g. based on EN 300 328 and EN 62657
  - Compared or predictive analyses via big data and cloud, increased optimisation possibilities by more accurate management information on the operational manufacturing process
  - Interoperability: providing improved interoperability using existing models for further developments, including special requirement analysis from process and manufacturing industries (e.g. real-time/ tactile internet, robustness, etc.)

FUNCTIONAL SAFETY ISSUES

- Safety, e.g. functional safety of machinery based on IEC 61508, IEC 61511, ISO 13849,
- Security, privacy and management of dta ownership in the manufacturing environment and for manufactured products. The new systems must protect (i) data in production systems and facilities and (ii) access to production systems and facilities, e.g. system security based on the ISO/IEC 27000 series and IEC 62443 series.

SKILLS DEFICIT REDUCTION

- Manufacturing skills for future manufactures;
- Work organisation;
- Training and continuing professional development.

ACTION 5 Considering standardisation in research projects is strongly recommended to identify existing standards and standardisation potential at an early stage. R&D phase standardisation covers any activity that aims to identify the potential of standardisation and assists with public availability of the results of these processes. In addition, the continuous and close cooperation with stakeholders to integrate their views and requirements and to foster community acceptance is essential to build the ground for securing effective impact. Based on this, such standardisation activities assist the transformation of research findings into product ideas transferred to the market afterwards, as they support the dissemination and implementation of innovative knowledge. Therefore in innovative fields the sustainable transfer of knowledge and technology is enhanced and accelerated.

In order for research and standardisation to be effectively linked, it must be remembered that standardisation activities can in many cases only be started at a relatively late stage of the project. To close the gap until industry is prepared to continue funding in a more mature stage, the support of standardisation-related research projects beyond the end of the projects themselves should be considered.

ACTIVITIES AND ADDITIONAL INFORMATION

RELATED STANDARDISATION ACTIVITIES

DIN/DKE

The "German Standardisation Roadmap Industrie 4.0" ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.dke.de/de/std/documents/rz_roadmap industrie 4-0_engl_web.pdf▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.dke.de/de/std/documents/rz_roadmap industrie 4-0_engl_web.pdf

provides an overview of the relevant existing standards in the ambit of Industrie 4.0 and the need for standardisation which is already discernible today. It presents the requirements for standards and specifications for Industrie 4.0, identifies areas where action is necessary and issues corresponding recommendations.
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.dke.de/de/std/documents/rz_roadmap%20industrie%204-0_engl_web.pdf

CEN

CEN/TC 438 'Additive Manufacturing' has been working since 2015 to standardize the process of AM, their process chains (hard and software), test procedures, environmental issues, quality parameters, supply agreements, fundamentals and vocabularies. CEN/TC 438 works closely with ISO/TC 461 in cooperation with ASTM F42. CEN/TC 438 will develop new projects that relate to aeronautic, medical, 3D manufacturing and data protection.

CENELEC

CENELEC/TC 65X "Industrial-process measurement, control and automation" works out methods for safe and secure communication protocols for wired and wireless industrial automation applications some of which are included in the 2,4 GHz industrial, scientific and medical radio band (ISM).

ETSI

ETSI ERM TG 11 is currently working on methods to improve the politeness of existing adaptive and non-adaptive mechanisms and to consider the inclusion of alternative mechanisms taking into account the needs of the wireless industrial applications operating in the 2,4 GHz ISM band.

ETSI ERM TG 41 is currently working on harmonised standards for wireless industrial applications in the frequency range 5725 MHz to 5875 MHz.

ETSI DECT has started the development of DECT-2020, a 5G radio interface operating on license exempt spectrum that will support Ultra Reliable and Low Latency use cases required by Industry Automation scenarios.

ISO/IEC

Interoperability standards from IEC/TC 65 "Industrial process measurement, control and automation", with its sub-committees, e.g. standard on internet security IEC 62443 series, functional safety standards IEC 61508, IEC 61511 or interoperability standards, e.g. IEC 62541 (OPC), and others

IEC/TC 65 and its subcommittees, like foundational/structuring groups SC 65E/AhG 1 "Smart manufacturing information models", AhG 3 "Smart manufacturing framework and system architecture", SC 65E/JWG 5 "Enterprise control", SC 65E/WG 9 "AutomationML — Engineering Data Exchange Format", operational groups WG 16 "Digital Factory" and WG 19 "Life-cycle management for systems and products"; and communication groups, including real-time communications work, SC 65C/MT 9 "Industrial networks — Fieldbusses", SC 65C/WG 16 "Wireless" and SC 65C/WG 17 "Wireless coexistence".

IEC systems evaluation group (SEG) 7 on smart manufacturing has been created to organise the transition from SG 8 to a systems committee (SyC). Among its tasks, SEG 7 will focus on:

- providing an inventory of existing standards and current standardisation projects under the management of IEC, ISO and other SDOs.
- expanding on the definition of common value chains within a smart manufacturing enterprise, as identified in SG 8, and identifying associated use-cases which will assist in determining the state of the art in the industry, and the identification of potential gaps where IEC standardisation is needed with respect to smart manufacturing.
- establishing an initial roadmap of smart manufacturing standardisation, architecture and prospective standardisation and conformity assessment projects to be conducted by the SyC member TCs and partners.
- delivering a dashboard to cross reference the project work items to documented use-cases within particular value chains to assist standards developers and industry stakeholders to navigate the domain

ISO/TC 184 deals with industrial automation technologies, including automated manufacturing equipment, control systems and the supporting information systems, communications and physical interfaces required to integrate them in the world of e-business http://www.iso.org/iso/iso_technical committee%3Fcommid%3D54110

Projects include:

- ISO 6983-1:2009 — Automation systems and integration -- Numerical control of machines -- Program format and definitions of address words -- Part 1: Data format for positioning, line motion and contouring control systems
- ISO 14649 (series of standards): Industrial automation systems and integration -- Physical device control -- Data model for computerized numerical controllers
- ISO 22093:2011 — Industrial automation systems and integration -- Physical device control -- Dimensional Measuring Interface Standard (DMIS)
- ISO 23570 (series of standards): Industrial automation systems and integration -- Distributed installation in industrial applications
- ISO 13584 (series of standards): Industrial automation systems and integration -- Parts library
- ISO 30303 (series of standards): Industrial automation systems and integration -- Product data representation and exchange

- ISO 16100 (series of standards): Industrial automation systems and integration -- Manufacturing software capability profiling for interoperability
- IEC/TC 3/SC3D" Product properties and classes and their identification"
- ISO/IEC JTC 1 "Information Technology" with its sub-committees, e.g. SC 31 on RFID
- ISO Strategic Advisory Group Industry 4.0/Smart manufacturing (ISO /SAG)
- ISO/TC 261 works on standardisation in the field of additive manufacturing concerning their processes, terms and definitions, process chains (hard- and software), test procedures, quality parameters, supply agreements and all kind of fundamentals.

IEEE

IEEE has standards activities relevant to advanced manufacturing, including in the networking, sensors, and IoT domains.
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://standards.ieee.org/develop/msp/advanced-manufacturing.pdf

ITU

The new ITU-T Study Group 20 on "IoT and its applications, including smart cities and communities" was created in June 2015. It provides a specialized IoT standardisation platform for the development of a cohesive set of international standards on IoT and smart manufacturing.
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://itu.int/go/tsg20

ITU-T SG13 approved Recommendation Y.2238 on Overview of Smart Farming based on networks. SG13 has a work in progress on service model for the pre-production stage for smart farming (Y.smpp). Also under development is an application of a u-learning environment to the smart farming (Y.sfes).

OASIS

Production Planning & Scheduling (PPS): Description: XML documents for production floor planning and scheduling in manufacturing industries, and transactional exchange patterns for operations management contexts.
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://www.oasis-open.org/committees/pps

W3C

Web of Things
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.w3.org/WoT/

IIC

Developing test beds and contributing to reference architecture and use-case development
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.iiconsortium.org/test-beds.htm

ADDITIONAL INFORMATION

There are three basic principles behind standardisation of advanced manufacturing technologies:

- accelerate the dissemination and commercialisation of advanced manufacturing technologies,
- boost the demand for advanced manufacturing technologies, and
- reduce skills shortages and competence deficits.

In industrial automation, it is essential for the vast variety of systems from various manufacturers to interact in a reliable and efficient manner. The users, operating globally, expect to be able to source their usual products and systems everywhere in the world. In order to ensure this global usability and consistency across different systems, international standardisation in industrial automation has always been regarded as especially important and pursued as a matter of a priority. Nowadays, standards are available or are at least being drafted to cover important issues in industrial automation. But again and again new technologies and new requirements create a new demand for standardisation. This requires the development of a host of new concepts and technologies. However it will only be possible to implement these new concepts and technologies in industrial practice if they are backed by standards based on consensus. Only such standards are able to create the necessary security for investments and confidence among manufacturers and users.

Development of new technologies and intensifying the relationships between more and different actors in the value chain require not only new standards but also updating, maintenance and even re-design and integration of existing standards.

Additional communication capabilities and a (partial) autonomy to react to external influences and internally stored specifications are transforming mechatronic systems into cyber-physical systems. The objectives derived from that transformation are developments and adjustments in ICT for manufacturing applications: robustness, resilience, information security and real-time capability. In addition, increasing improvement is aimed for energy and resource efficiency, and in the adjustment of industry to accommodate the social demands arising from demographic change.

With regard to machine to machine communication, consideration should be given to the framework of metadata. There may be a role for standards in developing an accepted architecture building on existing agreed terminology.

ROBOTICS AND AUTONOMOUS SYSTEMS

POLICY AND LEGISLATION

POLICY OBJECTIVES

The importance of robotics and autonomous systems (RAS) lies in its strong economic contribution as an industrial and commercial activity in its own right and in its broad and disruptive socioeconomic impact across diverse market sectors worldwide. Advanced robotics and autonomous (or near-autonomous) vehicles will have a potential annual economic impact by 2025 on a par with e.g. mobile internet, advanced materials or energy markets.

Industrial robotics has already become a cornerstone in several of Europe's high value manufacturing industries, such as the automotive industry, keeping these industries in Europe. This trend must be maintained, strengthened and extended to all main industries in Europe. Robotics technology also has an impact on a broad range of end-user markets and applications. The robotics professional and consumer service sectors are expected to achieve double-digit growth in the next decade and SMEs will play a key role e.g. in opening new markets. In addition to manufacturing, important future application domains for robots, with a high impact on everyday life, will include healthcare, agriculture, civil, commercial or consumer sectors, logistics and transport.

The EU's strategic vision is to build Europe's global position in the robotics market to account for one third of industrial robotics, two thirds of professional services and one fifth of the domestic services market by 2020.

EC PERSPECTIVE AND PROGRESS REPORT

Robotics and autonomous systems is a multidisciplinary scientific and technological domain for implementing complex systems with cognitive capabilities. These include mechatronics devices, power systems and drives, actuators, sensors, data communication systems, computer software, multi-agent technologies, signal processing techniques, artificial intelligence, semantic technologies and much more. Robots can be very small or very large and have many physical aspects; for instance, they can be similar to a crane, an arm, a snake or a human body, they can have wheels or legs, and they can be vehicles able to move on the ground, in the air or under the water. Robots can also be used for an extraordinary variety of applications including industrial manufacturing, logistics, maintenance, precision farming, autonomous driving, space exploration, surveillance, emergency and rescue services, commercial services, health care, rehabilitation, assistive living, entertainment, education and social interaction.

Therefore the number of standards that may affect robotic engineering is huge compared to the relatively small size of the robotic sector. Luckily, standardisation efforts can be shared with more general technological domains such as electromechanical engineering, electronics, information technologies, telecommunications, production management, geographical information and so forth, where robotics plays a technology user role and inherit their standards. Nonetheless, there are also many standards addressing the specific needs of the robotic sector. The following link list some of them:
▸ http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_tc_browse.htm?commid=54138

Since robotics is a fast-moving technological field, its standardisation needs are growing and changing. We can identify at least three main broad areas where new standardisation efforts are required:

- Robotic safety. Traditionally the robotic sector has adopted general personal and functional safety standards and regulations for machinery such as EN/ISO 13849-1, IEC/EN 62061. However, the particularities of robotics and its applicability to industrial and non-industrial environments has made it necessary to develop specific standards such as ISO/TS 15066 (Safety of collaborative robots) which builds further on EN/ISO 10218-1 and EN/ISO 10218-2 (Robots and robotic devices — Safety requirements for industrial robots) or EN/ISO 13482 (Robots and robotic devices — Safety requirements for personal care robots), ISO/TS 15066 (Safety of collaborative robots), ISO TC184/SC2/WG7 (Personal care robot safety), IEC TC62/SC62A and ISO TC184/SC2 JWG9 (Medical electrical equipment and systems using robotic technology). The huge expansion that robotics is experiencing in non-industrial environments including health care, autonomous driving and private homes, must be accompanied by the development of new safety standards addressing their specific issues.
- Robotics system integration and interoperability. Current robots can be made up of very different functional subsystems (dynamic control, perception, navigation, task planning, trajectory planning, human interaction, etc.) that must be integrated through complex interfaces. Also robotic systems can cooperate with other systems by means of other interfaces. Many of the standards that define these interfaces are inherited from more general domains such as electromechanical engineering and ICT. But there is a number of standards that are designed to

fit robotics-specific requirements, for instance ISO 9409 (mechanical interfaces) and ongoing work in ISO/TC 299/WG6, ISO TC184/SC2/WG10 (Modularity for service robots). At least two areas need further development:

- Robot programming languages and communication protocols for robot controllers. There are several widespread robot programming languages such as Rapid (ABB), PDL2 (Comau), KRL (Kuka), etc. that have been developed by robot manufacturers following a proprietary philosophy, but they act as de-facto standards as they must be used by system integrators and other third parties of the robotic value chain. The increasing level of integration of robots in complex systems is creating a need to standardise programming languages and protocols so that they can play a role similar to that of G-Code (ISO 6983/RS274D) in the world of CNC machine tools.
- Robot operating systems. Robot operating systems are software platforms that help connect various robotic subsystems (perception, control, reasoning, planning, etc) to perform complex tasks. Strictly speaking they are not actual operating systems as they must be run on conventional computers. However they are much more than a middleware layer. They determine and manage the environment for the interoperability of all the software components of the robotic system, irrespective of where they run (on standard computers, robot controllers or embedded systems). In the last 10 years, a number of robot operating systems have come out: ROS, Player, YARP, Orocos, CARMEN, Orca, MOOS, to name a few. Most have been developed and maintained as open source software by universities and non-profit research centres and have not achieved yet enough stability and maturity to become full standards. However, the most successful ones have the potential to set the interoperability standards of the future of robotics.

- Knowledge modelling. There are other factors attracting attention in the robotics community: acquisition of knowledge about the robot's physical environment, reasoning and learning. These involve a great variety of techniques such as signal processing, sensor data fusion, mapping, machine learning, artificial intelligence, constraint solving, and optimisation. All these techniques have something in common: they manage enormous amounts of data that must be contextualised and processed semantically. Much of this information is captured through complex sensor systems (e.g. image processing or speech recognition) but also from the web. The way how this information can be generated, processed and distributed depends heavily on the availability of appropriate standards. There are already many standards on knowledge modelling, most of them inherited from the ICT field (e.g. SQL, JSON, XML, OWL, and RDF) and a few from other domains (e.g. ISO 10303 for product manufacturing information and ISO 11783 for precision farming), but knowledge modelling for robotics is still a research topic and lacks the stability needed to build a comprehensive set of accepted standards that covers the requirement of all potential applications.

REFERENCES

- Robotics PPP — EU Robotics: Strategic Research Agenda
  ▸ http://roboproject.h2214467.stratoserver.net/cms/upload/PPP/SRA2020_SPARC.pdf
- Robotics PPP — EU Robotics: Multiannual Roadmap (rolling document)
  ▸ https://eu-robotics.net/sparc/about/roadmap/index.html
- European Machinery Directive 2006/42/EC
  ▸ http://ec.europa.eu/growth/single-market/european-standards/harmonised-standards/machinery/index_en.htm
- International Federation of Robotics: Standardisation
  ▸ http://www.ifr.org/standardisation/
- US Occupational Safety and Health Administration: Robotics
  ▸ https://www.osha.gov/SLTC/robotics/index.html
- The Consequences of Artificial Intelligence on the (Digital) Single Market, Production, Consumption, Employment and Society
  ▸ http://www.eesc.europa.eu/?i=portal.en.int-opinions.40538

REQUESTED ACTIONS

ACTION 1 Foster coordination of standardisation efforts on robotics and autonomous systems in Europe, promoting interaction of all stakeholders taking into account their vision and real needs (i.e. through SPARC public-private partnership).

ACTIVITIES AND ADDITIONAL INFORMATION

RELATED STANDARDISATION ACTIVITIES

The most relevant standards on robotics are led by ISO. Robotic markets are global and it does not make much sense to develop standards at national or regional level. So far, most of the standardisation efforts have been primarily driven by manufacturers of industrial robots and robotic components. Their engineering teams are well integrated in the various ISO technical committees. European manufacturers, such as ABB, Kuka and Comau are very active in this field. Also many outstanding European manufacturers of robotic components are involved in standardisation groups in their areas of expertise.

However, new players such as start-ups and SMEs developing highly innovative solutions and products suited to the next generation of robotics have not been involved in standardisation so far. Engaging and supporting them in participating in standardisation efforts and activities will strengthen Europe's position in the robotics industry.

EU-funded R&D projects also contribute to standardisation activities but to a lesser extent because their activities tend not to last enough to match the usually long timetables of standardisation work. When European projects are involved in standardisation, it tends to be through recipients of funding that are robot or robot-component manufacturers. It is important to strengthen the ties between EU R&I projects and SDOs, bringing project results into standardisation activities.

ISO

ISO TC on Robotics: ISO/TC 299 — Robotics.
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.iso.org/iso/iso_technical_committee?commid=5915511

IEEE

IEEE has standardisation and pre-standardisation activities in the field of robotics and automation, including navigation, applications for transportation and ethical considerations for the design of autonomous systems.
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://standards.ieee.org/develop/msp/robotics.pdf

SPARC

PPP for the collaboration between European robotic industry, academia and the European Commission to facilitate the growth and empowerment of the robotics industry and value chain. It includes a working group on standardisation.
http://www.sparc.eu/

H2020

R&D&I projects funded within topics ICT 24, ICT 25, ICT 26 and ICT 27 from Work Programme 2016-17 that may produce relevant input for standardisation.

CONSTRUCTION – BUILDING INFORMATION MODELLING

POLICY AND LEGISLATION

POLICY OBJECTIVES

The construction industry is one of the largest European industries but is also seen as relatively inefficient in both process and service delivery. It suffers from a comparatively low level of digitalisation and studies indicate that its productivity, compared to other sectors, has fallen in recent decades. Current practices lead to duplication of activities and increases in risks, costs and timescales for the delivery of construction projects.

Management of the asset portfolio throughout its life cycle has to be improved in order to ensure that construction clients and users receive better operating information at handover of the built assets.

The introduction of building information modelling (BIM) is seen as a solution to the management of this information during the four phases of the asset lifecycle: procurement; edesign; assembly and operation. The development of BIM is advancing rapidly and requires the application of common standards to ensure future compatibility in data exchange and use.

The introduction of common standards and operating methods using BIM would:

- reduce barriers to operation and trade across the European market area and beyond
- reduce both the capital and operating cost of construction assets
- reduce the time wasted because of inefficient breaks between productive construction processes
- improve the reliability of construction output, with better quality and fewer defects
- improve the resource efficiency of construction products and materials, improving both operating and embodied carbon performance
- support improvements in team working and collaboration
- improve the operations processes of construction assets

EC PERSPECTIVE AND PROGRESS REPORT

CEN Technical Committee 442 on Building Information Modelling was officially kicked off in 2015. The aim is to help the construction sector to be more (cost) efficient and sustainable by enabling smooth data exchange and sharing between partners in the value chain.

The objectives of CEN/TC 442 are:

- to deliver a structured set of standards, specifications and reports which specify methodologies to define, describe, exchange, monitor, record and securely handle asset data, semantics and processes with links to geospatial and other external data.
- to be the home for European BIM standardisation. CEN/TC 442 will be the central place to go for coordinating European BIM harmonisation.
- to coordinate the work with ISO under the Vienna Agreement, either adopting existing international standards at European level or developing new ones in parallel
- to receive and consider proposals for new deliverables and develop them within the TC structure of working groups for the different scopes

The committee so far has adopted the most important ISO standards in the field of BIM as European standards: EN ISO 12006-3, EN ISO 16739, EN ISO 29481-2, EN ISO 29481- 1:2016, and EN ISO 29481-2:2012"

REFERENCES

- Directive 2014/24/EU of the European Parliament and of the Council of 26 February 2014 on public procurement and repealing Directive 2004/18/EC, especially Art. 22
- COM(2012) 433 Communication from the Commission to the European Parliament and the Council on the Strategy for the sustainable competitiveness of the construction sector and its enterprises {SWD(2012) 236 final}
- Regulation (EU) No 305/2011 of the European Parliament and of the Council of 9 March 2011 laying down harmonised conditions for the marketing of construction products and repealing Council Directive 89/106/EEC
- Handbook for the introduction of Building Information Modelling by the European Public Sector (EU BIM Task Group, 2017; ▸ http://www.eubim.eu/handbook/)

REQUESTED ACTIONS

ACTION 1 A road map for standardization for digitization in construction is under development in CEN/TC 442/WG 1 in collaboration with ISO/TC 59/SC 13/TF02 and the corresponding national mirror committees. Based on a survey of ongoing standardization activities and market needs this will give directions for required future standardization. SDOs to develop European standards when necessary (i.e. if functional gaps are found or international standards are not available).

ACTION 2 SDOs to work on information exchange — Enhance and harmonize open data formats, structures and classification systems for model based working in the construction industry. This work is coordinated in CEN/TC 442/WG 2 in collaboration with ISO/TC 59/SC 13 and focuses on activities such as:

- The Industry Foundation Classes (IFC), EN ISO 16739 and its extension within the infrastructure sector. Important developments on a European and International Scale are to be started for bridge, tunnel, road, rail and harbors. A common neutral IFC based standard for infrastructure related asset management and construction activities supports a common European market and shall enable equal access to European IT companies,
- a European Objekt Type Library for Roads as currently under development in the INTERLINK project by the Conference of European Directors of Roads (CEDR) enhancing the neural definitions by a harmonized object catalog,
- preliminary Work Items in CEN/TC 442/WG2 and WG4 on providing a common catalog, templates and exchange structures for harmonized product data following the CPR directive,
- other national, domain specific, open data format for model based working with potential for European wide application.

ACTION 3 SDOs to develop common information requirements for project and information management as part of construction service procurement standards:

- Development, finalization and adaptation of national implementation strategies for information management in construction and asset management following the series of ISO 19650 standards,
- development of a common European framework for the Level of Information Needs to express the requested information to be delivered during the project execution and project hand over as New Work Item within CEN/TC 442/WG 2.
    - Develop standards for a common framework for

information sharing and management in the construction industry in Europe in parallel with ISO

ACTION 4 SDOs to support data dictionaries - Develop European standards for exchange of data on construction products, to ensure quality in data to support Regulation EU No 305/2011 CPR and trade of construction products in the European market. In specific, provide digital tools to support the collaborative development and European wide harmonization of terms and corresponding semantics for:

- written language in standards,
- Names, classifications and properties of entities in object oriented data models,

Tools providing a mapping between national/European terms and their corresponding semantics are the basis for the development of a framework for harmonized European vocabulary for digital construction and its European and national implementation.

In the current dynamic development phase with many groups working in parallel there is a great risk that without such tools divergent definitions will be established permanently.

ACTION 5 SDOs to support the BIM execution plan (BEP)

ACTIVITIES AND ADDITIONAL INFORMATION

RELATED STANDARDISATION ACTIVITIES

CEN

CEN/TC 442 Business Plan which can be found at the link below
▸ https://standards.cen.eu/dyn/www/f?p=204:7:0::::FSP_ORG_ID:1991542&cs=16AAC0F2C377A541DCA571910561FC17F

COMMON INFORMATION SHARING ENVIRONMENT (CISE) FOR THE EU MARITIME DOMAIN

POLICY AND LEGISLATION

POLICY OBJECTIVES

The global action's objective is to establish a common information sharing environment (CISE) enabling enhanced awareness and knowledge of what is happening at sea as an important contribution to efficiency in maritime operations and performance in all sectors within the EU maritime domain. This in turn will ultimately ensure safer, cleaner and more secure seas.

In line with the EU digital single market, this translates into seamless, more structured and trusted cross-sector and cross-border information exchange between public administrations across seven distinct maritime domains (maritime safety and security, maritime pollution and marine environment, fisheries control, border control, general law enforcement, trade and economy and defence).

CISE seeks therefore to develop appropriate semantic, technical, organisational and legal solutions and recommendations to enhance the interoperability between existing systems of around 400 maritime public authorities throughout the EU/EEA. As a result the systems become compatible and the content, speed and reliability of information exchange optimal, enabling improved security and sustainable development of economic maritime activities.

Cross-sector and cross-border interoperability between maritime surveillance systems is the major innovative aspect of the CISE. The technical solution proposed is mainly based on the CISE data and service model. Currently being tested in the major FP7 pre-operational validation project EUCISE 2020, the ICT specifications for this solution are also proposed for standardisation. This development could also benefit the European industry.

EC PERSPECTIVE AND PROGRESS REPORT

The objective is to reach firm agreement on the CISE data and service model with all the stakeholders involved in maritime surveillance in Europe. This interoperability agreement should encourage Member States to invest more resources in the exchange of maritime surveillance information across Europe with CISE, thus ensuring the long-term sustainability of the programme.

The present version of the CISE data and service model was developed in 2014 by a pilot project (the CISE cooperation project) involving 28 partners from 12 European countries and covering different sea basins and different sectors.

The EUCISE 2020 FP7 project (CISE pre-operational validation) will develop the CISE components using the CISE data and service model and validate them in a pre-production environment. This project involves 39 authorities from 15 European countries.

REFERENCES

- Council of the European Union: Council conclusions on Global Maritime Security (19 June 2017 - 10238/17)
- Council of the European Union: European Union Maritime Security Strategy (EUMSS) – Action Plan adopted on 16 December 2014 - 17002/14
- Communication from the Commission to the European Parliament and the Council *Better situational awareness by enhanced cooperation across maritime surveillance authorities: next steps within the Common Information Sharing Environment for the EU maritime domain* (COM/2014/0451 final)
- Commission Staff Working Document: 'Impact Assessment accompanying the communication from the Commission to the European Parliament and the Council *Better situational awareness by enhanced cooperation across maritime surveillance authorities: next steps within the Common Information Sharing Environment for the EU maritime domain*' (SWD/2014/0225 final)
- Council conclusions Towards the integration of maritime surveillance: A common information sharing environment for the EU maritime domain, 3092nd General Affairs Council meeting, Brussels, 23 May 2011
- Communication from the Commission to the Council and the European Parliament *Draft roadmap towards establishing the Common Information Sharing Environment for the surveillance of the EU maritime domain* (COM/2010/0584 final)
- *Council conclusions on integration of maritime surveillance,* 2974th External Relations Council meeting, Brussels, 17 November 2009
- Communication from the Commission to the Council the European Parliament, the European Economic and Social Committee and the Committee of the Regions *Towards the integration of maritime surveillance: A common information sharing environment for the EU maritime domain {SEC(2009) 1341} (COM/2009/0538 final)*

REQUESTED ACTIONS

ACTION 1 Based on the existing CISE data and service model, complete semantic and technical interoperability specifications to exchange surveillance information between competent authorities could be standardised.

ACTION 2 The complementary actions could be developed in addition to the standardisation action:

Maintenance of the collaborative platform for publishing technical and operational documentation ("the CISE eHandbook") from 2017. This platform will allow feedback to be collected from the future CISE participants (Member States and Authorities)

- Development of a reference implementation of the CISE software components to facilitate the adoption of CISE by interested authorities.
- Development of a testing platform to assess whether the CISE interface developed by the national authorities complies with the standardised specifications.
- Development of template service level agreement or memorandum of understanding for the future agreements on sharing information between Member States

ACTIVITIES AND ADDITIONAL INFORMATION

RELATED STANDARDISATION ACTIVITIES

ISO

ISO/TC 8: Ships and marine technology
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.iso.org/iso/iso_technical_committee?commid=45776

ISO/TC8 new focus items include:

- Cyber safety
- Electronic certification for port entry; data harmonisation, e-Navigation, IHO
- Ships' Energy Efficiency, EEOI, reductions in emissions from ships in freight transport

Projects include:
- ISO 19847, Ships and marine technology -- Shipboard data servers to share field data on the sea
- ISO 19848, Ships and marine technology -- Standard data for shipboard machinery and equipment

IEC

IEC/TC 80 Maritime navigation and radiocommunication equipment and systems has produced standards:

- IEC 62729 Long Range Identification and Tracking
- IEC 61993-2 Automatic Identification Systems for SOLAS ships
- IEC 62287 Automatic Identification Systems for non SOLAS ships

IEC 62320 Automatic Identification Systems shore infrastructure

- Current activities include the following projects:
- Satellite terminals to support new satellite service providers
- VHF Data Exchange System to support future e-navigation
- S-100 Common Maritime Data Structure to support future e-navigation

CENELEC

CLC/SR 80 Maritime navigation and radiocommunication equipment and systems. Standards and projects in CLC/SR 80 are those conducted at IEC level.

ANNEX I
LIST OF MEMBER STATES' WORK PLANS AND STRATEGIES

This Annex provides a list of links to strategy documents, policies and work plans on ICT standardisation that are available in the Member States, sometimes comprising several links depending on the respective document structuring in Member States. This list is for reference only. It does not claim completeness and only represents a current snap shot.

FRANCE

French digital strategy:

▸ http://www.redressement-productif.gouv.fr/feuille-de-route-pour-le-numerique;

Framework for interoperability and security:

▸ http://references.modernisation.gouv.fr/rgi-interoperabilite

GERMANY

Digital Agenda for Germany:

▸ http://www.bmwi.de/DE/Themen/Digitale-Welt/digitale-agenda.html

German ICT Strategy:

▸ http://bmwi.de/EN/Topics/Technology/ict-strategy.html

ITALY

Agenda Digitale for Italy:

▸ http://www.agid.gov.it/agenda-digitale

NETHERLANDS:

Digital Agenda for the Netherlands:

▸ https://www.rijksoverheid.nl/binaries/rijksoverheid/documenten/rapporten/2016/07/05/digitale-agenda-vernieuwen-vertrouwen-versnellen/digitale-agenda-vernieuwen-vertrouwen-versnellen.pdf

Generic Digital Infrastructure:

▸ https://www.digitaleoverheid.nl/dossiers/gdi-voorzieningen

Dutch National Interoperability Framework:

▸ https://www.noraonline.nl/wiki/NORA_online

Dutch Standardisation Forum / open standards policy:

▸ https://www.forumstandaardisatie.nl

Digital Agenda 2020 for Municipalities:

▸ https://www.da2020.nl/

Testing secure websites:

▸ https://ww.internet.nl

SPAIN:

Digital Agenda for Spain:
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.agendadigital.gob.es/digital-agenda/Paginas/digital-agenda-spain.aspx

Spanish National Cybersecurity Strategy:
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.lamoncloa.gob.es/documents/20131332estrategiaciberseguridadx.pdf

Spanish National Interoperability Framework, English version:
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://administracionelectronica.gob.es/pae_Home/dms/pae_Home/documentos/Estrategias/pae_Interoperabilidad_Inicio/pae_Esquema_Nacional_de_Interoperabilidad/ENI_INTEROPERABILITY_ENGLISH_3.pdf

Original Spanish version:
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.boe.es/boe/dias/2010/01/29/pdfs/BOE-A-2010-1331.pdf)

Strategy on Technical Interoperability Standards:
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://administracionelectronica.gob.es/pae_Home/pae_Estrategias/pae_Interoperabilidad_Inicio/pae_Normas_tecnicas_de_interoperabilidad.html#.UnI2QlPFnzs

Technical Interoperability Standard for the Catalogue of Standards, English version:
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://administracionelectronica.gob.es/pae_Home/dms/pae_Home/documentos/Estrategias/pae_Interoperabilidad_Inicio/LEGISLACION_2012_BOE-A-2012-13501_Catalogue_of_standards_ENI_publicacion_oficial_2012/Catalogue%20of%20Standards%20NIF%20Spain.pdf

Official Spanish version:
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.boe.es/diario_boe/txt.php?id=BOE-A-2012-13501 plus ▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://www.boe.es/diario_boe/txt.php?id=BOE-A-2013-455

SWEDEN:

Swedish Digital Agenda:
▸ http://www.government.se/sb/d/2025/a/181914

Swedish strategy for eGovernment:
▸ http://www.regeringen.se/sb/d/15700/a/206004

SWITZERLAND:

Strategy of the Federal Council for an Information Society in Switzerland 2016:
https://www.bakom.admin.ch/bakom/en/homepage/digital-switzerland-and-internet/strategie-digitale-schweiz.html

National strategy for the protection of Switzerland against cyber risks
https://www.isb.admin.ch/isb/en/home/themen/cyber_risiken_ncs.html

eGovernment Strategy Switzerland
https://www.egovernment.ch/en/umsetzung/e-government-strategie/

UNITED KINGDOM:

UK government policy on standardisation:
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://www.gov.uk/innovation-standardisation--4

Strategy on ICT:
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://www.gov.uk/government/publications/information-economy-strategy

Strategy on spectrum:
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://www.gov.uk/government/publications/spectrum-strategy

ICT infrastructure consultation:
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://www.gov.uk/government/consultations/digital-communications-infrastructure-strategy-consultation

Internet of Things development
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://www.gov.uk/government/collections/internet-of-things-review

Plans and progress on theNational Cybersecurity Strategy (NCSP)
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://www.gov.uk/government/publications/national-cyber-security-strategy-2-years-on

Government ICT procurement and the use of standards
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020s://www.gov.uk/government/publications/open-standards-principles/open-standards-principles
▸ http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020://standards.data.gov.uk/

ANNEX II: LIST OF LINKS TO STANDARDS BODIES' WEB SITES WITH UP-TO-DATE INFORMATION ON ONGOING WORK

This Annex provides a list of links to repositories of standards development organisations where information on projects and ongoing work relevant to the EU policy priorities can be found. The list does not claim completeness and may incrementally be increased.

CEN

http://www.cen.eu/cen/Sectors/Sectors/ISSS/Pages/default.aspx

CENELEC

http://www.cenelec.eu/aboutcenelec/whatwedo/technologysectors/Informationandcommunicationtechnology.html

ETSI

ETSI work programme:
http://www.etsi.org/about/etsi-work-programme

IEEE:

IEEE entry to standardisation activities relevant to the Rolling Plan:
http://standards.ieee.org/develop/msp/index.html

IETF:

IETF entry to standardisation activities relevant to the Rolling Plan:
http://trac.tools.ietf.org/group/iab/trac/wiki/Multi-Stake-Holder-Platform

OASIS

Current standards projects:
https://www.oasis-open.org/committees/
Standards projects by topical category:
https://www.oasis-open.org/committees/tc_cat.php

W3C:

Current list of W3C active Groups:
https://www.w3.org/Consortium/activities

ANNEX III: TERMS, DEFINITIONS AND ABBREVIATIONS

DEFINITIONS

TERMS

EUROPEAN STANDARDS ORGANISATIONS (ESO)

The three European standards organisations are listed in Annex I to Regulation 1025/2012/EU, i.e. CEN, Cenelec and ETSI. Among other activities, they adopt European standards.

EUROPEAN MULTI-STAKEHOLDER PLATFORM ON ICT STANDARDISATION (MSP)

The MSP is an advisory group to the Commission on matters relating to the implementation of standardisation policy for information and communications technology (ICT), including its work programme, priority-setting in support of legislation and policies, and identification of specifications developed by global ICT standard development organisations. It is composed of members of the national authorities of Member States and EFTA countries, industry associations, societal stakeholders and organisations representing ICT standardisation stakeholders.

http://ec.europa.eu/transparency/regexpert/index.cfm?do=groupDetail.groupDetail&groupID=2758

ANNUAL UNION WORK PROGRAMME ON EUROPEAN STANDARDISATION (AUWP)

The AUWP is a formal document adopted by the Commission identifying the strategic priorities for European standardisation, taking into account Union long-term strategies for growth.
http://ec.europa.eu/growth/single-market/european-standards/policy/index_en.htm

MAIN ABBREVIATIONS

AAL Active assisted living
ADMS Asset Description Metadata Schema
AG Amsterdam Group
AIOTI Alliance for Internet of Things Innovation
AM Additive manufacturing
AMNPO Advanced Manufacturing National Program Office
AMQP Advanced message queuing protocol
APT Asian Pacific Telecommunication
BIM Building information modelling
BSI British Standards Institution
CBOR Concise Binary Object Representation
CCEV Core Criteria/Evidence Vocabulary
CEF Connecting Europe Facility
CERIF Common European research information format
CII Cross-Industry Invoice
CIP Competitiveness and innovation framework programme
CIS Consent & information sharing
CISE Common Information Sharing Environment
CITS Collaboration on ITS Communication Standards
CMS Content management systems
COAP Constrained Application Protocol
COC Code of conduct
CORE Constrained Restful Environments
CPS Cyber-physical systems
CSA Coordination and support action
CSC Cloud Standards Coordination
CSCC Cloud Standards Customer Council
CSCG Cybersecurity Coordination Group
CSI Cities Standards Institute
DECT Digital enhanced cordless telecommunications
DOA Digital object architecture
DSM Digital single market
DSRC Dedicated short-range communications
ECC Electronic Communications Committee
ECEP European common enforcement priorities
EEAP European electronic access point
EETS European Electronic Toll Service
EFC Electronic fee collection
EFFRA European Factories of the Future Research Association
EMSFEI European Multi-Stakeholder Forum on e-Invoicing
EPC European Payment Council
EPS Electric Power System
ERN European Reference Networks
ERPB Euro retail payments board
ESEF European single electronic reporting format
ESMA European securities and market authority
ESO European standards organisations
ESOP European Statement of Principles
ESPD European single procurement document
EUPP Energy using and producing products
EV Electric vehicles
EXEP Expert group on e-Procurement
FIBO Financial industry business ontology
GDC GREEN DIGITAL CHARTER
GICTF Global Inter-Cloud Technology Forum
HAN Home automation networks
HMI Human-Machine-Interaction
HON Health On the Net
HRM Human resources management
HTG Harmonisation Task Groups
IAB Internet architecture board
IBOPS Identity-based attestation and open exchange protocol specification
ICT Information and communication technologies
IDM Information delivery manual
IDMP Identification of medicinal products
IFC Industry foundation classes
IFM Interoperable fare management
IFRS International financial reporting standards
IMF Interoperable master format
INSPIRE Infrastructure for Spatial Information in the European
IOT Internet of Things
ISA Interoperability solutions for public administrations
ISMS Information security management systems
ITLET Information Technology for Learning, Education and Training
ITS Intelligent Transport Systems
JISC Japanese Industrial Standards Committee
KET Key enabling technologies
KMIP Key management interoperability protocol
KPI Key performance indicators
KTN Knowledge Transfer Network
LOD Linked open data
LSP Large scale pilot
MOOC Massive open online course
MOU Memorandums of understanding
MQTT Message Queuing Telemetry Transport
NFC Near field communication
NSF Network security function
OAM Officially appointed mechanisms
OASC Open & Agile Smart Cities
OCC Open Cloud Consortium

OGC Open Geospital Consortium
OGF Open Grid Forum
OMG Object Management Group
PACS Picture archive and communication systems
PCHA Personal Connected Health Alliance
PII Personally identifiable information
PLC Power line communication
PMRM Privacy management reference model
PO Publications Office
POS Point of sale
PPP Public-Private Partnership
PPS Production planning & scheduling
PSA Programme Support Action
PSAP Public safety answering point
PSI Public sector information
QKD Quantum key distribution
QOE Quality of experience
QOS Quality of service
QSC Quantum safe cryptography
R&TTE Radio Equipment and Telecommunications Terminal Equipment
RAN Radio access networks
RAS Robotics and autonomous systems
RDA Research Data Alliance
RE Renewable Energy
REEIF Refined eHealth European Interoperability Framework
RES Renewable energy sources
RTS Regulatory technical standards
SAGA Strategic Advisory Group on Accessibility
SAML Security assertion markup language
SBR Standard business reporting
SCIM System for Cross-domain Identity Management
SEIF Semantic energy information framework
SEPA Single euro payments area
SGCC State Grid Corporation of China
SIP Strategic Implementation Plan
SLA Service level agreement
SME Small and medium-sized enterprises
SMPTE Society of Motion Picture and Television Engineers
SNIA Storage Networking Industry Association
SSP Smart Secure Platform
STA Smart Ticketing Alliance
STIR Secure Telephone Identity Revisited
TARV Telematics applications for regulated commercial freight vehicles
TC Technical committee
TGF Transformational Government Framework
TOSCA Topology and Orchestration Specification for Cloud Applications
TR Technical Report
TS Technical specification
TSP Trust service providers
UAAG User Agent Accessibility Guidelines
ULE Ultra-low energy
UPS Uninterruptible power sources
VIN Vehicle Identification Number
VOT Vectors of Trust
VRU Vulnerable Road Users
WAVE Wireless Access in Vehicular Environments
WCAG Web Content Accessibility Guidelines
WCPS Web coverage processing service
XDI XRI data interchange