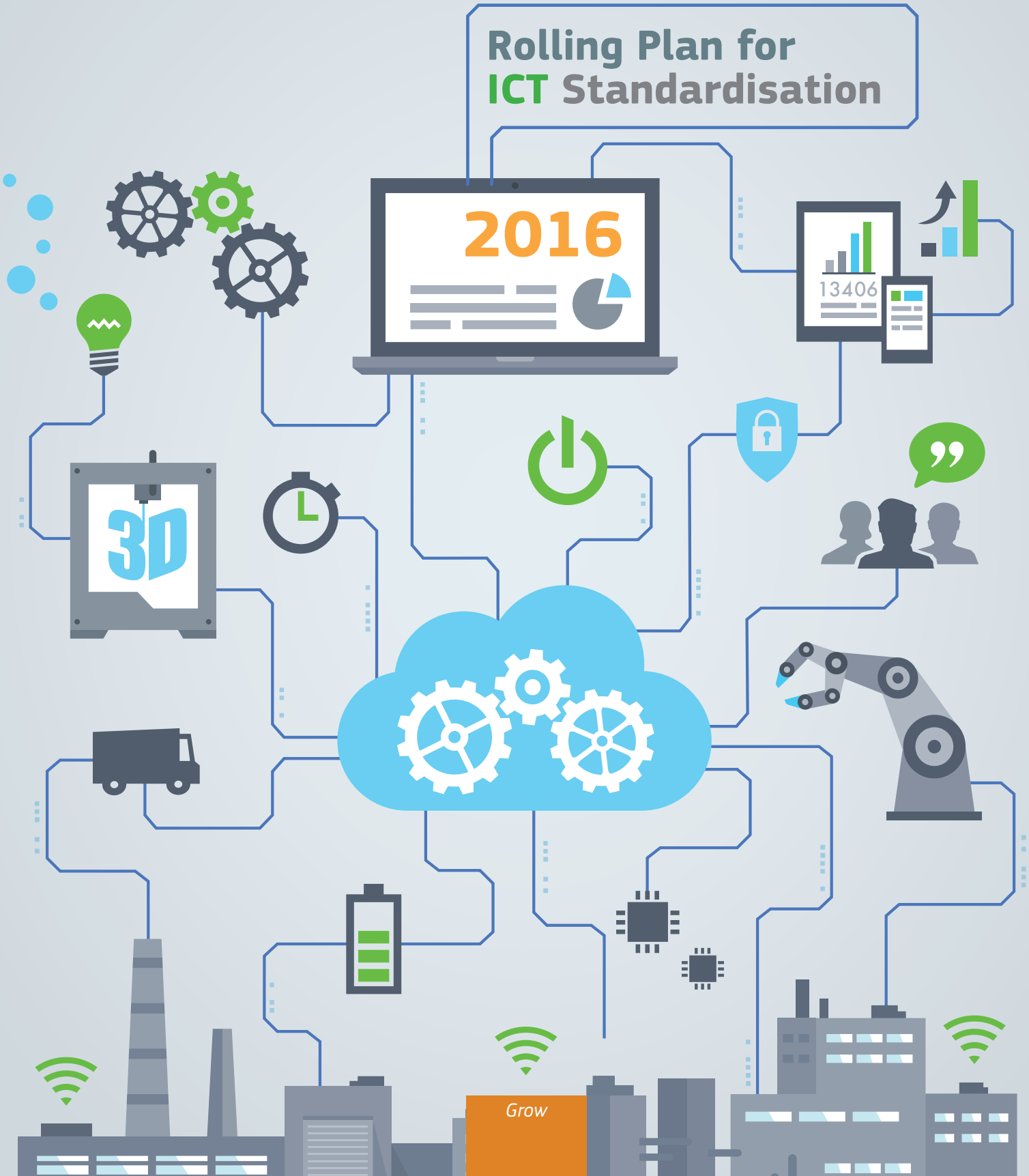
European Commission

# Rolling Plan for ICT Standardisation



**EUROPEAN COMMISSION**
**Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs**

**Innovation and Advanced Manufacturing**
*KETs, Digital Manufacturing and Interoperability*

# Rolling Plan for ICT Standardisation

# 2016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# Executive introduction to the EU Rolling Plan for ICT Standardisation

This **EU Rolling Plan for ICT Standardisation**, henceforth called the Rolling Plan (RP), is a document drafted by the European Commission, in collaboration with the European Multi-Stakeholder Platform on ICT Standardisation, henceforward referred as the "**Multi-Stakeholder Platform" or "MSP**". The MSP is an advisory group to the European Commission on matters of ICT standardisation policy; it includes Member States, European and global standardisation bodies, industry and association representatives.

This Rolling Plan provides a **multi-annual overview of the needs for preliminary or complementary ICT standardisation activities to undertake in support of the EU policy activities**. It is addressed to all ICT Stakeholders, standard makers or not, and gives a transparent view on how the policies are planned to be practically supported. Thanks to the wide participation in its drafting, it achieves to picture a unique view of the landscape of standardisation activities in a given policy area.

The Rolling Plan comprises several chapters. The first two chapters provide an introduction, placing standardisation in the policy context. Chapter 3 is the heart as it lists all topic areas identified as EU policy priorities where standardisation activities play a key role in the implementation of the respective policy. Chapter 4 covers technologies of horizontal importance in the contexts of ICT infrastructures and ICT standardisation. In this new version, actions are numbered to enable an improved follow-up.

The Rolling Plan is very rich in information about legal documents, available standards and technical specifications as well as ongoing activities in ICT standardisation. In order to keep this information up-to-date and make sure that new developments in the sector of ICT which is subject to fast progress one or more Addenda to the Rolling Plan may be published containing factual updates. These will be published alongside the Rolling Plan.

Comments or suggestions can be sent to
grow-ict-standardisation@ec.europa.eu

# Table of Contents

# 1. The strategic role of ICT standardisation in the context of EU policy making

## 1.1. Terms, Definitions and Acronyms

| TERMS | Definition |
|---|---|
| **European Standards Organisations (ESO)** | The three European Standards Organisations are the organisations listed in the Annex I of the Regulation 1025/2012/EU, i.e., CEN, CENELEC and ETSI. Among other activities, they adopt the 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 ICT Standardisation policy, 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 |

## 1.2. Legal Basis

**Regulation 1025/2012/EU on European Standardisation**
http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2012:316:0012:0033:EN:PDF
This Regulation sets up the general frame for the standardisation. It defines what a standard is, how stakeholders are involved in its elaboration and the link to the Annual Union Work Programme for ICT Standardisation and the financial arrangements.

**Commission Decision of the 28.11.2011 setting up the European Multi-Stakeholder Platform on ICT Standardisation**
http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2011:349:0004:0006:EN:PDF

**Communication from the Commission to the European Parliament, the Council and the European Economic and Social Committee of the 1.6.2011. COM(2011) 311**. A strategic vision for European Standards: Moving forward to enhance and accelerate the sustainable growth
http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2011:0311:FIN:EN:PDF

## 1.3. EU Policy Making and the Rolling Plan for ICT Standardisation

### 1.3.1. The Rolling Plan: Instrument of ICT Standards Policy

Innovation and technology adoption are of high importance for Europe. They both drive technology progress and make sure that state-of-the-art technologies get implemented and optimally used. Also, innovation and technology adoption provide critical support for Europe to face the challenges of a global market place, of society and economies. Information and Communication Technologies (ICT) play a focal role in supporting and facilitating innovation not only in ICT specific areas but also as horizontal technologies.

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 standards adopted by recognised standards bodies after a public enquiry procedure can be international, European or national. The three European Standards Organisations (ESOs) entitled to produce European standards are CEN, CENELEC and ETSI. Those ESOs also produce other technical specifications, so-called European standardisation deliverables, which undergo different development and consensus building processes.

Relevant ICT technical specifications, however, are also developed by global industry-driven ICT fora and consortia. When their development processes meet requirements as laid down in Annex II of the Regulation on European standardisation (1025/2012)[1] they may become common technical specification to be referenced by the public sector in their public procurements and public policies. This is in accordance with Articles 13 and 14 of the Regulation on European standardisation.

**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).

### 1.3.2. What is the Rolling Plan and what does it provide?

This Rolling Plan identifies EU policy priorities where ICT standardisation and ICT standards should be considered as part of policy making. The Rolling Plan is a strategic document focussing on the support those standards, technical specifications, and standardisation in general can provide in the context of EU policy priorities, in particular to ensure interoperability (including avoidance of technology lock-in) in the ICT domain.

The Rolling Plan looks at the standardisation landscape in relation to the EU policy priorities. It identifies possible areas for action and may go into suggesting a plan or roadmap regarding effective standardisation support. The **detailed recommendations** are addressed in relation to each policy priority individually in chapter 3 of this Rolling Plan.

The Rolling Plan is addressed to public authorities, but also to any other parties interested in ICT standardisation. It provides transparent information on the EU policy actions under way or envisaged and on the standardisation landscape in Europe and globally. It therefore serves as a source of basic information for stakeholders wishing to contribute to the policy objectives through standards activities. It is a guidance document without legal status.

## 1.4. Instruments of EU Policy Making

As outlined below the European Commission has different options for making use of standards and technical specifications or triggering activities around standardisation. These options also depend on the level of policy making.

The focus of the Rolling Plan is on the role of ICT standards in supporting policies, and it may reference or complement the New Approach and New Legislative Framework. Under these processes, standards may be referenced in support of legislation, i.e. in the context of EU Regulations or Directives. Harmonised European Standards (hEN) may be used to demonstrate compliance with so-called essential requirements, and thus enable products to be placed on the European market. Standardisation requirements in respect of these issues are covered in the Annual Union Work Programme, and will be the subject of mandates.

1 The exact definition and scope of the terms 'standard' and 'ICT technical specification' are detailed in article 2 of Regulation 1025/2012 (see legal basis). Additional information can be found in public procurement legislation (Directives 2004/17/EC, 2004/18/EC and 2009/81/EC, and Regulation 2342/2002, http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2004:134:0001:0113:en:PDF)

Standards may also be used in support of industrial or innovation policy, e.g. for driving interoperability and the uptake of new technologies. The Rolling Plan addresses specific technology areas which have been identified as policy priorities and explores the role which standards and technical specifications can play in achieving the policy objectives.

Standards can also play a role in EU funded Research and Innovation (R&I) projects, most notably in the context of the EU Framework Programmes for R&I. The impact of standards on R&I may be on different levels: R&I projects may contribute to standardisation work; standardisation may be a tool for adopting and exploiting new technologies; and standardisation may contribute input to R&I work or R&I activities may build on standardisation work that is available or in progress. Thus some topic areas addressed in Rolling Plan may be identified by Commission as areas with relevance for R&I and taken up in the context of the EU R&I Framework Programme.

Finally, standards take an important role in government internal policies, i.e. such areas, where governments identify procedures for internal information exchange, infrastructure and systems design. These policies may also be addressed on A2A (administration to administration), A2B (administration to business) and A2C (administration to citizen) issues.

Closely linked and often a consequence of government internal policies is public procurement. Where standards and common technical specifications have been identified as important in government internal policies, public procurement will –and should– reference these standards and common technical specifications in the respective calls for tenders when acquiring technologies that are needed to implement the respective policies. In other words: policy making often precedes public procurement, and thus the selection of standards and common technical specifications in policy contexts precedes the referencing of the respective standards in public procurement.

## 1.5. The relation between the Annual Union Work Programme on European standardisation and the Rolling Plan for ICT standardisation

The European Commission formally adopts an Annual Union Work Programme (AUWP) which covers strategic priorities for European standardisation across all sectors. The AUWP primarily addresses the work where the Commission intends to issue standardisation requests for European standards and other deliverables from the ESOs. It also includes objectives for the international dimension of European standardisation, in support of Union legislation and policies. It is drafted in consultation with the Member States, ESOs and stakeholder organisations. The AUWP is addressed to the other Institutions, the ESOs and the public at large. While the AUWP does include topic areas from the ICT sector, it contains limited detail and focuses on those actions where EU standardisation requests (former mandates) are or may be involved.

The Rolling Plan complements the AUWP, but is exclusively addressed to ICT standardisation. The Rolling Plan goes well beyond the items listed in the AUWP. The Rolling Plan sets out in detail the policy framework with relevance to ICT standardisation for the benefit of all interested parties in the ICT area. Topic areas addressed in the AUWP are always listed in the Rolling Plan as well when it comes to ICT related standardisation.

## 1.6. Pan-European consistency

### 1.6.1. EU Member States and EFTA Countries

The EU Member States as well as the EFTA countries associated with European standardisation participate in the development of the Rolling Plan. They are members of the MSP. For the Rolling Plan they can bring in their respective national interests, e.g. in the form of national strategy papers, standards lists, standardisation work programmes or interoperability frameworks.

The objective of the Rolling Plan in this respect is to integrate the different approaches, interests and policy objectives and to bridge between the various approaches and interests. The Rolling Plan is informative and not prescriptive in any way. The Rolling Plan may identify overlaps with policy objectives on the side of some of the Member States and EFTA countries. It also contains suggestions for new or further activities or policy needs as seen by Member States and EFTA countries. Overall, the Rolling Plan aims at facilitating pan-European consistency on ICT standardisation by providing the necessary information and linkage.

### 1.6.2. Broad Stakeholder input

The Rolling Plan is based and integrates 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.

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.

## 1.7. Development and Maintenance of the Rolling Plan

The Rolling Plan is a living document and does not claim completeness. 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 there is no systematic search.

The Rolling Plan is a Commission document, collaboratively and regularly reviewed, on the basis of input from the EU Services and on basis of 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 on a by-need basis in the form of Addenda to the Rolling Plan. Missing information may be notified to the European Commission which holds the secretariat of the MSP, at *ec-ict-std-platform@ec.europa.eu.*

## 1.8. Instruments for implementation of the Rolling Plan

### 1.8.1. General aspects

The Rolling Plan aims to provide a concise picture of the plans and needs in ICT standardisation in the context of EU policy making.

This information is intended for all stakeholders involved in ICT standardisation. This way, the ESOs and any other standards development organisation are given an overview on standardisation needs and the possibilities to contribute to the work.

This high level of transparency is an opportunity to encourage collaborative work among all these standards development organizations, which can coordinate in the MSP.

### 1.8.2. Financial instruments

The Commission supports the voluntary work by stakeholders concerning standardisation with the following tools:

(1) Standardisation budget. The ESOs have a privileged link with the Commission to apply for action grants, in particular to develop standards and European standardisation deliverables in support to mandated work, but also to develop standards and other European standardisation deliverables in support of EU policies. For ICT standardisation, ESOs can act as coordinator involving different global standards development organisations and including their work.

Research budget. Standardisation organizations and other bodies can apply to EU-financed research programmes[2] in accordance to the rules of the different available calls for proposals. The Commission encourages research projects to feed their results into the standardisation process. Therefore, activities in support of standardisation can be funded via research budget. Coordination and support actions may also provide support to standardisation activities.

2 Current EU Framework Programme for Research and Innovation is Horizon 2020, see http://ec.europa.eu/programmes/horizon2020/

# 2. Promoting the implementation of standards

## 2.1. The use of standardisation in support of policy making

An important objective of this Rolling Plan is to create awareness of the importance of 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 areas that were identified as policy priorities. To this end, the Rolling Plan may look at the full spectrum of available instruments for promoting awareness about standardisation and standards; for identifying standards 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 public authorities, but they may also be directed 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; or conferences to raise awareness on the importance of ICT standards. 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 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 standard development organisation (SDO) concerned and is relevant in all development phases of a standard.

In the next sections, instruments that are general in nature are mentioned. Gearing the instruments to the standard involved is up to the specific stake holder(s) who want to have a standard adopted and out of scope of this Rolling Plan.

## 2.2. Public procurement

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

The Rolling Plan moreover builds on the possibility to have relevant global ICT technical specifications available for use in Europe. The Regulation on European Standardisation 1025/2012, which came into force in January 2013, now offers the possibility to identify certain relevant ICT specifications, primarily to enable interoperability, 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. The European Commission draws on this possibility with the "Guide for the procurement of standards-based ICT — Elements of Good Practice" (COM(2013) 455 and SWD(2013) 224). The Rolling Plan supports this Guide by identifying available standardisation activities, standards and technical specifications in areas with policy relevance.

This may allow formal identification of various consortia standards that are in practical use at present by various Member States. Several Member States use lists with standards that can be used by public authorities in their public procurement. Some Member States use instruments to help procurement specialists requiring standards. E.g. the Netherlands have made procurements text (general and per standard) to help procurement specialists to ask for standards in a way that is in line with Dutch policy. Other Member States have similar activities in place.

With the "Guide for the procurement of standards-based ICT – Elements of Good Practice" the European Commission also promotes the sharing of best practices among public authorities in order to diminish lock-in.

## 2.3. Research and Innovation

Research is a rich potential source of new standards or standards components as well as 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. Similarly, historically, many European ICT research projects under EU R&D Framework Programmes utilise standards in their design and execution.

Initiatives to link ICT standardisation and ICT R&I appear to be most effective when carried out already at the research planning stage. Standardisation awareness thus needs to be considered early 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 as well as 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 addressing in particular innovative SMEs. The objectives are to promote the use and implementation of standards with SMEs but also to encourage and facilitate the participation of SMEs in the standardisation processes. Failing to support innovative SMEs in the ICT industry in their efforts to influence standards could seriously restrict the market impact of these SMEs, and their long-term growth prospects.

## 2.4. 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 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 enables manufacturers to benefit from the economies of scale of a wider market. There is a broad stakeholder demand in the marketplace to ensure interoperability.

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

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

Ongoing relevant activities are:

- 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 as well as 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.

## 2.5. 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.

# 3. EU policy areas supported by ICT standardisation

## 3.1. Listing and structuring EU policy areas

The topics listed in this chapter are policy priorities where standardisation plays a role in the implementation of the respective policy. The topics were identified by the European Commission and reviewed with the MSP. The topic areas are grouped into four clusters:

1

### Societal Challenges

- eHealth
- Active and Healthy Aging
- Accessibility of ICT products and services
- e-Skills and e-Learning
- Emergency communications
- eCall

2

### Innovation for the digital single market

- e-Procurement, Pre and Post award
- e-Invoicing
- Card, Mobile and Internet Payments
- XBRL
- Online Dispute Resolution (ODR)

3

### Sustainable growth

- Smart Grids and Smart Metering
- Technologies and Services for a Smart and Efficient Energy Use
- ICT Environmental Impact
- EETS (European Electronic Toll Service)
- Intelligent Transport Systems
- Advanced Manufacturing
- Robotics

4

### Key enablers and security

- Cloud computing
- Public Sector Information, Open Data and Big Data
- eGovernment:
- Electronic identification and trust services including e-signatures
- RFID
- Internet of Things
- Network and Information Security
- ePrivacy
- Broadband Infrastructure Mapping
- eInfrastructures for research data and computing-intensive science
- Preservation of Digital Cinema

All above topic areas are presented in the same structure outlined below., which represents both the rationale for proposing the topic area as policy priority and the details related to standardisation and standards.:

## A. Policy objectives

## B. Legislation and policy documents

B.1 At European level

B.2 Others

## C. Standardisation needs, ongoing activities and progress report

C.1 Commission perspective and progress report

C.2 Ongoing standards developments

## C.3 MSP Members' and Stakeholders' remarks

D. Proposed new standardisation actions

D.1 Standards developments

## D.2 Other activities around standardisation

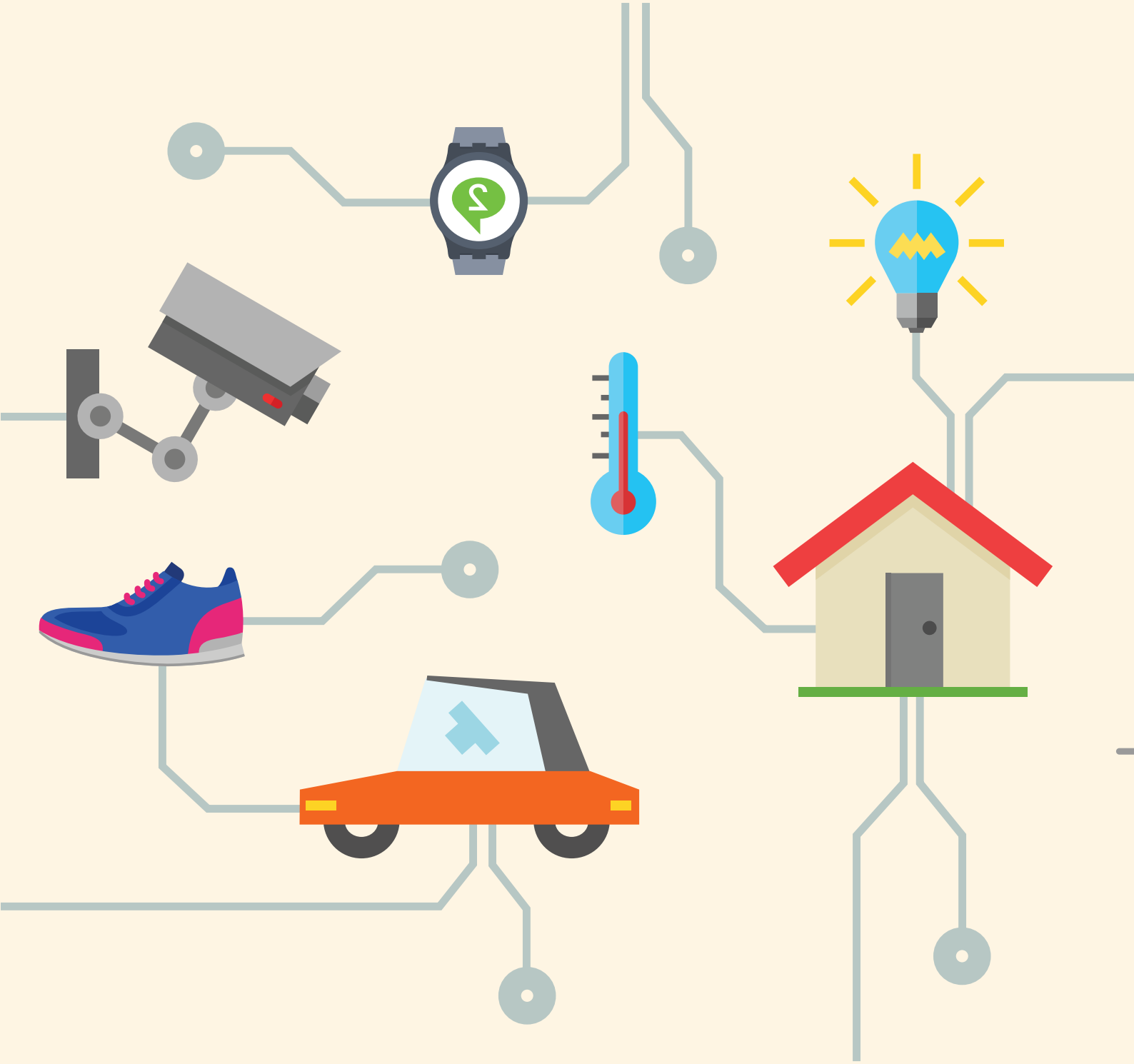
The above template has been applied for all policy areas below structuring the information in an identical way. If for some line items of the template no specific information is available, the line item may be absent from the structure.

In general, the information which is given in the following sections on each policy reflects the current status of technologies available or in progress as well as the current understanding of the policy needs.

This Rolling Plan does not claim completeness. The information provided by the stakeholders is the one which has explicitly been submitted to this Rolling Plan. Much more information may be available and many more activities may be going on in different stakeholder organisations or within Member States.

It is expected that the various organizations continue to refine their understanding of what work is relevant to which policy areas. Various stakeholders also maintain websites with up-to-date information about their activities - including in relation to the policy areas. The reader is advised to also refer to those web pages for the most up to date information.

## 3.2. Societal challenges



# 3.2.1. eHealth

## A. Policy objectives

Information and Communication Technologies (ICT) applied to health and healthcare systems can increase their efficiency, improve quality of life and unlock innovation in health markets. The European Commission has been developing targeted policy initia-tives aimed at fostering widespread adoption of eHealth throughout the EU.

The eHealth Network of Member States (eHN), a network of national authorities respon-sible for eHealth drawing up guidelines in the area of eHealth, has been set up pursuant to Article 14 of Directive 2011/24 on the application of patients' rights in cross-border healthcare. A Joint Action to provide scientific and technical support the eHealth Net-work (JAseHN) was launched in May 2015. JAseHN aims to prepare political recom-mendations and other instruments for cooperation in the four specific priority areas that are defined in the eHN's Multiannual Work Plan: (1) interoperability and standardiza-tion, (2) monitoring and assessment of implementation, (3) exchange of knowledge and (4) global cooperation and positioning.

Member States have dynamically responded to the eHealth policy agenda by demonstrat-ing a high level of commitment, notably through their participation in the eHN and in its operational support JAseHN, as well as in major large scale pilot projects such as epSOS and EXPAND.

Notwithstanding this substantial progress, difficulties continue to exist that need to be addressed in order to reap all the benefits from a fully mature and interoperable eHealth system in Europe. One of them is the lack of interoperability between eHealth solutions and the rather poor adoption of common standards in eHealth systems.

## B. Legislation and policy documents

### B.1 At European level

- **Directive 2011/24** on the application of patients' rights in cross border healthcare
  http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2011:088:0045:0065:en:PDF
- Communication from the Commission A Digital Single Market Strategy for Europe COM/2015/192
  http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1447773803386&uri=CELEX:52015DC0192
- **COM(2010) 245:** "A Digital Agenda for Europe", actions 76, 77 and 78
  http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52010DC0245R(01)&from=EN
- Communication of the Commission on telemedicine for the benefit of patients, **healthcare systems and society, COM(2008)689**
  https://ec.europa.eu/transparency/regdoc/rep/1/2008/EN/1-2008-689-EN-F1-1.Pdf
- **SWD(2012) 413 final** - eHealth Action Plan 2012-2020 - Innovative healthcare for the 21st century
  http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=SWD:2012:0413:FIN:EN:PDF
- **European Commission Green Paper** on mobile health ("mHealth") issued to stake-holders for comments April 2014' (now completed)
  http://ec.europa.eu/digital-agenda/en/news/green-paper-mobile-health-mhealth
- **Refined eHealth European Interoperability Framework (ReEIF) adopted by the eHN on 23.11.2015**
  http://ec.europa.eu/health/ehealth/docs/ev_20151123_co03_en.pdf
- **EU-US MoU**
  http://ec.europa.eu/digital-agenda/en/news/memorandum-understanding-eu-us-ehealth

### B.2 Others

- **Directory for eHealth policies, World Health Organisation,**
  http://www.who.int/goe/policies/en
- **French national strategy**
  http://proxy-pubminefi.diffusion.finances.gouv.fr/pub/document/18/17721.pdf#page=23
- **Strategy of the Federal Council for an Information Society in Switzerland:** [3]
  http://www.e-health-suisse.ch/index.html?lang=en
- **Legally eHealth - Putting eHealth in its European Legal Context**
  http://www.epsos.eu/uploads/tx_epsosfileshare/Legally-eHealth-Report_01.pdf

3 "eHealth Suisse" tries to link regional projects under national rules (middle-out approach); standards are recommended for use according to the needs emerging from use cases that are being implemented; interoperable IHE integration profiles are crucial

# C. Standardisation needs, ongoing activities and progress report

## C.1 Commission perspective and progress report

Interoperability of ICT-enabled solutions and of data exchange is the precondition for an improved coordination and integration of healthcare unlocking the EU eHealth single market.

The use of European and international standards is a way to ensure the interoperability of ICT solutions in general. In eHealth however, such standards often were not 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 Frame-work. An example thereof is the IHE set of specifications identified under the EU regula-tion 1025/2012 by the Commission Decision (EU) 2015/1302 of 28 July 2015 (http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=OJ:JOL_2015_199_R_0011).
A refined eHealth European Interoperability Framework (ReEIF) was adopted by the eHealth Network on 23.11.2015. It represents a common refined framework for manag-ing interoperability and standardisation challenges in the eHealth domain in Europe, of-fering a framework of terms and methodologies for reaching a common language, a common starting point, for the analysis of problems and the description of eHealth solu-tions throughout Europe.
In addition to European and international standards and specifications, interoperability testing, labelling and certification processes are also essential. Several projects are suc-cessfully testing and implementing standards, open and secure architecture, clinical workflows and subsets of terminologies as well as making policy recommendations, to prepare the deployment of eHealth services on a large scale.

To boost interoperability there is a need, when justified, of further specifications and components development and validation; this may be by launching standardisation man-dates, projects or direct grants.

The JAseHN is in the process of setting up an arrangement consisting of standards devel-oping (SDOs) and profiling organisations relevant to eHealth in Europe, that aims at gradually starting to function as one-stop shop for the eHealth Network and the Joint Ac-tion regarding strategic and practical issues related to eHealth standards and profiles.

With the purpose of developing health data exchange the eHealth Network adopted three guidelines on cross-border exchange of health data: the guidelines on a minimum/non exhaustive patient summary dataset for electronic exchange (2013), on a ePrescription dataset for electronic exchange (2014); and on an Organisational Framework for eHealth National Contact Points (2015). In addition, a recommendation to promote the use of pa-tients' registries has been adopted in 2015.

The Commission is working on the setting up of European Reference Networks (ERN) according to Article 12 of Directive 2011/24 on patients' rights in cross-border healthcare. The main aim of ERNs is health care provision in a networking environment. ERNs fulfilment of their goals would need an IT platform allowing the healthcare pro-viders to discuss, share knowledge and clinical information on concrete and real time pa-tient cases (a virtual consultation system) including the use of PACS systems.

The ERN model will play in the future an excellent showcase for the piloting and imple-mentation of other related ICT standards common to many other areas of healthcare.

The eHealth Interoperability Framework Study[4] identifies a representative set of the most relevant use cases within eHealth environment and initiates the specification of requests to foster ICT products and services. Further user centered work may be needed to cover different forms of user integration in the systems. The cited study covers:

- patient summaries, ePrescription, common cross-border Semantics approaches and subsets of ontology's in a specific clinical context ;
- standardised processes in a specific clinical context[5];
- technical specifications (including immunity) for eHealth Systems, especially cross border .

The Commission has launched three H2020 projects related to eHealth Standardization and Interoperability:

- OpenMedicine to building a common EU, standards based, medicines database;
- eStandards to fill in gaps in international standards, and resolve redundancies;
- AssessCT to assess SNOMED CT[6] .

4 http://ec.europa.eu/digital-agenda/en/news/ehealth-interoperability-framework-study
5 May be checked against ITU-T rec. H.860, and enhanced experiences reported to ITU-T SG16
6 http://www.ihtsdo.org/snomed-ct/

## C.2 Ongoing standards developments

### STANDARDS DEVELOPMENTS

| TITLE | SHORT DESCRIPTION & weblinks |
|---|---|
| BSI | PAS 277:2015 Health and wellness apps – Quality criteria across the life cycle - Code of practice |
| CEN | Technical Committee 251 – Health Informatics: providing a focal point for standards in this domain, in close collaboration with ISO C215<br>https://www.cen.eu/work/Pages/default.aspx |
| eHN | Guidelines on:<br>• a minimum/non exhaustive patient summary dataset for electronic exchange (2013), to be revised in 2016<br>• an ePrescription dataset for electronic exchange (2014); to be revised in 2017<br>• on an Organisational Framework for eHealth National Contact Points (2015)<br>http://ec.europa.eu/health/ehealth/key_documents/index_en.htm |
| ISO | The European Medicines Agency is part of a project to finalise the implementa-tion guides to support the adoption of the ISO standards for the Identification of medicinal products (IDMP).<br>http://www.ema.europa.eu/ema/index.jsp?curl=pages/regulation/general/general_content_000645.jsp&mid=WC0b01ac058078fbe2 |
| ETSI | develops DECT 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.<br>addresses work on Smart Body Area Networks. Standards for a dedicated radio technology for these networks are being developed.<br>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.etsi.org/technologies-clusters/technologies/medical |
| IEC | IEC SC 62B. Develops standard IEC 61910-1 which describes a data exchange high level language for data exchange between systems making medical imagery |
| IEEE | has unique standards programs supporting the eHealth area, extending from body area networks to 3D modelling of medical data, and integrating the IEEE 11073™ family of Health Informatics/Personal Health Device Communication standards for data interoperability and architecture.<br>http://standards.ieee.org/develop/msp/ehealth.pdf |
| ITU | published ITU-T H.810 (12/2013), Interoperability design guidelines for personal health systems, ITU-T H.860 (4/2014), Multimedia e-health data exchange services, Y.2065, Service and capability requirements for e-health monitoring services and a technical paper HSTP-H810 (7/2014). Also, 32 Recommendations on compliance test suites encompassing the entire ITU-T H.810 series architecture, including all health, medical and fitness device systems, their transports and their interfaces were published. A new edition of ITU-T H.810 is under preparation.<br>http://itu.int/en/ITU-T/e-Health |
| JIC | Joint Initiative on SDO Global Health Informatics standardisation Note: HL7 Europe Foundation, IHE Europe and others are members of JIC<br>http://www.jointinitiativecouncil.org/ |

## STAKEHOLDER GROUPS, TECHNOLOGY PLATFORMS, RESEARCH PROJECTS

| TITLE | SHORT DESCRIPTION & weblinks |
|---|---|
| **ACT PROJECT (PHILIPS / London Hospital)** | Advancing Care Coordination and Telehealth Deployment http://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. |
| **JAseHN** | Joint Action to Support the eHealth Network http://jasehn.eu/ |
| **eHDSI** | eHealth Digital Service Infrastructure (eHDSI) under the Connecting Europe Facility. |
| **eHealth Governance Initiative – SEHGOVIA** | Supporting the European eHealth Governance Initiative and Action http://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.ehr4cr.eu/ |
| **epSOS** | European Patient Smart Open Services www.epsos.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.esens.eu/home/ |
| **Eureca** | Enabling information re-Use by linking clinical REsearch and Care http://eurecaproject.eu/about/ |
| **eStandards** | The project works on the alignment of eHealth standards, at producing an Evidence-based Roadmap and contribute to an eHealth Quality Management System (interoperability testing & certification of eHealth systems). It also contributes to the coexistence of standards in large-scale eHealth deployment, the EU/US MoU roadmap and provide insights on the Socio-economic aspects of interoperability. http://www.estandards-project.eu/ |
| **EXPAND** | aims to exploit a number of selected eHealth assets developed in various initiatives http://www.expandproject.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://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.linked2safety-project.eu/node/23 |

| TITLE | SHORT DESCRIPTION & weblinks |
|---|---|
| **Momentum** | Momentum is a platform where key players in telemedicine share their knowledge and ex-perience in deploying telemedicine services into routine care. http://telemedicine-momentum.eu/ |
| **openMedicine** | produce recommendations on how to:<br>1. Solve the problem of identifying a medicinal product in a cross border setting<br>2. Address the issue of substitution across the European Union<br>http://www.open-medicine.eu/openmed/ |
| **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.phsforesight.eu/ |
| **PONTE project** | Efficient Patient Recruitment for Innovative Clinical Trials of Existing Drugs to other Indications<br>http://www.ponte-project.eu/ |
| **RENEWING HEALTH** | REgioNs of Europe WorkINg toGether for HEALTH: 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.<br>http://www.renewinghealth.eu |
| **Salus project** | Scalable, Standard based Interoperability Framework for Sustainable Pro-active Post Market Safety Studies<br>http://www.salusproject.eu/ |
| **SemanticHealthNet** | Network of excellence in semantic interoperability<br>www.semantichealthnet.eu |
| **Transform project** | Translational Research and Patient Safety in Europe<br>http://www.transformproject.eu/ |
| **Trillium Bridge** | The Trillium Bridge support action extends the European Patient Summaries of epSOS and Meaningful Use II, Transitions of Care in the United States to establish an interoperability bridge that will benefit EU and US.<br>http://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 maximize the transferability of services and knowledge among European healthcare providers at large scales and in collaboration.<br>http://ec.europa.eu/information_society/apps/projects/factsheet/index.cfm?project_ref=325215 |

### C.3 MSP Members' and Stakeholders' remarks

One must enhance co-existence and interoperability of medical devices (including appli-cation aspects), in order to enable plug-and-play connectivity (i.e. easy installation) and full operational functionality of devices and services for personal health management and healthcare delivery. This aspect is currently handled by the US initiative Continua Health Alliance and included in ITU publications. ESOs should be encouraged to investigate implications in coexistence and interoperability of learning of the experiences of the US Initiative experts taking also in consid-eration the ongoing process of Identification of the IHE set of specifications. To achieve interoperability in specific clinical tasks, IHE cre-ates profiles of relevant standards which make essential features for supporting the clini-cal task mandatory for products claiming conformance with a profile. IHE integration profiles specify the information to be exchanged between systems and the actions that recipient systems must take on receipt of the information.

There may be needs for further actions after appropriate analysis and experience gained on the basis of eHealth Interoperability Framework Study cited in clause C1, 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 multi-disciplinary standardisation approach (incl. linkage to common clinical professional standards), covering:

- Home health monitoring devices using optimized 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, interoper-ability 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 §3.2.3).
  In support of creating interoperable e-health through the development of common initiatives/standards that improves the private life of citizens', development of sensitive health data collected by the person him/herself to be used during treatment, should be supported. Although, if general practitioners are required to provide IT-systems which are open to receive data provided by the patient in question and will have to take responsibility for such data, challenges are posed in extra expenses for cover and also having to approve all devices collecting the data, according to the Medical Device Directive and national rules on data protection.

## D. Proposed new standardisation actions

### D.1 Standards developments

Listing key aspects requiring identification (patients, hospitals, clinics, doctors, diseases, etc.) should be considered at European level as a priority for work on eHealth, since many other areas depend on identifiers. In particular an agreement should be achieved on the categories of healthcare professionals who can access patient summaries, including a solution for the secure authentication of these professionals and their authorisations. Concerning identi-fication and authentication processes, the eIDAS regulation is solving parts of the issues and the work of the eHealth Network in that specific area. The follow-ing items should be covered as far as possible:

1. Accommodation of different identification processes implemented by Member States specific eHealth purpose identification mechanisms, or cross-sectorial identification mechanisms

2. Standardised drug identifiers to achieve national and international interoperability of health services (online or not), while complying with the legislation protecting patients, and including specific rules of enforcement of delivery on medical pre-scriptions[7] . Agreements on standards in this field should take into account the needs of cross-border exchange of Electronic Health Records since their medica-tion part faces similar terminological challenges.

3. Based on the Guidelines on a minimum/non exhaustive patient summary dataset for electronic ex-change (eHN, November 2013), agreements are needed on a terminological profile for a minimum set of fields included in the patient sum-mary and on a technical profile for the cross-border exchange of

7 'drug identifier' means, in this context, the 'unique identifier' to be set out by the European Commis-sion in the implementation of the article 54a, item2(a) of the FMD (DIRECTIVE 2011/62/EU), 'that enables the authenticity of medicinal products to be verified and individual packs to be identified'

patient summar-ies, in particular with regard to the security aspects. With regards to patient consent to the creation or sharing of electronic health records, the eHealth Network has given guidance which could eventually be completed by standards on the pro-cedure and information given for patient consent. This could be made for all eHealth services including the secondary use of data.

4. The ICT services to be provided to the European Reference Networks and healthcare providers shall satisfy the needs of communication and data sharing within and between ERNs addressing areas such as fast and easy share of digital medical images through Picture Archive and Communication Systems (PACS); telemedicine solutions, allowing the healthcare providers 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 epidemio-logical studies; and establishment of shared databases and registries.

5. The evolution towards personalised medicine requires standardisation of data re-lated 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.

6. Quality criteria for the development of health and wellness apps. Taking into ac-count the fast growing market of health and wellness applications and the con-cerns about their quality and reliability, there is a need for a standard at the Euro-pean level that would provide guidance to the app developers by setting out quali-ty criteria and principles to be followed throughout the app development life cy-cle. This standard could be based on the publicly available specification PAS:277 published by the British Standards Institution (BSI).

**ACTION 1:** Evaluate the need to produce an initial report listing all the necessary types of identifiers and identification processes and, where possible, all identifiers needed as components in a European eHealth system[8].

**ACTION 2:** For the further development of the patient summary, one could evaluate the need for solutions on a terminological profile for a minimum set of fields to be included and on a technical profile for the cross-border exchange of patient summaries, in particu-lar with regard to the security aspects and patient consent.

**ACTION 3:** Ongoing discussions for a grant agreement with CEN with the objective of starting a standardisation process of specific elements of the patient summary data set guidelines adopted by the eHealth Network. This action will entail:

1. Ensuring the European participation and input in the international standardization activity;
2. Supporting the development of European standards based on the guidelines of the Network. This activity will be subject to formal adoption by the eHealth Network.

**ACTION 4:** **Ongoing work to** develop European Standards to provide guidance to the eHealth and wellness apps' developers by setting out quality criteria and principles to be followed throughout the app development life cycle. These may include guidelines for users.

8 This report should be used as input for possible improvements in the recently published ITU-T H.860



# 3.2.2. Active and Healthy Ageing

## A. Policy objectives

One of the main trends shaping our future society and economy is demographic change9. Due to its wide ranging impact on society, demographic ageing requires a holistic policy approach to adapt society to the needs of the ageing population, to preserve the quality of life of our citizens while ageing, to maintain solidarity between generations, to promote social and economic inclusion, and to ensure sustainable health and care systems and age-friendly products, services and environments that are designed for all. Demographic ageing population transforms many dimensions of our society and economy, and a thorough re-orientation in the domains of policy and economy is needed to make that transition in such a way which benefits all. The Commission is already pursuing many relevant initiatives across key policy areas, which jointly provide the "fabric" and boundary conditions for a successful tackling of the ageing challenge and stimulate the Silver Economy market.

The demographic change is also the opportunity for Europe to address the safety, security, affordability and accessibility of assistive technologies for older people. New products and services based on Information and Communication Technologies (ICT) for active and healthy ageing can increase the efficiency and sustain the long-term viability of health and care systems, improve quality of life and offer considerable potential for Europe to unlock new markets and growth in Europe and globally. The European Commission has been developing targeted policy initiatives and funding opportunities (e.g. the Societal Challenge 1 on Health, Wellbeing and Active Ageing of Horizon2020) aimed at fostering widespread adoption of ICT for an active and healthy ageing throughout the EU. Member States and Regions have also dynamically responded by demonstrating a high level of commitment to the active and healthy ageing policy agenda, notably through their participation in the European Innovation Partnership on Active and Healthy Ageing, the creation of the Active and Assisted Living Joint Programme and through major large scale pilot projects such as UniversAAL, SMARTCARE, CASA and ReAAL.

Notwithstanding the substantial progress, barriers continue to exist that need to be addressed in order to reap all the benefits from active and healthy ageing systems in Europe. One of them is the lack of open and interoperable solutions for supporting active and healthy ageing and the rather poor adoption of standards in active and healthy ageing systems.

## B. Legislation and Policy documents

### B.1 At European level

- **The European Innovation Partnership** on active and healthy ageing
  http://ec.europa.eu/research/innovation-union/index_en.cfm?section=active-healthy-ageing
- **The ageing report**
  http://ec.europa.eu/economy_finance/publications/european_economy/2012/2012-ageing-report_en.htm
- **Decision on the participation of the Union in the Active and Assisted Living Research and Development Programme** jointly undertaking by several Member States
  http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//TEXT+REPORT+A7-2014-0076+0+DOC+XML+V0//EN
- **Council Conclusions on Healthy Ageing across the Lifecourse**
  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
- **Recommendation CM/Rec(2014)2** of the Committee of Ministers to member States on the promotion of the human rights of older persons
  http://www.coe.int/t/dghl/standardsetting/hrpolicy/other_committees/cddh-age/Document_CDDH_AGE/CMRec(2014)2_en.pdf
- **Active Ageing Index**: work of the European Center of Vienna
  http://ec.europa.eu/social/main.jsp?langId=nl&catId=89&newsId=1837&furtherNews=yes
- **The Dublin Declaration** on Age-Friendly Cities and Communities in Europe (2013)
  http://ec.europa.eu/digital-agenda/en/news/dublin-declaration-age-friendly-cities-and-communities-europe-2013

9 People aged 50+ represent 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 persons per annum 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. Thereby the number of very old persons, 80 years and older, who are most likely in need of care, will increase. At the same time fewer young people will be available to provide informal and formal support and care.

## B.2 Others

- WHO guidelines on age friendly cities
  http://www.who.int/ageing/publications/Global_age_friendly_cities_Guide_English.pdf
- Madrid International Plan of Action on Ageing (2002)
  http://undesadspd.org/Ageing/Resources/MadridInternationalPlanofActiononAgeing.aspx

# C. Standardisation needs, ongoing activities and progress report

## C.1 Commission perspective

Interoperability of ICT-enabled solutions and data exchange is a precondition for better coordination and integration across the entire delivery chain in the market for active and healthy ageing with ICT and the data exchange surrounding it, and thereby unlock the EU single market for ICT for active and healthy ageing.
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 to interoperability testing and European and international standards and specifications, labelling and certification processes are also important.

Several projects are successfully testing and implementing standards, open and secure architecture and subsets of terminologies as well as making policy recommendations, to prepare the deployment of services in ICT for an active and healthy ageing on a large scale.

It is proposed to boost interoperability by further developing and validating specifica-tions and components, also through the launch of standardisation mandates, projects or direct grants, definition of interoperability profiles and certification, if deemed necessary. Coordination with the JIC and other SDOs will be pursued.

Ensuring the right mechanisms are in place for collaboration and coherence on ICT for active and healthy ageing standardisation issues at European level, is a task of the eHealth Network of Member States in charge of coordination regarding eHealth Standards at EU level. See also chapter 3.2.1 on eHealth.

## C.2 Ongoing standards developments

| Title | **SHORT DESCRIPTION** & weblinks |
|---|---|
| **CEN** | TC 431, Social Alarms over IP<br>http://www.sis.se/terminologi-och-dokumentation/dokumentation-av-tekniska-produkter/service-chain-for-social-care-alarms-cen-tc-431 |
| **IEC** | SG-AAL (Reference Architecture, APIs)<br>http://www.iec.ch/dyn/www/f?p=103:85:0::::FSP_ORG_ID,FSP_LANG_ID:8761,25 |
| **ISO** | Standard 17347 on hyper-ontologies for interoperability<br>http://interop.cim3.net/file/pub/OntoIOp/2013-02-20_confcall_n.27_LucianoSerafini/Integrating-DDLs-into-OntoIOp--TillMossakowski-OliverKutz-ChristophLange_20130220.pdf |
| **OASIS project** | Open architecture for Accessible Services Integration and Standardisation, a large scale integrating project co-financed by the European Commission<br>http://www.oasis-project.eu/ |
| **ZIGBEE OSGI** | Reference implementation<br>http://zb4osgi.aaloa.org/ |

## STAKEHOLDER GROUPS, TECHNOLOGY PLATFORMS, RESEARCH PROJECTS

| Title | SHORT DESCRIPTION & weblinks |
|---|---|
| AALIANCE2 | project standards Wiki; the full presentation of Alliance2 recommendations is available in the link: http://tinyurl.com/nnrbter http://www.aaliance2.eu/; http://nero.offis.de/projects/aaliance2/ |
| AFE-INNOVNET project | develops a Thematic network that will support and enhance the operational implementation of the EIP AHA D4 Action Group's work plan; taking stock of the work done in the D4 Action Group and upscaling working ICT-based solutions. http://www.afeinnovnet.eu |
| CONTINUA ALLIANCE | an independent living use case http://www.continuaalliance.org/ |
| EASTIN | independent of commercial interest, provides on website (all European languages) a comprehensive overview of the assistive technology products available in the European market, including technical details of each product and related helpful information (companies, projects, service providers, articles, case descriptions, ideas, etc.); it facilitates companies developing, manufacturing and supplying products and services the selection of assistive technology components. www.eastin.eu |
| EIP-AHA | Independent Living http://ec.europa.eu/research/innovation-union/index_en.cfm?section=active-healthy-ageing&pg=action_group_c2 |
| ENGAGED | European Innovation Partnership on Active and Healthy Ageing; Thematic Network on innovative and sustainable active and healthy ageing services that make best use new technologies. http://www.engaged-innovation.eu/ |
| European Innovation Partnership on Active and Healthy Ageing | Action Plan B3 (Integrated Care) http://ec.europa.eu/research/innovation-union/pdf/active-healthy-ageing/b3_action_plan.pdf Action plan C2 (Independent Living) http://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://ec.europa.eu/research/innovation-union/pdf/active-healthy-ageing/d4_action_plan.pdf#view=fit&pagemode=non |
| ReALL project | is closely connected to the UniversAAL project; it intends to deploy a critical mass of Ambient Assisted Living applications and services based upon the UniversAAL platform with the intent of kick-starting the market for interoperable AAL services, applications and devices http://www.cip-reaal.eu/about/project-description/ |
| UNIVERSAAL Project | The UniversAAL framework is a reference model and architecture with an open source platform that consists of middleware and service components with tools to develop applications http://universaal.org/index.php/en/ |

### C.3 MSP Members' and Stakeholders' remarks

Considering the demographic change occurring in Europe, standardisation work should contribute to the development of accessible and supportive environments reducing the demand on 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 labour market active and productive participation of persons with disabilities, including older persons. 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 must 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) and harmonised solutions at the European level. In general, this aspect should also be taken into consideration in the context of eHealth and the proposed work items as well as Accessibility aspects like design guidelines related to diminished motor control and guidelines to offer accessibility to people with disabilities by illnesses related to their ageing process, e.g. memory loss. All the standardisation work on e-health should ensure a high level of accessibility, privacy protection and of security. In this context, the Health On the Net Foundation (HON) established a The HON Code of Conduct for medical and health Web sites (HONcode) [10].

Aspects like 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 coordination with 'eHealth' and in a technology neutral context as mentioned in the first action (D) in the clause 'eHealth'. Coordination with eGovernance', 'eAccessibility', 'eLearning' and the other areas that concern older people should also be considered.

## D. Proposed new standardisation actions

### D.1 Standards developments

Future standardisation efforts are necessary in the areas:

- Open service platforms APIs
- Possibly building on FI-WARE (see note 1), UNIVERSAAL in joint action under H2020 WP 2016-17 for smart homes and smart cities
- Service robotics for independent living
- Identify standardization needs to support ageing issues, e.g. memory deficiency
- Integration Profiles for EIP-AHA use cases
- Building on EIP-AHA work + PPI calls in H2020 SC1

Examples of key aspects that should be considered priorities for work on ICT for active and healthy ageing are:

- Facilitate the involvement of societal stakeholders in the development of standards in the field of active and healthy ageing
- Ensure 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.
- 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.
- All the standardisation work on active and healthy ageing should ensure a high level of privacy protection and of security.

**ACTION 1:** produce a report planning the standardization work required in the above designated areas, listing existing relevant standards, identifying gaps and offering an initial formulation for the scope of the proposed standards.

**ACTION 2:** As a complement to action 4 in eHealth, check existing standards to make sure they reflect the principles of the protection of individuals with regards to the processing of personal data and the free movement of such data.

10 http://www.healthonnet.org/HONcode/Conduct.html

# 3.2.3. Accessibility of ICT products and services

## A. Policy objectives

This policy area covers accessibility of ICT products and services; it includes telecom-munications, TV and Broad-casting, the web and new emerging technologies both from the mainstream side and the assistive technology side including the interoperability of the two.

This area is related to the EU implementation of the UN Convention on the Rights of Persons with Disabilities to which the EU and 25 Member States are a party while the remaining have signed it and are finalising the ratifica-tion process.

The Commission adopted the European Disability strategy 2010-2020 [11] with the aim of supporting the implemen-tation of the Convention in the EU. According to Regulation 1025/2012[12]

> *"(24) The European standardisation system should also fully take into account the United Nations Con-vention on the Rights of Persons with Disabilities. It is therefore important that organisations represent-ing 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 facili-tated by all available means".*

Within the area of accessibility this specific policy area addresses the proposal for a Directive on the Accessibil-ity of public sector bodies' websites by use of a harmonised standard based on globally agreed web accessibility guidelines. This area also addresses the proposal for a Directive on accessibility of products and services namely The European Accessibility Act.

## B. Legislation and policy documents

### B.1 At European level

The Commission adopted in the 2nd of December 2015 a proposal for a Directive Euro-pean Accessibility Act COM(2015) 615 final to improve the functioning of the internal market of accessible goods and services. One of the areas under examination to be cov-ered is the area of certain ICT goods and services.

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 websites providing basic services to citizens) are fully accessible.

Accessibility of ICT relates to the following documents:

1. 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
2. The Disability Strategy 2010-2020
   http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2010:0636:FIN:EN:PDF
3. 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

11 http://ec.europa.eu/justice/discrimination/disabilities/disability-strategy/index_en.htm
12 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

## B.2 Others

The UN Convention establishes accessibility as one of its general principles, which also applies to ICT and systems, including Internet and electronic services, and in article 9 on accessibility, requires the State Parties to take the necessary measures to ensure to persons with disabilities access on an equal basis with others. According to the UN CRPD this includes measures related to all services open or provided to the public.

# C. Standardisation needs, ongoing activities and progress report

## C.1 Commission perspective and progress report

Standardisation needs are derived, for instance from the UN Convention, which requires in Article 9 the development of accessibility standards and in the general obligations the promotion of universal design in the development of standards. Work on this area needs to advance at European level to increase market coherence.

The Proposal for a Directive on the accessibility of public sector bodies' websites includes a presumption of conformity for the websites concerned which meet the relevant harmonised standards. It also states that a harmonized standard to provide presumption of conformity should be built on the outcome of Mandate M/376 for accessibility requirements of products and services in the ICT domain suitable for public procurement purposes. The Commission's proposal also states that a methodology for the monitoring of the conformity of the websites concerned with the requirements for web accessibility will be developed.

## C.2 Ongoing standards related developments

### MANDATED STANDARDISATION WORK

| **Mandate Title** | **SHORT DESCRIPTION** & weblinks |
|---|---|
| **M/376** | addresses ICT accessibility standardisation at European level; it takes into con-sideration relevant national and international standards on accessibility, like those adopted by the US Access Board, W3C WAI and some related ISO work. The resulting standard EN 301 549 and other related deliverables have been published and contains the requirements of WCAG 2.0 Level AA. The possi-bility of proposing it as an international standard is under consideration within the JWG on eAccessibility which decided to wait until the US has published their revised standards under Section 508 in order to consider further possible alignments to the EN . http://ec.europa.eu/enterprise/standards_policy/mandates/database/index.cfm?fuseaction=search.detail&id=333#; http://webapp.etsi.org/WorkProgram/Report_WorkItem.asp?WKI_ID=30873 |
| **M/473** | ongoing standardisation work aiming to mainstream accessibility following Design for All in other (than M/376) relevant European standardisation initiatives; it also exists to update standards in priority areas by addressing accessibility according to 'Design for All' approach; in addition it requires the development of standards that will support to manufacturers and service providers to include accessibility following design for all, facilitate the implementation of the accessibility clauses in European standards, which could cover the majority of the standardisation work mentioned in this Rolling Plan. http://www.etsi.org/images/files/ECMandates/m473.pdf |
| **M/420** | while focusing on accessibility of the built environment, might also include ICT that is used in that context http://ec.europa.eu/enterprise/standards_policy/mandates/database/index.cfm?fuseaction=refSearch.search# |

## STANDARDS DEVELOPMENTS

| Title | SHORT DESCRIPTION & weblinks |
|---|---|
| BSI | BS 8878:2010 is the first British standard to outline a framework for web accessibility when designing or commissioning web products http://www.ihs.com/products/industry-standards/organizations/bsi/index.aspx |
| 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, as well as organisations representing disabled and older persons http://www.cencenelec.eu/standards/Sectors/Accessibility/Pages/default.aspx |
| ETSI | continues producing accessibility standards on specific ICT topics and is planning to produce a guide on 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 undertaken into transmission quality and its possible linkage to reported intelligibility problems for some hearing impaired people; EG 202 952, Guidelines to identify "Design for All" aspects in ETSI deliverables, was recently published http://www.etsi.org/technologies-clusters/technologies/human-factors/accessibility; http://webapp.etsi.org/WorkProgram/Report_WorkItem.asp?WKI_ID=35174; http://webapp.etsi.org/WorkProgram/Report_WorkItem.asp?WKI_ID=37153; http://webapp.etsi.org/WorkProgram/Report_WorkItem.asp?WKI_ID=35796 |
| IEC | IEC TC 100/TA 16 develops 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.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://trac.tools.ietf.org/area/rai/; http://trac.tools.ietf.org/group/iab/trac/wiki/Multi-Stake-Holder-Platform#ICTAccess; http://www.rfc-editor.org/rfc/rfc3551.txt; http://www.rfc-editor.org/rfc/rfc4103.txt; http://www.rfc-editor.org/rfc/rfc5194.txt; http://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 CLC as CEN/CLC Guide 6:2014. JTC1 SWG-A (Special Working Group on Accessibility) has been disbanded. Work has been transferred to SC35 (User Interfaces) http://www.iso.org/iso/catalogue_detail?csnumber=33987 • http://www.iec.ch/etech/2011/etech_1011/tc-14.htm |
| ITU | produced relevant accessibility and human factors work, a sample of which is found in the ITU Accessibility Portal. Related technical groups include Question 26/16 on accessibility and Question 4/2 on human factors. The checklist in FSTP-TACL on how to prepare ICT standards that include accessibility from their inception is also available, as well as ITU-T F.790. Draft ITU H-series Supplement 17 mirrors the new edition of ISO/IEC Guide 71 in preparation containing guidelines for standards developers to address the needs of older persons and persons with disabilities http://www.itu.int/en/ITU-T/accessibility; http://www.itu.int/rec/T-REC-F.790/recommendation.asp?lang=en&parent=T-REC-F.790-200701-I |
| W3C | globally recognised web-accessibility specifications are in "Web-Content Accessibility Guidelines" (WCAG) 2.0 that became ISO/IEC 40 500:2012. 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.w3.org/TR/WCAG; http://www.w3.org/TR/WCAG-EM/;http://www.w3.org/WAI/ |

STAKEHOLDER GROUPS TECHNOLOGY PLATFORMS, RESEARCH PROJECTS

| TITLE | SHORT DESCRIPTION & weblinks |
|---|---|
| **Aaliance2** | Next Generation European Ambient Assisted Living Innovation; FP7 repository of existing standards http://www.aaliance2.eu/ |
| **Atis4All** | EU Thematic Network on Assistive Technologies and Inclusive solutions for all: marketplace with a specific section on standards (CIP ICT PSP) http://www.atis4all.eu/presentation.aspx |
| **eAccess+** | HUB providing resources notably on standards and guidelines for Web accessibility (CIP ICT PSP) http://www.eaccessplus.eu/ |
| **EIII** | European Inclusion Internet Initiative: partners amongst others Dutch, Danish, Italian and Island governments http://eiii.eu/ |
| **Prosperity4All** | Develops the infrastructure and ecosystem that will allow for a ubiquitous auto-personalization 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.prosperity4all.eu; http://www.cloud4all.info/; http://gpii.net/ |
| **Raising the Floor Consortium** | Mission is to make the web and mobile technologies accessible to everyone with disability, literacy and aging-related barriers, regardless of their economic status http://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, 'Just Accessible'** | Other countries are invited to participate in this initiative which is the first European one involving all relevant stakeholders (government, market parties that build websites and market parties that test websites) to work together on continuously improving the accessibility of government websites by supporting both governments and market parties with proper instruments, e.g. accessibility plug-in to support content managers and monitor: accessibility of public websites on organizational and product levels, software conformity to the WCAG standard mismatches with WCAG standard that were found, suggestions to improve compliance http://www.quirksmode.org/blog/archives/2007/01/new_dutch_acces.html |
| **VERITAS, FP7** | Virtual and Augmented Environments and Realistic User Interactions, including review of policy and standardisation issues to achieve Embedded Accessibility Designs http://veritas-project.eu/ |

## C.3 MSP Members' and Stakeholders' remarks

Accessibility needs to be reflected in ICT and many other areas (like emergency commu-nication, digital cinema, health, public transport, tourism, and learning) both for users with disabilities in the general public and for staff/ entrepreneurs with disabilities in in-dustry or public administration. As a consequence, accessibility should ideally be men-tioned in all relevant policy areas. To that end the work under M 473 will help to achieve this objective.

The following list, to be seen as a complement to the proposals specified in sub-clause D of the present chapter, derived from views expressed by some Member States and experts in the field, contains possible standards-related actions. The list does not discusses the appropriateness of carrying out the specific work under standardisation initiatives, re-search projects or call for tenders, This is just an initial list which is intended to trigger further discussion with all stakeholders and should lead, when appropriate, to a gap anal-ysis in different areas:

- Investigating how mobile devices are useful to people with impaired movements and other type of disability when interacting with other ICT products and services; a wider scope (not only mobile devices) 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
- Specification of requests for user interface devices including presentation techniques and mapping of character repertoires on soft, non-standard and reduced keypads, in different domains, e.g. m-payments, self-service terminals and public transport, not only communications systems
- Specification of accessible Communications systems
  - 'total conversation' and 'accessible TV distribution' transmission needs including how many and which real time voice/audio, video, text, eventually others synchronized streams are needed to ensure accessibility features like subtitling, messaging, audio description and sign language for all citizens; this should include quality, particularly intelligibility, of the communication to be appropriate to all; this includes emergency and critical communication services.
  - 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 and text representations, e.g.
  - voice to text like automation of relay services for telephony and capturing/ subtitling TV transmissions.
  - interoperability of the most common text transmission techniques like IM – SMS- eMail.
  - text to voice like in automatic generated audio description.
  - text to sign language like in automatic generated sign language.
- Identification of accessibility requirements and associated standardization requests related to
  - analphabetic 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 as explained below (see also clauses related to 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 us-ers, 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 accessi-ble security mechanisms compatible with human abilities, and appropriate to the type of service being used. In this context the benefit of using of new technologies like biomet-rics or RFID could be evaluated.

The accessibility component of the privacy and security issues mentioned herein be-fore could be addressed in the general development following M/473 or preferably be mainstreamed in general privacy and security work.
A broad, open and undetermined discussion with stakeholders should be held on the best way for making the W3C WCAG 2.0 guidelines the base specification for web accessi-bility. Specific discussions and investigations with stakeholders are needed on the

- Evaluation method by which conformity is measured, especially regarding auto-matic testing. For the improvement of both evaluation methods and automatic testing it is necessary to look at the context in which faults occur. Data from au-tomatic test on websites may be used for further investigation e.g. in cooperation with W3C, CEN and the EIII project.
- A specific discussion and investigation is also needed of the intersection of mobile (devices) and accessibility.

Standards could be evaluated to produce a guide on user-centred terminology for all po-tential users in several EU languages, focusing on the benefits for those with learning and cognitive impairments. 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 nega-tive 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 cogni-tive impairments who are currently partly excluded from benefitting from the use of modern ICT.

# D. Proposed new standardisation actions

## D.1 Standards developments

Some citizens with hearing impairments are experiencing increasing intelligibility problems with modern networks and devices. It has not yet been possible to identify whether some of these problems are related to factors such as normal age-related hearing deterioration or to the increasing use of mobile phones in noisy public environments (such as airports). Further investigation into the potential causes of the reported problems experienced by hearing impaired people could identify areas where the standard models for predicting speech quality may need to be up-dated; this should include the definition and realization of dedicated subjective tests needed to develop an objective methodology to assess intelligibility.

**ACTION 1:** Develop a methodology for testing compliance with WCAG 2.0 to obtain comparable and relevant data across the testing

**ACTION 2:** Develop a living consolidated inventory of accessibility standards, improving the information provided by existing lists (e.g., http://standards.cen.eu/dyn/www/f?p=204:105:0)

**ACTION 3:** based on the relevant European projects to produce a technical report deliver-ing quality of service parameters addressing intelligibility of telecommunication per-ceived by people with disabilities. There is an urgent need to better understand how ICT products and services can be designed to meet the needs of persons with dis-abilities, in-cluding many older users.

**ACTION 4:** 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 disabili-ties; the report should propose enhancements to relevant existing standards and identify needs of further standardisation

**ACTION 5:** Continue work on M/473, providing the deliverables agreed including the Eu-ropean Standard and methodology for mainstream accessibility in standardisation pro-cesses.

**ACTION 6:** Stir the support for a global cooperation in web accessibility standardisation based on W3C/WCAG work in order to overcome fragmentation on meeting user needs with accessible products within the existing structures

# 3.2.4. e-Skills and e-Learning

## A. Policy objectives

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

## B. Legislation and policy documents

### B.1 At European level

- **COM(2013)654** Communication "Open up Education: Innovative teaching and learning for all through new Technologies and Open Educational Resources" of 25 September 2013.
- **IP/13/182** "Grand Coalition for Digital Jobs" of 4 March 2013
- **SWD(2012) 446**: "Digital Agenda for Europe - a good start and stakeholder feedback" of 18 December 2012
- **COM(2012) 173**: "Toward a Job-rich Recovery" and SWD(2012) 96: "Exploiting the employment potential of ICTs" of 18 April 2012
- **COM(2010) 682**: "An Agenda for New Skills and Jobs" of 23 November 2010
- **COM(2010) 546**: "Innovation Union" of 6 October 2010
- **Recommendation 2009/C 155/01** on the establishment of a European Quality Assurance Reference Framework for Vocational Education and Training (EQAVET).
- **COM(2010) 245**: "A Digital Agenda for Europe" of 26 August 2010
- **COM(2007) 496**:"e-Skills in the 21st Century" and Competitiveness

## C. Standardisation needs, ongoing activities and progress report

### C.1 Commission perspective and progress report

#### Regarding e-skills:

Pan-European e-competences frameworks and tools as well as efficient and interoperable e-learning solutions are indispensable to reduce e-skills shortages, gaps and mismatches. Similar activities are under development in the United States of America, Russia, Japan, Australia, Canada, South Africa and Latin America etc. In the early 2000s the development of national frameworks had already been initiated in the UK, Germany and France etc. In their 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; 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 the e-Competence Framework 3.0 being available and with the establishment of a CEN Project Committee. See details in C.2 below.

### C.2 Ongoing standards developments

#### Regarding e-skills:

**STANDARDS DEVELOPMENTS**

| ORGANISATION | SHORT DESCRIPTION & weblinks |
|---|---|
| CEN PC 428 | Professions for ICT. See also the previous CEN Workshop agreements and the e-CF at http://www.cen.eu/cen/Sectors/Sectors/ISSS/CWAdownload/Pages/ICT-Skills.aspx http://www.ecompetences.eu/e-cf-3-0-download/ |

## Regarding e-learning:

| ORGANISATION | SHORT DESCRIPTION & weblinks |
|---|---|
| CEN/TC 353 | Information and Communication Technologies for Learning, Education and Training |
| CEN PC 428 | Professions for ICT[AD1]. See also the previous CEN Workshop agreements and the e-CF at Framework for ICT Professionalism:<br>http://www.cepis.org/index.jsp?p=940&n=3016<br>http://www.cen.eu/cen/Sectors/Sectors/ISSS/CWAdownload/Pages/ICT-Skills.aspx<br>http://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<br>http://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:<br>http://www.iec.ch/dyn/www/f?p=103:22:0::::FSP_ORG_ID:3410<br>Standards to ensure interoperability between information technology systems used in ITLET<br>The identification of generic LET requirements for information technology systems and services used in ITLET situations (example: types of digital content)<br>Standards projects being addressed:<br>The description of metadata for learning resources<br>- ITLET vocabularies<br>- The personalization of the IT-enabled educational environment (individualized accessibility)<br>- Models for describing competency<br>- The creation of an ITLET quality framework<br>- The advancement of e-Assessments, e-textbooks and related learning services, virtual experiments<br>Future work planned<br>- Learning analytics<br>- Massive Open Online Course (MOOC) standardization<br>- How existing standards and specifications may work together to better the LET environment<br>http://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 and Recommendation ITU-T F.742 on service description and requirements for distance learning services. Recommendation on ubiquitous learning (u-learning) framework is under developed in Study Group 13. ITU also published a technology watch report on technology-based learning<br>http://itu.int/en/ITU-T/techwatch/Pages/learning-standards.aspx |

### C.3 MSP Members' and Stakeholders' remarks

#### 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 persons with disabilities. 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 and Private Partnerships (PPP) with the ICT industry playing a leading role (e.g. Career Space initiative). More recently, standardisation efforts have been launched by many countries in the world. There is a need to maintain a platform at a European level in order to exchange best practices, implement a master plan and coordinate across Europe. The existing structure of the CEN ICT Skills workshop is 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

## D. Proposed new standardisation actions

### D.1 Standards developments

#### 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 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.

#### Regarding e-learning:

**ACTION 1: European e-learning standards to ensure European harmonisation, usage and implementation.** 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.

### D.2 Other activities around standardisation

#### Regarding e-skills:

The public and private sectors need to collaborate on the following topics :

**ACTION 2: E-Competence Framework for ICT Professionalism**: Maintain the e-CF and continue work on job profiles, Body of Knowledge, qualifications and certifications, methods and tools for the development, promotion, implementation and maintenance of the e-Competence Framework with a view in particular to promote ICT professionalism (including international cooperation);

**ACTION 3: Curriculum development guidelines on e-skills and ICT industry training and certifications**: development, promotion and implementation of e-competences curriculum guidelines and quality labels to facilitate transparency and the recognition of learning outcomes between formal, non-formal and industry education and training.[13]

**ACTION 4: Organizational Capability:** Consider the capability of organizations in the context of the e-skills/e-competences of the personnel. Match personnel competences with organizational processes and procedures to ensure best return on investment in ICT. (The e-learning actions will require renumbering if this action is included)

## Regarding e-learning:

**ACTION 5: Investigate on standardisation potential around e-learning:** 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, inter alia, the didactic approach, aimed learning & learner's profiles.

**ACTION 6: Investigate in standardisation potential around interoperability and transfer of learners' data:** Exchange of learning & learners data with may be generated in all the different learning spaces. By the use of a Caliper-like framework, the exchange and therefore effective usage might be facilitated.

**ACTION 7:** Start a programme to connect detailed curriculum on a pan-European base. Starting with Mathematics and English. In this context it is very important that the semantics, i.e. the terminology being used of the data being exchanged, has been described clearly and standardised. Best practices that exist globally should be taken into account. This includes but is not limited to the USA-Common Core State Standards and the Dutch Onderwijsbegrippenkader, the Dutch database for detailed curriculum for primary and secondary education.

13 As e-Skills and competences are relevant for all ICT-users and boardroom-members (see D1) this action is not specifically aimed at the ICT-industry. (see C3)

# 3.2.5. Emergency communications

## A. Policy objectives

In the context of this Rolling Plan Emergency communications are defined primarily as the communication from individual citizens using individual electronic communication devices to the Public Safety Answering Points with a view of requesting and receiving emergency relief from emergency organisations. Reverse services (i.e. communication between PSAP and citizens) may also be considered.

The ability to initiate an emergency communications should be independent of the network and access technologies deployed and the physical and mental abilities of the citizen.

## B. Legislation and policy documents

### B.1 At European Level

- **Directive 2009/136/EC** of the European Parliament and 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 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 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 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 Mandate in support of the Location Enhanced Emergency Call Service

## C. Standardisation needs, ongoing activities and progress report

### C.1 Commission 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 for implementing future proof solutions which fulfil the requirements of the amended Universal Service Directive 2002/22/EC.

Standards for Total Conversation access to 112 are required to fulfil special needs for users' rights as per 2009/136/EC. The lack of harmonised values for location accuracy and reliability hampers the development of adequate solutions in Member States.

## C.2 Ongoing standards developments

| ORGANISATION | SHORT DESCRIPTION & weblinks |
|---|---|
| ETSI | ETSI is performing work in response to this mandate and is currently working on the single functional architecture (draft ES 2013 178) and will then move on to the protocols definition. Work on Total Conversation Access to emergency services is continuing with the finalisation of an ETSI Technical Specification and the development of a user guide. |
| ITU-T | Focus Group on "Disaster Relief Systems, Network Resilience and Recovery" produced several Technical Specifications that were pub-lished (http://www.itu.int/pub/T-FG/e) and are being refined for fur-ther standardisation in ITU-T SG2 and SG15. The draft Recommenda-tions ITU-T L.nrr.frm "Framework of disaster management for net-work resilience and recovery" and L.dm-nrr-mdru "Disaster manage-ment for improving network resilience and recovery with movable and deploy-able ICT resource units" are under development within ITU-T SG15. Recommendation ITU-T E.108 (was E.rdr-mms) "Requirements for a Disaster Relief Mobile Message Service" was determined in IUT-T SG2. Draft new Recommendations ITU-T E.TD-DR "Terms and definitions for DR&NRR", IUT-T E.RDR "Requirements for Disaster Relief Systems" and ITU-T E.rdr-scbm "Requirements for Safety Con-firmation and Broadcast Message Service for Disaster Relief" are be-ing developed in ITU-T SG2.<br><br>ITU also produced an Annex to its E.132 standard for quickly identify-ing next-of kin (or other emergency contact) in a mobile handsets' di-rectory, for use in case of emergency, and has de-fined a framework for international emergency call priority (ITU-T E.106 and E.107) Also OA-SIS Common Alerting Protocol versions 1.1 and 1.2 were trans-posed into ITU-T X.1303 and X.1303bis. Finally, ITU-T SG13 has a numbers of Recommendations ITU-T Y.2074, Y.2705, Y.1271, Y.2205 and Supplement 19 to ITU-T Y.2200-series covering different aspects of emergency com-munication operation. In ITU, the Radio communication Sector (ITU-R) also develops studies for emergency communications. |
| CEPT/ECC/WG NaN/PT ES | Investigating criteria for location accuracy and reliability. |
| W3C | WebRTC, the web's real time communication is currently 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 Frame-work 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 critical prerequisite 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 (https://datatracker.ietf.org/wg/stir/charter/) is developing Internet-based mechanisms that allow verification of the calling party's authorization 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 present an incorrect origin, in this context an origin telephone number. See, for example, RFC7375 "Secure Telephone Identity Threat Model" (https://datatracker.ietf.org/doc/rfc7375/) |

# D. Proposed new standardisation actions

## D.1 Standards developments

**ACTION 1** Address data protection and privacy requirements (privacy by design) in ongoing standardisation activities concerning location accuracy.

## D.2. Other activities around standardisation

**ACTION 2** Identify the 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** Completion of standards in response to mandate M/493 to produce the relevant 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** Identify the standardisation needs for the transmission of the GNSS location data from the handset to the Public Safety Answering Points by mobile network operators.

**ACTION 5** Definition of dictionaries for warning messages for a reverse-112 service based on the input of various civil protection agencies.

**ACTION 6** Identify the standardisation needs for enhancing EU-Alert (reverse-112) with rich media.

# 3.2.6. eCall

## A. Policy objectives

Intelligent Transport Systems. Emergency Communications. Road Safety. The pan-European in-vehicle emergency call, 'eCall', is an interoperable service to be available in all vehicles in order to reduce fatalities.

## B. Legislation and policy documents

### B.1 At European level

- **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

## C. Standardisation needs, ongoing activities and progress report

### C.1 Commission perspective and progress report

In the event of an accident, in-vehicle sensors will automatically trigger an eCall. A voice connection is established with the European emergency number 112 and routed to the Public Safety Answering Point (PSAP). At the same time, an emergency message is sent, providing information such as the time, location and driving direction (Minimum Set of Data=MSD). The emergency call can also be triggered manually.
It is required to develop standards for the future generation of eCall service, taking into account the future evolution of the mobile communication networks and the IP environment, in particular LTE and IPv6 networks.
It is also required to analyse the need and develop standards if needed for the extension to other vehicles types and services, such as Heavy Duty Vehicles, Power Two Wheelers or Hazardous Goods tracking, and other classes of vulnerable road users, taking into account requirements from type approval regulation and results from other initiatives in this area (pilots, CEF,...)

The European eCall Implementation Platform is proposing recommendations to ensure the best operation of the service and to take full advantage of all its possibilities.

Recognising that implementation via new vehicle models will take some considerable time to penetrate the car population, EU Regulation has already encouraged automotive manufacturers to voluntarily introduce eCall into existing models. However, once the PLMN and PSAP support networks are in place and operational, a considerable after-market opportunity exists to bring the benefits of eCall to the existing population of light vehicles throughout Europe, and several equipment vendors (both from within Europe and abroad) have already indicated interest to produce product to meet 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, it is urgently required to develop standards in respect of the physical parameters, installation and operational performance of such aftermarket devices, in order to enable an adequate certification regime. This will be essential if PSAPs are not to be potentially inundated with false messages from such devices, and so that such devices may be safely operated within vehicles.

## C.2 Ongoing Standards Developments

| ORGANISATION | SHORT DESCRIPTION & weblinks |
|---|---|
| CEN | CEN TC 278 WG15 has developed several TS, ENs and other deliverables to define the MSD structure and the application protocols to transfer it from the vehicles to the PSAP, as well as the E2E test suites. |
| ETSI | ETSI TC MSG 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 102 140. |
| Pilots | CIP Pilots HeEROs (Harmonised eCall European Pilot) tested the stand-ards in real conditions.<br>The iHeERO pilof from the 2014 Connecting Europe Facility (CEF) call for proposals is expected to produce relevant contributions for eCall standardisation.<br>http://iheero.eu/ |
| ITU | Study Group 12 approved Recommendation ITU-T P.1140 (ex. P.emergency): " Speech communication requirements for emergency calls originating from vehicles".<br>The current revision of Recommendation ITU-T E.212 by ITU-T Study Group 2 tries to take into account the requirement of eCall. The revision will provide flexibility to the Member States in the assignment of Mobile Network Codes (MNCs) and introduction of a new shared Mobile Country Code with three Digits MNCs. Migration to three-digit MNCs on a global scale may be addressed at a later stage. |

## C.3 MSP Members' and Stakeholders' remarks

The EC wants all new vehicle types placed on the market after 31 March 2018 to implement eCall, the PSAPs to be upgraded to handle the eCalls as from 1 October 2017, and the EC is making recommendations to Member States to draw up detailed rules for public mobile network operators operating in their countries on handling eCalls. 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 the establishment of 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 European-wide search via EUCARIS to support the respective national 112-emergency center(s).

# D. Proposed new standardisation actions

## D.1 Standards developments

**ACTION 1** Develop technical specification/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 as well as ongoing activities in this area (pilots, CEF,...).
**ACTION 2** Define physical and operating requirements for aftermarket in-vehicle devices
**ACTION 3:** Propose guidelines on certification of eCall Systems including aftermarket in-vehicle devices
**ACTION 4** Map existing standards developments to packet-switched networks (HLAP E-UTRAN - LTE/4G).
**ACTION 5** Develop technical specification/standards for the provision of the eCall service eCall via shared vehicle platforms (C-ITS).
**ACTION 6** Produce detailed conformance test specifications (TTCN-3), based on the high level testing specifications (EN 16454) in support of certification schemes.

## D.2 Other activities around standardisation

**ACTION 7** CCarry out Plugtest interoperability events (such as the eCall Testfest Interoperability Event which was held in Ostrava, Czech Republic, in November 201 – see http://www.etsi.org/news-events/events/1002-4th-ecall-tesfest-2015.
**ACTION 8** Collect feedback about the early versions of the standards and their implementation with technical representatives from vendors and implementers.

## 3.3. Innovation for the Digital Single Market

# 3.3.1. e-Procurement – Pre and Post award

## A. Policy objectives

Public Procurement, modernisation of public procurement in the European Union covering pre-award and post-award, e-Procurement, including procurement of goods, services and works using electronic means.

## B. Legislation and policy documents

### B.1 At European level

- **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
- **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

## C. Standardisation needs, ongoing activities and progress report

### C.1 Commission perspective and progress report

The Commission's e-Procurement Directive aims to make e-Procurement the mainstream method for carrying out public procurement to achieve broader competition (even across borders), increased transparency, and value for money on procurement expenditure and savings on procedural costs.

The Directive specifically mentions that tools and devices used for communicating electronically should be non-discriminatory, generally available, and interoperable. The Directive makes the use of e-Procurement progressively mandatory, as follows:

- by April 2016, electronic notification and electronic access to tender documents will become mandatory;
- by April 2017, electronic submission of tenders (e-Submission) will 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 e-Certis to ask for certificates and other documents: e-Certis will become a sort of clearing house for these documents. Member States will have to keep e-Certis up-to-date from 2016. In the future, as soon as Member States implement the new Public Procurement Directives, the European Single Procurement Document (ESPD) will be the standard document to ask economic operators information for 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 e-Procurement internal market is facing several types of barriers, including cross-border interoperability and interfaces complexity.

Cross-border variations in requirements: Specific member state e-Procurement platforms are often built on top of national or regional infrastructures which are optimized for integration with other public services, and for the specific performance and security requirements of that platform's host government.

Proliferation of platforms: SMEs (and anyone doing business in multiple locations) experience another hindering factor. The proliferation of platforms for e-Tendering (and consequently of user interfaces) makes it difficult for a company to respond to calls for tenders run on multiple platforms. e-Procurement technology interoperability and standardisation is a key strategy to remove technical barriers or extra costs when supplier bid on a plurality of systems. In order to achieve a true single market, bidders including SMEs ideally should be able to communicate and participate, in multiple markets across various systems, through their favourite or a common system.
This is recognised by the Directive, which empowers the Commission to adopt delegated acts in a number of specific areas to render mandatory the use of specific technical standards in order to ensure widespread interoperability.

The need for standardisation in the e-Procurement domain is strongly reaffirmed by the e-Tendering Expert (eTEG) group (see below), set up by the Commission, as one of the actions planned in the 2012 Communication, to advise on paths to be taken to achieve interoperable, accessible and SME-inclusive systems. The e-TEG report issued its report and operational recommendations in February 2013, and lists a number of standardisation actions to be undertaken as soon as possible.

A new multi-stakeholder expert group on e-Procurement (EXEP) was set up end of 2014. The group will assist and advise the Member States and the Commission in implementing the provisions of the new public procurement Directives relating to electronic procurement. It will contribute to monitoring the uptake of e-Procurement across the EU, sharing best practices and following new developments in the field. It will also help addressing interoperability issues in this area. With a view to further promote the uptake of end-to-end e-Procurement across the EU, including in the post-award phase, EXEP will liaise closely with the European Multi-Stakeholder Forum on e-Invoicing (EMSFEI) and with national forums. The group will be responsible for ensuring the coherence between the recommendations arising from the EMSFEI and broader policies on end-to-end e-Procurement. In addition, EXEP will provide governance and support for initiatives like CEF and eSENS, and will govern the standardisation process in the area of e-Procurement.

## C.2 Ongoing standards developments

### Standards developments

| **ORGANISATION** | **SHORT DESCRIPTION** & weblinks |
|---|---|
| **CEN WS/BII3 profiles.** | CEN workshop WS/BII3 Business Interoperability Interface for public procurement in Europe, phase 3" – builds on the work from previous phases of the workshop as well as feedback from implementation projects such as PEPPOL/OpenPEPPOL and eSENS - builds on work from PEPPOL, concentrating on gaps to be filled in the pre-award and post-award domains: http://www.cenbii.eu/activities/cen-wsbii-3/ |
| **CEN PC440** | CEN/PC 440 - "Electronic public procurement" - is established in order to provide standardization in the field of e-procurement to support the electronic public procurement processes and their accompanying information flows in the physical and financial supply chain. This is to facilitate end-to-end e-procurement including both Pre-award and Post-award processes for public procurement |

### Stakeholder groups, technology platforms, research projects

| **ORGANISATION** | **SHORT DESCRIPTION** & weblinks |
|---|---|
| **THE NETHERLANDS** | Amongst best practices available in member states, the NL central gov-ernment developed DigiInkoop for its e-Procurement processes and fi-nanced its development. The DigiInkoop architecture comprises of a workflow based e-Procurement application as well as a communication hub (Digipoort) to facilitate electronic messaging between government buyers and suppliers. |
| **PEPPOL** | EU Large Scale Pilot Project 2008-2012. PEPPOL provides 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.peppol.eu. |
| **OpenPEPPOL** | Following the closing of the PEPPOL-project, governance for the solutions developed was handed over to OpenPEPPOL AISBL. The PEPPOL transport infrastructure is today implemented by more than hundred service providers throughout Europe, servicing thousands of public and private entities, including the post-award processes of e-procurement: http://www.peppol.eu/about_peppol/about-openpeppol-1 ; http://www.peppol.eu/about_peppol/openpeppol-communities |

| ORGANISATION | SHORT DESCRIPTION & weblinks |
|---|---|
| eSENS | EU Large Scale Pilot project ("Electronic Simple European Networked Services"), integrating results from PEPPOL and other eGovernment LSPs. The eSENS 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 has been reached in January 2015. The acceptance trial of phase I in Work Package 5.1 was processed successfully. For the first time it was possible to interchange a publication and an application for participation between 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 works is based on specifications from CEN WS/BII3. http://www.esens.eu/home/ |
| EXEP | The EXEP is established to assist and advise Member States and the Commission in implementing the provisions of the new public procurement Directives relating to electronic procurement. It will also contribute to monitoring the uptake of e-Procurement across the EU, sharing best practices and following new developments in the field. In addition, EXEP will provide governance and support for initiatives like CEF and eSENS, and will govern the standardisation process in the area of e-Procurement. |

## C.3 MSP Members' and Stakeholders' remarks

# D. Proposed new standardisation actions

## D.1 Standards developments

**ACTION 1:** A new CEN Technical Committee was created for electronic public procurement (CEN/PC 440). The kick off meeting was held in June 2015

The objective of CEN/PC440 is to provide standards, in the form of Business Interopera-bility Interface specifications, as a tool to ensure interoperability and thus facilitate effi-cient and effective electronic information exchange in the (public) procurement processes between the buyer and the seller.

At the kick- off meeting a number of concrete standardization deliverables were agreed:

- A CEN Technical Report on "Roadmap for implementation of Business Interop-erability Specifications from CEN/PC 440". The scope of this report is to estab-lish a common understanding of maturity and best practices in the different pro-cesses within public e-procurement throughout Europe. Provide guidance (roadmap) to the user community and the policy makers on how deliverables from CEN/PC 440 and its preceding initiatives (e.g. CEN/WS/BII) may support interoperability in e-procurement through the implementation of standards. The deliverable will also provide a high level business architecture as well as a high level description of the technical architecture for the different artefacts to be pro-vided..
- A CEN Technical Specification on "E-Notification Business Interoperability Specifications". The scope of this deliverable is to provide core semantic mod-el(s), syntax binding and syntax implementation guidelines and choreography for the information exchange in the area of e-Notification.
- A CEN Technical Specification on "E-Tendering". The scope of this specification is to provide core semantic model(s), syntax binding and syntax implementation guidelines and choreography for the information exchange in the pre-award area excluding of e-Notification.
- A CEN Technical Specification on "Product & Price information". The scope of this deliverable is to provide core semantic model(s), syntax binding and syntax implementation guidelines and choreography for the information exchange of information about products and prices.
- A European Standard on "E-Ordering Business Interoperability Specifications". The scope of this European Standard is to provide core semantic model(s), syntax binding and syntax implementation guidelines for the information exchange between the Buyer and the Seller relating to establishing an order.
- A CEN Technical Specification on "E-Fulfilment Business Interoperability Specifications". The scope of this delivery is to provide core semantic model(s), syntax binding and syntax implementation guidelines for the information exchange between the Buyer and the Seller related to delivery of ordered good and services.

These deliverables will be based on the equivalent deliverables from CEN WS/BII in alignment with the deliverables of CEN/PC 434, in order to support the electronic exchange of information in public procurement as well as in B2B transactions.

CEN/PC440 is established in order to facilitate 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/PC 434, and be part of a wider eBusiness standardization 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 e.g. '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', 'directive 2014/55/EU on e-Invoicing in public procurement.'
3. Recognize the rather ambitious timeline envisaged for implementation of 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 as well as 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 -Economic Operators to select the platform of their choice and still be able to participate in procurement opportunities across the full European market

## D.2 Other activities around standardisation

OpenPEPPOL has provided, and eSENS will augment, a set of existing specifications and methods sufficient for production implementation of e-Procurement and e-Invoicing business functions.

**ACTION 2:** An appropriate long-term community feedback, updating and maintenance structure for these assets is desirable, as any living network of transacting parties will evolve and discover new needs over time.

As the deliverables of OpenPEPPOL and eSENS to a large degree are based on the workshop agreements provided by CEN WS/BII, to be further enhanced by CEN/PC440, it is envisaged that the timeline for CEN/PC440 will be adopted to allow for feedback from OpenPEPPOL and eSENS as well as other implementation initiatives. The log-term governance and maintenance will be ensured by the CEN standardization process.

The Commission's e-TEG group identified the following needs for standardisation:

- **ACTION 3:** e-notification (publication of notices on procurement opportunities, contracts awarded and other legal notifications);
- **ACTION 4:** qualification of suppliers (eAttestations/certificates/Virtual Company Dossier);
- **ACTION 5:** a process model for procurement procedures as specified in the Directives such as 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 (For example, see http://www.xvergabe.org);
- **ACTION 7:** tender structures for de-materialisation of tenders.

**ACTION 8:** 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 and the responsible agencies;
- 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 sharing company information or even single sign-on services, simplifying the task of economic operators which currently have to go through complex procedures on each

platform on which they have to work);
- 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.
- To a large degree these actions (Actions 3, 4, 5, 6, 7 and 8) are expected to be accomplished through the CEN/PC440 deliverables related to "E-Notification Business Interoperability Specifications", "E-Tendering" and "Product & Price information". Through these deliverables, standardized specifications will be made available to the market allowing cross-border and cross-platform interoperability. Aspects of cross-border and cross-platform interoperability is also under piloting in initiatives such as e-SENS and OpenPEPPOL, based on the pre-standard deliverables provided by CEN WS/BII3.

It also has been suggested by stakeholders that:
- **ACTION 9:** e-Procurement Service Providers should interconnect their networks thus facilitating pan-European routing of e-Procurement messages.
- **ACTION 10:** Software Vendors should be stimulated to make e-Procurement messaging from within their applications as simple as possible.
- **ACTION 11:** A complete ban on paper B2G e-Procurement messages should be considered for all European member states. A deadline to be determined.
- **ACTION 12:** A rigorous PR campaign reaching out to Chief Procurement Officers, Chief Financial Officers, and Billing Service Providers all over Europe including Software Vendors internationally should be devised to further the cause of e-Procurement.

Fulfilling these actions (Action 9, 10, 11 and 12) requires engagement beyond the formal standardization bodies, and requires engagement and involvement from policy makers and user organizations as well as form the ICT industry.

# 3.3.2. e-Invoicing

## A. Policy Objectives

Electronic invoicing, i.e. an invoice that has been issued, transmitted 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. Its deployment is a strong tool in support of enterprise and financial policies as it renders enterprises more efficient and generates potentially significant savings for Member States' governments. Therefore, electronic invoices are 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, above).

## B. Legislation and policy documents

### B.1 At European Level

- 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 November 27th, 2018, onwards; and local authorities from November 27th, 2019, onwards. These electronic invoices shall 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)14.
- 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" defines 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.
- European Multi-stakeholder forum on Electronic Invoices, Final Report Phase 1, 1013

### B.2 Others

- Danish legal e-Invoice mandate: Executive Order No. 354 of 26 March 2010: http://www.oioubl.info/documents/en/OIOUBLStatute.pdf
- German ZUGFeRD 1.0 structured eInvoice format www.zugferd.de
- Several European countries already introduced or already decided to oblige their public authorities to accept only electronic invoices from their suppliers and all these initiatives are expected to align with the ongoing standardization activities carried out by CEN/PC 434 according to the Annex of the standardization request C(2014) 7912 final.
- 4 corner e-invoicing network in the Netherlands http://www.simplerinvoicing.org

 http://ec.europa.eu/taxation_customs/resources/documents/taxation/vat/traders/invoicing_rules/explanatory_notes_en.pdf

# C. Standardisation needs, ongoing activities and progress report

## C.1 Commission perspective and progress report

In the current environment, a vast number of e-invoicing standards, data formats, and usage requirements exist across the EU and globally. The existing formats have established in different sectors and businesses and are used. What is important is to promote interoperability while respective different sector needs and practices. Commission policy initially supported the parallel development and planning of multiple suitable systems, by various member states, but has emphasized the need for interoperability and broad access across markets. The diversity of data and usage requirements, and very different approaches to their implementation, increase complexity and cost, and create a risk of market fragmentation.

The Commission has addressed the issues around e-Invoicing on the legal level:

- DG GROW paper "e-Invoicing standardisation - Overview, issues and conclusions for future actions" published in September 2012: http://ec.europa.eu/DocsRoom/documents/10472/
- Communication COM(2012)573 identifies 12 key actions, one of which is "Adopt legislation to make e-invoicing standard billing mode in public procurement", with the intention of presenting a legislative proposal for this purpose in the second quarter of 2013.
- Directive 2014/55/EU obliges central government bodies of the Member States of the European Union to accept electronic invoices in public procurement ultimately by November 27th, 2018, onwards; and local authorities from November 27th, 2019, onwards. These electronic invoices shall comply with a European standard on electronic invoicing and with all of the syntaxes on a limited list of syntaxes. This European standard and the list of syntaxes is under development in CEN/PC 434 as required by C(2014) 7912 final. and shall be drafted and published the latest by March 31st 2017.

Electronic invoicing has been used by business for some time already. The earliest form of e-invoicing was based on Electronic Data Interchange (EDI) which is still used by many multinational companies. In the last decade or so, many newer e-invoicing standards/formats have been developed, based for the most part 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 enterprises or financial and IT service providers need to support multiple formats, necessitating substantial mapping and conversion exercises to cope with data expressed in different syntaxes.

- At the same time, contracting authorities will have to turn primarily to e-Certis to ask for certificates and other documents: e-Certis will become a sort of clearing house for these documents. Member States will have to keep e-Certis up-to-date from 2016. In the future, as soon as Member States implement the new Public Procurement Directives, the European Single Procurement Document (ESPD) will be the standard document to ask economic operators information for the exclusion and selection criteria. Together with national registers and national prequalification services e-Certis and ESPD will support the once only principle.
- At European level, efforts at standardisation have been ongoing since the middle of the last decade. In November 2009, the Final Report of the Expert Group on e-Invoicing anticipated the use of a common reference semantic data model, as a unifying method of interoperability for e-invoice contents, and recommended that the UN/CEFACT Cross-Industry Invoice (CII) v.2 be adopted. Along these lines, the Communication COM(2010) 712 encouraged all market actors within both the private and public sectors to develop and to implement, or to converge on, solutions that are compliant with the UN/CEFACT CII data model.
- A European Multi-stakeholder Forum on e-Invoicing (EMSFEI) has been set up by the Commission with Commission Decision C(2010)8467 and confirmed by C(2014) 4142 to advie the Commission on electronic invoicing related matters.

EMSFEI on 1 October 2013 unanimously adopted and endorsed a *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.

## C.2 Ongoing standards developments

### Standards developments

| ORGANISATION | SHORT DESCRIPTION & weblinks |
|---|---|
| CEN | PC 434 was established to undertake the standardization activities required by the Directive 2014/55/UE<br>CEN/PC 440 - "Electronic public procurement" - established in order to provide standardization in the field of e-procurement including Post-award processes.<br>CEN WS/BII 3. Currently developing its 3rd evolution has been aligned to the draft version of the "core invoice model" from CEN/PC 434. |
| UN/CEFACT | Cross-Industry Invoice (CII) v.2 adopted as ISO standard; no initiatives for convergence with UN/CEFACT foreseen |
| OASIS | Adoption of UBL 2.1 as ISO/IEC 19845 'Information technology -- Universal Business Language Version 2.1 (UBL v2.1)' is ongoing |

### Others (Including stakeholder groups, technology platforms, research projects)

| TITLE | SHORT DESCRIPTION & weblinks |
|---|---|
| eSens | Pilot project. Follow-on project to PEPPOL which has been the previous pilot projects. It includes a pilot to e-Invoicing.<br>http://www.esens.eu/home/ |
| OpenPEPPOL | E-Invoice developer community to implement the PEPPOL (and eSens) programs. The PEPPOL transport infrastructure is today implemented by more than hundred service providers throughout Europe, servicing thousands of public and private entities, specifically in the post-award processes of e-procurement, where e-invoicing is the predominant use case.<br>http://www.peppol.eu/about_peppol/about-openpeppol-1 |

## C.3 MSP Members' and Stakeholders' remarks

The French government took an ordinance on e-Invoicing development. This action is part of the simplification programme for business. The goal is to dematerialize invoicing between public bodies and suppliers. The entry into force of the e-invoicing is progressive and goes from January the first of 2017 for big firms to 2020 for micro-enterprises. Public bodies have to be ready to by perform e-Invoicing by 2017.

In order for small and medium sized enterprises to also benefit from the advantages of 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) which has been available to interested companies and organisations since June 2013, initially as a release candidate, and since 25th June 2014 as Version 1.0 Using the new format ,structured invoices can be exchanged electronically between different companies as well as between companies and the public administration quickly, conveniently and easily. Moreover, the new ZUGFeRDFormat not only reduces invoicing costs - the entirely electronic process makes material and postage costs redundant- but will also make invoicing much more efficient in the future by means of optimized processes.http://www.zugferd.de

In Italy 100% of the supplier of central and local authorities are obliged to issue electronic invoices in FatturaPA format since March 31, 2015 semantically aligned with CEN/BII WS core invoice. This broad-scale project lead 2-2.5 million suppliers to send invoices electronically and enabled the Italian government to reap the benefits of digital invoicing to the full extent.

NL 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 forthcoming 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. In The Netherlands a Dutch profile on HRXML (SETU) has a comply or explain status, 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 Dutch central government to reap the benefits of digital invoicing to the full extent. The Simplerinvoicing infrastructure will further help to reach the objective of 100% e-invoicing in 2018. 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 B2C e-Invoicing. B2G and B2C 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 as well as delivery. Standardized E-invoicing 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 a multitude of ways with various vendors and/or data mining third party services to receive invoices in various different formats or embedded in proprietary apps would be detrimental to the objectives of the Digital Single Market.

## D. Proposed new standardisation actions

### D.1 Standards developments

The most pressing standardisation activity at this moment is to fulfil the standardisation request addressed to the European Standardisation Organisations in support of the implementation of the Directive 2014/55/EU of the European Parliament and of the Council of 16 April 2014 on electronic invoicing in public procurement.

The Commission Implementing Decision on Standardisation Request on e-Invoicing in public procurement requests the following deliverables:

- **ACTION 1:** to develop a European standard (EN) for the semantic data model of the core elements of an electronic invoice;
- **ACTION 2:** to identify a limited number of invoice syntaxes (formats) which fully comply with the European standard, to be given in a Technical Specification (TS);
- **ACTION 3:** to develop syntax bindings, i.e. information specifying how the semantic data model could be represented in the listed syntaxes (formats), and their automatic validation artefacts, to be given in a Technical Specification (TS);
- **ACTION 4:** to develop guidelines on interoperability of electronic invoices at the transmission level, taking into account the need of ensuring the authenticity of the origin and the integrity of the electronic invoices' content, to be given in a Technical Report (TR);
- **ACTION 5:** to develop guidelines on the optional use of sector or country extensions (as described in the Recommendation of the European Multi-stakeholder Forum on e- Invoicing) in conjunction with the European standard, including a methodology to be applied in the real environment, to be given in a Technical Report (TR);
- **ACTION 6:** to carry out the test of the European standard with respect to its practical application for an end user, and to provide the result in a Technical Report (TR).

The above actions are currently under development within CEN/PC 434.

## (D.2) Other activities around standardisation

**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 with active implementations. Commission may launch further broad, neutral fact-finding inquiries (perhaps via the MSP and EMSFEI) to identify appropriate shared needs and goals.

**ACTION 7:** **OASIS and CEN may carry out remaining work** in response to the actions described in the Communication COM(2010)712, or to specific needs that are endorsed by the Commission further to their identification by the European Multi-stakeholder Forum on e-Invoicing.

### INVESTIGATION INTO STANDARDISATION NEEDS AROUND THE FOLLOWING ISSUES:

- **ACTION 8:** For all types of invoices the generic container [body] of data might be standardized (including tax requirements on a European level); for industry specific purposes specific containers of data in addition to the generic container might be devised and standardized on a European level: i.e. for energy and HRM purposes in line with the guidelines on the optional use of sector or country extensions developed by CEN/PC 434.

- **ACTION 9:** Versions of generic and specific containers should be limited to two versions in operation and [only] one version under development thus enabling release management across all partners in the digital invoicing chains.

- **ACTION 10:** Billing Service Providers should interconnect their invoicing networks thus facilitating for pan European digital invoice interchanges. Simplerinvoicing is an example of how such a network could work and could be used as a base.

- **ACTION 11:** Testing facilities to foster the correct adoption of the standards

- **ACTION 12:** Options for standardized e-invoicing for B2C commerce covering over-the-counter as well as online purchases

# 3.3.3. Card, Internet and Mobile Payments

## A. Policy objectives

While there is no globally accepted definition of mobile payments, payments involving the mobile phone seem to gain 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 benefits of consumers and merchants.

## B. Legislation and policy documents

### B.1 At European level

- Directive 2007/64/EC on payment services which is currently under revision
- Regulation (EC) 924/2009 on cross-border payments
- Regulation (EC) 260/2012 on the SEPA migration end-date
- COM(2011) 941 final: Green Paper "Towards an integrated European market for card, internet and mobile payments"
- Cybersecurity Strategy of the European Union: An Open, Safe and Secure Cyberspace [JOIN(2013) 1 final].

### B.2 Others

French strategy :
http://proxy-pubminefi.diffusion.finances.gouv.fr/pub/document/18/17780.pdf#page=7

## C. Standardisation needs, ongoing activities and progress report

### C.1 Commission perspective and progress report

By the end of 2014, the number of mobile connected devices will exceed the number of people on earth, and in February 2014 mobile access to the Internet surpassed fixed access. Whether to shop, move, buy concert tickets, pay bills or access banking services, mobile 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 a myriad of 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 are 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, providing with the 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 commit to making the necessary investments.

It requires a coordinated and pragmatic approach by the public authorities and by the various players in order to favour the deployment of the service. The cooperation among the players is key, and should be supported by the real willingness and commitment to achieve concrete results.

The European Commission doesn't plan yet to engage into specific legislation since it requires a more mature market. However, it will continue the cooperation and discussion with the institutional players and the ESOs, and 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. CEN will leverage on 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 ERPB working group should work in cooperation with relevant players that are not represented in the ERPB (e.g. telecom operators), and is expected to deliver a vision that will enhance the consumers' confidence in m-payments. Future standardisation work in the m-payments domain should pay particular attention to security for apps, access and accessibility, management and portability of customer data, transparency. Certification of equipment and solutions should be addressed as well by the competent bodies.

In order to foster and accelerate innovation and create a level playing field, a certain degree of standardization is imperative 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. Standardization could include making a distinction between mobile platforms (e.g. secure element, mobile handset) and their functions/security which are of generic nature and in support to all mobile services / applications and mobile payment applications (running on these platforms).

## C.2 Ongoing standards developments

| **ORGANISATION** | **SHORT DESCRIPTION** & weblinks |
|---|---|
| ISO | Mobile payments WG - ISO TC68/SC7/WG10. ISO 12812 will be ready for publication in 2015. It includes five parts:<br>· ISO 12812-1: General Framework<br>· ISO 12812-2: Security and data protection for Mobile Financial Services<br>· ISO 12812-3: Financial Application Management<br>· ISO 12812-4: Mobile Payments to Persons<br>· ISO 12812-5: Mobile Payments to Businesses |
| ETSI | Following the EC-ETSI jointly organized 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) standardized 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 specific and co-ordinated standardisation activities at European and international level. |
| ITU-T | *ITU-T SG13 approved two Recommendations on secure mobile payments and mobile banking solutions.*<br>Recommendation ITU-T Y.2740 elaborates approaches to develop system security for mobile commerce and mobile banking by describing the security requirements for the mobile commerce and the mobile banking systems, based on four specified security levels.<br>Recommendation ITU-T Y.2741 specifies the general architecture of a security solution for mobile commerce and mobile banking in modern telecommunication networks.<br>Focus Group Digital Financial Services is working towards analysing the barriers to mobile payments and mobile financial services in developing countries http://itu.int/en/ITU-T/focusgroups/dfs |

| ORGANISATION | SHORT DESCRIPTION & weblinks |
|---|---|
| W3C | The Web Payments Interest Group will 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), and to establish a common ground for payment service providers on the Web Platform. The overall objective of this group is to identify and leverage the conditions for greater uptake and wider use of Web Payments through the identification of standardization needs to increase interoperability between the different stakeholders and the different payment methods. http://www.w3.org/Payments/IG/<br>W3C is also about to create a Working Group chartered to ease integration of the payments ecosystem into the Web for a payment initiated within a Web application. The Working Group will standardise a set of messages and a message flow for 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. This group will not define a new digital payment scheme.<br>• https://www.w3.org/community/webpayments/ |
| EPASOrg and EPC | EPASOrg and EPC currently focus on the protocols for card payment protocols in the Eurozone and aim to replace the current mess of proprietary protocols. EPC (European Payment Council) are also involved in SEPA (Shared Euro Payment Area) and see themselves as the decision-making and coordination body of the European banking industry in relation to payments. |

## C.3 MSP Members' and Stakeholder's remarks

Extract from European Round Table of Industrialists (ERT) summary document:

CASE STUDY: NEAR FIELD COMMUNICATION (NFC) STANDARD

*Initiated in 2011, the NFC standard aims at leveraging mobile payment services in Europe by defining the tools to develop a SIM-based NFC ecosystem. This standard is currently developed with a cross-industry approach, involving primarily mobile network operators and handset-manufacturers.*

*The NFC standardisation process engages over 40 industry players which allows for competition within a standard, contrary to quasi-monopolistic market structures often generated by proprietary platforms. Stakeholder involvement is also crucial to achieve critical mass when launching a new network service, such as NFC mobile wallets. Given the pace of technologies and the level of global competition in the Telecom sector, it is essential for the NFC success that standardisation is fast and takes the time-to-market of the product into account. To support these needs for coordination and speed, the European Commission as a whole has a key role to ensure that strategic coordination across industries in standard setting is facilitated and promoted.*

Other inputs:
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, transparency.

# D. Proposed new standardisation actions

## D.1 Other activities around standardisation

**ACTION 1:** 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. This is needed to give a clearer definition and scoping 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:** Review existing Standards and specifications, especially at the architecture level, to take into account to the protection of individuals with regards to the processing of personal data and the free movement of such data .

## D.2 Other activities around standardisation

**ACTION 4:** **Assess landscape of existing standards.** The Commission, in cooperation with the European Central Bank, intends to facilitate the convergence 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 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 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 serve to develop missing standards and to fix the existing problems.

In particular the following issues (in particular in the m-payment domain) should be addressed: security for apps, access and accessibility, management and portability of customer data, transparency. Certification of equipment and solutions should be addressed as well by the competent bodies.

**ACTION 5:** **INVESTIGATE WORK FOR W3C.** After a successful Workshop, W3C expects the need to charter a new working group on the payment request API and a complementary business group with a broader remit. The proposed DRAFT charter was published recently: http://www.w3.org/2015/06/payments-wg-charter.html

# 3.3.4. eXtensible Business Reporting Language (XBRL)

## A. Policy objectives

eBusiness, defined as doing business over the internet, needs unified definitions, identification and codification of business-related information, processes, actors and their roles, and relationships. That includes names, legal form and status, financial information and reports, transactional information, deeds and claims in legal and administrative proceedings used in a variety of commercial, societal and administrative contexts in commerce, taxation, statistics, public procurement, supervision of regulated activities, judicial etc. Once unified, information can then be automatically processed by ICT, published, searched and retrieved from the internet, automatically analysed and used by governments, businesses, consumers and civil society.

XBRL is a set of XML predefined vocabularies and rules, developed and used by financial industries, originating largely with accountancy practices, to report financial position, performance and economic viability of businesses. XBRL permits the publication of financial reports augmented by mark-up according to sets of XBRL tags (called taxonomies) which then may be processed and retrieved by market participants, including analysts, supervisors, enterprise regulators, tax offices, clients, suppliers, creditors and investors.

## B. Legislation and policy documents

### B.1 At European level

- The **European Parliament resolutio**n of 10 March 2009 on the Small Business Act (2008/2237(INI)) http://www.europarl.europa.eu/sides/getDoc.do?type=TA&language=EN&reference=P6-TA-2009-0100

- **COM(2011)0684** – C7-0393/2011 – 2011/0308(COD): The European Parliament, Committee of Legal Affairs - Report of 25 September 2012 on the proposal for a directive of the European Parliament and of the Council on the annual financial statements, consolidated financial statements and related reports of certain types of undertakings. http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//NONSGML+REPORT+A7-2012-0278+0+DOC+PDF+V0//EN

- **COM(2011)0683 – C7-0380/2011 – 2011/0307(COD):** The European Parliament, Committee of Legal Affairs - Report of 27 September 2012 on the proposal for a directive of the European Parliament and of the Council amending Directive 2004/109/EC on the harmonisation of transparency requirements in relation to information about issuers whose securities are admitted to trading on a regulated market and Commission Directive 2007/14/EC http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//NONSGML+REPORT+A7-2012-0292+0+DOC+PDF+V0//EN

### B.2 Others

- The Netherlands Standard Business Reporting (SBR) program, using XBRL taxonomies for government-to-business interactions: http://www.sbr-nl.nl/english/

# C. Standardisation needs, ongoing activities and progress report

## C.2 Ongoing standards developments

| ORGANISATION | SHORT DESCRIPTION & weblinks |
|---|---|
| **XBRL** | Base specifications and related resources: http://www.xbrl.org/ |
| **XBRL** | International Financial Reporting Standards taxonomies and related resources: http://www.ifrs.org/XBRL/Resources/Pages/Resources.aspx |
| **XBRL Europe** | XBRL Europe is a non-profit organisation 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 organisations http://xbrleurope.org/ |
| **International Accounting Standards Board** | XBRL resources for EU banking and insurance supervision: http://www.eurofiling.info. Note: The website is maintained by Eurofiling and links to both EBA (European Banking Authority) and EIOPA (European Insurance and Occupational Pensions Authority) |
| **CEN** | CEN/WS XBRL: workshops on Improving transparency in financial and business reporting, including CWA 16744-3:2014 (European 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: XBRL Handbook for Declarers). |

# D. Proposed new standardisation actions

## D.2 Other activities around standardisation

**ACTION 1.** A basic survey to determine EU member states' initiatives, resources and position on XBRL and its fit to European regulatory accounting practices has been suggested. Coordinated EU input to the global XBRL standardisation processes, notably in XBRL and in International Financial Reporting Standards taxonomy, could leverage multilateral efforts leading to transparent financial industries and sound governance in the post-crisis global economy.

# 3.3.5. Online Dispute Resolution (ODR)

## A. Policy objectives

This action is related to the EU policy on consumer redress and alternative dispute resolution. The European Commission will set up a web-based European Online Dispute Resolution ('ODR') Platform, making it possible for consumers, traders and alternative dispute resolution ('ADR') entities in the EU Member States to communicate with each other online, in all EU official languages and through an accessible website, for the purpose of resolving e-commerce disputes out of court. The ODR platform will respect subsidiarity and not require adaptation of the national ODR systems and should not increase administrative burden of the Member States.

## B. Legislation and policy documents

### B.1 At European level

- Directive 2013/11/EU of the European Parliament and of the Council on alternative dispute resolution for consumer disputes and amending Regulation (EC) No 2006/2004 and Directive 2009/22/EC (Directive on consumer ADR)
- Regulation 524/2013 of the European Parliament and of the Council on online dispute resolution for consumer disputes and amending Regulation (EC) No 2006/2004 and Directive 2009/22/EC (Regulation on consumer ODR)

## C. Standardisation needs, ongoing activities and progress report

### C.1 Commission perspective and progress report

The ODR platform will enable the online submission of complaints to a competent ADR entity. To this end, all ADR entities established in the EU Member States in accordance with the Directive on consumer ADR will be connected electronically to the ODR platform.

The Regulation on consumer ODR sets out the requirement for the ODR platform to ensure the secure interchange of data with ADR entities and to comply with the principles of the European Interoperability Framework adopted pursuant to Decision 2004/387/EC on interoperable delivery of pan-European eGovernment services to public administrations, businesses and citizens (IDABC).

In order for the ODR platform to meet the abovementioned objectives and requirements, it is necessary to allow for a certain degree of standardisation of data exchange and interoperability between the ODR platform and the ODR systems operated by ADR entities at national level.

### C.2 Ongoing standards developments

| **ORGANISATION** | **SHORT DESCRIPTION** & weblinks |
|---|---|
| **CEN** | CEN Workshop Agreement (CWA) was adopted in November 2009 by the CEN Workshop on standardisation of Online Dispute Resolution tools |
| **IETF** | http://trac.tools.ietf.org/group/iab/trac/wiki/Multi-Stake-Holder-Platform#ODR |

## D. Proposed new standardisation actions

### D.1 Standards developments

- **ACTION 1: Encourage the development of an interoperable framework for data exchange between ODR systems.** This should build in particular on UN/CEFACT international standards and practices, in order to determine the content and format of electronic document exchange and to re-use global business processes for the definition and expression of standard data object types. Further involvement of European standardisation bodies, including for the establishment of standards at European level, could be considered subject to stakeholder interest, and alignment with UN/CEFACT.

## 3.4. Sustainable growth

# 3.4.1. Smart Grids and Smart Metering

## A. Policy objectives

One of the EU's key ambitions is to develop a low-carbon economy. In the 2020 and 2030 framework for climate and energy, the EU committed to lower greenhouse gas emissions by 20% with respect to 1990 and 40% by 2030, to reach a share of renewable energy consumption of at least 20% by 2020 and 27% by 2030, and 27% energy savings by 2030 (compared with the business-as-usual scenario).

In this landscape, the electricity network has a central role to play. In 2012, electricity represented 22% of our final energy consumption with a share of renewables of 24% in the gross production i.e. almost a 3% increase compared to 2011. Owing to the increas-ing number of appliances, of the expected penetration of heat pumps and electric vehi-cles, this share is expected to rise and the share of renewables could be as high as 50% by 2030 with an im-portant contribution from variable sources. There is therefore a tremen-dous need for accelerating the smart grids rolling out. Smart grids will be the backbone of the future decarbonised power system. They will enable improved energy efficiency and the integration of vast amounts of Renewable Energy Sources (RES), decentralised genera-tion 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.

The use of Smart Grids for future high-tech infrastructures in Europe, such as integration of renewables and energy infrastructure for electric cars, needs to be addressed at European level from a very beginning to create synergies, assure interoperability and establish a real internal market.

## B. Legislation and policy documents

### B.1 At European level

- **Directives 2009/72/EC and 2009/73/EC: Internal market in electricity and gas**
- **Directive 2012/27/EU** on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and re-pealing Directives 2004/8/EC and 2006/32/EC
- **Directive 2014/94/EU** on the deployment of alternative fuels infrastructure
- **Directive 2014/32/EU** on measuring instruments repealing Directive 2004/22/EC
- **COM(2012) 663:** Communication: Making the internal energy market work
- **COM(2015) 339:** Communication: Delivering a new deal for energy consumers
- **Regulation (EU) No. 347/2013** on guidelines for trans-European energy infra-structure
- **Commission Recommendation COM 2012/148/EU** (09.03.2012) on prepara-tions for the roll-out of smart metering systems
- **Commission Recommendation 2014/724/EU** (10.10.2014) on the Data Protec-tion Impact Assessment Template for smart grid and smart metering systems
- **COM(2011) 202** Smart Grids: from innovation to deployment
- **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
- **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
- **COM(2015) 192:** A Digital Single Market Strategy for Europe and COM(2010) 245: "A Digital Agenda for Europe": actions 71 & 73 address respectively mini-mum functionalities to promote smart grid interoper-ability and a common set of functionalities for smart meters and are directly related to the standardisation ac-tivities at CEN/CENELEC/ETSI.
- **COM(2009) 111**: 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 Technolo-gies (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 Infor-mation and Communication Technologies
- **COM(2009) 7604**: Recommendation (9.10.2009) on mobilising Information

# C. Standardisation needs, ongoing activities and progress report

## C.1 Commission perspective and progress report

The deployment of Smart Grids will be crucial to achieve the 2020 and the 2030 targets. The implementation of appropriate ICT solutions will also enhance network efficiency and improve overall system operation through better demand response mechanisms and cost savings (remote operation of meters, lower reading costs, avoiding investment in peak generation, etc.), which will also contribute to the implementation of the internal energy market.
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.

As systems need to be integrated to ensure their coherent operation in response to user's requirements, interoperability is a first and fundamental requirement to be considered. This can be ensured only through an appropriate standardisation activity by reviewing existing standards or, where needed, developing new ones. The majority (estimated at 70%) of the standards needed for the smart grid are ICT related. Of paramount importance is the agreement around data protection and data security related standards.

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.

A major difficulty is the choice of 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 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, ENV, 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.

Policy aspects related to the smart grid mandate M/490 were dealt with under the Expert Group 1 (EG1) of the Smart Grids Task Force. The group chaired by ENER and CNECT is actively participating in this group. EG1 is also monitoring related activities under mandate M/441 (Smart Meters) and M/468 (electric vehicles chargers) to the ESOs. EG1 has recently assessed the interoperability, standards and functionalities applied in the large scale roll out of smart metering in Member States, with particular attention to the implementation of the required standardised interfaces and of the Commission recommended [15] functionalities for the provision of consumer benefitting energy management services. A report summarising the main findings was published in October 2015 [16].

On the level of technical standardisation and coordination of work, IEEE, OASIS and the ESO Smart Grid Coordination Group are continuing their collaboration including identifying whether there are serious conflicts between their respective standardisation deliverables which may have negative impact on interoperability and market adoption of smart grid solutions.

15 Commission Recommendation 2012/148/EU
16 https://ec.europa.eu/energy/en/topics/markets-and-consumers/smart-grids-and-meters/smart-grids-task-force

## C.2 Ongoing standards developments

### STANDARDS DEVELOPMENTS

| ORGANISATION | SHORT DESCRIPTION & weblinks |
|---|---|
| CEN, CENELEC, ETSI | At present mandate M/490 given to CEN-CENELEC-ETSI by the Commission in March 2011 can be considered as completed; this 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 EG1 work on standards.<br>Main outcomes are available at : http://www.cencenelec.eu/standards/Sectors/SustainableEnergy/SmartGrids/Pages/default.aspx<br><br>The European Standardisation Organisations have agreed to continue their collaboration in relation to Smart Grids following the completion of the work under this mandate, under the Smart Energy Grid Coordination Group. The latter will focus at security and interoperability, follow-up on new developments in the field of Smart Grids, and actively promote the results of its work at European and international levels.<br>Concerning smart metering, a separate Smart Meters Coordination Group (SM-CG) of the three ESOs is managing the standards work programme still contributing to the development of new and maintenance of existing standards for advanced metering infrastructures.<br><br>Regarding electro-mobility, a work programme and a list of relevant standards for the charging of electric vehicles was last updated in November 2014.<br><br>Finally, regarding charging points for electric vehicles of interest to the eM-Coordination Group, and in support of the implementation of the alter-native fuels infrastructure Directive 2014/94/EU, a new standardization request was issued to the ESOs in March 2015. ETSI and the oneM2M Partnership project are active in the area of M2M with some relation to smart grids. ETSI is also developing radio technologies for wireless inter-connection in Home Automation Networks with applications such as smart metering and energy control in the scope of the technology. |
| IEC | IEC has a number of Technical Committees dealing with Smart Grids and Smart Metering standardisation:<br>TC 8: Systems Aspects for Electrical Energy Supply<br>SC 8A: Grid Integration of Large-capacity Renewable Energy (RE) Generation<br>TC 13: Electrical Energy Measurement and Control (including Smart Metering)<br>TC 57: Power Systems Management and Associated Information Exchange<br>PC 118: Smart Grid User Interface<br>Strategic Group 3 on Smart Grid has been disbanded and an IEC Systems Committee on Smart Energy has been set up. The committee provides systems level standardization, coordination and the areas of Smart Grid and Smart Energy, including interaction in the areas of heat and gas.<br>http://www.iec.ch/dyn/www/f?p=103:186:0::::FSP_ORG_ID,FSP_LANG_ID:11825<br>A copy of the IEC Smart Grids System Roadmap is available at<br>http://www.iec.ch/smartgrid/downloads/sg3_roadmap.pdf<br><br>Please refer also to the Smart Grid Mapping Tool:<br>http://smartgridstandardsmap.com/. |

| ORGANISATION | SHORT DESCRIPTION & weblinks |
|---|---|
| IEEE | IEEE has many standards and standards projects in development from the diverse fields of digital information and controls technology, networking, security, reliability, assessment, interconnection of distributed resources including renewable energy sources to the grid, sensors, electric metering, and broadband over power line, and systems engineering. IEEE has developed a guide for smart grid interoperability standardisation, IEEE 2030-2011 IEEE Guide for Smart Grid Interoperability of Energy Technology and Information Technology Operation with the Electric Power System (EPS), End-Use Applications, and Loads. IEEE 2030(r) spans the three distinct perspectives of power and energy, communications and information technology. http://standards.ieee.org/develop/msp/smartgrid.pdf. |
| ITU-T | The ITU-T Smart Grid Focus Group completed its work in December 2011 and adopted deliverables at http://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.<br>ITU-T SG13 Recommendation ITU-T Y.2070 "Requirements and architecture of the home energy management system and home network services", and consented Y.2071 "Framework of micro energy grid".<br>Detailed information is described in the document "Smart Grid Standardization Overview and Work Plan" developed by ITU-T SG15 and available at http://www.itu.int/en/ITU-T/studygroups/2013-2016/15/Pages/exec-sum.aspx |
| 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.<br>See OASIS Energy Interoperation: https://www.oasis-open.org/committees/energy-interop OASIS Energy Market Information Exchange (eMIX): https://www.oasis-open.org/committees/emix OASIS Web Services Calendar (WS-Calendar): https://www.oasis-open.org/committees/ws-calendar OASIS Open Building Information Exchange (oBIX): https://www.oasis-open.org/committees/obix. |
| 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 https://datatracker.ietf.org/wg/eman/charter/ has produced several specifications for an energy management framework, for power/energy monitoring and configuration. See http://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).<br>Many of the IETF Working Groups listed under section 5.6 Internet of Things are developing standards for embedded devices that may also be applicable to Smart grids. |

## Others (including stakeholder groups, technology platforms, research projects)

| TITLE | SHORT DESCRIPTION & weblinks |
|---|---|
| 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.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://sgip.org/ |
| JISC | Japanese Industrial Standards Committee (JISC) roadmap to 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. |

### C.3 MSP Members' and Stakeholders' remarks

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.

A missing element in the Smart Grid applications is negotiations mechanisms that allow users and providers to negotiate optimized usage, including planning and scheduling of availability and use of energy resources.
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 standardized approach covering all aspects of the problem, from application semantics to indoor interconnection wired or wireless technologies; 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.

## D. Proposed new standardisation actions

### D.1 Standards developments

**ACTION 1:** he Expert Group (EG1) of the Smart Grids Task Force will continue its work for assessing the interoperability and standards used in a smart grid environment for de-livering the required functionality, connectivity and seamless interaction of data reposito-ries and services, also for the benefit of consumers. The new focus will be (i) the delivery of demand-response ready interfaces, and (ii) the standardisation, in close consultation with the ESOs and their respective groups, of the information type and format required for seamless data flow, and towards preparing the ground for launching measures that would enable consumers to share easily their consumption data of service providers and other entities of their choice.

**ACTION 2:** The Smart Grids Task Force should, in collaboration with the Cyber Security Coordination Group (CSCG), assess major security and privacy standards and regula-tions applicable to smart grids and smart metering and identify gaps and measures to progress for a further step, taking into account personal data protection.

# 3.4.2. Smart Cities / Technologies and Services for a Smart and Efficient Energy Use

## A. Policy objectives

The construction sector is the highest energy consumer in the EU (about 40%) and main contributor to GHG emissions (about 36% of the EU's total CO2 emissions and for about half of the CO2 emissions which are not covered by the Emission Trading System). In this framework, the building industry will be one of the key enablers of the 2050 decarbonisation goal for the European economy. This goal links two European policies:

- The energy policy: scenarios by 2050 show that a 40% to 50% reduction of the building "sector" energy consumption is mandatory by 2050, where fossil fuel heating represents a major share (60%);

The climate policy: scenarios by 2050 show that the building "sector" must target a reduction of about 90% of its CO2 emissions, since accounting for about 1.4 Gtons of CO2 per year.

## B. Legislation and policy documents

### B.1 At European level

- **Directive 2003/96/EC** of the Council on Energy Taxation
- **Directive 2003/87/EC** of the European Parliament and the Council on EU Trading Scheme
- **Directive 2004/8/EC** of the European Parliament and the Council on Cogeneration
- **Directive 2009/28/EC** of the European Parliament and the Council on the Use of Energy from renewable sources
- **Directives 1992/75/EC and 2010/30/EU** on Labelling and Information
- **Directives 2005/32/EC and 2009/125/EC** on Eco Design of products
- **Directive 2006/32/EC** of the European Parliament and the Council on Energy end-use efficiency and energy services
- **Directive 2010/31/EU** of the European Parliament and the Council on Energy Performance of Buildings
- **Regulation 2013/105/EC:** Mobilising Information and Communications Technologies to facilitate the transition to an energy-efficient, low-carbon economy
- **COM(2012) 4701:** "Smart Cities and Communities - European Innovation Partnership"

## C. Standardisation needs, ongoing activities and progress report

### C.1 Commission perspective and progress report

- At the level of Smart Cities, the interoperability need is stronger than at the level of buildings, - which is in the end a controlled environment -, due to the many players, actors and system owners. This is specially so when it comes to public services. Open data comes along with standardised open data.
- It has to link with the public services energy management (i.e. lighting), and buildings energy management (public buildings, offices and businesses and homes).

From a physical point of view, we can think of the urban environment as a hierarchical system in which, for example, buildings are grouped in neighbourhoods, neighbourhoods in cities, cities in regions, and so on.Urban areas are therefore inherently complex systems, the subsystems of which work together to create the whole.

A city is considered a "system of systems" – the systems being Energy, Water, Heat, Waste, Mobility, etc. Standardization can help assist the communication and cross-sectoral connection of these systems. 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 optimizing environmental, social and economic outcomes through the seamless transfer of information; availability of energy management appliances (sensors, switches) designed as 'plug and play' devices; compatibility with home automation networks.

In Smart Cities, nowadays, ISO standards are all in terms of the building scale, and there are no specific International Standards for energy modelling at the urban scale. However, starting from analysis at the building scale, the ISO standards also can be indirectly applied to urban energy modelling.

The European Commission has created a Smart Cities and Communities European Innovation Partnership (SCC-EIP). This has 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) that describes a joint vision, a common target and proposals for implementation, which are contain standardisation aspects. The SIP is available at http://ec.europa.eu/eip/*smartcities*/files/sip_final_en.pdf.

Home Automation Networks is an important domain to be included in any global initiative for improvement in energy efficiency. Applications such as lighting and energy control, appliances control, power monitoring and buildings energy management are part of the Home Automation Networks have a significant impact on energy efficiency. This complex issue involves multiple domains, from application semantics to specific radio interconnection technologies.

## C.2 Ongoing standards developments
## Standards developments

| **TITLE** | **SHORT DESCRIPTION** & weblinks |
|---|---|
| **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).<br>http://www.bsigroup.com/en-GB/smart-cities/Smart-Cities-Standards-and-Publication/PAS-181-smart-cities-framework/ |
| **CEN, CENELEC, ETSI** | Smart and Sustainable Cities Co-ordination Group (similar activities are also going on national level, e.g. in DIN/DKE, and are linked to this co-ordination group) |
| **ISO, IEC** | Technical Committee 268 "'Sustainable development in communities" is directly working on many relevant issues, including management systems and indicators.<br>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), and ISO 50001:2011 (Energy management systems – Requirements with guidance for use).<br>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) |
| **CENELEC** | Ongoing work includes EN 50523:2009 'Household appliances interworking |
| **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 aims to guide cities in upgrading their traditional infrastructures and reimagining processes and models by integrating new digital technologies. It will supersede the work previously done in the ITU-T Focus Group on smart sustainable cities (FG-SSC).<br>http://itu.int/go/tsg20<br>ITU-T Study Group 5 consented a methodology to assess the environmental impact of ICT in cities together with many stakeholders including the European Commission. The approval of this Recommendation is expected in October 2015.<br>SG13 has three Recommendations on smart energy saving (ITU-T Y.3021, Y.3022 and Y.2064). |

| TITLE | SHORT DESCRIPTION & weblinks |
|---|---|
| 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://standards.ieee.org/develop/msp/smartcities.pdf. |
| OASIS | Transformational Government Framework (TGF) Description: Models and practices for using IT to improve delivery of public services. https://www.oasis-open.org/committees/tgf, https://www.oasis-open.org/news/pr/new-british-smart-cities-specification-uses-oasis-transformational-government-framework |
| DIN/DKE/VDE | The German Standardisation Roadmap Smart City http://www.smartcities.din.de/sixcms_upload/media/3704/Standardization%20Roadmap_SmartCity_EN_2105.pdf http://www.vde.com/en/dke/std/documents/nr_smart%20city_en_version%201.0.pdf |
| AENOR | http://www.vde.com/en/dke/std/documents/nr_smart%20city_en_version%201.0.pdf |
| IETF | The EMAN WG https://datatracker.ietf.org/wg/eman/charter/ has produced several specifications for an energy management framework, for power/energy monitoring and configuration. See http://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 5.6 Internet of Things are developing standards for embedded devices that may also be applicable to this section. |

## Others (including stakeholder groups, technology platforms, research projects

| TITLE | SHORT DESCRIPTION & weblinks |
|---|---|
| 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 are running a series of Vocabulary Camps addressing specific sub-areas. |
| PROJECT FROM DG GROW | "Stimulating industrial innovation in the construction sector through smart use of ICT: connecting SMEs in digital value chains" Objectives: provide a market analysis of the construction industry in terms of the current and foresight integration of ICT and eBusiness solutions and systems; develop a framework for digital value networks in the construction sector. |
| 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. |

| TITLE | SHORT DESCRIPTION & weblinks |
|---|---|
| HORIZON 2020 CALL SCC-03-2015 | Development of system standards for smart cities and communities solutions. The process for developing smart cities and communities standards should ensure inter-operability of solutions, i.e. adaptabil-ity of solutions to new user requirements and technological change as well as avoidance of entry barriers or vendor lock-in through promoting common meta-data structures and interoperable (open) interfaces instead of proprietary ones;<br>open and consistent data, i.e. making relevant data as widely avail-able as possible – including to third parties for the purpose of appli-cations development – whilst using common, transparent measure-ment and data collection standards to ensure mean-ingfulness and comparability of performance/outcome measurements. |
| INDUSTRY MEMORAN-DUM OF UNDERSTAND-ING ON URBAN PLAT-FORMS | Develop a set of principles and a joint reference architecture framework to enable in-teroperability, scalability and open interfaces to integrate different solutions. Develop a joint data and service ontology to be used by individual Smart cities. Accelerate the adoption of the developed framework by standardisation bodies |
| 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 interop-erability, portability and comparability, in order to avoid vendor lock-in and to support local digital entrepreneurship. OASC con-sists 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 to adopting the OASC principles, The OASC mechanisms are directly linked to the exist-ing standardisation processes on national, European and interna-tional level, including the SSCC-CG. |
| FUTURE INTERNET PUB-LIC PRIVATE PARTNER-SHIP | Specifications and technologies developed under the Future Internet Public Private Partnership programme (FP7) that can be used within the context of smart cities:<br>FIWARE NGSI is an API that provides a lightweight and simple means to gather, pub-lish, query and subscribe to context infor-mation. This is an API for context informa-tion 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 offered it as open data through the reutilization by developers. For instance, it is possible to offer in real time data from sensors or sys-tems to leverage the creation of new applications.<br>FIWARE CKAN: Open Data publication Genic 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 man-age open datasets and data sources, while supports searching, browsing, visualizing or accessing open data. FIWARE CKAN is an Open Data publication platform that is used by many cities, public author-ities and organizations.<br>www.fiware.org/ |

## C.3 MSP Members' and Stakeholder's remarks

There are already many activities going on around smart cities in various standards de-velopment organisations around the globe. Industry, therefore, welcomes that the Com-mission does not see a need to trigger further stand-ards developments at this point in time but relies on the industry initiatives which have started in organisations around the globe.

Cities and regions welcome the facilitation by the Commission to ensure the systematic inclusion of perspectives of the demand side in the standards processes, especially since cities have not traditionally been contributing directly to standards in the way that is hap-pening currently.

Broad coordination both with stakeholders but also with Member States and the Com-mission is important for mak-ing consistent progress in this area which covers a large field of sub-domains.

# D. Proposed new standardisation actions

## D.1 Standards developments

**ACTION 1: Multidisciplinary standardized approach for Home Automation Networks (HAN)**. This should cover all aspects of the problem, from application semantics to radio technologies. Applications such as lighting and energy control, appliances control, power monitoring and buildings energy management are part of the Home Automation Net-works and have significant impact in energy efficiency. http://ec.europa.eu/digital-agenda/en/smart-cities.

**ACTION 2: Provision of elements for a global solution on smart appliances and home energy control**, such as suitable radio protocols for indoor coverage.

## D.2 Other activities around standardisation

**ACTION 3: The CSA on ICT/Energy vocabularies and ontologies (Ready4SmartCities):** DG CONNECT Objective ICT-2013.6.4 will contribute to the standardisation organisations.

**ACTION 4: The CSA on Smart Cities and Communities standards (Espresso)**: DG CONNECT Objective SCC-03-2015 will contribute to standardisation activities, with the objective on building consensus that would lead to the development of the standards needed in this area.

**ACTION 5:** O**pen & Agile Smart Cities (OASC):**
The global OASC initiative is based on three open, existing, free, lightweight mecha-nisms – a common API, a set of data models and a data platform – which address core issues of the Digital Single Market strategy, including interoperability, portability and comparability in smart cities, especially in the form of open service platforms such as FIWARE. Governed by the OASC Task Force, which is led by the cities who implement the mechanisms, the OASC initiative has set up an open process in which the mecha-nisms will be developed further, feeding into standards processes, including those related to the EIP-SCC. A concrete proposal is an ETSI ISG specifying a cross-cutting context management API to provide a lightweight and simple means to gather, publish, query and subscribe to reliable real-time urban context information (a proposed candidate is the FIWARE NGSI API), and an open data portal specification for the publication, manage-ment, discovery and consumption of urban data. 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 communica-tion standards on lower levels.

**ACTION 6:** CEN/CENELEC Technical Report to clarify whether further standardisation is needed on citizen issues related to smart cities (eg: 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. Inter alia, as a key issue, the EIP SSC, in implementing the strategic smart city goals, recommends to fully respect consumer privacy (European Innovation Partnership on Smart Cities and Communities Operational Implementation Plan, page 6). The Commission and SETIS consider it essential for inno-vation to build trust, especially concerning energy data security and privacy (SET Plan, December 2014, page 7.)

**ACTION 7:** Investigations should be started on the possible optimization ICT standardisa-tion could contribute 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 expo-nentially over the last couple of years.

**ACTION 8: Privacy issues:** Existing standards should be checked for account to the pro-tection of individuals with regards to the processing of personal data and the free move-ment of such data Identification and where needed development of specific Privacy by Design standards should be done**.**

# 3.4.3. ICT Environmental Impact

## A. Policy objectives

ICT is currently one of the fastest growing GHG emission and energy management sector.
At the level of ICT multiple methodologies were present to assess the environmental impact of ICT itself but they didn't provide a consistent methodological framework for this assessment. A solution to this is the work developed in various European and International standardisation bodies like ETSI , ITU-T , IEC , ISO and others around methodologies to asses this environmental impact, currently focused on energy management including energy consumption and GHG emissions, in a widely consented way. This work is done together with industry, standardisations bodies and public authorities and it is expected to be extended to water, raw materials and other environmental criteria.

## B. Legislation and policy documents

### B.1 At European Level

**COM(2010) 245**: "A Digital Agenda for Europe",

**KEY ACTION 12**:

1. Assess whether the ICT sector has developed common measurement methodologies
2. Propose legal measures if appropriate

## C. Standardisation needs, ongoing activities and progress report

### C.1 Commission perspective and progress report

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 others, a workshop on policy measures, metrics, and methodologies in the context of environmentally sound data centres. Links to the final reports of both above initiatives:
  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 DG CONNECT 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), among others:
  - it provides a basis to help cities take the right decisions as regards their ICT-infrastructure and the relevant energy costs/environmental effects
  - it provides a level playing field for industry to compete and innovate in provid-ing the most sustainable solutions to its customers (cities in this case).

- DG ENV where the ongoing pilot on Product Environmental Footprint on Category Rules is looking at various ICT products such as IT Equipment, UPS and batteries for ICT application.

- DG GROW is looking at an Eco design measure for Enterprise servers that are found among others in Data Centers. The definition of global KPIs is essential to this objective.

## C.2 Ongoing standards developments

### Efficient Energy use

| ORGANISATION | SHORT DESCRIPTION & weblinks |
|---|---|
| **ESOS** | Mandate 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 mandate is not only limited to networks but extends as well to the data centres and other ICT nodes associated with broadband deployment. It is entering its phase 2.<br>Energy and more general resource management in data centres is addressed by a cross-ESO coordination group (Coordination Group Green Data Centres). This group monitors European and international standardisation for data centre resource management (including energy) and maintains a live Executive Summary of that activity.<br>ftp://ftp.cencenelec.eu/EN/EuropeanStandardization/HotTopics/ICT/GreenDataCentres/GDC_report_summary.pdf<br>CG GDC encourages standardisation activity to support Commission objectives and has recently requested CLC 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, CLC TC215 is transcribing resource management KPI standards produced by ISO/IEC into European format. |
| **CENELEC** | Work on prEN 50600-4-1, prEN 50600-4-2 and prEN 50600-4-3 on key performance indicators (KPI) for data centres will be started by CENELEC TC 215, based on results from ISO/IEC JTC 1 |
| **ITU AND ETSI** | Starting at the level of "Good, networks and Services", they have approved methodologies for the assessment of the environmental impact. These will allow assessing in a transparent, qualitative, accurate and consistent way the footprint among others of various products and services that are part of our daily digital live like email, telephone services, laptops, broadband access, etc.. As well, companies, public bodies and other organizations will be able to assess and report their own ICT footprint based among others on ITU's "ICT in Organization".<br>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.<br>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): where the footprint of ICT in cities and the city dimension of ICT projects & services are being considered. The European Commission through DG CNECT H5 played the role of Chief editor<br>ITU-T SG 5 has developed a series of standards aimed at reducing GHG 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.1430 : Methodology for assessment of the environmental impact of information and communication technology greenhouse gas and energy projects |

| | |
|---|---|
| **IEEE** | Standardisation activities that contribute to assessing the environmental impact of ICT such as Electronic Product Environmental Assessment. http://standards.ieee.org/develop/msp/envr.pdf http://standards.ieee.org/develop/msp/envr.pdf. |
| **IEC** | IEC TC 100/TA 13 deals with environmental aspects of audio-visual and multimedia equipment (in particular with the quantification methodology for greenhouse gas emissions for computers and monitors). http://www.iec.ch/dyn/www/f?p=103:7:0::::FSP_ORG_ID,FSP_LANG_ID:7810,25 |
| **ISO/IEC JTC 1** | ISO / IEC JTC 1 SC 39 (Sustainability for and by Information Technology) WG 2 prepares guidance for the development of energy efficient ICT (excluding data centres). http://www.iso.org/iso/standards_development/technical_committees/list_of_iso_technical_committees/iso_technical_committee.htm?commid=654019 |

## Data centers

| **ORGANISATION** | **SHORT DESCRIPTION** & weblinks |
|---|---|
| **CEN/CENELEC/ETSI** | Coordination Group Green Data Centres |
| **CENELEC** | CLC TC215 WG3 and a number of other TCs dealing with specific appliances |
| **ETSI** | TC ATTM and former STF 439 working on the definition of Global KPIs for Energy Management of Data Centres |
| **ETSI** | ETSI Industrial Specification Group Operational Energy efficiency for Users (ISG OEU) gathering ICT Users from the whole industry (all sectors, e.g. aircraft factories, banks, insurances, energy providers) issuing 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) WG 1 deals with resource-efficient data centres, including the following tasks: Development of a data centre resource efficiency taxonomy, vocabulary and maturity modelDevelopment 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/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 considered to be referenced in possible future legislation.

## Others

| TITLE | SHORT DESCRIPTION & weblinks |
|---|---|
| **EUROPEAN COMMISSION** | With the support of ICT companies, concluding the piloting of various methodologies for goods, networks, services & organizations. Elements like compatibility and 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 around "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 DCs. Disseminate the results. Create a proper bidirectional communication channel between EC and Standardization Bodies and the Cluster, in order to facilitate information sharing and to push a relevant shortlist of the created KPIs through the standardisation process. |
| **H2020 CITYKEYS** | Support Action funded under Horizon 2020 Programme, 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. http://www.citykeys-project.eu/ |

Impact and measure of progress: 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 number of companies reporting their footprint calculated using these methodologies.

# D. Proposed new standardisation actions

## D.1 Standards developments

**ACTION 1:** Guidelines for the environmental foot printing of ICT networks, products or services.
**ACTION 2:** Guidelines for Organizations ICT footprint reporting.

## D.2 Other activities around standardisation

**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.
**ACTION 9:** Ontologies and vocabularies to foster interoperability of Energy Systems / white goods / brown goods / inside the buildings

# 3.4.4. European Electronic Toll Service (EETS)

## A. Policy objectives

Intelligent Transport Systems, Continuity of traffic and freight management, and Implementation of the interoperability of electronic road.

## B. Legislation and policy documents

### B.1 At European Level

- **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 European Electronic Toll Service and its technical elements;
- **COM(2012)474:** Implementation of the European Electronic Toll Service.

## C. Standardisation needs, ongoing activities and progress report

### C.1 Commission perspective and progress report

European Electronic Toll Service (EETS), as required by Directive 2004/52/EC, will achieve interoperability of the electronic road toll systems in the European Union. EETS involve 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 motorists 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 the use of their network.

Directive 2004/52/EC provides that Member States having electronic road toll systems would ensure that operators offer the European Electronic Toll Service 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.
It is required to further develop standards allowing (i) to monitor and enforce EETS, in particular for autonomous GNSS-based toll systems (Trusted Recorders); (ii) to exchange information between Service Provision and Toll Charging activities (Interoperable Application Profiles) (iii) to enable effective assessment of charging key performance indicators, conformity to specifications, certification and suitability for use of EETS-related standards (by developing test standards).

### C.2 Ongoing standards developments

| ORGANISATION | SHORT DESCRIPTION & weblinks |
|---|---|
| CEN, ETSI | Mandate M/338: standards for DSRC- and GNSS-based electronic fee collection systems. http://www.etsi.org/images/files/ECMandates/m338en.pdf<br>CEN/TC278Overview of EFC standards and links to the standardized data structures and test suites http://tc278.eu/index.php/efc#EFCstandards |

### (C.3)MSP Members' and Stakeholders' remarks

It is required to further develop standards to support (i) secure charging, enforcement and related information exchanges for the EETS (e.g. definition of security profiles and maintenance of specified security measures), (ii) information exchange between Service Provision and Toll Charging (notably specification of Interoperable Application Profiles), (iii) assessment and monitoring of key performance indicators for EETS (iv) conformity assessment of implementations to standards, EETS suitability for use and product certification (through provision of test standards).

## D. Proposed new standardisation actions

### D.1 Standards developments

- **ACTION 1:** ESOs to develop a test specification for the interoperable profiles for information exchange between Service Provision and Toll Charging activities.
- **ACTION 2:** jointly CEN/ISO to revise the test standards forming the basis of satellite-based electronic tolling systems, i.e. for EN 17575-1/3
- **ACTION 3:** jointly CEN/ISO to revise the EFC architecture standard, i.e. ISO 17573
- **ACTION 4:** ESOs to develop a specification for Security Profile(s) for EFC (for use in the EETS)
- **ACTION 5:** ESOs to develop a KPI specification (for use in the EETS) based on CEN/ISO/TS 17444-1/2.

# 3.4.5. Intelligent Transport Systems (ITS)

## A.) Policy objectives

- ITS means applying Information and Communication Technologies (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 Internal Market and competitiveness objectives.

## B.) Legislation and policy documents

### B.1 At European Level

- **C(2013) 885/2013 final:** Commission Delegated Regulation (EU) 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
- **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:** Communication from the Commission "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).

### B.2 Others

Extract from 'ICT Strategy of the German Federal Government: Digital Germany 2015' (TFRP011_DE_ict-strategy-digital-germany-2015.pdf). 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*'.

- Extract from 'ICT for Everyone – A Digital Agenda for Sweden' (TFRP037_SV_ICT_for_Everyone-ADigitalAgendaForSweden.pdf). '*The Government established a Council for Intelligent Transport Systems (ITS Council) in June 2010. The aim is to make better use of the opportunities to use information and communication technology in the transport system to attain transport and business policy objectives. The Council is to develop forms of cooperation between authorities and the business community, provide advice to and speed up the work of the Swedish Transport Administration and other parties on implementing the action plan for intelligent transport systems and promote greater Swedish action in the EU. A final report is due to be presented by 31 December 2012*'.

Pursuant 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

# C. Standardisation needs, ongoing activities and progress report

## C.1 Commission 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 as well as to accelerate their introduction and impact. International cooperation aiming at global harmonisation is relevant in this area.

## C.2 Ongoing standards developments

### C.2.1 C-ITS

**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**

## Standards Developments

| **ORGANISATION** | **SHORT DESCRIPTION** & weblinks |
|---|---|
| **CEN (ISO), ETSI** | CEN (TC 278 WG16) with ISO TC 204 and ETSI (TC ITS) www.etsi.org/m453; www.itsstandards.eu. Cooperation is also ensured through the ITS Standardisation Coordination Group (ITS-CG)<br>http://www.etsi.org/images/files/technologies/Final_Joint_Mandate_M453_Report_2013-07-15.pdf<br>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 |
| **SO TC22 & ISO TC204 (CEN TC278 WG16 & TC 301), SAE.** | In-vehicle Platform.<br>HLC & JWG between TC204 and TC22 discussing how to continue activities.<br>SAE looks at electrical connections related activities. |
| **ETSI, CEN, ISO, SAE, IEEE** | Evaluation of the application of existing standards is an ongoing activity.<br>Harmonisation Task Groups (HTGs) 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.<br>See also CEN/TR 16690 on Electronic fee collection - Guidelines for EFC applications based on in-vehicle ITS stations |
| **ITU** | ITU has various standardization activities in the area of ITS communica-tions. In ITU-R<br>- Radio interface standards of V2V and V2I communications for ITS ap-plications. ITU-was put forward for simultaneous adoption and approval by consultation. Draft revision of Report ITU-R M.2228<br>- Advanced ITS Radiocommunications was approved. Work is progress-ing toward a preliminary new Report ITU-R M.[ITS USAGE] - ITS usage in ITU Member States<br><br>ITU-T Study Group 16 is working on a family a family of vehicular gate-way protocols that can be used for inter-vehicle communications.<br><br>SG13 has approved Recommendation ITU-T Y.2281 on networked vehi-cle gateway specifications and on harmonizing taxonomy for automated driving. ITU-T Study Group 17 progressed its work on secure software updates for ITS communications devices and security mechanisms for over the air vehicle software updates. |

| | |
|---|---|
| **IEEE** | IEEE has standards activities in many aspects of ITS, such as vehicle communications and networking (IEEE 802 series). In addition, the IEEE 1609 Family of Standards for Wireless Access in Vehicular Environments (WAVE) define an architecture and a complementary, standardised set of services and interfaces that collectively enable secure vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) wireless communications. These standards are designed to provide the foundation for a broad range of applications in the transportation environment, including vehicle safety, automated tolling, enhanced navigation, traffic management and many others. http://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 in- form 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. |

International cooperation for the development of harmonised global standards is particularly important in these areas. The European 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 organizations such as IEEE, SAE, ISO, IETF, and standardisation supporting industry groups like TISA. Additionally ETSI have liaisons and contacts with regional and national standards organizations such as ARIB (Japan), CCSA (China) and TTA (Korea) as well as the Asian Pacific Telecommunication organization (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 harmonized set of Intelligent 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.

## Other activities related to standardisation

| **ORGANISATION** | **SHORT DESCRIPTION** & weblinks |
|---|---|
| **C-ITS PLATFORM** | Established by the EC, it brings together representatives of all C-ITS stakeholders to co-operate 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 different Member States. |
| **CAR-2-CAR COMMUNICATION CONSORTIUM (C2C-CC)** | The industry organization is actively participating in the ETSI TC ITS, including chairmanship of TC ITS. Also contributing to CEN WGs |
| **ERTICO – ITS EUROPE, GSM-A AND THE IMOBILITY FORUM** | Stakeholder organisations providing input to ETSI and CEN |
| **"AMSTERDAM GROUP" (AG)** | 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. Members are also actively participation 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.unece.org/trans/main/welcwp29.html |
| **GENIVI** | GENIVI® is a nonprofit industry alliance committed to driving the broad adoption of specified, open source, In-Vehicle Infotainment (IVI) software.<br>The alliance develops an open standard for aligning automotive and consumer infotainment cycles. http://www.genivi.org/ |
| **MIRRORLINK INITIATIVE** | The MirrorLink initiative turns the car into a terminal, lacking much in the way of its own computing power and relying on the phone as its processor.<br>http://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, iMobility-Support, SIM-TD, SCORE@F, eCoMove, EasyWay, SPITS |
| **WCO DATAMODEL** | The WCO datamodel (World Customs Organization data model) is an important standard for providing alignment for announcements to and from government about transport and trade. It makes communi-cation throughout Europe between governmental parties and be-tween government and commercial parties easier and therefore cheaper. |

### C.2.2 ICT for Electric Vehicles/Electromobility

| **ORGANISATION** | **SHORT DESCRIPTION** & weblinks |
|---|---|
| **EU FUNDED RTD PROJECTS AND PILOTS** | Projects such as Mobinet, Mobincity, eCo-FEV; E-DASH, eDAS, SmartV2G, ODIN, CO-SIVU, SafeAdapt, Smart-LIC, VRUITS and the pilots ICT4EVEU, MOBI.Europe, MOLECULES, SmartCEM and Green Emotion and the support action Smart EV-VC will have outcomes possibly relevant for standardisation |
| **IEEE** | IEEE P2030.1 (vehicle to grid -V2G- interconnectivity), addressing applications for electric-sourced vehicles and related support infrastructure and also communication for charging (IEEE 1901) |

### C.2.3 **ICT for traffic Management and Infrastructure to Infrastructure (I2I)** related information exchange and architectures beyond short range communications.

| **ORGANISATION** | **SHORT DESCRIPTION** & weblinks |
|---|---|
| **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 Norm. |
| **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. |

(C.2.4) Other ITS Topics

| ORGANISATION | SHORT DESCRIPTION & weblinks |
|---|---|
| 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 a work item related to ITS Automotive, namely related to HMI. http://www.w3.org/community/autowebplatform/ |
| TN-ITS (TRANSPORT NETWORK ITS SPATIAL DATA DEPLOYMENT PLATFORM) | Based on the outcome of ROSATTE project (FP7), the WG promotes the integration of accurate (public) road data in navigation oriented maps, and their timely updating, including possible alignment with the INSPIRE technical Framework, including identification of standardisation needs. http://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) |

# D. Proposed new standardisation actions

## D.1 Standards developments

· CO-OPERATIVE SYSTEMS.

**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 to support Vulnerable Road Users (VRU) applications (see e.g. projects like VRUITS *www.vruits.eu*). In particular to agree common requirements and identification of related communication standards at ETSI TC ITS.
**ACTION 4:** Standard to allow flawless spectrum sharing between RLAN (Wi-Fi) and C-ITS systems at the 5.9 GHz bands based on current developed spectrum sharing report by CEPT working group FM and SE24 (ETSI ERM). Enabling Spectrum sharing with RLAN (Wi-Fi) without interference of the Cooperative functionalities in the 5.8 and 5.9 GHz bands

· ELECTRIC VEHICLES (EV):

**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; subsystem partitioning and their interfaces; X-by-wire controls; Testing and management of energy storage systems with on board BMS, metering and certification.

· LOCATION PRECISION: It is essential to most safety applications to realize a high precision location reference beyond current GNNS systems enabling more effective and advanced safety applications. For that all functional and technical means need to be used (e.g., Crowd sourcing, high precision objects and radio communications)

**ACTION 7:** Standardisation of data and communication aspects to ensure interoperable implementation and data sharing system for increased location accuracy (especially at ETSI TC ITS but also at other ESO's and SSO's).

· DIGITAL MAPS:

**ACTION 8:** 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 inITS digital maps for navigation and more advanced in-vehicle applications, including cooperative ITS and automated driving, as well as for non-vehicle ITS applications, and addressing a possible alignment with the INSPIRE technical framework.

· Digital Local Dynamic Maps (specifically for the safety related applications such as C-ACC and VRU)

**ACTION 9:** To extend the Local Dynamic Map standards/TS 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:** Standards supporting the emerging IFM, taking into account the outcome of the work of Smart Ticketing Alliance (STA), including development of Technical Specification and test procedures for the application related quality assurance of the interoperable fare medium and Technical Specification and standards for profiles of information exchange between the operational entities in IFM Develop 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.
(D.2) Other activities around standardisation

· CO-OPERATIVE SYSTEMS

**ACTION 12:** Development of European 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 and taking into account crypto-agility.

· URBAN ITS The European standardisation organisations are requested to draft new European standards and European standardisation deliverables in support of the im-plementation of Article 8 of the ITS Directive for multimodal 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 variety of users' needs, the ranges of environments and the different type of vehicles, modes of transport or mobility services, the diversity of cities and be easily implementable.

They should include 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
- 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, such a need for coherence will concern a broad set of standards and technical specifications, namely:

- Transmodel, the European Reference Data Model for Public Transport, CEN-TC278 ENV12896;
- IFOPT, (CEN/TS 00278207) a CEN Technical Standard defining a data model for the Identification of Fixed Objects in Public Transport (e.g. stop points, stop areas, stations, connection links, entrances, etc.);
- SIRI, (CEN/TS 00278181-1 to 5), a European CEN technical standard defining Service Interface for Real-Time Information relating to public transport operations;
- NeTEx, a prCEN/ Technical Standard currently in development. It is based on Transmodel, extended with additional concepts from IFOPT and SIRI. NeTEX is divided into three parts: Part 1 - Transport Network and Part 2 - Schedules Part 3 - Fares and data for AVL
- Standards supporting the emerging interoperable fare management (IFM) systems: Public Transport interoperability (IOPTA) standard ISO EN 15320 defining the functional system architecture and the application scenarios; the EN 1545 standard describing the data elements and the ISO EN 24014-1 standard, defining functional system architecture and the application scenarios.

**ACTION 13:** European standardisation deliverables on reference data models, common data dictionaries and meta-data 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
- 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 study from the ITS) 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 HGV.

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) to access to in-vehicle data. The following related standardisation needs have been identified:

**ACTION 14:** To develop the missing standards for an advanced physical/electrical/logical interface (e.g., evolution of OBD2) –which includes the necessary minimum level of security (i.e., integrity, authentication and availability) –, including minimum data sets and standardised data protocols enabling ITS services..

'HUMAN-MACHINE-INTERACTION': 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 shall be taken into consideration.

**ACTION 15:** Guidelines and potentially technical specifications to ensure a 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 16:** 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 eco-system in their immediate vicinity (other vehicles, infrastructure) as well as to the wider mobility ecosystem (central traffic management systems, other modes of transport, etc..) and to the internet. The aim is to have this convergence to be as smooth and efficient as possible.

**ACTION 17:** Development of a roadmap assessing the standardisation needs of connected automated driving, based on the expected convergence of developments in C-ITS and in autonomously driving vehicles.

·LAND TRANSPORT:

**ACTION 18:** In order to implement new legislation on Digital Tachographs and on Weights and Dimensions an additional standard on 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 19:** Another issue is related to onboard weighing systems for trucks, where different providers may equip the tractor and the trailers which it will tow. An interface standard is required between the different suppliers to ensure that the onboard weighing computer in the tractor will be able to receive the weights per axles of any trailer, store them, and then compute the whole weight of the vehicle. This standard could be based upon ISO 11992.

# 3.4.6. Advanced Manufacturing

## A. Policy objectives

Advanced manufacturing addresses the transformation of the manufacturing and automa-tion 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 manufac-turing and information and communication technologies and includes all optimization solutions that may improve the productivity and flexibility, lower waste and pollution, and/or lower costs in the entire manufacturing lifecycle.

Work pieces and semi-finished products involved in the manufacturing process are to possess information on themselves and suitable means of communication, and therefore themselves constitute cyber-physical systems (CPS). These "smart products" are to be embedded in the process as a whole. They will control not only their own logistical path through production, but rather the entire production workflow concerning them. Decen-tralization of the digitally stored information will consequently be followed by a decen-tralization of control systems.

Advanced Manufacturing as a policy focuses on fostering the development and speeding up the uptake of advanced manufacturing technologies by European industry. This ambition unfolds in three objectives: accelerate the dissemination and commercialization 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 intelli-gence in supply chains. Agile manufacturing (e.g.: reacting to changes in demand, in la-bour or material resources available) would enable smarter logistics and lower produc-tion costs. 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 mem-ber 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.

## B. Legislation and policy documents

### B.1 At European Level

- **COM(2012)341** A European strategy for Key Enabling Technologies - A bridge to growth and jobs
- **COM(2012)** 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

### B.2 Others

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" http://www.vinnova.se/PageFiles/750915348/Made in Sweden 2030-eng.pdf

# C Standardization needs, ongoing activities and progress report

## C.1 Commission perspective and progress report

Several research oriented activities are performed under H2020:

- I4MS (Innovation for Manufacturing SMEs) is an initiative of the European Commission dedicated to the manufacturing sector and in particular to its high-tech small and medium size enterprises. 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 (PPP) that represents more than 90 industrial and research process industry stakeholders from over a dozen countries across Europe.

Advanced manufacturing is also part of the Key Enabling Technologies (KETs).
Standards can play a key role to accelerate the industrialization of the aforementioned pre-normative research or existing solutions in the market, and possibly nurture new opportunities in research. In some cases, standardisation can also play a stabilizing 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 more and more organize themselves as well as their supply chains from design, to warehousing, until delivery of a product. Internet of Things (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 customization). Easier and cost-effective product differentiation is a key to growth. Additive manufacturing (3D printing) may push differentiation to a further stage of individualization, generating a market of crowd-based production and retailing.

Standardisation is of central importance and, at the same time, 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 standardized terminology and concepts and ensure interoperability, fitness for use and market relevance. Drawing up concepts at an early stage by a consensus-based standardization process and a close cooperation between researchers, industry and the standardization bodies is one of the 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 will be dramatically speeded up if they are compatible with the installed manufacturing base.

## C.2 Ongoing standards developments

| ORGANISATION | SHORT DESCRIPTION & weblinks |
|---|---|
| DIN/DKE | The "German Standardization Roadmap Industrie 4.0" http://www.dke.de/de/std/documents/rz_roadmap industrie 4-0_engl_web.pdf • http://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 standardization 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.dke.de/de/std/documents/rz_roadmap%20industrie%204-0_engl_web.pdf |
| 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 ISM communication band. |
| 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.<br>ETSI ERM TG 41 is currently working on harmonized standards for wireless industrial applications in the frequency range 5725 MHz to 5875 MHz |
| ISO/IEC | • Interoperability standards from Technical Committee IEC/TC 65 "Industrial-process measurement, control and automation", with its sub-committees<br>– E.g. standard on internet security IEC 62443 series or interoperability standards, e.g. IEC 62541 (OPC), and others (refer to [1])<br>• New founded Strategic group (IEC/SMB SG 8) "Industry 4.0 – Smart Manufacturing"<br>• ISO/TC 184 "Automation Systems and Integration", with its sub-committees, e.g. SC 4 on Industrial Data<br>• IEC/TC 3/SC3D" Product properties and classes and their identification"<br>• ISO/IEC JTC 1 "Information Technology" with its sub-committees, e.g. SC 31 on RFID<br>• ISO/TC 261 works on standardization in the field of Additive Manufacturing (AM) concerning their processes, terms and definitions, process chains (Hard- and Software), test procedures, quality parameters, supply agreements and all kind of fundamentals. |
| 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 standardization platform for the development of a cohe-sive set of international standards on IoT and smart manufacturing. http://itu.int/go/tsg20 |
| 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. https://www.oasis-open.org/committees/pps |
| W3C | Web of Things http://www.w3.org/WoT/ |
| IIC | Developing test beds and contributing to Reference Architecture and Use Case development http://www.iiconsortium.org/test-beds.htm |

## C.3 MSP Members' and Stakeholders' remarks

In industrial automation, it is essential for the vast variety of systems from various manufacturers to interact reliably and efficiently. 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 cross-system consistency, international standardization in industrial automation has always been regarded as especially important and pursued as a matter of priority. Nowadays, standards are available or 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 standardization. This requires the development of a host of new concepts and technologies. It will however only be possible to implement these new concepts and technologies in industrial practice if they are backed by standards based on consensus, as only such standards are able to create the necessary security for investments and confidence among manufacturers and users. Additional communication capabilities and (partial) autonomy to react to external influences and internally stored specifications are transforming mechatronic systems into Cyber-Physical Systems (CPS). 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, it is aimed to achieve an increasing improvement in energy and resource efficiency, and 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 meta data. There may be a role for standards in developing an accepted architecture building on existing agreed terminology.

# D. Proposed new standardisation actions

## D.1 Standards developments

**ACTION 1:** Common communications standards and a reference interoperable architecture for connections between machines (M2M) as well as 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 transfer of large volumes of data quickly over net-worked industries, easing the ability to switch between platforms. One must analyse how to provide industries with a solution enabling wireless communications without interfer-ing 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 code (em-bedded and embodied systems).
**ACTION 2:** The e-skills standards should be checked as well as to take into account the manufacturing skills for future manufacturers, M2M, rapid prototyping and others.
**ACTION 3:** Review the recommendations for actions in the "German Standardization Roadmap Industrie 4.0" (http://www.dke.de/de/std/documents/rz_roadmap industrie 4-0_engl_web.pdf), chapter 6. The Roadmap also presents a description of the current status in standardisation for Industrie 4.0 (chapter 4) and an analysis of the currently identifiable need for standardisation (chapter 5).

## D.2 Other activities around standardization

**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 developed:

- Additive manufacturing (incl. 3D printing)
- Human-machine-interface for "autonomous co-laborative robots"
- Future manufactures (M2M, agile manufacturing): self-organization 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;
- 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
  - Manufacturing lifecycle, including advanced maintenance
- Safety, e.g. functional safety based on IEC 61508, IEC 61511, ISO 13849, …
- Security, privacy and management of ownership of data in the manufacturing environment and for manu-

factured products. The new systems must protect data in and access to production systems and facilities, e.g. system security based on the ISO/IEC 27000 series and IEC 62443 series.
- 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.)
- Wireless network in the plant, e.g. based on EN 300 328 and EN 62657
- Compared or predictive Analyses via Big Data and Cloud
- Rapid prototyping
- Clean manufacturing
- Standardised economic justifications.
- Manufacturing skills for the future manufactures
- Availability/resilience of production systems and facilities
- Usage of IoT and related requirements from manufacturing.
- Work organisation
- Training and continuing professional development

**ACTION 5:** To identify existing standards and standardisation potentials at an early stage, the consideration of standardisation in research projects is strongly recommended. R&D Phase Standardization covers any activity with the aim of an early identification of standardization potential 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 acceptance in the community are essential to build the ground for securing effective impact. Based on this, the transformation of research findings into product ideas transferred to the market afterwards is also assisted by such standardization activities, as they support the dissemination and implementation of innovative knowledge. Therefore the sustainable transfer of knowledge and technology is enhanced and accelerated in innovative fields.

In order to allow for an effective linkage between research and standardisation, it must be kept in mind that standardisation activities can in many cases only be started at a relatively late stage of the project. In many cases such activities need to be continued beyond the end of the research project. To close the gap until industry is prepared to continue funding in a more mature stage, it should be considered to continue funding of standardisation related to research projects beyond the end of the project itself.

# 3.4.7. Robotics and autonomous systems

## A. 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 socio-economic impact across diverse market sectors world-wide. 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.

Already now, industrial robotics has become a cornerstone in several of Europe's high value manufacturing industries, such as automotive, keeping these industries in Europe. This trend must be maintained, strengthened and enlarged 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 during 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 high impact on everyday life, will include healthcare, agriculture, civil, commercial or consumer sectors, logistics and transport.

The EU's strategic vision aims at strengthening Europe's global position in the robotics market to one third of industrial robotics, two-thirds of professional services and one-fifth of the domestic services market by 2020.

## B. Legislation and policy documents

### B.1 At European level

- Robotics PPP – EU Robotics: Strategic Research Agenda
  http://www.eu-robotics.net/cms/upload/PPP/SRA2020_SPARC.pdf
- Robotics PPP – EU Robotics: Multiannual Roadmap (rolling document)
  http://www.eu-robotics.net/cms/upload/Multi-Annual_Roadmap2020_ICT-24_Rev_B_full.pdf
- European Machinery Directive 2006/42/EC
  http://ec.europa.eu/growth/single-market/european-standards/harmonised-standards/machinery/index_en.htm

### B.2 Others

- 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

## C. Standardisation needs, ongoing activities and progress report

### C.1 Commission perspective and progress report

Robotics and autonomous systems is a multidisciplinary scientific and technological domain for implementing complex systems with cognitive capabilities that 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, as well as they can be vehicles able to move on the ground, in the air or under the water. Also robots can be used for an extraordinary variety of applications including industrial manufacturing, logistics, maintenance, precision farming, autonomous driving, space exploration, surveillance, emergency and rescue, commercial services, health care, rehabilitation, assistive living, entertainment, education and social interaction, among others.

Therefore the number of standards that may impact on robotic engineering is huge compared to the relatively small size of the robotic sector. Luckily the standardisation efforts can be shared with more general technological domains such as electro-mechanical engineering, electronics, information technologies, telecommunications, production management, geographical information and so forth, where robotics plays a technology user role and inherit their standards. Notwithstanding there are also many standards addressing specific needs of the robotic sector. The following links list some of them:

- http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_tc_browse.htm?commid=54138
- http://publicaa.ansi.org/sites/apdl/Lists/Robotic%20Standards/Allitemsg.aspx

Since robotics is a highly dynamic technological field, it is clear that its standardisation needs are growing and changing. We can identify at least three main broad areas where new standardization 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 their applicability to non-industrial environments has made necessary the development of more specific standards such as EN/ISO 10218-1 and EN/ISO 10218-2 (Robots and robotic devices -- Safety requirements for industrial robots) or 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 widespread 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.

- Robotic system integration and interoperability. Current robots can be made up by very different functional subsystems (e.g. dynamic control, perception, navigation, task planning, trajectory planning, 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 electro-mechanical engineering and ICT. But there is a number of standards that are designed to fit robotic specific requirements, for instance ISO 9409 (mechanical interfaces), ISO TC184/SC2/WG10 (Modularity for service robots)... We may identify at least two areas that would 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 of standardising programming languages and protocols so that they could 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 facilitate the integration of the various robotic subsystems (perception, control, reasoning, planning...) 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 define and manage the environment for the interoperability of all the software components of the robotic system, independently where they are run (standard computers, robot controllers or embedded systems). In the last ten years, a number of robot operating systems have come out: ROS, Player, YARP, Orocos, CARMEN, Orca, MOOS, Microsoft Robotics Studio... Most of them 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 it can be anticipated that the most successful proposals will become the basis for defining the interoperability standards of the future on robotics.

- Knowledge modelling. There are other elements that are capturing a lot of attention from the robotics community: acquisition of knowledge about the physical environment of the robot, reasoning and learning. They involve a great variety of techniques such as signal processing, sensor data fusion, mapping, machine learning, artificial intelligence, constraint solving, optimisation, and so forth. All these techniques have something in common: they manage enormous amounts of data that must be contextualised and processed semantically using big data approaches. Much of this information is captured through complex sensor systems (e.g. image processing or speech recognition) but also from the web (Internet of things). The way how this information can be generated, processed and distributed is strongly dependent on the availability of appropriate standards. Indeed there are already many standards on knowledge modelling, most of them inherited from the ICT field (e.g. SQL, JSON, XML, OWL, RDF...) and a few from other domains (e.g. ISO 10303 for product manufacturing information or ISO 11783 for precision farming), but knowledge

modelling for robotics is still a hot research topic and lacks the required stability to build a comprehensive set of well accepted standards that covers the requirement of all possible applications. Therefore there is no doubt that its importance is growing and the need for starting more systematic standardisation efforts is becoming peremptory due to the colossal task this can be.

## C.2 Ongoing standards developments

Looking at the lists of robotics standards, we can easily realise that most of them are ISO. Robotic markets are global and it does not make much sense developing 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 into the various ISO working groups. 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.

As an example, the following document presented at the European Robotics Forum shows some of the standardisation groups where ABB, an outstanding European robot manufacturer, is involved: http://www.eu-robotics.net/cms/upload/euRobotics_Forum/ERF2014_presentations/day_2/Industrial_HRC_-_ERF2014.pdf
European funded R&D project also contribute to standardisation activities but to a lesser extent due to the limited duration of their activities that uses to be too short for fitting the usually long duration of the standardisation works. The participation of European projects in standardisation efforts uses to be implemented through beneficiaries that are robot or robot-component manufacturers (e.g. Piltz in FP7 project X-Act contributing to EN/ISO 10218).

### Standards Development

| **TITLE** | **SHORT DESCRIPTION** & weblinks |
|---|---|
| **ISO** | ISO TC on Robotics: ISO/TC 184/SC 2 - Robots and robotic devices - .<br><br>http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_tc_browse.htm?commid=54138 |
| **IEEE** | IEEE has standardization and pre-standardization activities in the field of robotics and automation, including ontologies and applications for transportation and surgical applications.<br>http://standards.ieee.org/develop/msp/robotics.pdf |

### Other activities related to standardisation

| **ORGANISATION** | **SHORT DESCRIPTION** & weblinks |
|---|---|
| **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.<br>http://www.sparc.eu/; |
| **H2020** | It is expected that there will be R&I project funded within topics ICT 5.1, ICT 5.2 y ICT 5.3 from Work Programme 2016-17 that may produce relevant input for standardisation. |

# D. Proposed new standards actions

## D.1 Standards developments

*(D.2) Other activities around standardisation*

**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 PPP)

## 3.5. Key enablers and security

# 3.5.1. Cloud computing

## A. Policy Objectives

stablishing 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 con-firmed the importance of Cloud computing, which is driving a paradigm shift in the de-livery of digital technologies thus enhancing innovation, digital single market and access to content.

## B. Legislation and policy documents

### B.1 At European level

- **COM(2012)529** "Unleashing the Potential of Cloud Computing in Europe"
- **COM(2015)192** "A Digital Single Market Strategy for Europe"

### B.2 Other

Extract from 'ICT Strategy of the German Federal Government: Digital Germany 2015' (http://www.bmwi.de/English/Redaktion/Pdf/ict-strategy-digital-germany-2015,property=pdf,bereich=bmwi2012,sprache=en,rwb=true.pdf). Measure listed on page 10 for Cloud reads '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'.

## C. Standardisation needs, ongoing activities and progress report

### C.1 Commission perspective and progress report

Please refer to the key action 1 of the EU Cloud Strategy COM(2012)529 "Unleashing the Potential of Cloud Computing in Europe".

In 2012/2013, the Commission tasked ETSI to coordinate with stakeholders the identifi-cation of a detailed map of the necessary standards (inter alia for security, interoperabil-ity, data portability and reversibility). The final report of the ETSI Cloud Standards Co-ordination (CSC) Task Force <http://csc.etsi.org> was delivered on 11th December 2013 and is available at http://www.etsi.org/images/files/Events/2013/2013_CSC_Delivery_WS/CSC-Final_report-013-CSC_Final_report_v1_0_PDF_format-.PDF.

In February 2015, CSC Phase 2 was launched to address issues left open after CSC Phase 1. The Phase 2 focused its activities on cloud security, on the users' needs, on the rela-tionship between open source and standards, and it also produced an update to the Phase 1 report on cloud standards. The four reports consolidating the outcomes of CSC Phase 2 are available at http://csc.etsi.org/phase2.html.

## C.2 Ongoing standards developments

### Standards Developments

| ORGANISATION | SHORT DESCRIPTION & weblinks |
|---|---|
| CEN, CENELEC, ETSI | CEN/TC225 (AIDC Technologies) is working on the standardization of data carriers for automatic identification and data capture, of the data element architecture therefore, of the necessary test specifications and of technical features for the harmonization of cross-sector applications. TC225 is not directly involved in the development of cloud computing interoperable infrastructure but TC 225 is about edgeware data capture: bar code, RFID and RTLS. So, as cloud computing presents an opportunity for data from different capture points in the same domain to be accessible by stakeholders within a domain, the data needs to be presented in a manner that is consistent in structure within a domain, but:<br>It should support a mixture of mandatory and optional data<br>It does not need the same 'message' structure from the edgeware between domains and possibly not even within a domain.<br>There might be a weakness in the chain of command of data being transferred from the edgeware to the Cloud in terms of data corruption (accidental) and data manipulation (deliberate). There could also be threats to privacy along this pathway.<br>The work done on privacy and public awareness within TC225 (Mandate M/436) could be used by stakeholders involved in cloud computing technologies. |
| ETSI | Cloud Standards Coordination Phase 2 in progress |
| ISO/IEC | ISO/IEC - JTC 1/SC 38: Cloud Computing and Distributed Platforms. http://www.iso.org/iso/jtc1_sc38_home<br>ISO/IEC 17788 \| ITU-T Y.3500 "Cloud Computing - Overview and Vocabulary<br>ISO/IEC 17789 \| ITU-T Y.3502 "Cloud Computing - Reference Architecture<br>ISO/IEC-Standard 17826:2012 Information technology - Cloud DatavManagement Interface (CDMI)<br>ISO/IEC 27017 – Code of practice for information security controls based on ISO/IEC 27002 for cloud services<br>ISO/IEC 27018 – Code of practice for PII protection in public cloud acting as PII processors<br>ISO/IEC 27036-4 – Information security for supplier relationships – Part 4: Guidelines for security of cloud services<br><br>Work In progress:<br>ISO/IEC 19086-1 Cloud computing - Service Level Agreement (SLA) framework and terminology — Part 1: Overview and concepts<br>ISO/IEC 19086-2 Cloud computing - Service Level Agreement (SLA) framework and terminology — Part 2: Metrics<br>ISO/IEC 19086-2 Cloud computing - Service Level Agreement (SLA) framework and terminology — Part 3: Core requirements<br>ISO/IEC 19086-4, Information technology – Cloud computing – Service Level Agreement (SLA) framework – Part 4: Security and privacy (Managed by ISO/IEC JTC1 / SC27)<br>Recently approved Work Items and just commencing:<br>ISO/IEC 19941 Cloud Computing -- Interoperability and Portability<br>ISO/IEC 19944 Cloud Computing - Data and their Flow across Devices and Cloud Services<br>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?commid=45306 |

| ORGANISATION | SHORT DESCRIPTION & weblinks |
|---|---|
| ITU | ITU-T SG13: Study Group 13 leads ITU's work on standards for next generation networks (NGN) and future networks and is the primary SG working on Cloud Computing. To this end, it approved nine Recommendations covering different aspects of cloud computing from terminology and overview till reference architecture, functional requirements for technologies supporting XaaS. This work is complemented by SG11 for cloud computing interoperability and SG17 for cloud computing security. Cloud computing roadmap, maintained by ITU-T JCA-Cloud SG13, lists and points to cloud computing standardization efforts deliverables across telco/IT industry.<br>http://www.itu.int/en/ITU-T/studygroups/2013-2016/13/Pages/default.aspx<br>http://itu.int/en/ITU-T/jca/Cloud<br>https://extranet.itu.int/sites/itu-t/Roadmaps/SitePages/JCA-Cloud-Standard.aspx |
| IEEE | The IEEE Intercloud Testbed ("Testbed" for short) creates 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.<br>http://standards.ieee.org/develop/msp/cloudcomputing.pdf. |
| IETF | The IETF has multiple groups working on standards for virtualization techniques, including techniques used in Cloud Computing and Data Centers.<br>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.<br>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.<br>The Layer Three Virtual Private Network Service Model (L3SM) working group is tasked to create a YANG data model that describes a L3VPN service (a L3VPN service model) that can be used for communication between customers and network operators, and to provide input to automated control and configuration applications.<br>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)<br>The System for Cross-domain Identity Management (SCIM) working group works on standardizing 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.<br>http://trac.tools.ietf.org/group/iab/trac/wiki/Multi-Stake-Holder-Platform#Cloud. |
| OGF | Open Grid Forum (OGF) is a leading standards development organization 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.<br>http://www.ogf.org/ |

| ORGANISATION | SHORT DESCRIPTION & weblinks |
|---|---|
| OMG | Object Management Group (OMG): 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 clouds for portability, interoperability & reuse. http://www.omg.org/ |
| OASIS | OASIS hosts multiple standardisation projects for cloud computing management, interoperability and functionality, including<br>Cloud Application Management for Platforms (CAMP)<br>https://www.oasis-open.org/committees/camp,<br>Cloud Authorization project, the OASIS Identity in the Cloud project<br>https://www.oasis-open.org/committees/id-cloud,<br>OASIS Open Data Protocol (Odata) Protocol https://www.oasis-open.org/committees/odata,<br>Topology and Orchestration Specification for Cloud Applications (TOSCA)<br>https://www.oasis-open.org/committees/tosca.<br>https://www.oasis-open.org/committees/tc_cat.php?cat=cloud |

Others (including stakeholder groups, technology platforms, research projects)

| ORGANISATION | SHORT DESCRIPTION & weblinks |
|---|---|
| C-SIGS | Proposal to list deliverables from the Cloud Select Industry Groups as contribution from Europe to the global Cloud standardisation community.. |
| GICTF | Global Inter-Cloud Technology Forum (GICTF) is promoting standardization of network protocols and the interfaces through which cloud systems inter-work with each other, to promote international inter-working 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.<br>http://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.<br>http://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.<br>http://www.tmforum.org/DigitalServices/13907/home.html |
| HELIX NEBULA | Helix Nebula is an H2020 EU-funded project online platform where scientists and researchers can choose between various cloud services.<br>http://www.helix-nebula.eu |
| 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 realize its significant cost, scalability and agility benefits. It includes some of the industry's leading cloud providers and end-user organizations, collaborating on standard models and frameworks aimed at eliminating vendor lock-in for enterprises looking to benefit from cloud products and services.<br>http://www.snia.org/cloud |

## C.3. MSP Members' and Stakeholders' remarks

Coordination between the ongoing standardization developments is important.

The CSC activity conducted under ETSI's coordination has delivered great value to the discussion by identifying key use cases for Cloud and by mapping available standards to the use case scenarios. This provides a good source of information on available and on-going standards and standardisation activities and will be helpful to prevent duplication of efforts as well as fragmentation regarding relevant Cloud standards. And it will help towards determining which standards can be used in the context of open Cloud platforms and architectures taking into account the key role of open source for Cloud infrastructure design and implementations.

Phase 2 of the CSC has further refined the mapping of available standards and has ana-lysed the standardization needs in cloud security, has implemented a wide survey to un-derstand the users' needs, and has analysed the relationship between open source and standards..

Existing standards should be checked for account to the protection of individuals with regards to the processing of personal data and the free movement of such data in the light of the proposal for a General Data Protection Regulation COM(2012) 11 final. Identifica-tion and where needed development of specific Privacy by Design standards should be done.

Another factor for consideration in relation to cloud computing is work done in open source projects which address particular aspects of cloud computing (e.g. OpenStack (IaaS), Cloud Foundry (PaaS) and Docker (Container technology)). Open Source com-munities should be encouraged to collaborate with standardisation and submit their APIs for standardisation.

# D. Proposed new standardisation actions

## D.1 Standards developments

**ACTION 1:** Publish the results of the Cloud Select Interest Groups and promote them as a key contribution from Europe to the global Cloud community and bring them in into the proper processes, e.g. by submitting them to standardisation.

## D.2 Other activities around standardisation

**ACTION 2:** Facilitate an open stakeholder dialogue on open source and Cloud in relation to standardisation. Encourage Open Source communities in the area of Cloud to submit their APIs for standardisation.

**ACTION 3:** Facilitate a dialogue with end users' to understand and support their standardi-sation needs and priorities.

**ACTION 4:** Facilitate a dialogue with stakeholders on standards needs for cloud security, in particular, in the context of cloud certification.

# 3.5.2. Public Sector Information, Open Data and Big Data

## A. Policy objectives

With the continuously growing amount of data (often referred to under the notion Big Data) and the increasing amount of Open Data, interoperability ever more becomes a key issue for leveraging 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 to foster innovation on the basis of data. This refers to all types of (multilingual) data, including both structured and unstructured data, as well as 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.

## B. Legislation and policy documents

### B.1 At European level

- **Directive 2013/37/EU**. The policy area of Open Data[17] relates to Directive 2013/37/EU on re-use of Public Sector Information (a revision of the PSI Directive[18]) which has been published in the Official Journal on 27 June 2013 and requests Member States to provide their data preferably in machine-readable formats. The following legislative acts are also of application:
- **Decision No 922/2009/EC** on interoperability solutions for public administrations (ISA)
- **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 Sector Information Directive)[19]
- **COM(2011) 882** on Open data
- **COM(2010) 245** Digital Agenda
- **COM(2015)192** "A Digital Single Market Strategy for Europe"

## C. Standardisation needs, ongoing activities and progress report

### C.1 Commission 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 and the Pan-European Open Data Portal.

Studies conducted on behalf of the European Commission show that businesses and citizens were facing difficulties in finding and re-using public sector information. In its communication on Open Data of December 12 2011, the European Commission states that the availability of the information in a machine-readable format as well as a thin layer of commonly agreed metadata could facilitate data cross-reference and interoperability and therefore considerably enhance its value for reuse. [20]

A common standard for the referencing of Open Data in the European Open Data portals would be useful. The 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 (see section C.2)

The DCAT Application Profile has been developed as a common project from the ISA Programme, the Publications Office (PO) and DG CONNECT to describe public sector data catalogues and datasets and to promote the specification to be used by data portals across Europe. By agreeing on a common application profile and promoting this to the MSs, the interoperability amongst data catalogues and the exchange of data between MSs will be substantially improved. The DCAT-AP is the specification that will be used by the Pan-European Open Data Portal, which is part of the Connecting Europe Facility in-frastructure.

FIWARE CKAN is an open source solution for the publication, management and con-sumption of Open Data. FIWARE NGSI is an API that provides a lightweight and simple means to gather, publish, query and subscribe to context information.

17 http://ec.europa.eu/information_society/policy/psi/docs/pdfs/report/final_version_study_psi.docx
18 http://ec.europa.eu/information_society/policy/psi/docs/pdfs/directive_proposal/2012/open_data.pdf
http://ec.europa.eu/digital-agenda/overview-2003-psi-directive
19 http://ec.europa.eu/information_society/policy/psi/rules/eu/index_en.htm
20 see 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

The mapping of existing relevant standards for a number of big data areas would be ben-eficial. Moreover, it might be useful to identify European clusters of industries that are sufficiently homogeneous in their activities to develop data standards. Especially in the context of Open Data, the subjects of data provenance and licensing (for example the potential of machine-readable licenses) need to be addressed, as encouraged by the revised PSI Directive (see section C.2).

The revised PSI Directive (2013/37/EU) encourages the use of standard licences which must be available in digital format and be processed electronically (Article 8(2)). Fur-thermore, 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 in the transposition of the revised provisions, the Commission adopted guidelines[21] that, amongst others, recommend the usage of such standard open licences for the re-use of PSI.

## C.2 Ongoing standards development

### Stakeholder groups, technology platforms, research projects

| **TITLE** | **SHORT DESCRIPTION** & weblinks |
|---|---|
| **SHARE-PSI 2.0, PROJECT FUNDED BY DG CONNECT AND LED BY GEIE ERCIM (EUROPEAN HOST OF W3C)** | Re-use of public sector information and harmonisation of the implementation of the new PSI Directive (Directive 2013/37/EU) across Europe |
| **EU COMMISSION** | Smart Open Data project of DG ENV for contributing to standards developments |
| **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):<br>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 re-al-time Open Data management.<br>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 it supports searching, browsing, visualizing or accessing Open Data |

21 see http://www.europeandataportal.eu/en/content/edp-and-fiware-launch-new-partnership

Standards Developments

| TITLE | SHORT DESCRIPTION & weblinks |
|---|---|
| **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 the interoperability between data portals, for example to allow for meta-searches in the Pan-European Open Data Portal that harvests data from national Open Data portals. https://joinup.ec.europa.eu/asset/dcat_application_profile/asset_release/dcat-application-profile-data-portals-europe-draft-1 Under the framework of the Connecting Europe Facility programme tools for the interoperability of metadata and data at national and EU level will be developed. |
| **ITU-T** | Recommendation Y.3600 provides requirements, capabilities and use cases of cloud computing based big data as well as its system context. Cloud computing based big data provides the capabilities to collect, store, analyze, visualize and manage varieties of large volume datasets, which cannot be rapidly transferred and analysed using traditional technologies. http://www.itu.int/ITU-T/workprog/wp_item.aspx?isn=9853 The ITU workshop on "Big Data" (June 2014) discussed standards needs for big data in the telecommunications sector and adopted an outcome document. http://itu.int/en/ITU-T/Workshops-and-Seminars/bigdata SG13 is developing a definition for Big Data and most importantly a roadmap for big data standardization in ITU-T, including standardization landscape, identification/prioritization of technical areas and possible standardization activities. |
| **W3C** | The project Multilingual Web-LT funded by the CSA grant LT-WEB, standardization work coordinated and managed by W3C Working Group "Multilingual Web-LT addressed standardisation and promotion of best practices in language processing, exchange and interoperability of multilingual data, and on multilingual Web content management and was funded by the CSA grant LT-WEB. This group is part of the Internationalization (I18N) Activity of W3C with the main task to implement an Internationalisation Tag Set (ITS) that provides a standardized set of metadata for web content and "deep web" content that facilitates its interaction with multilingual technologies and translation/localization processes, ensuring smooth automated multilingual processing of web content. Version 2.0 of ITS has on 29 October 2013 been published as a W3C Recommendation. In the multilingual open data track of the Multilingual Web initiative, which is driven by the World Wide Web Consortium (W3C), there is an ongoing discussion about the standardisation of multilingual URIs and localisation of URIs. Moreover, a W3C community group on "Best Practices for Multilingual Linked Open Data" has been created, where this topic is also discussed. http://www.multilingualweb.eu, http://www.w3.org/International/multilingualweb/lt/ |
| **OASIS** | The project addresses the querying and sharing of data across disparate applications and multiple stakeholders for re-use in the enterprise, Cloud, and mobile devices. Specification development in the OASIS OData TC builds on the core OData Protocol V4 released in 2014 and addresses ad-ditional requirements identified as extensions in four directional white papers: data aggregation, temporal data, JSON documents, and XML documents as streams. https://www.oasis-open.org/committees/tc_home.php?wg_abbrev=odata |

| TITLE | SHORT DESCRIPTION & weblinks |
|---|---|
| **OASIS** | ODF is an open, standardized 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. Link: https://www.oasis-open.org/committees/office https://www.oasis-open.org/committees/odata OASIS XML Localisation Interchange File Format (XLIFF): https://www.oasis-open.org/committees/xliff |
| **W3C** | DCAT vocabulary (done in the Linked Government Data W3C Working Group) http://www.w3.org/TR/vocab-dcat/ |
| **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 |

## C.3 MSP Members' and stakeholders' remarks

Existing standards should be checked for account to the protection of individuals with regards to the processing of personal data and the free movement of such data in the light of Data Protection principles. Identification and where needed development of specific Privacy by Design standards should be done.
Since early 2014, French companies and public entities have been working in the context of the French Association for standardization (AFNOR) on a white paper on expectations regarding standards for Big Data.
The white paper is publicly available: http://www.afnor.org/liste-des-actualites/actualites/2015/juin-2015/big-data-impact-et-attentes-pour-la-normalisation-decouvrez-le-livre-blanc-afnor
Several priorities have been identified:

- 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 identifiedProcesses and methods of reversibility in pseudonymisation algorithms, evaluation of system performance (ex: Hadoop), NoSQL query language, or visualization 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 to characterize 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 ;

Big data use cases: the last step covers the need of normalization to develop big data us-es. Highly visible issues of end users that were presented in the introduction should be addressed: technical interoperability, SLAs, traceability of treatment, data erasure, regu-latory compliance, data representation, APIs, etc

# D. Proposed new standardisation actions

## D.2 Other activities around standardisation

**ACTION 1:** invitation to the CEN to support and assist DCAT-AP standardisation process. DCAT-AP is based on the Data Catalogue vocabulary (DCAT). It contains the 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. EuroVoc22) and mappings to existing metadata vocabularies (e.g. SDMX, INSPIRE metadata, Dublin Core, etc.). DCAT-AP has been developed by a multi-sectorial expert group. Experts from international standardisation organisations as well as open data portal owners participated in the group to ensure the interoperability of the resulting specification and to assist in its standardisation process.

**ACTION 2:** promote standardisation in/via the Open Data infrastructure, especially the Pan-European Open Data Portal deployed in the period 2015-2020 as one of the Digital Service Infrastructures under the Connecting Europe Facility programme,

**ACTION 3:** **support of standardisation activities** at different levels: H2020 R&D&I activities (see examples in section C above); support internationalisation of standardisation, in particular for the DCAT-AP specifications developed under the ISA programme (see also action 2 under eGovernment section D), as well for specifications developed under Future Internet Public Private Partnership, such as FIWARE NGSI and FIWARE CKAN (see section C2).

**ACTION 4:** **involvement of stakeholders** in a dialogue about standards for Open Data and Big Data.

**ACTION 5:** For standardising the DCAT - Application Profile CEN should coordinate with the relevant W3C Groups to avoid making incompatible changes as well as on the conditions for availability of the standard(s).

## 3.5.3. eGovernment

### A. Policy objectives

Semantic interoperability is a condition for cross-sector and cross-border interoperability and agreeing on and re-using common semantic specifications and standards assets across Europe is an important step in facilitating semantic interoperability.

The EU Digital Agenda identifies the lack of semantic interoperability between public administrations as a major obstacle to the Digital Single Market and the provision of cross-border digital public services.

In addition to the multilingual challenge, 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 programme, is undertaking a number of initiatives to reduce semantic interoperability conflicts in Europe.

- The ISA programme (Interoperability between European Public Administrations and Public Sector) supports and facilitates cross-border and cross-sector collaboration of public administrations. It defines, promotes and supports the implementation of interoperability solutions and frameworks for European public administrations. It achieves synergies and promotes the reuse of infrastructure, digital services and software solutions. It translates public administrations' interoperability requirements into specifications and standards for digital services.
- The ISA Programme is contributing in this area through three streams of work, further described in the relevant subsections: DCAT-AP as a data standard to describe open data catalogues and datasets (see §3.5.3.1); ADMS as metadata description of semantic specifications and standards (§0); and Core Vocabularies as generic, simplified and reference data models of important master data types used across public administration information systems and applications (§3.5.3.3). In all three, care should be taken to ensure compatibility between the public sector and what the private sector can achieve, noting existing standards and specifications.

### B. Legislation and policy documents

#### B.1 At European level

- Decision No 922/2009/EC on interoperability solutions for public administrations (ISA)
- 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)

### D. Proposed new standardisation actions

#### D.2 Other activities around standardisation

The following actions are valid for all the three streams of work described above (DCAT, ADMS and Core Vocabularies):

**ACTION 1:** organise a workshop on ISA topics. In order to promote standardization in this area the organization of a workshop via an ESO involving European organizations (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 technical specifications which are or have been developed under the ISA programme, it might be advisable to promote them beyond the European context by providing them for becoming international standards via ISO, IEC or ITU, as applicable. In particular the following options may be considered: ISO/IEC JTC1 SC32 (Data management and interchange); ITU-T Study Group 16 (Multimedia) and Study Group 17 (Security).

### 3.5.3.1. DCAT Application profile for data portals in Europe

*Please refer to the "PSI , Open Data and Big Data" section §3.5.2 which includes DCAT matters.*

## 3.5.3.2. Exchange of metadata on re-usable interoperability assets (eGovernment)

### A. Policy objectives

- Interoperability between European Public Administrations - Exchange of metadata on re-usable interoperability assets among national and international repositories.

The Asset Description Metadata Schema (ADMS) is a metadata description of semantic specifications and standards, which has also been extended to cover other type of interoperability solutions.

### B. Legislation and policy documents

*Please refer to top section eGovernment*

### C. Standardisation needs, ongoing activities and progress report

#### C.1 Commission perspective and progress report

- 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 semantic interoperability solutions described using ADMS, through a federation of asset repositories of Member States, standardisation bodies and other relevant stakeholders. Through this federation – reachable through the **Joinup**[23] platform), semantic interoperability solutions became retrievable and available via a single point of access.

#### C.2 Ongoing standards developments

| **ORGANISATION** | **SHORT DESCRIPTION** & weblinks |
|---|---|
| **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. https://dvcs.w3.org/hg/gld/raw-file/default/adms/index.html |

#### C.3 MSP Members' and Stakeholders' remarks

Several MSs already use ADMS to export standards from their national standards catalogues (e.g. Germany).

### D. Proposed new standardisation actions

No action specific to ADMS

23 https://joinup.ec.europa.eu/asset/dcat_application_profile/asset_release/dcat-application-profile-data-portals-europe-draft-1

## 3.5.3.3. Core Vocabularies to facilitate the development of interoperable solutions

### A. Policy objectives

Interoperability between European Public Administrations - 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.

### B. Legislation and policy documents

*Please refer to top section eGovernment*

### C. Standardisation needs, ongoing activities and progress report

#### C.1 Commission perspective and progress report

The European Commission, in the context of the ISA programme, is undertaking a number of initiatives to reduce semantic interoperability conflicts in Europe.

Definitions should first be agreed on fundamental concepts, where divergent and/or conflicting views can be handled. These concepts are simplified data models that capture the minimal, global characteristics/attributes of an entity in a generic, country- and domain-neutral fashion. 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.

- The Commission has made available four core vocabularies with high re-usability possibilities: the Core Person, the Core Business, the Core Location and the Core Public Service Vocabularies[24]

#### C.2 Ongoing standards developments

| **ORGANISATION** | **SHORT DESCRIPTION** & weblinks |
|---|---|
| **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.w3.org/TR/vocab-regorg/ |

### D. Proposed new standardisation actions

#### D.2 Other activities around standardisation

- **ACTION 4:** Consider Core Location Vocabulary as important input to W3C (new working group that is currently discussed in W3C with the participation of the JRC, INSPIRE team).

24 https://joinup.ec.europa.eu/asset/core_public_service/description, and https://joinup.ec.europa.eu/asset/adms/event/efir-workshop-2013-take-part-extension-joinups-catalogue-interoperability-assets

# 3.5.4. Electronic identification and trust services including e-signatures

## A. 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.

## B. Legislation and policy documents

### B.1 At European level

- **Directive 1999/93/EC** of the European Parliament and of the Council of 13.12.1999 on a Community framework for electronic signatures (e-signature directive).
- **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

## C. Standardisation needs, ongoing activities and progress report

### C.1 Commission perspective and progress report

In the context of the e-signatures Directive, in January 2010, the Commission mandated the ESOs to rationalise the standards related to e-signatures and related trust services into a coherent and up-to-date framework (mandate M/460). The bulk of the mandate results are expected in 2014 onwards.

However, in June 2012, the Commission proposed the eIDAS Regulation to replace the e-signatures Directive and to expand its scope to address in one comprehensive legislation, electronic identification, electronic signatures, electronic seals, time stamping, electronic delivery, electronic documents and website certificates as core instruments for electronic transactions. The Regulation was adopted on 23.7.2014. To support the implementation of the regulation which is highly technical, further standardisation work will be needed in particular with regard to the planned secondary legislation which extensively refers to the availability of standards as possible means to meet the regulatory requirements. Existing standards should be checked for account to the protection of individuals with regards to the processing of personal data and the free movement of such data. Identification and where needed development of specific Privacy by Design standards should be done. Moreover, accessibility needs of persons with disabilities should be taken into account

### C.2 Ongoing standards developments

Standards Developments

| **ORGANISATION** | **SHORT DESCRIPTION** & weblinks |
|---|---|
| **CEN** | Under the standardisation mandate M/460 on e-signatures, CEN (TC224) and ETSI have undertaken activities to update and rationalise their standards on e-signatures and related trust services (see ETSI SR 001 604). Also, the adoption by citizens/consumers and SMEs as well as 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. |

| | |
|---|---|
| **CEN, ETSI** | Five ongoing grant agreements running till end 2015 (will be delayed to match with the new Regulation), are supporting CEN and ETSI to carry out the above rationalisation work. In addition, ETSI is working on Trusted Lists (TS 119 612), and enhancements of deliverables related to Trusted Services Providers. Ongoing draft deliverables are being aligned with the terminology and requirements in the new Regulation as they relate to the scope of the deliverables. In addition, the scopes of the deliverables are changed to include electronic seals which are identified as being, in general, technically equivalent to electronic signatures.<br>http://www.etsi.org/deliver/etsi_ts/119600_119699/119612/01.01.01_60/ |
| **OASIS** | Projects for e-identity and e-signature management and functionality, including standards for Cross-Enterprise Security and Privacy Authorization (XSPA); Digital Signature Services; the eXtensible Access Control Markup Language (XACML, also ITU-T Recommendation X.1144); the Key Management Interoperability Protocol (KMIP); the Security Assertion Markup Language (SAML, also ITU-T Recommendation X.1141); Web Services Federation (WS-Fed); Web Services Trust (WS-Trust); Web Services Secure Exchange (WS-SX), and the Extensible Resource Identifier (XRI) and XRI Data Interchange (XDI) standards; OASIS Identity Based Attestation and Open Exchange Protocol Specification (IBOPS). OASIS also hosts standardisation projects on Biometrics device calls and on e-ID credential Trust Elevation methods. |
| **ITU-T** | 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 (recognizing the mandates of other study groups) and prioritize the studies to be carried out by the study groups, and to ensure the preparation of consistent, complete and timely Recommendations.<br>http://www.itu.int/en/ITU-T/studygroups/com17/Pages/idm.aspx |
| **OIDF** | Set of standards and related certification profiles addressing identity transactions over the internet. Active working groups in this area include: 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://openid.net/wg/ |
| **IETF** | The OAUTH ( https://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 authorization tokens to access a protected resource.<br>The ongoing standardization effort within the OAUTH working group is focusing on enhancing interoperability of OAUTH deployments.<br>The Public Notary Transparency (TRANS) WG ( https://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.<br>The Automated Certificate Management Environment (ACME) WG ( https://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.<br>There is the non-WG Vectors of Trust (VoT) work which may or may not develop into a WG at some point https://www.ietf.org/mailman/listinfo/vot |

Others (including stakeholder groups, technology platforms, research projects)

| ORGANISATION | SHORT DESCRIPTION & weblinks |
|---|---|
| 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, eDocuments, eDelivery, and eSignature etc. from previous pilot projects and integrate them into a pan-European digital platform for cross-sector, interoperable eGovernment services. http://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. https://www.eid-stork.eu/. |
| SSEDIC | Scoping the Single European Digital Identity Community –SSEDIC http://www.eid-ssedic.eu |
| FIDIS | Future of Identity in the Information Society - FIDIS http://www.fidis.net |
| PRIME | Privacy and Identity Management for Europe - PRIME https://www.prime-project.eu |

# D. Proposed new standardisation actions

## D.1 Standards developments

**ACTION 1:** Complete and complement the work done under Mandate M/460, e.g. in the following way: addressing the trust service providers (TSP) providing signature gen-eration 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 organized 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 Regula-tion (EU) N°910/2014 adopted by the European Parliament and Council. Alternatively or in complement, ESOs may autonomously submit requests for Commission support to carry out these standardisation activities. Further domains of interest include eIdentifica-tion, eDelivery, and Website Authentication certificates. In particular regarding eIdentifi-cation, the possible standardisation activities arisen from Commission Implementing Regulation (EU) 2015/1501 of 8 September 2015 on the interoperability framework and of Commission Implementing Regulation (EU) 2015/1502 of 8 September 2015 on set-ting out minimum technical specifications and procedures for assurance levels for elec-tronic identification means.

**ACTION 3:** Standardisation actions should take into account where needed ongoing activi-ties, e.g. in ISO/IEC JTC 1 SC 27 WG5 (identity management and privacy technolo-gies). Furthermore, in order to promote the strengths of the European approach to elec-tronic trust services at global level and to favour the mutual recognition of trust services with third countries, the "internationalisation" and promotion of related European stand-ards should be favoured.

Finally, e-signatures standards ensure accessibility for people with disabilities (cf man-date 376 on European Accessibility Requirements for Public Procurement of Products and Services in the ICT Domain).

## D.2 Other activities around standardisation

**ACTION 4:**Support and improve the development of Electronic Signatures interoperable standards by facilitating the organization of Plugtests (interoperability events) and devel-oping and enhancing conformity testing tools. Such interoperability events may address CAdES, XAdES, PAdES, ASiC, use of Trusted Lists, signature validation, etc.

**ACTION 5:** Given the technical complexity of electronic trust services, information should be disseminated to raise awareness and promote the take-up of EU related standards, in particular to the industry for the development of new solutions or for the usage of trust services embedded other sector applications.

# 3.5.5. Radio Frequency Identification (RFID)

## A. Policy objectives

The RFID standardisation mandate M/436 has in the first place the objective to ensure that the deployment of RFID applications takes place in a way compliant to the data protection directive.

Providing security for low-cost RFID tags is a key challenge for many applications, where expensive RFID tags to execute advanced cryptographic and other functions cannot be afforded - this concerns in particular privacy and anti-counterfeiting.

## B. Legislation and policy documents

### B.1 At European level

The legal origin is the data protection directive EC 95/46 and the RFID recommendation of May 15 2009 {SEC(2009)585}

## C. Standardisation needs, ongoing activities and progress report

### C.1 Commission perspective and progress report

The RFID standard mandate will deliver a European standard that will uniquely identify the presence of RFID readers and Tags in compliance of the notification principle of the data protection directive.

In addition there will be specifications for the largest RFID application domains (e.g. retail, ticketing, ...) that will simplify the process of making the application compliant with the data protection legislation. These standards are also called Privacy Impact Assessment templates.

The RFID standard mandate covers the important domain of privacy and data protection issues in wireless technologies.

### C.2 Ongoing standards developments

#### Standards developments

| **ORGANISATION** | **SHORT DESCRIPTION** & weblinks |
|---|---|
| **CEN** | TC225 completed the work on phase 2 of mandate M/436. The following deliverables were published in June / July 2014:<br>EN 29160, Radio frequency identification for item management - RFID Emblem<br>EN 16570, Notification of RFID - The information sign and additional information to be provided by operators<br>TS 16685, Notification of RFID - The information sign to be displayed in areas where RFID interrogators are deployed<br>TR 16684, Notification of RFID - Additional information to be provided by operators<br>TR 16672, Privacy capability features of current RFID technologies<br>EN 16571, RFID privacy impact assessment process<br>TR 16674, Analysis of privacy impact assessment methodologies relevant to RFID<br>TR 16673, RFID privacy impact assessment analysis for specific sectors<br>TR 16670, RFID threat and vulnerability analysis<br>TR 16671, Authorisation of mobile phones when used as RFID interrogators<br>TR 16669, Device interface to support ISO/IEC 18000-3 Mode 1 |
| **ISO/IEC JTC 1** | New standards are being developed in ISO/IEC JTC 1 addressing "Security services for RFID air interfaces" (ISO/IEC 29167 series), |

## C.3 MSP Members' and Stakeholders' remarks

The work completed under phase 2 of the M/436 mandate helps the RFID operators to be "compliant" with the RFID Recommendation of May 15 2009. This will allow the establishment of confidence between RFID operators and citizen. Nevertheless, further work has to be done to benefit this potential trust and increase the European RFID market. Within CEN/TC225, three working groups are dealing with RFID technologies: "Security and data structure", "Automatic ID applications" and "RFID, RTLS and on board sensors".

Numerous possible new work items have been discussed in 2014. Among those, the following two NWI could start in 2016.

TR: Assess the potential of digital signatures in association with AIDC technology

Some RFID technology is at the point of being able to authenticate the RFID tag, but not necessarily the data content. As data can change, and is sometimes required to change authenticated tags are only the start point. This TR will assess and identify techniques that might be applicable to particular AIDC technologies and consider the memory requirements and explore potential application scenarios. It will take into account the development of ISO/IEC 20248 from SC31.

TS: Performance test for RFID tags having the reduced range feature

This TS will determine the procedure to evaluate the actual reading and writing range of the reduced range feature. ISO/IEC 18046-3 and CEN/TR 16670 developed by M436/2 PT-D will serve as the references for the drafting of this TS.

# D. Proposed new standardisation actions

No further work is foreseen.

# 3.5.6. Internet of Things

## A. Policy objectives

IoT is a dynamic global network infrastructure with self-configuring capabilities based on communication protocols where physical and virtual "things" have identities, physical attributes and virtual personalities and use intelligent interfaces. Technological developments have made it possible to connect these "things" to data networks.

As a consequence 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 deployments of truly IoT applications, i.e. where information of connectable "things" can be flexibly aggregated and scaled have been limited in scale and in scope, actually limiting the IoT 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. A certain level of standardization can facilitate the inter-operability, compatibility, reliability, security and effective operations on a global scale among different technical solutions,stimulating industry innovation and provide a clearer technology evolution path.

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 (LSPs), which will be subject of a call of proposals in 2016, in the domain of the Internet of Things (IoT) are a key element. The LSPs will support the deployment of IoT solutions, by enhancing and testing their acceptability and adoption by users and citizens alike, 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.

## B. Legislation and policy documents

### B.1 At European Level

- 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 operational 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.

The proposal for a Directive and for a companion regulation reforming data protection to better adapt it to global ICT developments may also be considered as relevant for IoT standardisation.
See: http://ec.europa.eu/justice/data-protection/law/index_en.htm#h2-5

## C. Standardisation needs, ongoing activities and progress report

### C.1 Commission perspective and progress report

It is the intention to follow an approach to standardisation in IoT similar to that followed in the Cloud Computing Strategy (COM (2012) 529 – Unleashing the Potential of Cloud Computing in Europe). As many relevant standards exist already for the IoT domain, a gap analysis would be the next step, taking into account the most promising business models and use cases. A workshop on IoT co-organised by the European Commission and ETSI was held in July 2014. Based on the results of this workshop, the Commission considered further requests for action. Information on the workshop is available at http://www.etsi.org/news-events/events/771-2014-etsi-ec-dg-connect-iot.

As multiple initiatives in the field already exist, it is indeed needed to correctly position IoT standardisation vis-à-vis existing initiatives such as oneM2M, ITU global standards initiative on IoT, or the ETSI led standardisation activities.
IoT standards will notably support the emergence of business models unleashing the commercial capabilities of systems and devices integrations. Beyond standards identification, it is also important to identify implementation reference models that can be shared by industrial actors. This approach was notably followed under the Future Internet PPP (FI-PPP).

## C.2 Ongoing standards activities

### Standards Developments

| ORGANISATION | SHORT DESCRIPTION & weblinks |
|---|---|
| CEN | TC 225 is about edgeware data capture: bar code, RFID and RTLS. It is clear that these technologies will be part of deployment of IoT applica-tions. Some of future IoT scenarios will be intended to manage sensitive data and any information leakage could seriously compromise users' pri-vacy.<br><br>A dedicated Working Group (WG6) (Internet of Things - Identification, Data Capture and Edge Technologies) has been set up in 2013 that focus on the interfacing of edge data capture technologies with the IoT. The work to be done will include data structures and associated resolution, au-thentication, security and privacy issues.<br>With the background of the work that has been done for Mandate M/436 (Privacy and public awareness of RFID applications), CEN/TC225 has the expertise and legitimacy to be involved in the future standard develop-ment regarding IoT edge technologies and privacy.<br><br>Two work items have been approved at stage 0:<br>One Technical Specification: AIDC technologies — Internet of Things – AIDC Object identifier Structures<br>One Technical Report: AIDC Technologies – Internet of Things – Rele-vant CEN ICT standards<br><br>This TR could be done in collaboration with other CEN/TC involved in the development of IoT. This could be also done in collaboration with other ESO.<br>http://standards.cen.eu/dyn/www/f?p=204:7:0::::FSP_ORG_ID:6206&cs=1E12277AECC001196A7556B8DBCDF0A1C |
| ETSI | ETSI TCs are active in the developing of radio technologies specific for M2M/Internet of Things such as DECT ULE, a wireless technology with ultra-low power consumption for Home Automation and Industry Auto-mation applications. DECT ULE provides audio and data transmission with reliable radio links, superior indoor range, very low power consump-tion, strong security features and remote software downloading capabilities. Activities are also being carried out in the highly active ETSI ISG (NFV – Network Function Virtualization) along with ETSI TC NTECH/WG AFI (Autonomic Future Internet) and TC INT (Core Net-work and Interoperability Testing). A need has been identified to achieve standardized interoperability testing via a common methodology.<br><br>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 Internet of Things (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.<br><br>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.<br>https://ec.europa.eu/digital-agenda/en/news/new-machine-2-machine-standard-smart-appliances-introduced-european-telecommunication |
| IEEE | The IEEE Standards Association (IEEE-SA) has created a working group to develop its Standard for an Architectural Framework for the Internet of Things (IoT) (P2413). In addition, IEEE has a number of existing standards, projects in development, activities, and events that are directly related to creating the environment needed for a vibrant IoT, recognizing the value of IoT to industry and the benefits this technology innovation brings to the public<br>http://standards.ieee.org/develop/msp/iot.pdf. |

| ORGANISATION | SHORT DESCRIPTION & weblinks |
|---|---|
| IETF | 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.<br>6LO WG focuses on the work that facilitates IPv6 connectivity over constrained node networks using the 6LOWPAN technologies.<br><br>The Light-Weight Implementation Guidance (LWIG) Working Group fo-cuses on helping the implementers of the smallest devices. The goal is to be able to build minimal yet interoperable IP-capable devices for the most constrained environments.<br><br>The ROLL working group is developing standards to support the routing of communications within low-power and lossy networks. The 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.<br><br>Security aspects of the IoT are being addressed in the following WGs:<br>The Authentication and Authorization for Constrained Environments (ACE) WG ( https://tools.ietf.org/wg/ace/charters) is working on a standardized solution for authentication and authorization to enable authorized 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.<br><br>The DTLS In Constrained Environments (DICE) WG ( https://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.<br><br>http://trac.tools.ietf.org/group/iab/trac/wiki/Multi-Stake-Holder-Platform#IOT |
| ISO/IEC JTC 1 | The Internet of Things Special Working Group (SWG) was terminated with the work moving into ISO/IEC JTC1/WG10<br><br>ISO/IEC JTC 1 WG 10 (Internet of Things): developing ISO/IEC 30141 – Internet of Things Reference Architecture<br>http://www.iso.org/iso/iso_technical_committee%3Fcommid%3D45020<br><br>JTC1/WG10 has also performed a standards gap analysis, and an IoT Vocabulary.<br>http://www.iso.org/iso/jtc1_home.html |

| ORGANISATION | SHORT DESCRIPTION & weblinks |
|---|---|
| ITU | The 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 standardization platform for the development of a cohesive set of international standards (ITU-T Recommendations) on IoT. It will concentrate in single technical committee the core IoT studies. It will supersede the work previously done in the IoT – Global Standards Initiative (IoT-GSI). http://itu.int/go/tsg2<br><br>Definition of IoT in Recommendations ITU-T Y.2060 "Overview of the IoT" http://itu.int/itu-t/Y.2060<br><br>IoT relevant Recommendations have been developed in Study Groups 13 (Future Networks), SG16 (Multimedia) and SG11 (Protocol and test specifications). http://itu.int/ITU-T/studygroups.<br><br>To promote international coordination among SDOs a Joint Coordination Activity on Internet of Things (JCA-IoT) has been set up. http://itu.int/en/ITU-T/jca/iot .<br><br>JCA-IoT maintains the global online IoT standards roadmap http://itu.int/en/ITU-T/jca/iot/Documents/deliverables/Free-download-IoT-roadmap.doc Study Group "ITU-T Study Group 20: IoT and its applications, including smart cities and communities". |
| OASIS | OASIS runs a Technical Committee on Message Queuing Telemetry Transport (MQTT) https://www.oasis-open.org/committees/mqtt. It is producing a standard for the Message Queuing Telemetry Transport 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/Internet of Things (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. https://www.oasis-open.org/committees/tc_home.php?wg_abbrev=mqtt<br><br>OASIS also runs Advanced Message Queuing Protocol (AMQP) Description: Ubiquitous, secure, reliable internet protocol for high speed transactional messaging https://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 sub-group for connected objects in 4G, called LTE MTC). |
| 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; provide an open source implementation of the standard. http://openinterconnect.org/developer-resources/specs/ |

## Others (including stakeholder groups, technology platforms, research projects

| **ORGANISATION** | **SHORT DESCRIPTION** & weblinks |
|---|---|
| AIOTI | The Alliance for Internet of Things Innovation (AIOTI) created under the Commission's auspices has the goal to promote interoperability and convergence between standards, facilitate policy debates and prepare a Commission's initiative for large scale testing and experimentation, tabled for 2016. 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.<br>AIOTI Working Group 3 focuses on standardisation.<br>The Commission published a 51M€ 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.<br>Amongst AIOTI's European largest technical and digital companies are:<br>•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, start-ups (SIGFOX)…<br>•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.<br>https://ec.europa.eu/digital-agenda/en/news/launch-alliance-internet-things-innovation |
| EC | There are several projects funded by the European Commission, which are integrated in the Internet of Things Research in Europe Cluster (IERC) that are dealing with aspects of the 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 on European and International Level and perform pre-normative research work on standardisation requirements. Also, the Future Internet PPP (FI-PPP) deals with some issues connected to the standardization of the IoT. |
| IVA | Internet of Things (IoT) is a sub-project within ICT for Sweden with the objective of supporting the entire value chain, from business benefits to sensors.<br>http://www.iva.se/IVA-seminarier/Internet-of-Things-IoT---fran-affarsnytta-till-sensorer/ |
| W3C | W3C kick off in April 2015, after having organised a workshop on "Web of Things" in June 2014. http://www.w3.org/2014/02/wot/ |
| UK | the KTN (Knowledge Transfer Network) IoT interest group<br>https://connect.innovateuk.org/web/internet-of-things |
| Finland | IoT Cluster supporting investments in IoT<br>http://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 network. LoRaWAN target key requirements of internet of things such as secure bi- directional communication, mobility and localization services |
| IIC | Work on promoting the uptake of technologies around industrial internet including building confidence around new and innovative approaches to security; develop use cases and test beds; influencing global standards development and facilitating open forums to share and exchange best practices. |

## C.3 MSP Members' and Stakeholders' remarks

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. 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 (Message Queuing Telemetry Transport) in OASIS.

IoT requirements coming, e.g. from retail manufacturing, automotive, aeronautics, pharmaceutical, medical equipment industry and the medical sector in general should be taken fully into consideration. Security, privacy, 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. A wide acceptance would bring the benefits accessible through IoT mechanisms, e.g. for manufacturing and for manufactured products, in 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 that allow products and services to interoperate.

Existing standards should be checked for account to the protection of individuals with regards to the processing of personal data and the free movement of such data in the light of the proposal for a General Data Protection Regulation COM(2012) 11 final. Identification and where needed development of specific Privacy by Design standards should be done.

**In the IoT context, understanding the demands of the users towards standardisation is an absolute need and** it would be beneficial to study the accessibility needs of users.

# D. Proposed new standardisation actions

## D.2 Other activities around standardisation

**ACTION 1:** IoT standards gap analysis.
**In the IoT context understanding the demands of the users towards standardisation – including the accessibility needs of users – is an absolute need.** Based on this, understanding how these demands are met – or not yet met - by the current status of standards; and how coordination within the IoT standards landscape could take place is essential.-Continue activities on standards landscaping and gap analysis as set up in ETSI with a Specialist Task Force to perform these tasks, targeting to develop a set of deliverables, which are expected to become supporting reference for the Large Scale Pilots (LSPs):

1. Standards landscape for IoT (who does what, what are the next milestones) and identification of potential interworking frameworks (e.g. oneM2M)
2. Identifying any remaining gaps to be addressed in standards to achieve the IoT vision

Holding thematic workshops for specific industries. These workshops will handle the following application domains: Smart living (including e-health) and Smart cities including an early study of how a connected car scenario is improving services management.

**ACTION 2:** Establish some cooperation amongst SDOs working on standards landscaping and gap analysis in order to leverage on the results and reduce duplication of work and efforts.
**ACTION 3:** Address the semantics of standards for better data interoperability.
**ACTION 4:** **High level events**

**In parallel, DG CNECT is following up Internet Standardisation and maintains contacts at the highest level with** key European and international SDOs that could be shaped in organising roundtables or other high-level events with participation of SDO key figures, policymakers EU and global industry and the Commission.

# 3.5.7. Network and Information Security

## A. Policy objectives

The European Cyber Security Strategy and the accompanying legislative proposal on Network and Information Security foresee actions on the promotion of the development and of the take-up of ICT security standards.

A Network and Information Security Public-Private Platform (NIS Platform) has been implemented by the Commission with representation of various stakeholders.

## B. Legislation and policy documents

### B.1 At European level

- **Cybersecurity Strategy** of the European Union: An Open, Safe and Secure Cyberspace - JOIN(2013) 1 final - 7/2/2013
- **Proposal for a Directive** of the European Parliament and of the Council concerning measures to ensure a high common level of network and information security across the Union - **COM(2013) 48 final** - 7/2/2013 – EN
- **COM(2015)192** "A Digital Single Market Strategy for Europe"

## C. Standardisation needs, ongoing activities and progress report

### C.1 Commission perspective and progress report

- For security and notification requirements for operators of essential services, the fo-cus will be on establishing a number of reference standards and/or specifications rel-evant to network and information security, including, where relevant, harmonized standards, to serve as a basis for encouraging the coherent adoption of standardisation practises across the Union.
- 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 organization – in particular the strategic level or the management board room - are aware of the need for standards and frameworks in the field of cyber security. Moreover, between organizations that are partners in (vital) online chains will have to be made clear agreements on the different standards.

### C.2 Ongoing standards developments

| **ORGANISATION** | **SHORT DESCRIPTION** & weblinks |
|---|---|
| **CEN, CENELEC, ETSI** | Cyber Security Coordination Group (CSCG). CSCG White Paper "Recommendations for a Strategy on European Cyber Security Standardisation" was published in April 2014. Also the work going on in the area of biometrics contributes to the broader standardisation activities around Cyber Security. http://www.cscg.focusict.de |
| **OASIS** | PKCS 11 standardisation project for cryptographic tokens controlling authentication information (such as personal identity), see https://www.oasis-open.org/committees/pkcs11<br>Key Management Interoperability Protocol (KMIP) for enterprise encryption key administration and deployment.<br>Cyber Threat Intelligence (CTI) TC<br>A new committee (2015) defining a set of information representations and protocols to support automated information sharing for cybersecurity situational awareness, real-time network defense, and sophisticated threat analysis.<br>https://www.oasis-open.org/committees/kmip<br>SAML TC<br>https://www.oasis-open.org/committees/tc_home.php?wg_abbrev=security |

| ORGANISATION | SHORT DESCRIPTION & weblinks |
|---|---|
| OIDF | **Risk and Incident Sharing and Coordination Working Group [RISC]**<br>RISC (chartered 2015) provides data sharing schemas, privacy recommendations and protocols to share information about important security events in order to thwart attackers from leveraging compromised accounts from one Service Provider to gain access to accounts on other Service Providers. RISC focuses on peer to peer sharing of information related to the state of individual accounts.<br>http://openid.net/wg/risc/charter/ |
| ISO/IEC JTC 1 | SC 27 work is ongoing on the following work areas<br>1. Security requirements capture methodology<br>2. Management of information and ICT security; in particular information security management systems (ISMS), security processes, security controls and services<br>3. Cryptographic and other security mechanisms, including but not limited to mechanisms for protecting the accountability, availability, integrity and confidentiality of information<br>4. Security management support documentation including terminology, guidelines as well as procedures for the registration of security components<br>5. Security aspects of identity management, biometrics and privacy<br>6. Conformance assessment, accreditation and auditing requirements in the area of information security<br>7. Security evaluation criteria and methodology<br>http://www.iso.org/iso/home/standards_development/list_of_iso_technical_committees/iso_technical_committee.htm?commid=45306<br><br>ISO 29115 entity authentication framework.<br>http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm? csnumber=45138<br>Ongoing projects and deliverables:<br>ISO/IEC 27001 – Information security management systems - Requirements<br>ISO/IEC 29101 – Privacy architecture framework<br>ISO/IEC 29151 – Code of practice for PII protection<br>ISO/IEC 29190 – Privacy capability assessment model |
| ITU-T | SG17: study group on security: standardizes network and information security where numerous ITU-T Recommendations have been developed including the security Recommendations under the ITU-T X-series<br>http://itu.int/ITU-T/go/sg17<br>http://www.itu.int/en/ITU-T/studygroups/2013-2016/17/Pages/default.aspx<br>http://www.itu.int/ITU-T/recommendations/index_sg.aspx?sg=17.<br>SG17 / Q10/17 - Identity management architecture and mechanisms<br>http://www.itu.int/itu-t/workprog/wp_block.aspx?isn=2048 |
| IEEE | Standardization 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, as well as applications of these technologies and cyber security in smart grids.<br>http://standards.ieee.org/develop/msp/nis.pdf. |
| ETSI | ETSI TC CYBER has started work in several areas, has currently 11 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 related to NFV and Lawful Interception, post quantum computing, security design requirements, the creation of a structured way to share information on threats, and a document to keep track of the evolution of global cybersecurity ecosystem.<br>http://portal.etsi.org/tb.aspx?tbid=824&SubTB=824.<br>NFV SEC https://portal.etsi.org/tb.aspx?tbid=799&SubTB=799 |

| ORGANISATION | SHORT DESCRIPTION & weblinks |
|---|---|
| IETF | The Managed Incident Lightweight Exchange (MILE) WG ( https://tools.ietf.org/wg/mile/charters) develops standards to support computer and network security incident management. The WG is focused on two areas: IODEF (Incident Object Description Exchange Format, RFC5070), the data format and extensions to represent incident and indicator data, and RID (Real-time Inter-network Defense, RFC6545), the policy and transport for structured data.<br>The Security Automation and Continuous Monitoring (SACM) WG ( https://tools.ietf.org/wg/sacm/charters) is working on standardizing protocols to collect, verify, and update system security configurations that allow high degree of automation. This facilitates securing information and the systems that store, process, and transmit that information. The focus of the WG is the assessment of network endpoint compliance with security policies so that corrective measures can be provided before they are exposed to those threats.<br><br>The aim of DDoS Open Threat Signaling (DOTS) WG ( https://tools.ietf.org/wg/dots/charters) is to develop a standards based approach for the realtime signaling of DDoS related telemetry and threat handling requests and data between elements concerned with DDoS attack detection, classification, traceback, and mitigation. |
| 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.<br>http://www.3gpp.org/specifications-groups/sa-plenary/sa3-security |

## C.3 MSP Members' and stakeholders' remarks

The Dutch government has selected a group of security standards for its comply or explain regime: DNSSEC, DKIM, SAML, ISO 27001/2, TLS, and is actively using different adoption strategies to get the standards implemented.
In addition to the actions and objectives addressed so far there may be further work on cyber resilience with 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; 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 (Cloud Security Alliance) and others in addition provide Best Practices in the area of cyber security.

# D Proposed new standardisation actions

## D.1 Standards developments

**ACTION 1:** Work on ensuring privacy and improving existing standards regarding the protection of individuals with regards to the processing of personal data.

## D.2 Other activities around standardisation

- **ACTION 2:** Investigate on suggestions for further improvements of standards and specifications in the area of Network Security. This may include recommendations regarding the further development of DNSSEC DOTS and I2NSF within IETF. In addition the NIST Cyber Security Framework may provide some background for further progress on achieving better cyber security.
- **ACTION 3:** Investigate on work addressing issue of malware on personal computers. ENISA (European Union Agency for Network and Information security) has concluded that many personal computers contain malware that is able to monitor (financial) transactions. As we are becoming increasingly dependent on eBusiness and e-transactions, a European initiative should investigate this topic.

**ACTION 4: 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 is overcome by sharing of relevant cyber threat information among trusted partners and communities in consistence with the agreed interests of their users.

**ACTION 5:** Investigate requirements on secure protocols for networks of highly constrained devices and heavily constrained protocol interaction (low bandwidth/ultra-short session durations (50ms)/low processing capabilities).

**ACTION 6:** Investigate the impact of cyber security standardisation activities on the Internet of Things (IoT)

**ACTION 7:** Investigate work on standardisation of cyber security capabilities of ICT vendors in terms of strategy governance and control; standards and processes; laws and regulations; human resources; research and development; verification; third-party supplier management; manufacturing; delivering services securely; issue, defect and vulnerability resolution; and audit.

**ACTION 8:** Create awareness about available international and global standards and frameworks on cyber security and promote their use and implementation.

**ACTION 9:** Investigate on the availability of standards as regards to the security and inci-dent notification require-ments for Digital Service Providers as defined in the NIS Di-rective

# 3.5.8. ePrivacy

## A. Policy objectives

The enforcement of the EU data protection and privacy legal framework is made easier if data processing products and processes are designed and built from the beginning with legal requirements in mind. This is referred to 'privacy by design'. Standards may set forth the basic requirements for privacy by design for products and processes, minimising the risk of (i) divergent national approaches, with their concomitant 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: economic operators wishing to have 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 requires that data controllers implement appropriate technical and organization 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.*

## B Legislation and policy documents

### B.1 At European level

The following legal instrument should be considered at European level:

- The ePrivacy Directive. Article 14(3) provides that *"Where required, measures may be adopted to ensure that terminal equipment is constructed in a way that is compatible with the right of users to protect and control the use of their personal data, in accordance with Directive 1999/5/EC and Council Decision 87/95/EEC of 22 December 1986 on standardisation in the field of information technology and communications)".*
- The **Data Protection Directive** includes provisions which indirectly, in different situations, suggest the implementation of privacy by design. In particular, Article 17 requires that data controllers implement appropriate technical and organization measures to prevent unlawful data processing.
- **Proposed Data Protection Regulation**. Article 23 requires data protection by design and by default. [25]
- The **1999/5 RTTE Directive**, and **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 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.".

### B.2 Others

The Commission published in June 2015 a Study on "ePrivacy Directive: assessment of transposition, effectiveness and compatibility with the Proposed Data Protection Regulation, SMART 2013/0071". It contains in-depth analysis of 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 Art 5.3 of the ePrivacy Directive, see http://www.iabeurope.eu/policy/e-privacy.

25 Having regard to the state of the art and the cost of implementation, the controller shall, both at the time of the determination of the means for processing and at the time of the processing itself, implement appropriate technical and organisational measures and procedures in such a way that the processing will meet the requirements of this Regulation and ensure the protection of the rights of the data subject."

# C. Standardisation needs, ongoing activities and progress report

## C.1 Commission 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 coherent adoption of standardisation practises across the Union.
The Commission recently has 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.

## C.2 Ongoing standards development

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 as well as other stakeholders. The European Commission proposed a standardisation request/mandate in support of the implementation of privacy management in the design and development and in the production and service provision processes of security technologies, which was approved in October 2014. The aim of M/530, "Standards for privacy & personal data protection management", is for manufacturers & providers to 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 foreseen to start in 2016.".

| **ORGANISATION** | **SHORT DESCRIPTION** & weblinks |
|---|---|
| **ETSI** | TC Cyber is starting work on the EU Mandate M/530 |
| **CEN/CENELEC** | CEN-CENELEC JWG 8 is addressing the EU Mandate M/530 |
| **IEEE** | CEN-CENELEC JWG 8 is addressing the EU Mandate M/530 |
| **W3C** | Initiative to develop specifications by which Internet users may express 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 agreement or disagreement to be tracked on the Internet. http://www.w3.org/2011/tracking-protection/ |
| **OASIS** | Privacy by Design Documentation for Software Engineers standards project (PbD-SE): https://www.oasis-open.org/committees/pbd-se |
| **OASIS** | Privacy Management Reference Model (PMRM) project https://www.oasis-open.org/committees/pmrm, |
| **IETF** | IETF's Internet Architecture Board established a Privacy Program to serve as a forum for synthesizing IETF privacy thinking and privacy design considerations http://www.iab.org/activities/programs/privacy-program/ |
| **IETF** | Privacy Considerations http://tools.ietf.org/html/draft-iab-privacy-considerations-09 |
| **ISO/IEC JTC1** | ISO/IEC Joint Technical Committee 1's Subcommittee 27 on IT Security Technologies published a Code of Practice for protection of personally identifiable information (PII) in public clouds(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?commid=45306 |
| **ITU-T** | ITU, through a variety of activities, is examining issues related to building confidence and security in the use of ICTs, including stability and measures to combat spam, malware, etc., and to protect 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 |

Others (including stakeholder groups, technology platforms, research projects

| ORGANISATION | SHORT DESCRIPTION & weblinks |
|---|---|
| KANTARA | User-Managed Access (UMA)<br>UMA is an OAuth-based protocol designed to privacy-enable websites by giving web users a unified control point for authorizing who and what can get access to their online personal data, content, and services, no matter where hosted. http://kantarainitiative.org/confluence/display/uma/Home<br>**CONSENT & INFORMATION SHARING WORKGROUP (CIS)**<br>Individuals' capacity to manage their privacy is increased if they are able to aggregate and manage consent & information sharing relationships with consent receipts. Standardized consent receipts also provide a channel 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. https://kantarainitiative.org/confluence/display/infosharing/Home |

## C.3 MSP Members' and stakeholders' remarks

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

# D. Proposed new standardisation activities

## D.1 Standards developments

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 regards to the processing of personal data, 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 as necessary, so as to provide standardised methods that support that review and improvement in due respect of EU data protection rules.
Proposed specific areas on which to focus 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.

## D.2 Other activities around standardisation

- **ACTION 3:** Promote EU-wide attention to standardization 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 ongoing reform of the Data Protection Directive. The Kantara CIS work could be used as a basis for this action.
- **ACTION 4:** further investigation of technical measures apt to make personal data anonymous or pseudonymised (and therefore unintelligible by those who are not authorised to access them) may be warranted.
- **ACTION 5:** Further investigation of standards based on a user-centric approach to privacy & access management may be warranted: see http://www.laceproject.eu/blog/give-students-control-data/ and http://www.lvm.fi/julkaisu/4440204/mydata-a-nordic-model-for-human-centered-personal-data-management-and-processing.
- **ACTION 6: Start processes for investigating on requirements to privacy standardisation deriving from Internet of Things (IoT).**
- **ACTION 7:** preventing unwarranted pervasive monitoring by default when developing standards. This is not only relevant in the context the internet but also the Internet of Things.
- **ACTION 8: Secure coding standards for secure application development:** EU-wide attention to standardization 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 ongoing reform of the Data Protection Directive and the emergence of the Internet of Things. (The emergence of the Internet of Things where (embedded) devices process personal data of the owner of the device and others provides additional challenges to transparency and informed cons

# 3.5.9. E-Infrastructures for Research Data and Computing-Intensive Science

## A. 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 blurring 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 no effort exists where some degree of coherence is achieved or even sought.

Some research domains are experiencing exponential growth of data produced with doubling rates 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 in modernizing 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.

A large number of data e-infrastructures, mixing competences of scientific communities and technology providers, have been launched in domains of astronomy, earth and ocean observation, climate, environment and biodiversity, etc. Other e-infrastructures initiatives were launched cutting-across disciplinary domains providing a participatory network of Open Access repositories at European scale and filling the gap between user-application and generic e-infrastructure layers for high-volume storage, data interoperability, high-performance computing and connectivity layers.

All these initiatives have a common aspect: they are the biggest research data factories of the present and the future. Some are led by large research infrastructures and others by collaborative undertakings of e-infrastructure service providers (university and national libraries, data-centers, super-computing centers, etc.).

## B. Legislation and policy documents

### B.1 European legislation and policy documents

**e-Infrastructures supporting the European policies**
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 optimize 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.

The policy line has been defined to a great extent. There are some key issues on the policy side related with how funders will cooperate on the different "flavours" of OS (Green/Gold, etc.). That could include support for Open Access mandates and monitoring of Member State and Horizon 2020 progress. On the e-Infrastructure side, the time is now to implement the policies, improving European Capacity in this domain (linking publications and research data) to face the increasing demand of new services, involving the key stakeholders and ensure global interoperability of repositories.

E-infrastructure core services are being used by many players in the scientific publishing business. These include digital object and author identifier infrastructure services (e.g. DataCite, ORCID). These are playing an increasingly important role in improving the usability of the scientific data resources as well as enabling data publication. They include also the promotion of authorization and authentication infrastructures services (AAA Infrastructures) that are expected to increase trust in the scientific information services.

## B.2 Others

**Member States follow this area through the group of "National Reference Points" (NRPs).**

To creating a competitive European Research Area, Europe has already invested a significant amount of resources in modernizing 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 (ELIXIR, BBMRI), environment (LifeWatch, ENES, EPOS), social sciences and humanities (CLARIN, CESDA, DARIAH), geophysics and astronomy (SKA, EISCAT-3D, EPOS), physical and engineering (WLCG and ISIS). A large number of data e-infrastructures, mixing competences of scientific communities and technology providers, have been launched in domains of astronomy (Euro-Virtual Observatory), earth and ocean observation (SCIDIP-ES, GeoSEAS, iMarine), climate (METAFOR, ESPAS), biodiversity (4D4Life, ViBRANT, PESI), etc. Two important e-infrastructures were launched that cut-across disciplinary domains: OpenAIRE, providing a participatory network of Open Access repositories at European scale and the EUDAT initiative filling the gap between user-application and generic e-infrastructure layers for high-volume storage, data interoperability, high-performance computing and connectivity layers.

All these initiatives have a common aspect: they are the biggest research data factories of the present and the future. Some are led by large research infrastructures undertakings (ESA, EBI, ESO, CERN, EMBL,...) and others by collaborative undertakings of e-infrastructure service providers (university and national libraries, data-centers, super-computing centers, etc.).

But it is not only about the volume and complexity of the research data produced. The European strategy addresses the challenges of access and long term preservation recommending that results should become widely and openly accessible, preserved and curated in a cost effective way in order for citizens to trust the scientific enterprise as generator of the future knowledge and wealth. All this requires a combination of actions at European and Member State to exploit synergies and maximize impact.

Open data e-Infrastructures increase scope, depth and economies of scale of the scientific enterprise; they are catalysts of new and unexpected solutions to emerge by global and multidisciplinary research. They bridge the gap between scientists and the citizen and are enablers of trust in the scientific process.

# C. Standardisation needs, ongoing activities and progress report

## C.1 Commission 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 take advantage from economies of scale. Some scientific communities are pushing the envelope and adopting new technologies and 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 competences from different scientific fields and also the competences of technology and services providers in order to make use of the opportunities offered by new information and communication technologies.

Interoperable data infrastructures will allow researchers and practitioners from different disciplines to find 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 leveraged by clear and efficient arrangements for exchange of data between private and public sectors.

**How can RDA contribute to the European "Open Science" agenda?**
Considerable developments have taken place in providing open access to research publications, and we are making progress in providing for open data, open source software, and opening educational resources.

These four vectors of open science – open access, open research data, open source software, and open educational resources – are not only advancing developments in research and education, they are reducing costs in these areas, making better use of existing computing power, enriching learning experiences, and providing new opportunities for service industries in this knowledge-based economy.

## C.2 Ongoing standards developments

The Research Data Alliance (RDA) is not a fora standardisation organisation but is a mechanism to speed-up the adoption of standards for research data and computing infrastructures. RDA is a strategic and ambitious initiative (http://rd-alliance.org/) responding to the need of research communities and operators of research infrastructures to have interoperable global data infrastructure. RDA brings the best worldwide competence together to build the data infrastructure for data-intensive science.
The European Commission is supporting the efforts on data infrastructure and policy developments centred on openness and interoperability. They have the potential to structure the global knowledge space, increase scope, depth and economies of scale of the scientific enterprise. And, not least, they bridge the gap between scientists and the citizen and are enablers of trust in the scientific process.
E-infrastructures standardisation work needs to have synergies and be aligned with work in other areas. Exchange of information in both directions should be promoted for activities belonging to the areas of data and cloud computing among others.

| **ORGANISATION** | **SHORT DESCRIPTION** & weblinks |
|---|---|
| **RESEARCH DATA ALLIANCE** | Supports the EC 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 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 is based the Recommendation ITU-T X.1255 "Framework for discovery of identity management information<br><br>SG13 works on a Recommendation on the basic principles of a trusted environment<br>http://itu.int/ITU-T/go/sg13 |

## Other activities related to standardisation

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

| **TOPIC** | **SHORT DESCRIPTION** & weblinks |
|---|---|
| **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 |

## C.3 MSP Members' and Stakeholders' remarks

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.

# D. Proposed new standardisation actions

## D.1 Standards developments

In 1991 the EC recommended the CERIF data model to member states. CERIF was initially conceived to document and exchange research information (funding programmes and projects, researchers and research institutions, etc.) and has been since adopted by many member states and institutions. The data model continues to be developed and currently work is ongoing within EuroCRIS (CERIF host organisation) and OpenAIRE initiative to expand the model to include also research outputs.

There will be synergies with the Open Data domain (see also the Rolling Plan contribution on 'Data'). An example of initiatives that is being transferred through a multi-stakeholder collaboration from the Open Data domain to Research data widely understood is Linked Open Data (LOD), a method of publishing data in a structured form so that it can be interlinked. LOD is based on standards such as RDF (a W3C recommendation). Its applications are discussed and implemented in the RDA and in OpenAIRE, for example.

In concrete terms the CERIF data model could be the first standard to be explored. It is already widely used in research related information (grants, researchers, publications, etc.). Its implementation is being considered now for the EC research information system (CORDA). Next steps will include discussions with Eurocris and also in the framework of RDA more generally. Related activity could be included in future research infrastructure funding programmes.

In addition RDA will be approached to identify candidates for standards development in the area of research data. These might come from already existing initiatives in specific research fields or from established general purpose initiatives (e.g. RDF).

**ACTION 1:** Identify standards needs and develop them in the area of research data.

**ACTION 2:** Explore opportunities for collaboration on the use of the Digital Object Architecture (DOA) as an e-infrastructure for enhanced information management. E.g. ITU-T is active in this area.

# 3.5.10. Broadband Infrastructure Mapping

## A. Policy objectives

The high-speed broadband objectives of the *Digital Agenda for Europe* seek to ensure that, by 2020, all Europeans have access to much higher internet speeds of above 30 Mbps and 50% or more of European households subscribe to internet connections above 100 Mbps. In this context, GIS-based information about physical broadband infrastructures and services available in any given area in Europe should be made available as much as possible in a standardized way in order to facilitate comparison and benchmarking at all levels (European, national, regional, local). Such interoperable geographical data may support planning and decision making processes of private and public operators, as well as inform citizens on the current broadband situation in a fast-moving sector.

## B. Legislation and policy documents

### B.1 At European level

- **Directive 2014/61/EU** of the European Parliament and of the Council on measures to reduce the cost of deploying high-speed electronic communications networks
- **Directive 2007/2/EC** of the European Parliament and of the Council establishing an Infrastructure for Spatial Information in the European Community (INSPIRE)
- **Commission Regulation (EU) No 1253/2013** amending Regulation (EU) No 1089/2010 implementing Directive 2007/2/EC as regards interoperability of spatial data sets and services

## C. Standardisation needs, ongoing activities and progress report

### C.1 Commission perspective and progress report

Telecom manufacturers, operators and other stakeholders have an interest in assuring a minimum of interoperability of broadband infrastructure mapping in order 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, reliable and valid data on existing and planned broadband infrastructures, services offered, demand and investment is fundamental. 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.

## C.2 Ongoing standards development

### Standards developments

| ORGANISATION | SHORT DESCRIPTION & weblinks |
|---|---|
| **ITU-T** | SG11 is developing a draft Recommendation Q.in_speed_test "Unified methodology of Internet speed quality measurement usable by end-users on the fixed and mobile networks". The best experience on the implementation of the Internet speed measurement system shows that it could be easily coupled with GIS-based information and therefore it can provide reliable data on existing and planned broadband infrastructure. There is ongoing collaboration with OECD aiming to evaluate the ITU framework to measure broadband Internet speed access for possible adoption at national level. http://www.itu.int/ITU-T/workprog/wp_item.aspx?isn=9972<br>SG15 works on optical transport network, access network, home network, and power utility network infrastructures, systems, equipment, optical fibres and cables, and their 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.itu.int/ITU-T/go/sg15<br><br>SG12 works on performance, quality of service (QoS) and quality of experience (QoE) covering broadband. This work spans the full spectrum of terminals, networks and services, ranging from speech over fixed circuit-switched networks to multimedia applications over mobile and packet-based networks. http://www.itu.int/ITU-T/go/sg12 |

### Others (Including Stakeholder Groups, Technology Platforms, Research Projects):

| ORGANISATION | SHORT DESCRIPTION & weblinks |
|---|---|
| **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 2012/2020** | A "Broadband and infrastructure mapping study" (SMART 2012/0022) was contracted by the European Commission. http://www.broadbandmapping.eu. |
| **VIRGO** | In the context of standards-based infrastructure mapping, a European project VIRGO (Virtual Registry of the Ground Infrastructure) was initiated in 2014 focused on mapping cloud computing. It is coordinated by Infratel Italia which is active in broadband mapping in Italy. |
| **ECC REPORT 195** | The ECC drafted out the Report 195 about Minimum Set of Quality of Service Parameters and Measurement Methods for Retail Internet Access Services. http://www.erodocdb.dk/Docs/doc98/official/pdf/ECCREP195.PDF |
| **BEREC FEASIBILITY OF QOS** | BEREC has published a number of documents on several key topics related to net neutrality. In this context BEREC is carrying out a study through a Working Group on "Feasibility of QoS Monitoring in the context of NN" for which the deliverable is expected Q4/2015. http://berec.europa.eu/eng/berec_office/search?q=net+neutrality |

| | |
|---|---|
| **ITU-T PROJECTS** | ITU-T Reference Guide G.1011: ITU-T has an appropriate recommendation for the QoS of different types of most important services in its reference guide G.1011 Table 9-1. https://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, EUR Region, Asia Pacific region, North America region, Latin America and the Caribbean region, and the Africa region. http://www.itu.int/en/ITU-D/Technology/Pages/InteractiveTransmissionMaps.aspx |
| **SMART 2012/0046 TENDER** | The internet is important basic infrastructure, but public efforts to monitor this complex system have been somewhat scattered. This study is analyzing existing internet monitoring tools and methodologies and providing concrete recommendations about the needs and the next steps that Europe should take in this area. http://internet-monitoring-study.eu/ |
| **SMART 2014/0016** | EC 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 aggregate 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 users experiences data to be pulled from crowdsourcing applications). The contractor will build a sustainable database easy to be updated and 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 mapping broadband at EU, national and regional levels using GIS-based state of the art applications. https://etendering.ted.europa.eu/cft/cft-display.html?cftId=747 |

# D. Proposed new standardisation activities

## D.1 Standards developments

**ACTION 1** Develop an inventory of existing standards or standardisation in progress related to the broadband infrastructure mapping activity (e.g. ITU-T SG 11 draft Recommendation Q.int_speed_test).

**ACTION 2** Develop standardised ways and guidelines to map broadband infrastructures, services offered, demand status and (future) investments.

## D.2 Other activities around standardisation

# 3.5.11. Preservation of digital cinema[26]

## A. Policy objectives

The 2005 European Parliament and Council Recommendation on film heritage recommended Member States to ensure preservation of cinematographic works. The 4th application report of 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, do it using diverging standards. Some Member States, as Germany, are planning to adopt national standards in this area.

## B. Policy documents

### B.1 At European level

- **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

### B.2 Other

- 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

## C. Standardisation needs and ongoing activities

### C.1 Commission perspective

The film heritage sector would benefit from European standards describing 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.

26 Proposed by CNECT, not revised by the MSP yet.

## C.2 Ongoing standards related developments

| ORGANISATION | SHORT DESCRIPTION & weblinks |
|---|---|
| **OAIS** | OAIS (Open Archive Information System) – ISO 14721:2012 http://www.iso.org/iso/iso_catalogue/catalogue_ics/catalogue_detail_ics.htm?csnumber=57284 |
| **GERMANY** | Germany is starting standardization activities at national level to produce one standard at national level on preservation of digital films |
| **CST/FRAUNHOFER** | CST/Fraunhofer started a new "Society of Motion Picture and Television Engineers" (SMPTE) activity for a mezzanine file format of digitized movies based on IMF (Interoperable Master Format) which can be extended to a preservation format of digital films |

# D. Proposed new standardisation actions

## D.1 Standards developments

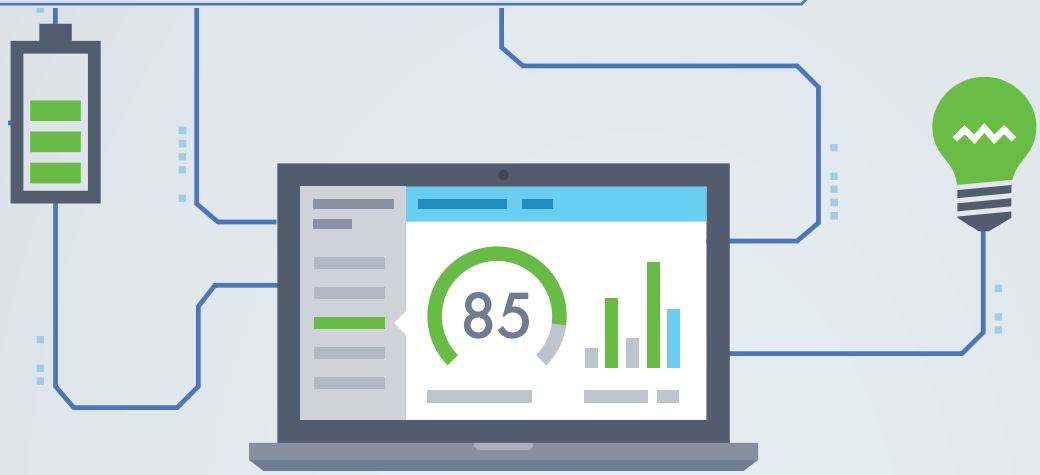
Future standardisation efforts are necessary in the areas:

**ACTION 1: adopt a European standard and the related guidelines on preservation of digital films**, based on existing standardisation activities at national and international level.

## D.2 Other activities around standardization

**ACTION 2: promote awareness of and the implementation of the European standard among relevant stakeholders** (e.g. European film heritage institutions).

# 4. Technology Areas and standardisation activities



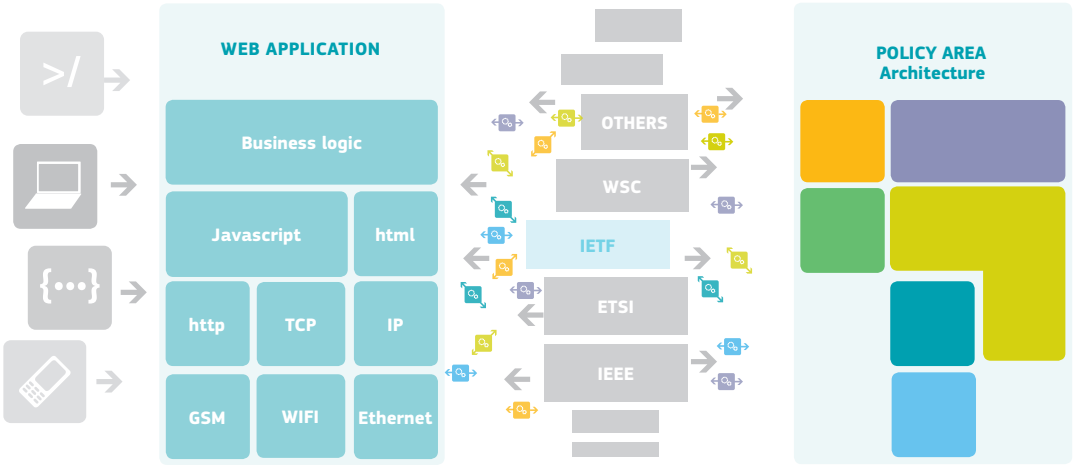
## 4.1. Horizontal technologies for ICT infrastructures

On the basic infrastructure for ICT systems work is done in a number of standards organisations that may be applicable to the various policy areas, i.e. of horizontal relevance. This may refer to work done in global open standards organisations which develop standardised technology components that are widely deployed or work done in formally recognised standards organisations including the ESOs. Rather than mapping these standards developed one-to-one to specific policy areas the standards should be considered as building blocks. Metaphorically, one could see these technologies such as Lego pieces that can be utilised to build complex architectures.

These technologies and the respective standards are not necessarily considered in the specific policy areas listed in chapter 3 of this Rolling Plan. To this end, the sections under chapter 3 are consequently incomplete. Therefore, the relevant aspects will be addressed below in order to draw the attention to these horizontal technologies.

It is quite often the case that technologies standardised and maintained by one of the standards organisations depend on one another. Therefore, in order to specify a standardised solution for a specific policy requirement one might need to use, for example, a scripting standard (ECMA) with specific object security (IETF) to be used within a web service (W3C) that runs on top of a transport layer using specific security architectures (both IETF) which in turn runs on Ethernet (IEEE) and communicates with other systems over wireless networks (IEEE and ETSI).

Utilising relevant specifications will lower the costs of the implementation and reduce specification overhead, thereby significantly lowering costs and risks in reaching results for the key policy goals. It is therefore recommended that. While solutions in these policy areas are being standardised, elements that have been or are being standardised by the respective standards organisation are being considered for use, and that those who partake in developing the solutions bring their requirements and/or solutions to those global open standards development organisations when appropriate.




Architects and implementers are encouraged to seek applicable building blocks and have them submitted for identification if they have not been identified yet.

Likewise, CAMSS (Common Assessment Method for Standards and Specifications) created by the ISA Programme, is a method to assess standards and specifications in the field of ICT based on the best practices of Member States and aligned with the Regulation on Standardisation (No 1025/2012). The CAMSS method is a sound and standardised instrument ensuring that the assessments and selections of standards and specifications are made in a way which ensures their consistency for increasing interoperability between EU Member States in the area of eGovernment and therefore creating synergies and economies of scale.

The following drawing illustrates those horizontal technology layers which provide building blocks for ICT infrastructures and systems:

## 4.2. Technology Areas, Major Building Blocks and Relevant Organisations

The chapter below provides a very high level illustrative outline[27] of the relevant horizontal technology areas. For each area examples of major technology building blocks that are covered are listed. Moreover those standards development organisations are listed which have major activities ongoing in the respective technology area and which can act as a source for further information as well as for providing relevant specifications. This section serves to illustrate the wealth of commonly available and globally deployed building blocks without the intention of providing a detailed inventory or roadmap.

### Technology area: Physical and Link

**SCOPE: COVERS TECHNOLOGIES THAT ALLOW DEVICES TO CONNECT TO OTHER DEVICES, PHYSICAL AND TRANSMISSION SPECIFICATIONS**

| | | |
|---|---|---|
| **TECHNOLOGY BLOCKS COVERED** | Cabling, USB, BUS specifications, Ethernet, WIFI, GSM, LTE, Signalling and framing specifications | |
| **ORGANISATIONS ACTIVE IN THESE AREAS** | CENELEC<br>ETSI<br>IEEE<br>ISO/IEC | ITU-T<br>JEDEC<br>TIA<br>USB-IF |

### Technology area: Internet-working technologies

**SCOPE: COVERS TECHNOLOGIES THAT ALLOW HOSTS OR APPLICATIONS ON INDEPENDENT NETWORKS TO COMMUNICATE TO EACH OTHER.**

| | |
|---|---|
| **TECHNOLOGY BLOCKS COVERED** | IP level technologies. For example, Binding to lower layers, Mobility solutions, Rendezvous, Locator/Identifier splits, Home networks, Tunnelling, and DNS, intra and inter domain routing, virtual networking, multi-cast, congestion control mechanism, TCP maintenance, and various traffic optimisation mechanisms |
| **ORGANISATIONS ACTIVE IN THESE AREAS** | ETSI<br>IETF<br>ITU-T |

### Technology Area: Applications

The Applications area covers the session presentation and application layer in the OSI model. The ordering below is somewhat arbitrary.

#### *Applications: Messaging and Media*

**SCOPE: COVERS SESSION PROTOCOLS AND ARCHITECTURES, AND PLATFORM TECHNOLOGIES.**

| | | |
|---|---|---|
| **TECHNOLOGY BLOCKS COVERED** | Application layer protocols. For example, various e-mail standards, HTTP, LDAP Internet based telephony (SIP and RTP), internet messaging (XMPP), emergency services, geolocation, and web platform (HTML, Cookies, XML, EcmaScript). | |
| **ORGANISATIONS ACTIVE IN THIS AREA** | Ecma<br>ETSI<br>IETF | IEEE<br>W3C<br>XMS |

27 In order to achieve better comprehension, the areas are somewhat aligned with the OSI or Internet Layer model, but the mapping is not necessarily exact nor is the positioning of technology blocks in the areas.

## *Applications; Presentation and Interfacing*

**SCOPE: COVERS INTERFACING AND HUMAN INTERACTION**

| | | |
|---|---|---|
| **TECHNOLOGY BLOCKS COVERED** | Fonts, Internationalization, Audio and Video Codecs, Accessibility standards, File formats (jpeg, SVG), APIs, Cascading style sheets | |
| **ORGANISATIONS ACTIVE IN THIS AREA** | ETSI<br>IETF<br>ITU-T | MPEG<br>Unicode<br>W3C |

## *Applications: Business logic*

**SCOPE: COVERS AREA SPECIFIC COMMUNICATION ASPECTS THAT ARE SPECIFIC TO APPLICATION AREAS**

| | |
|---|---|
| **TECHNOLOGY BLOCKS COVERED** | XML based document definitions, business semantics, and Modelling Languages (e.g. invoicing standards) |
| **ORGANISATIONS ACTIVE IN THIS AREA** | CEN<br>OASIS<br>OMG<br>UN/CEFACT<br>W3C |

## *Technology Area: Security and Privacy*

**SCOPE: SECURITY AND PRIVACY IS THE BROADEST OF THE TECHNOLOGY AREAS. IT IS PART OF HORIZONTAL BUT ALSO PART OF THE COMPLETE VERTICAL STACK AND, THEREFORE, MAY BE SEEN AS "CROSS-AREA". THE BUILDING BLOCKS HEREIN CAN BE SOLUTIONS BY THEMSELVES OR BE APPLIED AS PART OF SOLUTIONS.**

| | | |
|---|---|---|
| **TECHNOLOGY BLOCKS COVERED** | Internet Public Key<br>Internet infrastructure (x.509 based)<br>web authorization<br>JavaScript signing and encryption<br>transport layer security mechanism ( TLS)<br>Authentication information exchange mechanisms (SAML)<br>Privacy enhancement mechanisms | |
| **ORGANISATIONS ACTIVE IN THESE AREAS** | CEN<br>ETSI<br>ISO/IEC<br>ITU-T | IEEE<br>IETF<br>OASIS<br>W3C |

# 5. Closing Remarks

The Rolling Plan has been produced in a consensual and open way, between the Commission and the MSP. It is a comprehensive strategy document covering policy making across different Directorates-General of the European Commission and consolidating their input with the advice given by the MSP based on its broad stakeholder representation.

The Rolling Plan is not conceived to be a finalised document ever, but a snapshot reflecting the policy needs and stakeholders' advice reflecting at a given moment and subject to the information that was available to the authors at that point in time.

The Rolling Plan provides the opportunity for policy makers on EU and on national level to move towards closer collaboration and a closer common understanding regarding the objectives of policy making in the various areas. The Rolling Plan aims at giving a concise overview on available standards and ongoing standardisation activities of relevance to the respective policy context. This should facilitate effective policy making by providing information on the global and European standardisation landscape per area. And it shall avoid any duplication of work and at the same time bring global standards into the focus of policy making.

The Rolling Plan is a work plan of the European Commission, a guideline for the implementation of policies supported by standardisation and a source of information for stakeholders about policy priorities and envisaged actions. The Rolling Plan also relies on the willingness of standardisation organisations to take up work which is relevant in specific policy contexts and thus contribute to driving the technologies in the identified policy priorities.

The fast evolution of needs in the ICT field requires an equally fast adaptation of the Rolling Plan, including new topics and updating or even removing the topics already mentioned in the document. Therefore the Rolling Plan will regularly be reviewed by the Commission with the collaboration of the ICT Standardisation Multi-Stakeholder Platform. Updates on factual information may be provided in the form of an Addendum to the Rolling Plan. The full Rolling Plan will be revised at least once a year.

# ANNEXE

# 6. 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**:
Dutch Digital Agenda:
http://www.rijksoverheid.nl/onderwerpen/ict/documenten-en-publicaties/kamerstukken/2011/05/17/ digitale-agendanl.html
Standardisation Forum and Board:
https://zoek.officielebekendmakingen.nl/stcrt-2011-23581.html
Documents related to Open Connection:
https://www.google.nl/url?sa=t&rct=j&q=&esrc=s&frm=1&source=web&cd=1&cad=rja&ved=0CC4QFjAA&url=https%3A%2F%2Fwww.ictu.nl%2Farchief%2Fnoiv.nl%2Ffiles%2F2009%2F12%2FAction_plan_english.pdf&ei=h9VfUu2cNOaq7Qb89YHgAw&usg=AFQjCNFUTfOoXCkDj5jv8RY88gq6mH3UTQ&sig2=c4_dIip0VBnS2ReRDVI-yw
I-Nup:
http://www.rijksoverheid.nl/documenten-en-publicaties/kamerstukken/2011/05/30/aanbiedingsbrief-overheidsbrede-implementatieagenda-voor-dienstverlening-en-e-overheid-i-nup.html
Comply or explain policy for open standards:
https://zoek.officielebekendmakingen.nl/stcrt-2008-837.html

**SPAIN**:
Digital Agenda for Spain:
http://www.agendadigital.gob.es/digital-agenda/Paginas/digital-agenda-spain.aspx
Spanish National Cybersecurity Strategy:
http://www.lamoncloa.gob.es/documents/20131332estrategiadeciberseguridadx.pdf
Spanish National Interoperability Framework, English version:
http://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.boe.es/boe/dias/2010/01/29/pdfs/BOE-A-2010-1331.pdf)
Strategy on Technical Interoperability Standards:
http://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://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.boe.es/diario_boe/txt.php?id=BOE-A-2012-13501 **plus** http://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 2012:
http://www.bakom.admin.ch/themen/infosociety/index.html

**UNITED KINGDOM:**
UK government policy on standardisation;
https://www.gov.uk/innovation-standardisation--4
Strategy on ICT:
https://www.gov.uk/government/publications/information-economy-strategy
Strategy on spectrum:
https://www.gov.uk/government/publications/spectrum-strategy
ICT infrastructure consultation:
https://www.gov.uk/government/consultations/digital-communications-infrastructure-strategy-consultation
Internet of Things development
https://www.gov.uk/government/collections/internet-of-things-review
Plans and progress on theNational Cyber Security Strategy (NCSP)
https://www.gov.uk/government/publications/national-cyber-security-strategy-2-years-on
Government ICT procurement and the use of standards
https://www.gov.uk/government/publications/open-standards-principles/open-standards-principles
http://standards.data.gov.uk/

# 7. 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/images/files/WorkProgramme/etsi-work-programme-2013-2014.pdf
http://webapp.etsi.org/workprogram/SimpleSearch/QueryForm.asp

**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

1 'drug identifier' means, in this context, the '***unique identifier***' to be assigned by the European Commission in the implementation of the article 54a, item2(a) of the FMD (*DIRECTIVE 2011/62/EU*), '*that enables the authenticity of medicinal products to be verified and individual packs to be identified*'
2 This report should be used as input for possible improvements in the recently published ITU-T H.860
3 Taking into account the results of the European Interoperability Framework Study (Deloitte, 2013), cf. *http://ec.europa.eu/digital-agenda/en/news/ehealth-interoperability-framework-study*