



STANDARDS ANALYSIS ICT SECTOR LUXEMBOURG

ILNAS

Institut luxembourgeois de la normalisation,
de l'accréditation, de la sécurité et qualité
des produits et services



AGENCE POUR LA NORMALISATION ET
L'ÉCONOMIE DE LA CONNAISSANCE

Executive summary

The analysis of European and International standards in the Information and Communication Technology (ICT) sector has been initiated in 2012 by the "*Institut Luxembourgeois de la Normalisation, de l'Accréditation, de la Sécurité et qualité des produits et services*" (ILNAS). This work is conducted by the ILNAS Digital trust department in order to develop an information and exchange network for ICT standardization knowledge in the Grand Duchy of Luxembourg. Since 2013, the analysis is realized in the frame of the implementation of the "Luxembourg's policy on ICT technical standardization 2013-2020"¹.

The ICT sector is already an active sector at the national standards level with 52 national delegates currently registered by ILNAS. Nevertheless, ILNAS is convinced that this standardization sector could be more "productive", especially since some ICT subsectors are not yet covered and certain stakeholders are not yet represented. Thus, the purposes of this analysis are firstly to provide useful information to the national stakeholders regarding standardization activities in the field of ICT and secondly to involve them into an integrated and innovative approach.

Conducted in several steps, this survey is basically built on a standards watch that allows the identification of standardization technical committees related to the ICT sector at the European and International level. Detailed information concerning the most interesting formal standardization technical committees (about 42) and non-formal standardization technical committees (about 13 *fora/consortia*) are provided in the present report. It also provides avenues for national economic development through the detection of niche opportunities from the standardization point of view. Then, in order to induce stakeholder interest, the national market of the ICT sector has been characterized through the definition of 12 categories for which potential interests and opportunities to participate in the standardization process (*via* ILNAS) have been identified. Lastly, the connections at the standards level between the ICT sector and other economic sectors active in the Grand Duchy of Luxembourg have been pointed out.

Conceived as a practical tool, this report is evolving and should be used to quickly identify issues and interests for the national stakeholders of the ICT sector. Published for the first time in November 2012, the present report constitutes the third version of this analysis which will continue to be updated twice a year according to the market interest.

¹ <http://www.ilnas.public.lu/fr/publications/normalisation/etudes-nationales/policy-on-ict-technical-standardization-2013-2020.pdf>

Preface

The “*Institut Luxembourgeois de la Normalisation, de l’Accréditation, de la Sécurité et qualité des produits et services*” (ILNAS) is an administration under the supervision of the Minister of the Economy in Luxembourg. It was created based on the law of May 20, 2008 and started its activities on June 1, 2008.

For reasons of complementarity, effectiveness and transparency as well as for purposes of administrative simplification, ILNAS is in charge of several administrative and technical legal missions that were previously the responsibility of different public structures. These assignments have been strengthened and new tasks are now assigned to ILNAS. ILNAS thus corresponds to a network of skills for competitiveness and consumer protection.

Through its Digital trust department, ILNAS carries out different legal missions in the frame of ICT. In order to organize an information and exchange network for Information and Communication Technology (ICT) standardization knowledge, this department has become the head of delegation of the national standardization committee ISO/IEC JTC 1. This mission aims to achieve excellence in the ICT sector and, additionally, to support the national (digital) economy in order to remain competitive and effective.

To promote standardization in Luxembourg, a national standardization strategy, approved by the Minister of the Economy, had been drawn up by ILNAS on June 2010 for the decade 2010-2020.

This national strategy, directly related to the 2020 strategy of the European Union, has been updated in January 2014 by the “Luxembourg Standardization Strategy 2014-2020”², which is more in line with the needs of the national market and with the priorities identified after three years of active promotion of the technical standardization in Luxembourg. The new positioning can be summarized by the motto: “Technical standardization as a service”.

To meet the new priorities, the strategy is based on the three following pillars in which the ICT sector is now one of the cornerstones:

1. Information and Communication Technology (ICT)

Given the dynamism and the vital importance of the ICT sector for the national market:

- A constant support and development of the standardization field dedicated to ICT (including in terms of education and *ad hoc* promotion) according to the “Luxembourg policy on ICT technical standardization 2013-2020”³ is provided;
- A detection of niche opportunities for national economic developments is carried out.

2. National influence and compliance with legal responsibilities

In order to increase the influence of Luxembourg:

- A support to the influence of the Grand-Duchy of Luxembourg within European and International standards organizations is scheduled;
- An active contribution to respect legal attributions in terms of European standardization is guaranteed;
- A detection of opportunities for the national economic market is provided.

² <http://www.ilnas.public.lu/fr/publications/normalisation/etudes-nationales/luxembourg-standardization-strategy-2014-2020.pdf>

³ <http://www.ilnas.public.lu/fr/publications/normalisation/etudes-nationales/policy-on-ict-technical-standardization-2013-2020.pdf>

3. Products and services

- A support in terms of implementation of current products and services⁴ in the field of standardization (diagnostic, awareness/training sessions, specific watch, sector-based analysis, etc.), mainly on request from the national economic market is carried out.

Moreover, as mentioned in the national standardization strategy, a "Luxembourg's policy on ICT technical standardization 2013-2020" has been published in 2013 with the aim to foster and strengthen the national ICT sector in its involvement in standardization work, and to achieve its main objectives consisting in five lead projects:

- Developing the national standards analysis for the ICT sector (current report);
- Defining a national implementation plan for ICT technical standardization (in line with the national standards analysis for the ICT sector);
- Organizing and developing the ICT technical standardization representation at the national level;
- Reinforcing the research and innovation activities related to ICT standardization;
- Representing national interests within European and International entities in the field of ICT technical standardization.

Since October 2010, ILNAS has been supported by the Economic Interest Grouping "*Agence pour la Normalisation et l'Économie de la Connaissance*" (ANEC GIE) in implementing the national standardization strategy. The role of ANEC GIE is to support the development of standardization activities at the national level and to promote the benefits of participating in standardization. Its mission is to create awareness, training and monitoring in the field of standardization and applied research in order to support the competitiveness of companies in Luxembourg. Thus, ILNAS, with the support of ANEC GIE, can effectively contribute to the economic diversification policy pursued by the Government in niches for economic developments.

In this context, the ILNAS Digital trust department commissioned ANEC GIE, through the "Luxembourg's policy on ICT technical standardization 2013-2020", to complete the task of an analysis of European and International standards of the ICT sector. Indeed, in line with the priorities set by the Government of the Grand Duchy of Luxembourg, this sector has long been identified as a carrier for the national economy.

⁴ <http://www.ilnas.public.lu/fr/normes-normalisation/normalisation-et-pme/services-aux-pme/index.html>
Training catalogue:
<http://www.ilnas.public.lu/fr/publications/normalisation/brochures-information/catalogue-formation-2014.pdf>

Table of Contents

1. INTRODUCTION	1
2. STANDARDIZATION	3
2.1. DEFINITIONS.....	3
2.2. STANDARDIZATION OBJECTIVES.....	5
2.3. STANDARDIZATION LANDSCAPE.....	6
2.4. STANDARDS DEVELOPMENT.....	9
3. CONTEXT OF THE ICT SECTOR.....	11
3.1. DEFINITION AND ISSUES OF THE ICT SECTOR.....	11
3.2. STANDARDS CONTEXT OF THE ICT SECTOR	13
4. METHOD FOR THE STANDARDS ANALYSIS	19
4.1. STANDARDS WATCH	19
4.2. STAKEHOLDERS OF THE ICT SECTOR.....	23
4.3. LINKS BETWEEN THE STANDARDS WATCH RESULTS AND THE STAKEHOLDERS	24
4.4. ICT FORA/CONSORTIA AND ECONOMIC INTERSECTORAL APPROACH.....	26
4.5. DEFINITION OF THE OPPORTUNITIES FOR THE NATIONAL MARKET	28
5. RESULTS OF THE STANDARDS ANALYSIS	29
5.1. RESULTS OF THE STANDARDS WATCH	29
5.2. INTERESTS FOR THE STAKEHOLDERS	36
5.2.1. DESCRIPTION OF THE NATIONAL MARKET	36
5.2.2. PUBLIC INSTITUTIONS.....	37
5.2.3. FEDERATIONS AND ASSOCIATIONS	40
5.2.4. TEACHERS AND TRAINERS	42
5.2.5. RESEARCHERS	45
5.2.6. INVESTORS.....	48
5.2.7. CONFORMITY ASSESSMENT BODIES.....	49
5.2.8. DEVELOPMENT AND INTEGRATION COMPANIES.....	51
5.2.9. CONSULTING COMPANIES	53
5.2.10. DATA CENTER OPERATORS.....	57
5.2.11. NETWORK AND TELECOMMUNICATIONS COMPANIES	60
5.2.12. SERVICE PROVIDERS	63
5.2.13. CUSTOMERS AND CONSUMERS REPRESENTATIVES	66
6. OPPORTUNITIES FOR THE NATIONAL MARKET	69

7. ICT STANDARDS WATCH	75
7.1. ISO/IEC standardization committees.....	75
7.1.1. ISO/IEC JTC 1	76
7.1.2. ISO/IEC JTC 1/WG 7	82
7.1.3. ISO/IEC JTC 1/SC 2	84
7.1.4. ISO/IEC JTC 1/SC 6	85
7.1.5. ISO/IEC JTC 1/SC 7	87
7.1.6. ISO/IEC JTC 1/SC 17	89
7.1.7. ISO/IEC JTC 1/SC 22	91
7.1.8. ISO/IEC JTC 1/SC 23	93
7.1.9. ISO/IEC JTC 1/SC 24	94
7.1.10. ISO/IEC JTC 1/SC 25	96
7.1.11. ISO/IEC JTC 1/SC 27	97
7.1.12. ISO/IEC JTC 1/SC 28	100
7.1.13. ISO/IEC JTC 1/SC 29	101
7.1.14. ISO/IEC JTC 1/SC 31	103
7.1.15. ISO/IEC JTC 1/SC 32	105
7.1.16. ISO/IEC JTC 1/SC 34	107
7.1.17. ISO/IEC JTC 1/SC 35	109
7.1.18. ISO/IEC JTC 1/SC 36	111
7.1.19. ISO/IEC JTC 1/SC 37	113
7.1.20. ISO/IEC JTC 1/SC 38	115
7.1.21. ISO/IEC JTC 1/SC 39	117
7.1.22. ISO/IEC JTC 1/SC 40	119
7.2. CEN standardization committees	121
7.2.1. CEN/TC 224	122
7.2.2. CEN/TC 225	124
7.2.3. CEN/TC 247	126
7.2.4. CEN/TC 251	128
7.2.5. CEN/TC 278	129
7.2.6. CEN/TC 287	131
7.2.7. CEN/TC 294	132
7.2.8. CEN/TC 310	134
7.2.9. CEN/TC 353	135
7.2.10. CEN/TC Project Committee 365.....	137
7.2.11. CEN/TC Project Committee 428.....	138
7.3. ISO/TC 46	139
7.4. CENELEC/TC 215.....	141
7.5. ETSI - European Telecommunications Standards Institute.....	143
7.5.1. ETSI – European Telecommunications Standards Institute	144
7.5.2. ETSI/TC CLOUD.....	147
7.5.3. ETSI/TC ESI	148
7.5.4. ETSI/TC SmartM2M	149
7.5.5. ETSI/TC ITS	151
7.6. ITU-T - International Telecommunication Union - Telecommunication Standardization Sector	152

8. FORA/CONSORTIA	155
8.1. IETF - Internet Engineering Task Force	156
8.2. W3C - World Wide Web Consortium	157
8.3. IEEE-SA - Institute of Electrical and Electronics Engineers Standards Association	159
8.4. DMTF - Distributed Management Task Force	161
8.5. Ecma International (previously called ECMA)	162
8.6. OASIS - Organization for the Advancement of Structured Information Standards	163
8.7. OMG - Object Management Group	165
8.8. OGF - Open Grid Forum	167
8.9. TOG - The Open Group	169
8.10. SNIA - Storage Networking Industry Association	170
8.11. TCG - Trusted Computing Group	171
8.12. UPnP Forum	172
8.13. OGC - The Open Geospatial Consortium	173
9. ICT AND ECONOMIC INTERSECTORAL APPROACH	175
9.1. ICT AS A SUPPORTING SECTOR OF THE ARCHIVING SECTOR	175
9.1.1. Standardization in the archiving sector and ICT	175
9.1.2. Technical Committees related to ICT in the archiving sector	176
9.2. ICT AS A SUPPORTING SECTOR OF THE ENERGY SECTOR	177
9.2.1. Standardization in the energy sector and ICT	177
9.2.2. Technical Committees related to ICT in the energy sector	178
9.3. ICT AS A SUPPORTING SECTOR OF THE BIOMEDICAL TECHNOLOGIES SECTOR	179
9.3.1. Standardization in the biomedical technologies sector and ICT	179
9.3.2. Technical Committees related to ICT in the biomedical technologies sector	180
9.4. ICT AS A SUPPORTING SECTOR OF THE SPACE SECTOR	182
9.4.1. Standardization in the space sector and ICT	182
9.4.2. Technical Committees related to ICT in the space sector	182
9.5. OTHER SECTORS WHERE ICT ACTS AS A SUPPORTING SECTOR	183
10. PROMISING STANDARDIZATION AREAS	185
10.1. TURNING TECHNOLOGY TRENDS INTO STANDARDIZATION	185
10.2. SMART CITIES	187
10.3. BIG DATA	189
10.4. INTERNET OF THINGS (IoT)	190
11. CONCLUSION	193

12. APPENDIX	195
<i>12.1. LIST OF ACRONYMS.....</i>	<i>195</i>
<i>12.2. PARTICIPATION IN THE STANDARDIZATION PROCESS.....</i>	<i>205</i>
<i>12.3. LIST OF ALL IDENTIFIED STANDARDS-RELATED FORA AND CONSORTIA OF THE ICT SECTOR.....</i>	<i>207</i>
<i>12.4. FEEDBACK FORM</i>	<i>213</i>
<i>12.5. DECLARATION OF INTEREST IN ICT STANDARDIZATION</i>	<i>217</i>
<i>12.6. CONTACTS.....</i>	<i>218</i>

1. INTRODUCTION

The sector of Information and Communication Technology (ICT) is a keystone of the worldwide economy and can be considered as a horizontal support for all sectors of economic activity. The effectiveness and growth of the ICT sector are mainly determined by the ability of its component parts to interoperate (“to talk to each other”). As a result, standards are absolutely essential for the interoperability of different component parts and products from different manufacturers. Thus, the standardization activities of this sector follow the trend of its economic growth.

The ICT sector is already an active sector at the national standards level. Driven by the Digital trust department of ILNAS, several tools have already been set up (ISO/IEC JTC 1 national forum; ISO/IEC JTC 1 national day; ISO/IEC JTC 1 national chapter), and 52 national delegates are currently active in the ICT sector.

Initiated by ILNAS, the standards analysis described in this document constitutes indeed a sector-based “snapshot” for fostering and strengthening the national ICT sector in its involvement in standardization work. Based on the detailed information provided, its aim is to involve national stakeholders in a global approach to standardization in this sector in the Grand Duchy of Luxembourg. Achievement of this objective would allow supporting the sector in terms of competitiveness, visibility and performance, while enhancing the international recognition of the Grand Duchy of Luxembourg at the standards level.

The analysis of European and International standards related to ICT has been realized in several steps listed hereafter:

- Execution of a standards watch of the targeted sector (inventory of standards – both published and under development – at the European and International level; identification and description of standardization technical committees);
- Targeting the national market of the related sector by identifying national stakeholders (public and private);
- Establishment of logical links between the national market, the different stakeholders and the results of the standards watch;
- Identification of relevant *fora/consortia* related to the ICT sector; identification of technical committees dealing with ICT as a supporting sector; identification of niche opportunities based on technological trends;
- Preparation of a final report of analysis and opportunities;
- Transfer of the standards knowledge acquired to various stakeholders.

The report structure follows the same execution sequence. After introductory chapters dedicated to standardization in general (**Chapter 2**) and the context of the ICT sector (**Chapter 3**), the method applied for the standards analysis is described in **Chapter 4**.

Chapter 5 then presents the main results of the standards analysis. In order to bring the national stakeholders of the ICT sector into an active approach to standardization, logical links were established between the national market and the standards watch results. Thus, this chapter offers an overview of the different subsectors and technical committees identified for the ICT sector. Then, the potential interests to take part in the standardization process are highlighted for all stakeholder categories characterizing the national market.

The same potential interests for different stakeholder categories constitute opportunities for the sector as a whole. **Chapter 6** presents them in order to engage not only an individual but also a general perspective about the benefits of standardization.

Considering the results of the standards watch as relevant information, the next two chapters are dedicated to a detailed presentation of each standardization technical committee identified at the European and International level. **Chapter 7** focuses on formal standardization technical committees, while **Chapter 8** presents other technical committees analyzed through investigation of non-formal standards organizations (ICT *fora/consortia* developing *de facto* standards). Through this form, the information is directly available for someone seeking to estimate his or her interest for a specific technical committee.

Then, it is also important to note that the ICT sector can be considered as a horizontal support of many other sectors in the global economy. The examples of sectors where ICT is a keystone are numerous and obvious: aeronautics, automotive, energy, biomedical, space, etc. **Chapter 9** thus highlights ICT as a sector that supports other economic sectors at the standards level. In this framework, technical committees having drawn a link between the ICT sector and other sectors are described in this chapter.

Furthermore, to complete the standards analysis, the prospective and innovative role of standardization is described in **Chapter 10**. Indeed, crucial ICT developments are in course and standardization has a key role to play to support and allow their implementation.

Finally, the conclusion points out the main purpose of this standards analysis which is to provide useful information to the national stakeholders in order to involve them in the standardization process.

Note:

In accordance with the ILNAS policy on participation in standardization technical committees, the term “standardization technical committee” is in this report a generic term that covers also the “technical committees”, “subcommittees”, “working groups”, etc.

2. STANDARDIZATION

2.1. DEFINITIONS

❖ ILNAS:

This acronym designates the “*Institut Luxembourgeois de la Normalisation, de l’Accréditation, de la Sécurité et qualité des produits et services*”. ILNAS, an administration under the authority of the Minister of the Economy, was created by the law of May 20, 2008, and began its activities on June 1, 2008.

❖ OLN:

This acronym designates the “*Organisme luxembourgeois de normalisation*,” an ILNAS department and which, according to the law of May 20, 2008, fulfills the ILNAS missions as the national standards body. It is a member of the European and International standards organizations.

❖ ANEC GIE:

This acronym designates the “*Agence pour la Normalisation et l’Economie de la Connaissance*”. Created in October 2010, the role of ANEC GIE is to implement the national standardization strategy established by ILNAS in order to support the development of standardization activities at the national level and to promote the benefits of participating in the standardization process.

❖ STANDARDIZATION:

Standardization is a VOLUNTARY, CONSENSUS-driven activity, carried out by and for the interested parties themselves, based on openness and transparency within independent and recognized standards organizations leading to the adoption of standards with which compliance is voluntary.⁵ It is the activity of establishing with regard to actual or potential problems, provision for common and repeated use, aimed at the achievement of the optimum degree of order in a given context.⁶

❖ STANDARD:

A standard is a document established by consensus and approved by a recognized body and that provides applicable guidelines for activities. Standards are for common and repeated used rules, guidelines or characteristics for products or related processes and production methods for which compliance is not mandatory.⁶ They have a national, regional or international concern. Standards are created by bringing together all interested parties, such as manufacturers, consumers and regulators of a particular material, product, process or service. All parties benefit from standardization. Several categories of standards exist: core standards, standards of analysis and testing, standards of specifications, methodological standards, etc.

❖ STANDARDS BODY:

A standards body can be defined as a standardizing body recognized at the national, regional or International level whose main function is the preparation, approval or adoption of standards available to the public.⁶ In this report, a distinction has been made between formal standards bodies (e.g. CEN or ISO) and non-formal standards bodies (e.g. W3C or IEEE).

⁵ Official Journal of the European Communities 2000/C141/01

⁶ Based on the definition proposed in the standard EN 45020:2006 - Standardization and related activities – General vocabulary

❖ **STANDARDIZATION TECHNICAL COMMITTEE:**

A standardization technical committee is a technical decision-making body with a precise title, scope and work program, within European and/or International standards organization, essentially to manage the preparation of deliverables as standards in accordance with an agreed upon business plan.⁷

❖ **NATIONAL MIRROR COMMITTEE:**

A national mirror committee is a national structure to European or International technical committees, ensuring, for example, the formulation of coherent national positions as a first round of consensus finding.

❖ **CEN WORKSHOP AGREEMENT:**

A CEN Workshop Agreement (CWA) is a standardization document, developed in a CEN Workshop. The latter is open to the direct participation of anyone with an interest in the development of the agreement. There is no geographical limit on participation and hence participants may be from outside of Europe. The development of a CWA is fast and flexible. It does not have the status of a European standard, and there is no obligation for the national standards bodies to adopt it as national standard.⁸

⁷Based on the information available on the [CEN website/BOSS](#).

⁸Based on the information available on the [CEN website/CEN Workshop Agreements](#).

2.2. STANDARDIZATION OBJECTIVES

Standardization is an efficient economical tool offering the possibility to pursue various objectives, such as:

- Management of the diversity;
- Convenience of use;
- Compatibility;
- Interchangeability;
- Health;
- Security;
- Environmental protection;
- Product protection;
- Mutual understanding;
- Economic performance;
- Trade;
- Etc.

The standardization principles are:

- **Voluntary:** standardization is open to all and is based on voluntary involvement of all the stakeholders of the market;
- **Consensus:** a standard is approved by consensus; all the positions of all the participants are taken into account (manufacturers, vendors and users, consumer groups, testing laboratories, governments, engineering professions, research organizations, etc.);
- **Industry wide:** a standard is developed to offer global solutions to satisfy industries and customers all around the world.

2.3. STANDARDIZATION LANDSCAPE

In Europe, the three recognized European Standards Organizations (ESO) are⁹:

- European Committee for Standardization (**CEN**);
- European Committee for Electrotechnical Standardization (**CENELEC**);
- European Telecommunications Standards Institute (**ETSI**).

At the International level, the three recognized standards organizations are:

- International Organization for Standardization (**ISO**);
- International Electrotechnical Commission (**IEC**);
- International Telecommunication Union's Telecommunication Standardization Sector (**ITU-T**).

The standardization frame allows cooperation between the standards organizations at the same level, but also at different levels, on the same topics:

- CENELEC and IEC are specialized in electrotechnical standards;
- ETSI and ITU-T are focused on telecommunications standards;
- CEN and ISO are in charge of the standards in other sectors.

Table 1 presents the main characteristics of the European and International standards bodies.

Table 1: Characteristics of European and International Standards Organizations¹⁰

European and International Standards Bodies		Date of Creation	Number of Members	Number of Published Standards
ISO	International Organization for Standardization	1946	161	20010
IEC	International Electrotechnical Commission	1906	82	6971
ITU-T	International Telecommunication Union's Telecommunication Standardization Sector	1865	282	3929
CEN	European Committee for Standardization	1961	33	15225
CENELEC	European Committee for Electrotechnical Standardization	1973	33	12781
ETSI	European Telecommunications Standards Institute	1988	755 ¹¹ (64 countries)	29010

⁹ <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2012:316:0012:0033:EN:PDF>

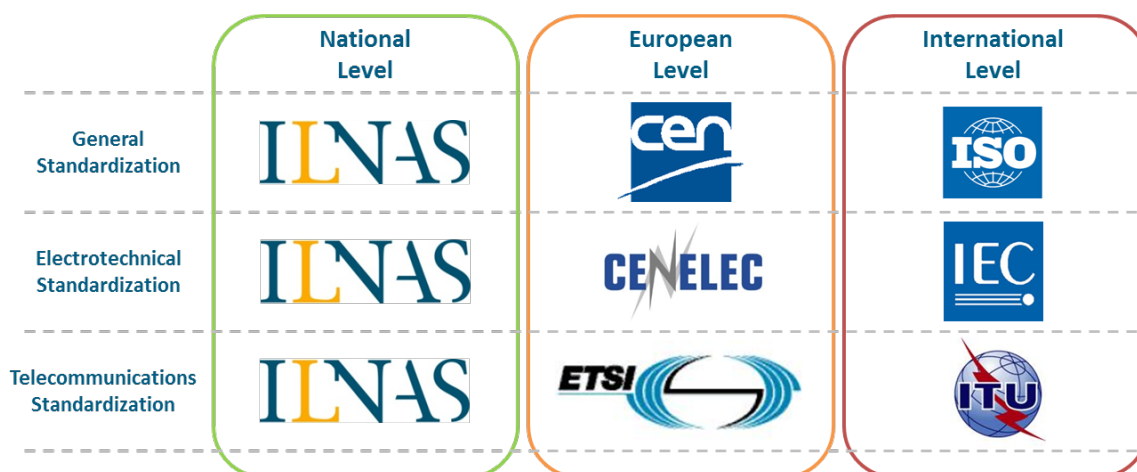
¹⁰ Source: Websites of organizations – February 2014 (excepted CEN data established on December 2013)

¹¹ ETSI and ITU-T have a specific way of working compared to the other recognized organizations, as they work through the direct participation of industry stakeholders

From a national perspective, one or several standards bodies protect national interests within the European and International standards organizations. In Luxembourg, ILNAS – the only official national standards body – is a member of the European and International standards organizations CEN, CENELEC, ISO, IEC and ETSI.

Several bridges exist between the national, European and International standards organizations in order to facilitate the collaboration and coordination of the standardization work on the different fields (Figure 1).

Figure 1: Interactions between the Standards Organizations



A strong collaboration exists between the European and International standards organizations. To increase transparency in the work and avoid the duplication of standards, the Vienna Agreement was concluded in 1991 between ISO and CEN. This agreement is based on the following guiding principles:

- Primacy of International standards and implementation of ISO Standards at European level (EN ISO);
- Work at European level (CEN) if there is no interest at the International level (ISO);
- Notifications of the standardization documents for approval between the two organizations.

Similarly, the Dresden Agreement was concluded in 1996 between IEC and CENELEC with the aim of developing intensive consultations in the electrotechnical field. This agreement is based on the following guiding principles:

- Development of all new standardization projects by IEC (as much as possible);
- Work at European level (CENELEC) if there is no interest at International level (IEC);
- Ballots for documents made in parallel at IEC and CENELEC.

Finally, ITU-T and ETSI have agreed on a Memorandum of Understanding (MoU) in 2012 (replacing existing MoU signed in 2000) that paves the way for European regional standards, developed by ETSI, to be recognized internationally.

Under both agreements, approximately 55% of all European standards ratified by CEN, as well as about 70% of those ratified by CENELEC, are now technically equivalent or identical to ISO or IEC standards¹²; in that respect, the European and International organizations do not duplicate work.

¹² [European Standardisation: Current Challenges - Future Actions, European Parliament's Committee on the Internal Market and Consumer Protection, 2010](#)

Agreements also exist between the standards organizations to facilitate their cooperation. The two conventions established between ISO and IEC allow the creation of Joint Technical Committees. Similarly, the cooperation between CEN and CENELEC aims to create a European standardization system that is open, flexible, and dynamic.

2.4. STANDARDS DEVELOPMENT

Developing a standard is characterized by four main steps:

- Proposal: following an identified need, a party proposes a preliminary draft;
- Study and preparation: a working group studies the draft and prepares the standard draft;
- Public Inquiry and Approval: the standard draft goes into public consultation and is subject to approval in a second step;
- Publication: the ratified standard is published by the standards body.

At each stage, a validation of all participating members of the standardization technical committee is required. This is done automatically as a vote; however, the rules of the vote differ between the European and International level as outlined in Table 2 below.

Table 2: Voting rules at European and International level

Organization	Members	Method of adopting standards	Integration into the collections of national standards
International ISO and IEC	National bodies from countries members of ISO (161) and IEC (82)	1 country = 1 voice	Voluntary
European CEN and CENELEC	National bodies from the EU and EFTA ¹³ countries (33)	Weighted Vote (Treaty of Nice)	Required: countries must eliminate conflicting provisions from their collections

At the European level, the weighted vote is defined by the Treaty of Nice, which was signed in 2001 by the EU (European Union) Member States and fixes the distribution of the voices for the European Union Council as showed in Table 3.

Table 3: Distribution of the weighted votes throughout the European Member States¹⁴

Country	Weighting of votes
Germany, France, Italy, United Kingdom, Turkey	29
Spain, Poland	27
Romania	14
Netherlands	13
Belgium, Greece, Hungary, Portugal, Czech Republic	12
Austria, Bulgaria, Sweden, Switzerland	10
Croatia, Denmark, Finland, Ireland, Lithuania, Norway, Slovakia	7
Cyprus, Estonia, Latvia, Luxembourg, Slovenia, Former Yugoslav Republic of Macedonia	4
Iceland, Malta	3

¹³ EFTA: "European Free Trade Association" whose current members are Norway, Switzerland, Iceland and Liechtenstein

¹⁴ Source: [Internal regulation CEN/CENELEC – Part 2 – Annex D](#)

Another particularity at the European level is that the European standards approved shall be implemented identically in both technical content and presentation, with no restrictions for application by each national member. This implies enforcing the new standard through publication and withdrawing all conflicting standards already in place at the national level in an average of six months. The new European standard then takes the status of national standard.

In the Grand Duchy of Luxembourg, the list of new national standards is regularly published in the "*Mémorial A*" ¹⁵ by ILNAS.

¹⁵ <http://www.legilux.public.lu/leg/a/index.php>

3. CONTEXT OF THE ICT SECTOR

3.1. DEFINITION AND ISSUES OF THE ICT SECTOR

ICT (also commonly called IT or Information Technology) is defined by ISO/IEC JTC 1 as follows: “*ICT includes the specification, design and development, integration and interoperability of systems, tools and applications dealing with the capture, representation, accessibility, processing, security, transfer, interchange, presentation, management, organization, storage and retrieval of information, and their related cultural, linguistic adaptability and societal aspects*”.¹⁶

Regarding current trends and the future of ICT at a global level, this sector remains promising. R&D investment in the ICT sector is still very important¹⁷ and most of the other dynamic sectors (healthcare, education, cultural industries, etc.) are massively investing in ICT¹⁸. Moreover, the coming trends show that the sector is still innovating with the development of technologies such as hybrid and personal cloud, internet of things, mobile device diversity and management, 3D printing, etc.¹⁹

At the European level, the ICT sector has been directly responsible for 4.7% of GDP (Gross Domestic Product), with a market value of EUR 543 billion in 2012²⁰, but it contributes far more to overall productivity growth. The reason is the high levels of dynamism and innovation inherent in the sector, and the enabling role the sector plays in changing how other sectors do business. At the same time, the social impact of ICT has become significant – for example, the facts that 79% of individuals in the EU have an Internet access at home (this figure rises to 94% for Luxembourg)²¹, that 62% of individuals in the EU used the internet daily (this figure rises to 82% for Luxembourg)²² and that virtually all Europeans own mobile phones have changed lifestyles.

In 2010, the European Commission published “A Digital Agenda for Europe”²³. The overall aim of the Digital Agenda is to deliver sustainable economic and social benefits from a digital single market based on fast / ultra-fast internet and interoperable applications. The Digital Agenda for Europe is one of the seven flagship initiatives of the Europe 2020 Strategy²⁴, set out to define the key enabling role that the use of ICT will have to play if Europe wants to succeed in its ambitions for 2020.

According to the European Commission²⁵, digital technologies have enormous potential to benefit our everyday lives and tackle social challenges. The Digital Agenda focuses on ICT capability to reduce energy consumption, support ageing citizens' lives, revolutionizes health services and deliver better public services. ICT can also drive forward the digitization of Europe's cultural heritage providing online access for all. ICT plays a crucial role in²⁶:

- Advanced research to uncover radically new technological possibilities and ICT contributions to research and innovation;
- Research and innovation activities on generic technologies either driven by industrial roadmaps or through a bottom up approach;

¹⁶ JTC 1 Strategic Business Plan (November 2013)

¹⁷ 2013 EU Industrial R&D Investment Scoreboard

¹⁸ <http://ipts.jrc.ec.europa.eu/publications/pub.cfm?id=4479>

¹⁹ <http://www.gartner.com/newsroom/id/2603623>

²⁰ Eurostat (online data code : nama_nace10_c)

²¹ Eurostat (online data code: tin00088)

²² Eurostat (online data code: tin00092)

²³ http://ec.europa.eu/information_society/digital-agenda/index_en.htm

²⁴ http://ec.europa.eu/europe2020/index_en.htm

²⁵ <http://ec.europa.eu/digital-agenda/ict-enabled-benefits-eu-society-analysis-and-data>

²⁶ https://ec.europa.eu/programmes/horizon2020/sites/horizon2020/files/ICT%20in%20H2020%20WP2014-15_0.pdf

- Multi-disciplinary application-driven research and innovation leveraging ICT to tackle societal challenges.

As a conclusion, Europe must master both the development and use of ICT to generate sustainable economic and social benefits.

Finally, at the national level, ICT is considered as a key economic sector. Within the national government program²⁷, to have a developed ICT sector is a cornerstone, especially to support the other economic sectors: ecotechnologies (e.g. smart grid, IT management), logistics (e.g. e-commerce), biotechnologies (e.g. archiving, data management), industrial and financial sector (e.g. high performance cloud computing). Indeed, ICT sector is already a competitive sector at the national level which represents more than 1,500 companies or 4.1% of the total employment²⁸. Moreover, the ICT sector has been directly responsible for 6.4% of GDP (Gross Domestic Product) in 2012²⁹.

Through national policy pursued in recent years, Luxembourg has built a branding of "European Trusted Information Center" that the Government intends to consolidate and expand. For this purpose, the Government plans to extend this area by making the country the world database of finance and real economy.

The next section is focused on the standards context of the ICT sector and details in particular the different tools established in order to develop ICT standardization in Luxembourg.

²⁷ <http://www.gouvernement.lu/3322796/Programme-gouvernemental.pdf>

²⁸ http://www.statistiques.public.lu/stat/TableView/tableViewHTML.aspx?ReportId=7250&IF_Language=fra&MainTheme=2&FldrName=3&RFPPath=92 (Source: STATEC)

²⁹ http://epp.eurostat.ec.europa.eu/portal/page/portal/national_accounts/data/database (Source: Eurostat - code nama_nace10_c)

3.2. STANDARDS CONTEXT OF THE ICT SECTOR

Standards play a very important role for ICT since they bring the language that enables technology to understand each other. This is especially relevant because the key idea behind ICT is that information storage devices need to communicate with communication networks and computing systems. Interoperability is thus a key concept in today's ICT environment. The current landscape of Standards Developing Organizations (SDO) active in and representative of the ICT sector is composed of formal standards bodies that are acknowledged standards bodies, developing *de jure* (formal) standards, and *fora/consortia* developing *de facto* standards.

At the International level, ISO is a generic formal standards body, developing International standards for all industry sectors. IEC is another formal standards body preparing and publishing International standards for all electrical, electronic and related technologies collectively known as "electrotechnology". An agreement reached in 1976 defines responsibilities for both of them: the IEC covers the field of electrical and electronic engineering, all other subject areas being attributed to ISO. However, to deal with the consequences of substantial overlap in areas of standardization and work, this agreement allows for creating Joint Technical Committees (JTC) between ISO and IEC. ICT is such an overlapping standardization domain, thus ISO and IEC formed a JTC in 1987 known as ISO/IEC JTC 1. It is today clearly established that the committee ISO/IEC JTC 1 "Information Technology" (including its subcommittees) is the leading SDO for ICT standardization.

At the European level, in "A Digital Agenda for Europe" established by the European Commission, the lack of interoperability is considered as one of the seven most significant obstacles to a virtuous cycle of the digital economy. Thus, one of the seven pillars of the Digital Agenda is about "Interoperability and standards". Indeed, *"weaknesses in standard setting, public procurement and coordination between public authorities prevent digital services and devices used by Europeans from working together as well as they should"*.³⁰

To tackle the different problem areas identified in "A Digital Agenda for Europe", the European Commission proposes a set of key actions. Among them, one action is to propose legal measures on ICT interoperability to reform the rules on implementation of ICT standards in Europe to allow use of certain ICT *fora* and *consortia* standards. It is obvious that today, ICT *fora* and *consortia* play an important role in the frame of ICT standardization. The underlying need is to reach *"effective interoperability between IT products and services to build a truly digital society"*. Moreover, the European Commission also launched a Work Program about ICT standardization entitled "2010-2013 ICT Standardisation Work Programme for industrial innovation"³¹ replaced at the end of 2013 by the "Rolling plan for ICT standardization (2013)"³² prepared by the European Commission, in collaboration with the European Multi-Stakeholder Platform on ICT Standardization (MSP). This Rolling Plan provides a multi-annual overview of the needs for preliminary or complementary ICT standardization activities to undertake in support of the EU policy activities. It is addressed to all ICT stakeholders and gives a transparent view on how the policies are planned to be practically supported.

The European Multi-Stakeholder Platform on ICT Standardization has been created by the European Commission through the European Decision of November, 28 2011 (2011/C 349/04)³³, to advise it on matters relating to the implementation of ICT standardization policy, including the work program for ICT standardization, priority setting in support of legislation and policies and identification of

³⁰ European Commission - COM(2010) 245 final/2

³¹ http://ec.europa.eu/enterprise/sectors/ict/files/ict-policies/2010-2013_ict_standardisation_work_programme_2nd_update_en.pdf

³² <http://ec.europa.eu/DocsRoom/documents/4122/attachments/1/translations/en/renditions/pdf>

³³ <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2011:349:0004:0006:EN:PDF>

specifications developed by global ICT standards development organizations to improve standard setting in the field of ICT to ensure interoperability between ICT applications, services and products³⁴.

This platform is an Advisory Expert Group on all matters related to European ICT standardization and its effective implementation:

- Advise the European Commission on its ICT standardization work program;
- Identify potential future ICT standardization needs;
- Advise the European Commission on possible standardization mandates;
- Advise the European Commission on technical specifications in the field of ICT with regard to its referencing in public procurement and policies;
- Advise the European Commission on cooperation between standards developing organizations.

The MSP is composed of representatives of national authorities of Member States and EFTA countries, stakeholder organizations representing industry, small and medium-sized enterprises, consumers and other societal stakeholders as well as European and International standardization bodies and other non-profit making organizations, which are professional societies, industry or trade associations or other membership organizations active in Europe that within their area of expertise develop standards in the field of ICT.

Note:

Since January 2012, the Grand Duchy of Luxembourg, *via* ILNAS - Digital trust department, is the national representative of the European Multi-Stakeholder Platform on ICT Standardization.

CEN, as defined in Chapter 2, is the formal standards body in charge of developing ICT standards at the European level. The ICT sector is an active standardization domain in the CEN, including 12 technical committees under its supervision, the other ICT-related topics being tackled at the International level by ISO/IEC JTC 1, because of the "Vienna Agreement" set up in June 1991 between CEN and ISO. Its aim is to avoid parallel or conflicting standards and to provide mutual assistance in the work.

Regarding *fora* and *consortia*, many of them are active in the ICT domain. The list of standards-related *fora* and *consortia* established by the CEN contains 234 *fora* and *consortia*³⁵.

At the national level, the ICT sector is already an active standardization sector with 52 national delegates. The organization and development of the ICT technical standardization representation at the national level is one of the five leads project of the "Policy on ICT technical standardization 2013-2020" published by ILNAS. In this frame, four tools have been established by ILNAS to manage ICT standardization:

- **ISO/IEC JTC 1 national forum**

A communication platform between ICT standardization actors in Luxembourg has been implemented through the concept of "ISO/IEC JTC 1 national forum". It is composed of the chairpersons of the national mirror committees of the ISO/IEC JTC 1 subcommittees and the delegates of ILNAS who are currently chairing ISO/IEC JTC 1 at the national level. The forum normally meets minimum twice per year. The objectives of the ISO/IEC JTC 1 national forum are:

³⁴ In the context of the MSP, the term "standards" is used in a generic way for all such deliverables from both recognized standards organizations and from standardization *fora* and *consortia* – or the terms "standards and technical specifications" are used.

³⁵ Comprehensive list of ICT Standards Consortia, 17th Edition - August 2012 (Source: CEN and CENELEC)

- To follow the different topics of ISO/IEC JTC 1: votes, comments, feedback from the ISO/IEC JTC 1 plenary meetings;
- To facilitate information exchange between ILNAS and the chairpersons of the national mirror committees related to ISO/IEC JTC 1 subcommittees;
- To promote communication and exchanges between the chairpersons of the national mirror committees related to ISO/IEC JTC 1 subcommittees;
- To prepare the annual ISO/IEC JTC 1 national day and the ISO/IEC JTC 1 plenary meeting.

The ISO/IEC JTC 1 national forum is led by Mr. Jean-Philippe HUMBERT from ILNAS, and currently composed of the following members:

- Mr. Pierre Emmanuel LE LAY (Acting as Chairman ISO/IEC JTC 1/SC 6);
- Mr. Alain RENAULT (Chairman ISO/IEC JTC 1/SC 7);
- Mr. Benoit POLETTI (Acting as Chairman ISO/IEC JTC 1/SC 17);
- Mr. Benoit POLETTI (Chairman ISO/IEC JTC 1/SC 27);
- Mr. Stéphane JACQUEMART (Chairman ISO/IEC JTC 1/SC 36);
- Mr. Jürgen BLUM (Acting as Chairman ISO/IEC JTC 1/SC 38);
- Mr. Didier MONESTES (Acting as Chairman ISO/IEC JTC 1/SC 39);
- Ms. Béatrix BARAFORT (Chairwoman ISO/IEC JTC 1/SC 40).

- **ISO/IEC JTC 1 national day**

ISO/IEC JTC 1 national day is the yearly event aiming to inform the national market about current trends and developments of ICT standardization and promoting ICT standardization in Luxembourg. In 2013, for example, ILNAS in collaboration with the CRP Henri Tudor organized a conference held during the World Standards Day (November 14, 2013) on the topic: "Standards ensure positive change". On this occasion, a specific session dedicated to ICT introduced to the participants some strategic aspects of ICT standardization. In this frame, the updated national standards analysis for the ICT sector (version 2.0), was presented to national stakeholders in order to spread them awareness about standardization opportunities in the ICT sector. Generally each year, such an ISO/IEC JTC 1 event will be held in Luxembourg.

- **ISO/IEC JTC 1 national chapters**

An ISO/IEC JTC 1 national chapter is established when a delegate (or group of delegates) in Luxembourg is (co-)editor of an ISO/IEC JTC 1 standard and needs some input from an economic sector to develop this standard. An *ad hoc* committee, called a "national chapter", is thus established with representatives of this economic sector. The committee's purposes are to gather relevant input for the standard in progress and to provide to the editor regular feedback about its current work. This initiative naturally helps to take into account the point of view of the national stakeholders.

A first chapter was already opened in 2009, in the frame of the ISO/IEC TR 27015 technical report development about "ISMS guidance for financial services". The representatives of the financial sector were linked with the editor of the standard, member of the ISO/IEC JTC 1/SC 27 national mirror committee.

Note:

To guarantee the development of the digital economy while ensuring the quality and security of exchanges, digital trust is a key instrument in the service of national competitiveness. In this context, ILNAS and CRP Henri Tudor conducted a joint research project called "NormaFI-IT" to analyze the field of digital trust through different angles and led to the publication of a White Paper entitled

“Digital Trust - Towards excellence in ICT”³⁶. A new version of this White Paper will be released in 2014 by ILNAS.

- **European multi-stakeholder platform on ICT standardization (MSP)**

Since January 2012, ILNAS - Digital trust department, is the Luxembourg representative within the European Multi-Stakeholder Platform on ICT Standardization. In this frame, ILNAS is the official national contact point dedicated to exchange information between the market and the European multi-stakeholder platform on ICT standardization.

The Rolling Plan³⁷ established at the end of 2013 lists all topic areas identified as EU policy priorities where standardization, standards or ICT technical specifications may play a key role in the implementation of the respective policy³⁸. The main EU policy priorities related to ICT standardization are summarized in Table 4 below:

Table 4: EU policy priorities related to ICT standardization

Societal Challenges	Innovation for the digital single market
<ul style="list-style-type: none"> • eHealth • Web Accessibility • Accessibility of ICT products and services • e-Skills and e-Learning • Emergency communications • eCall • Digital Cinema 	<ul style="list-style-type: none"> • e-Procurement, Pre and Post award • e-Invoicing • Card, Mobile and Internet Payments • eXtensible Business Reporting Language (XBRL) • Online Dispute Resolution (ODR)
Sustainable growth	Key enablers and security
<ul style="list-style-type: none"> • Smart Grids and Smart Metering • Technologies and Services for a Smart and Efficient Energy Use • ICT Environmental Impact • European Electronic Toll Service (EETS) • Intelligent Transport Systems (ITS) 	<ul style="list-style-type: none"> • Cloud computing • (Open) Data • eGovernment: • Electronic identification and trust services including e-signatures • Radio Frequency Identification (RFID) • Internet of Things (IoT) • Network and Information Security • ePrivacy

Moreover, the Rolling Plan covers technologies of horizontal importance in the contexts of ICT infrastructures and ICT standardization. It provides an overview of relevant basic horizontal standards and ongoing standardization activities in various technology areas with relevance across the specific topic areas. These technologies are summarized in Table 5 below:

³⁶ http://www.ilnas.public.lu/fr/publications/confiance-numerique/etudes-nationales/ilnas-tudor-white-paper-digital-trust-june-2012-v1_0.pdf

³⁷ <http://ec.europa.eu/DocsRoom/documents/4122/attachments/1/translations/en/renditions/pdf>

³⁸ In the context of the MSP, the term “standards” is used in a generic way for all such deliverables from both recognized standards organizations and from standardization fora and consortia – where the terms “standards and technical specifications” are used.

Table 5: Relevant horizontal areas and major covered technologies

Technology areas		Covers technologies
Physical and Link		Cabling, USB, BUS specifications,, Ethernet, WIFI, GSM, LTE, Signaling and framing specifications
Internet-working technologies		IP level technologies (e.g.: Binding to lower layers, Mobility solutions, Rendez-Vous, Locator/Identifier splits, Home networks, Tunneling, DNS, intra and inter domain routing, virtual networking, multi-cast, congestion control mechanism, TCP maintenance, and various traffic optimization mechanisms
Applications	Messaging and Media	Application layer protocols (e.g.: 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).
	Presentation and Interfacing	Fonts, Internationalization, Audio and Video Codecs, Accessibility standards, Fileformats (jpeg, SVG), APIs, Cascading style sheets
	Business logic	XML based document definitions, business semantics, and Modelling Languages (e.g. invoicing standards)
Security and Privacy		Internet Public Key, Internet infrastructure (x.509 based) web authorization, javascript signing and encryption, transport layer security mechanism (TLS), Authentication information exchange mechanisms (SAML), Privacy enhancement mechanisms

4. METHOD FOR THE STANDARDS ANALYSIS

In the frame of the "Luxembourg's policy on ICT technical standardization"³⁹, a standards analysis was carried out and is presented in this report. Different steps were followed and are illustrated in Figure 2 below.

Figure 2: Main steps of the ICT standards analysis



4.1. STANDARDS WATCH

A standards watch was carried out in order to identify the standardization technical committees of potential interest for the national stakeholders in the ICT sector. These technical committees are from the formal standards bodies dealing with ICT standardization:

- ISO/IEC that forms a system for international standardization as a whole by means of the ISO/IEC Agreement of 1976⁴⁰;
- CEN;
- ETSI;
- ITU-T.

The other formal standards bodies (ISO, IEC, and CENELEC) do not specifically deal with ICT standardization.

However, it is important to note that some technical committees related to economic sectors other than ICT may produce standards related to ICT. These technical committees are identified in Chapter 9 and all of the formal standards bodies are in this frame analyzed (step 4 of the standards analysis).

Regarding non-formal standards bodies, they are also considered in step 4 of the standards analysis and surveyed in Chapter 8.

The different stages processed to carry out the standards watch are described below.

³⁹ <http://www.ilnas.public.lu/fr/publications/normalisation/etudes-nationales/policy-on-ict-technical-standardization-2013-2020.pdf>

⁴⁰ ISO/IEC Directives, Part 1 (2013, 10th ed.)

❖ **Stage 1: Identification of the standardization technical committees in relation with the ICT sector**

This first step is obvious, because ICT standardization is currently very precisely identified in the studied formal standards bodies:

- **Identification of the ICT technical committees:**

At the International level, ISO and IEC formed a Joint Technical Committee known as the ISO/IEC JTC 1 in 1987. The scope of ISO/IEC JTC 1 is “Information Technology”. This technical committee as a whole, as well as all subcommittees, is identified as relevant in the frame of the standards watch.

CEN standardization is organized in sectors. One of these sectors is ICT, encompassing all ICT technical committees. All of these technical committees are identified as relevant in the frame of the standards watch.

ETSI and ITU-T deal with standardization of telecommunications. ETSI, ITU-T and their technical committees are thus fully in the scope of the standards watch.

- **European Multi-Stakeholder Platform on ICT standardization (MSP):**

The MSP is an advisory expert group on all matters related to European ICT standardization⁴¹. Based on a European Commission Decision to advise on matters related to the implementation of ICT standardization policies.

In this frame, amongst its activities, the Technical Board (BT) CEN/CLC BT/WG 6 “ICT standardization policy” supports the CEN and CENELEC representatives in the European Commission's ICT Multi-stakeholder Platform. It aims to develop ways and means for further improving the visibility and recognition of CEN and CENELEC and to draft responses to political issues in ICT standardization context.

- **Division of the ICT sector into subsectors:**

Furthermore, to facilitate the view and understanding of the watch results, the ICT sector was divided into subsectors. The overall standardization technical committees identified were classified according to these subsectors.

❖ **Stage 2: Presentation of the results using identification cards for each standardization technical committee**


Identification cards (ID-Cards) were designed in order to present each surveyed technical committee through a simple and quick view.

However, if a large majority of the technical committees identified are from formal standards bodies, non-formal standards bodies dealing with ICT standards are also important and interesting resources of standards. As the information available is slightly different between these types of organizations, two different templates were designed and used to present the watch results.

The template used for the technical committees of ISO/IEC and CEN is presented below (Figure 3).


⁴¹ In the context of the MSP, the term “standards” is used in a generic way for all such deliverables from both recognized standards organizations and from standardization fora and consortia – or the terms “standards and technical specifications” are used.

Figure 3: ID-Card template used for ISO/IEC and CEN technical committees

General information			
Committee		Title	
Creation date		MEMBERS 	
Secretariat			
Secretary			
Chairperson			
Involvement of Luxembourg			
Organizations in liaison			
Web site			
Scope			
Structure			
Standardization work			
Published standards			
Standards under development			
Comments			

The information available for ETSI, ITU-T and their technical committees is close to the one available for non-formal standards bodies. Thus, the same template is used to present both of them. This template is presented below (Figure 4).

Figure 4: ID-Card template used for ETSI, ITU-T and non-formal standards bodies

General information			
Forum / Consortium		Title	
Creation date		MEMBERS 	
Chairperson			
Involvement of Luxembourg			
Web site			
Scope			
Executive summary			
Structure			
Standardization work			
Published standards			
Standards under development			

4.2. STAKEHOLDERS OF THE ICT SECTOR

In parallel to the standards watch, an identification of the national private and public stakeholders representing the entire ICT sector of the Grand Duchy of Luxembourg has been realized. This national panorama of the ICT sector, which proposes a view of the situation based on the experience and expertise of ILNAS, is not intended to be exhaustive. However, the objective is naturally to be as complete as possible. If necessary, it would be adjusted following the comments received after the release of this report⁴².

To summarize the national ICT market, a key activity of this step is to divide the national market into categories. This proposed categorization is designed to facilitate the standards analysis. Grouping the different stakeholders into categories facilitates the analysis, as stakeholders of the same category should have similar potential interests in participating to standardization activities. Then, connections between the ICT subsectors defined in stage 1 (Section 4.1) and the categories of stakeholders are simplified.

⁴² A feedback form is available in Section 12.4 in order to improve this report according to the stakeholders interests

4.3. LINKS BETWEEN THE STANDARDS WATCH RESULTS AND THE STAKEHOLDERS

After having compiled the selected technical committees in relation to the ICT sector into subsectors (Section 5.1), and having categorized the different stakeholders (Section 5.2), an analysis of the potential interests for the national stakeholders to participate in the standardization work was carried out.

This step consists of identifying, for each stakeholder category, the potential interests to follow and participate in standardization technical committees. In practice, it links a category of stakeholders with ICT subsectors, as they were defined in the initial stage of the selective standards watch, according to their potential interests.

❖ Stage 1: Definition of the potential interests for stakeholders

The potential interests defined were the following:

◆ Information	Thanks to the participation in a standardization technical committee, the stakeholders are informed on the latest standardization developments relating to their activities, thus allowing them to identify potential future impacts and to anticipate the consequences.
■ Performance	Through participation in standardization activities within a technical committee, stakeholders contribute to the increase of their performance in particular: Development of new competencies due to contact with other professionals and experts of the sector (networking); Information on directions taken by other states or other entities (benchmarking); Translation of innovations into future rules (knowledge codification); Anticipation of the obligation to comply with European regulatory requirements.
❖ Services	The follow-up of standards developments offers in some cases the opportunity for stakeholders to develop new services in relation with their activities.
□ Projects	Research projects directly related to standardization or involving standards in order to codify the acquired knowledge are regularly launched. Stakeholders can access useful information in the framework of future calls for tenders as well as benefit from specific support to get involved in projects.
● Training	Thanks to the knowledge of standards and process, stakeholders have solid and reliable elements to update, improve or develop trainings in the ICT sector.
\$ Investments	Stakeholders could have an interest in investing in new technology or concepts.

❖ Stage 2: Matrix of the potential interests and the ICT subsectors

Thus, for each stakeholder category, a specific matrix is realized to cross the ICT subsectors classifying the selected standardization committees with the potential interests of the national stakeholders.

Figure 5: Example of a specific matrix of standards analysis

Stakeholder category		Information	Performance	Services	Projects	Training	Investments
SUBSECTORS	1	X	X		X		
	2	X	X		X		
	3	X	X		X		
	4	X	X		X		
	5	X	X		X		
	6	X	X		X		
	7	X	X		X		
	8	X	X		X		
	9	X	X		X		
	10	X	X		X		

The main objective of this approach is to establish a relationship between the different ICT subsectors and a specific stakeholder category. This link is made by suggesting some potential interests specific to each stakeholder category according to particular subsectors.

4.4. ICT FORA/CONSORTIA AND ECONOMIC INTERSECTORAL APPROACH

As acknowledged by CEN, **much of the key standardization activity in ICT is carried out by industry consortia rather than in formal standards organizations such as CEN and ISO**⁴³. ICT *fora* and *consortia* are developing *de facto* standards widely spread in the ICT sector.

In order to complete the ICT standards watch performed in stage 1 (Section 4.1), a survey of the main *fora/consortia* seems particularly relevant. ICT is certainly one of the sectors having the highest number of non-formal standards bodies. It is thus not realistic to detail and analyze them all. A selection of *fora/consortia* related to the ICT domain we consider the most relevant for the current national market has thus been done. We have especially included all of the Publicly Available Specifications (PAS) Submitters of ISO/IEC JTC 1. The work quality of these organizations is recognized by ISO/IEC JTC 1, and they are approved to submit PAS as drafts for review and approval as International ISO/IEC JTC 1 standards⁴⁴.

This survey is informative, because no link between *fora/consortia* and potential interests of the national stakeholders has been done. It is indeed not realistic to try to define these links, because *fora/consortia* are generally too large to be related to one or several subsectors. Moreover, it is usually difficult to have a clear view of the scope of committees composing the studied *fora/consortia*.

ICT can also be considered as a horizontal support of many other sectors in the worldwide economy. The examples of sectors where ICT is a cornerstone are numerous and obvious: aeronautics, automobile industry, banking industry, logistics, etc. To reach the same objective of completing the ICT standards watch performed in stage 1, a survey of all of the formal standards bodies (ISO, IEC, CEN and CENELEC – ETSI and ITU-T having already been completely selected in the standards watch described in stage 1) is performed in order to identify technical committees of other economic sectors related to ICT. This survey uses the ICS (International Classification for Standards) codes to identify technical committees developing standards related to ICT. A research on every formal standards body has been done using the following ICS codes⁴⁵:

- **33 TELECOMMUNICATIONS. AUDIO AND VIDEO ENGINEERING:**
 - o 33.020 Telecommunications in general;
 - o 33.030 Telecommunication services. Applications;
 - o 33.040 Telecommunication systems;
 - o 33.050 Telecommunication terminal equipment;
 - o 33.060 Radiocommunications;
 - o 33.070 Mobile services;
 - o 33.080 Integrated Services Digital Network (ISDN);
 - o 33.100 Electromagnetic compatibility (EMC);
 - o 33.120 Components and accessories for telecommunications equipment;
 - o 33.140 Special measuring equipment for use in telecommunications;
 - o 33.160 Audio, video and audiovisual engineering;
 - o 33.170 Television and radio broadcasting;
 - o 33.180 Fibre optic communications;
 - o 33.200 Telecontrol. Telemetering.

- **35 INFORMATION TECHNOLOGY. OFFICE MACHINES:**

⁴³ Comprehensive list of ICT Standards Consortia, 17th Edition - August 2012 [Source: CEN and CENELEC]

⁴⁴ http://jtc1info.org/?page_id=517 (the list may be incomplete)

⁴⁵ <http://www.iso.org/iso/ics6-en.pdf>

- 35.020 Information technology (IT) in general;
- 35.040 Character sets and information coding;
- 35.060 Languages used in information technology;
- 35.080 Software;
- 35.100 Open systems interconnection (OSI);
- 35.110 Networking;
- 35.140 Computer graphics;
- 35.160 Microprocessor systems;
- 35.180 IT terminal and other peripheral equipment;
- 35.200 Interface and interconnection equipment;
- 35.220 Data storage devices;
- 35.240 Applications of information technology;
- 35.260 Office machines.

Each technical committee (representatively) developing standards corresponding to these ICS codes is identified with its economic sector, and highlighted as an economic sector using ICT as a supporting sector.

4.5. DEFINITION OF THE OPPORTUNITIES FOR THE NATIONAL MARKET

Finally, opportunities for the national market are identified. These opportunities are based on potential interests common to all of the stakeholder categories. However, when interesting, some opportunities could also be dedicated to a specific category of stakeholders.

Based on the standards analysis of the ICT sector, and especially the potential interests emerging from the actors, there are many opportunities for the national market. Convinced that national stakeholders have a real interest to seize these opportunities, ILNAS and ANEC GIE will jointly and actively contribute in order to inform them and support their normative developments. The identified opportunities should be seen by national stakeholders as a series of proposals which could lead to go further and to engage future actions with the aim to more rapidly take advantage of the standardization.

5. RESULTS OF THE STANDARDS ANALYSIS

5.1. RESULTS OF THE STANDARDS WATCH

The performed standards watch allowed to identify **42 standardization technical committees** (European and International) directly related to the ICT sector; they are described in Chapter 7.

As defined in Section 4.3, each category of stakeholders has potential interests to follow and participate in standardization technical committees. To facilitate the identification of the relevant technical committees identified, 8 subsectors have been defined directly in relation with the standards watch and the scope of these technical committees.

Furthermore, 2 subsectors representing particularly relevant topics for ILNAS and the current national market have been added: electronic signature and e-archiving. For these subsectors, the standards watch is extended to technical committees potentially out of the scope defined in Section 4.1 in order to establish a link between these subsectors and technical committees.

The 10 subsectors addressed in the standards analysis are described in Table 6. Actually, they include 28 technical committees listed in Table 7. According to the market interests and the standardization strategic developments, new subsectors will be added in the further versions of this analysis.

Finally, 14 technical committees out of the 42 have been identified as relevant for the ICT sector during the standards watch, but they are not related to subsectors. They are listed in Table 9.

Table 6: ICT subsectors

<p>Subsector 1 - Cloud computing</p>	<p>Cloud computing is currently a hot topic in ICT and is closely followed by many organizations at the national level, making it relevant as a subsector. The main idea behind cloud computing is to store and process data in the cloud, access applications from anywhere and maintain important information in the cloud, all of this being done faster and at lower cost than through conventional means.</p> <p>Cloud computing is defined by ISO/IEC DIS 17788 as “<i>a paradigm for enabling network access to a scalable and elastic pool of shareable physical or virtual resources with self-service provisioning and administration on-demand</i>”.⁴⁶</p> <p>The main characteristics of cloud computing are:</p> <ul style="list-style-type: none"> - On-demand self-service: a cloud service customer can provision computing capabilities, as needed, automatically or with minimal interaction with the cloud service provider; - Broad network access: physical and virtual resources are available over a network and accessed through standard mechanisms that promote use by heterogeneous client platforms; - Resource pooling: a cloud service provider’s physical or virtual resources can be aggregated in order to serve one or more cloud service customers; - Rapid elasticity and scalability: physical or virtual resources can be rapidly and elastically provisioned, in some cases automatically, to quickly increase or decrease resources. Measured service: the metered delivery of cloud services is such that usage can be monitored, controlled, reported, and billed; - Multi-tenancy: physical or virtual resources are allocated in such a way that multiple tenants and their computations and data are isolated from and inaccessible to one another.
<p>Subsector 2 - Data center</p>	<p>As stated by the European Commission in “A Digital Agenda for Europe”, the data center industry acts as a key business enabler to support the continuous digitalization trend. Luxembourg has defined its data centers offer as a key component in its development strategy for the coming years. A EUR 100 million ICT infrastructure investment plan has been adopted as a direct illustration of this commitment.⁴⁷</p> <p>It is interesting to note that this subsector supports several other promising economic sectors such as entertainment and media; biotechnologies, health and patient management; and e-commerce.</p> <p>Data center is defined by ISO/IEC 30134-1 as “<i>a structure, or group of structures, dedicated to the centralized accommodation, interconnection and operation of information technology and network telecommunications equipment providing data storage, processing and transport services together with all the facilities and infrastructures for power distribution and environmental control together with the necessary levels of resilience and security required to provide the desired service availability. A structure can consist of multiple buildings and/or spaces with specific functions to support the primary function</i>”.⁴⁸</p>
<p>Subsector 3 - Telecommunications</p>	<p>Telecommunications is defined by ISO 5127:2001 as the “<i>theory and techniques of the transmission of signals by electromagnetic or electronic means</i>”.⁴⁹ The telecommunications subsector covers any remote transmission, emission, and reception of signs, signals, writing, images, sounds or intelligence of any nature by wire, radio, radio, optical link, or other electromagnetic systems⁵⁰.</p>

⁴⁶ Draft International Standard ISO/IEC DIS 17788, Information technology -- Cloud computing -- Overview and Vocabulary [developed by ISO/IEC JTC 1/SC 38]

⁴⁷ The future of data centres in Europe – Luxembourg: where else?, PricewaterhouseCoopers, 2010

⁴⁸ Committee Draft International Standard ISO/IEC 30134-1, Information Technology -- Data Centres -- Key performance indicators -- Part 1: Overview and general requirements [developed by ISO/IEC JTC 1/SC 39]

⁴⁹ ISO 5127:2001, Information and documentation -- Vocabulary [developed by ISO/TC 46]

⁵⁰ Definition extracted from the Telecommunications Act of 1984 by Of tel (currently named Ofcom)

Subsector 4 – Software and system engineering	<p>According to ISO/IEC 2382-1:1993 concerning Fundamental terms in ICT, software engineering is defined as “<i>the systematic application of scientific and technological knowledge, methods, and experience to the design, implementation, testing, and documentation of software</i>”.⁵¹</p> <p>The International Standard ISO 16404:2013 defined system engineering as an “<i>interdisciplinary approach and means to enable the realization of successful systems, starting with the definition of customer needs, the identification of product functionality, and the intended validation very early in the lifecycle</i>”.⁵²</p> <p>Software and system engineering is thus a broad subsector encompassing fundamental activities such as requirements engineering, design, coding, integration, installation, and management of an information system.</p>
Subsector 5 - Security	<p>Information security includes three main dimensions: confidentiality, availability and integrity. Information security involves the application and management of appropriate security measures that involves consideration of a wide range of threats, with the aim of ensuring sustained business success and continuity, and minimizing impacts of information security incidents:</p> <ul style="list-style-type: none"> - Confidentiality is the property that information is not made available or disclosed to unauthorized individuals, entities, or processes; - Integrity is the property of safeguarding the accuracy and completeness of assets. Accuracy could be threatened by (unauthorized or undesirable) update or tampering. Completeness could be threatened by altering or deletion; - Availability is the property of being accessible and usable upon demand by an authorized entity.⁵³ <p>This subsector deals thus with a large scope of standards at the hardware, software, network or management level.</p>
Subsector 6 - Data management	<p>As defined by ISO/IEC TR 10032:2003, data management consists of “<i>the activities of defining, creating, storing, maintaining and providing access to data and associated processes in one or more information systems</i>”.⁵⁴</p> <p>This subsector thus encompasses the whole scope of data management, data going from characters or strings manipulated by a user to sophisticated and valuable assets. Data management can be performed in different environments such as a computer, a wired network or without contact (e.g. RFID - Radio-frequency identification, NFC - Near field communication technologies or Sensor Network); on various supports such as recorded media, hard drives or smartcards.</p>
Subsector 7 – Electronic signature	<p>ETSI has defined electronic signature as a “<i>data in electronic form that is attached to or logically associated with other electronic data and that serves as a method of authentication</i>”.⁵⁵</p> <p>An electronic signature is thus a mechanism to authenticate the author of an electronic document (like the handwritten signature for a paper document), and to ensure its integrity.</p>

⁵¹ ISO/IEC 2382-1, Information technology -- Vocabulary -- Part 1: Fundamental terms (developed by ISO/IEC JTC 1)

⁵² ISO 16404:2013, Space systems -- Programme management -- Requirements management (developed by ISO/TC 20/SC 14)

⁵³ Based on ISO/IEC 27000:2014, Information technology -- Security techniques -- Information security management systems -- Overview and vocabulary (developed by ISO/IEC JTC 1/SC 27)

⁵⁴ ISO/IEC TR 10032:2003, Information technology -- Reference Model of Data Management (developed by ISO/IEC JTC 1/SC 32)

⁵⁵ ETSI TS 101 733, Electronic Signatures and Infrastructures (ESI); CMS Advanced Electronic Signatures (CAAdES) (developed by ETSI/TC ESI)

	<p>Directive 1999/93/EC of the European Parliament and of the Council⁵⁶ on a Community framework for electronic signatures establishes a harmonized electronic signature similar to the handwritten signature.</p> <p>This subsector about electronic signature includes the different concepts and mechanisms upon which electronic signatures are based including public key cryptography, public key certificate, hash functions and Public Key Infrastructures (PKI).</p>
Subsector 8 – E-archiving	<p>Archiving consists of the maintenance of records for continuing use, where records are information created, received and maintained as evidence and as an asset by an organization or person, in pursuit of legal obligations or in the transaction of business. Moreover, in the frame of a continuing use, the preservation of records is a highly important notion that consists of processes and operations involved in ensuring the maintenance of records over time.⁵⁷</p> <p>In the context of the ICT sector, we focus on digital archives.</p>
Subsector 9 – Sensor Networks	<p>Sensor networks consist in a “<i>system of spatially distributed sensor nodes interacting with each other and, depending on applications, possibly with other infrastructure in order to acquire, process, transfer, and provide information extracted from its environment with a primary function of information gathering and possible control capability</i>”⁵⁸.</p> <p>Sensor networks are essential for the development of numerous ICT innovations: smart cities, smart grids, intelligent transport systems, internet of things, etc.</p>
Subsector 10 – Governance of IT	<p>Corporate governance involves a set of relationships between a company’s management, its board, its shareholders and other stakeholders. Corporate governance also provides the structure through which the objectives of the company are set, and the means of attaining those objectives and monitoring performance are determined.⁵⁹</p> <p>The governance of IT is thus a component or a subset of organization governance, which is one key element in improving economic efficiency and growth as well as enhancing investor confidence. Governance of IT can be defined as the system by which the current and future use of IT is directed and controlled.⁶⁰</p>

Following the definition of the subsectors categorizing the ICT sector, the identified technical committees are classified. The 28 identified standardization technical committees (included ETSI and ITU-T as a whole) that are related to the selected ICT subsectors are listed in the Table 7 below. In addition, in order to have access to more details, each technical committee has a detailed ID-Card presented in the following chapters. The exact page number referring to the specific ID-Card is also available in the following table.

⁵⁶ http://eur-lex.europa.eu/smartapi/cgi/sga_doc?smartapi!celexapi!prod!CELEXnumdoc&numdoc=31999L0093&model=guichett

⁵⁷ Based on ISO/IEC 30300:2011, Information and documentation — Management systems for records — Fundamentals and vocabulary (developed by ISO/TC 46/SC 11)

⁵⁸ ISO/IEC 29182-2:2013, Information technology -- Sensor networks: Sensor Network Reference Architecture (SNRA) -- Part 2: Vocabulary and terminology (developed by ISO/IEC JTC 1/WG 7)

⁵⁹ OECD principles of corporate Governance

⁶⁰ Based on ISO/IEC TR 38502:2014, Information Technology -- Governance of IT -- Framework and model (developed by ISO/IEC JTC 1/SC 40)

Table 7: Identified technical committees by ICT subsector

SUBSECTOR	ORIGIN*	TECHNICAL COMMITTEE (TC)	ID-CARD Ref. Page
CLOUD COMPUTING	INT	ISO/IEC JTC 1/SC 38 – Distributed application platforms and services (DAPS)	115
	EU	ETSI/TC CLOUD – Cloud Computing	147
DATA CENTER	INT	ISO/IEC JTC 1/SC 39 - Sustainability for and by Information Technology	117
	EU	CLC/TC 215 - Electrotechnical aspects of telecommunication equipment	141
TELECOMMUNI- CATIONS	INT	ISO/IEC JTC 1/SC 6 – Telecommunications and information exchange between systems	85
	INT	ISO/IEC JTC 1/SC 25 - Interconnection of information technology equipment	96
	INT	ITU-T - International Telecommunication Union's Telecommunication Standardization Sector	152
	EU	CEN/TC Project Committee 365 – Internet Filtering	137
	EU	ETSI – European Telecommunications Standards Institute	144
SECURITY	INT	ISO/IEC JTC 1/SC 27 -IT Security techniques	97
	INT	ISO/IEC JTC 1/SC 37 -Biometrics	113
SOFTWARE AND SYSTEM ENGINEERING	INT	ISO/IEC JTC 1/SC 7 – Software and systems engineering	87
	INT	ISO/IEC JTC 1/SC 22 -Programming languages, their environments and system software interfaces	91
	INT	ISO/IEC JTC 1/SC 29 -Coding of audio, picture, multimedia and hypermedia information	101
DATA MANAGEMENT	INT	ISO/IEC JTC 1/SC 2 – Coded character sets	84
	INT	ISO/IEC JTC 1/SC 23 -Digitally Recorded Media for Information Interchange and Storage	93
	INT	ISO/IEC JTC 1/SC 24 -Computer graphics, image processing and environmental data representation	94
	INT	ISO/IEC JTC 1/SC 31 -Automatic identification and data capture techniques	103
	INT	ISO/IEC JTC 1/SC 32 -Data management and interchange	105
	INT	ISO/IEC JTC 1/SC 34 -Document description and processing languages	107
	EU	CEN/TC 225 – AIDC Technologies	124
ELECTRONIC SIGNATURE	INT	ISO/IEC JTC 1/SC 17 – Cards and personal identification	89
	INT	ISO/IEC JTC 1/SC 27/SG-PKI - Study Group on Framework for PKI Policy / Practices / Audit	97
	EU	CEN/TC 224 – Personal Identification, Electronic Signature and Cards	122
	EU	ETSI/TC ESI – Electronic Signatures and Infrastructures	148
E-ARCHIVING	INT	ISO/TC 46 – Information and documentation	139
SENSOR NETWORKS	INT	ISO/IEC JTC 1/WG 7 – Sensor Networks	82
GOVERNANCE OF IT	INT	ISO/IEC JTC 1/SC 40 - IT Service Management and IT Governance	119

* EU: European origin and INT: International origin

In summary, the 28 technical committees, which are potentially interesting regarding the national ICT subsectors, are distributed in Table 8 below. The reader should note that ETSI and ITU-T as a whole are also related to the “telecommunications” subsector.

Table 8: Distribution of the selected technical committees in the ICT subsector

Subsector	European TC	International TC	Total
Subsector 1 – Cloud computing	1	1	2
Subsector 2 – Data center	1	1	2
Subsector 3 – Telecommunications	2	3	5
Subsector 4 – Security	0	2	2
Subsector 5 – Software and System engineering	0	3	3
Subsector 6 – Data management	1	6	7
Subsector 7 – Electronic signature	2	2	4
Subsector 8 – E-archiving	0	1	1
Subsector 9 – Sensor Networks	0	1	1
Subsector 10 – Governance of IT	0	1	1
Total	7	21	28

Finally, the standards watch has identified 14 technical committees that are focused on ICT standardization, but not related to any subsector (Table 6). The result is that they are deliberately not linked to the stakeholders, because the objective is to focus on the defined subsectors representing, from our point of view, the most relevant categorization of the interests of the national market. Although these committees are not related to the current subsectors, they can naturally be of interest for the stakeholders. For example:

- They can be of interest for all of the stakeholders for information purposes;
- They can be of interest for researchers for research project purposes;
- They can be of interest for service providers to propose new ICT services;
- Etc.

These technical committees are presented in Table 9 below.

Table 9: Technical committees not related to subsectors

SDO	ORIGIN*	TECHNICAL COMMITTEE (TC)	ID-CARD Ref. Page
ISO/IEC	INT	ISO/IEC JTC 1 - Information technology	76
	INT	ISO/IEC JTC 1/SC 28 - Office equipment	100
	INT	ISO/IEC JTC 1/SC 35 - User interfaces	109
	INT	ISO/IEC JTC 1/SC 36 - Information technology for learning, education and training	111
CEN	EU	CEN/TC 247 Building - Automation, Controls and Building Management	126
	EU	CEN/TC 251 - Health Informatics	128
	EU	CEN/TC 278 - Road transport and traffic telematics	129
	EU	CEN/TC 287 - Geographic Information	131
	EU	CEN/TC 294 - Communication systems for meters and remote reading of meters	132
	EU	CEN/TC 310 - Advanced Automation Technologies and their Applications	134
	EU	CEN/TC 353 - Information and Communication Technologies for Learning, Education and Training	135
	EU	CEN/TC Project Committee 428 - Professions for Information and Communication Technology (ICT)	138
ETSI	EU	ETSI/TC SmartM2M - Smart Machine-to-Machine Communications	149
	EU	ETSI/TC ITS - Intelligent Transport Systems	151

5.2. INTERESTS FOR THE STAKEHOLDERS

If the first step was to identify the technical committees in the ICT sector and to categorize them into subsectors, while the next step proposes a description of the national market and links between the subsectors of the ICT sector and the possible interests of the different stakeholders. These links suggest potential participation in standardization works according to a given subsector.

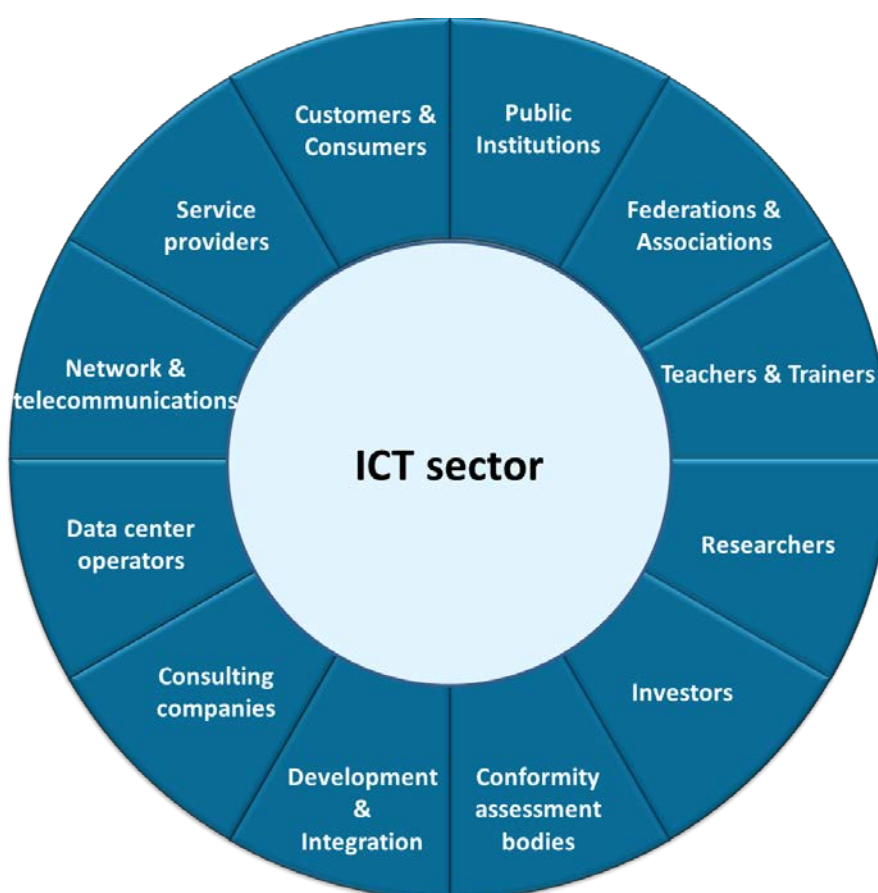
The potential interests for participating in standardization works for national stakeholders of the ICT sector are defined in the current section.

The national panorama of stakeholders of the ICT sector gives a vision of the situation based on the experience and expertise of ILNAS and ANEC GIE. It reflects the situation at any given time and is not intended to be exhaustive. Possible links and interests could have not been identified and corrections could be integrated in order to update the related matrices⁶¹.

5.2.1. DESCRIPTION OF THE NATIONAL MARKET

The national market of the ICT sector has been characterized through the definition of several categories of actors. The categories of actors we identified are represented in the Figure 6 below. All of them are presented and analyzed in the following sections.

Figure 6: Illustration of the categories of national stakeholders of the ICT sector



⁶¹ A feedback form is available in Section 12.4 in order to improve this report according to the stakeholders interests

5.2.2.PUBLIC INSTITUTIONS

a) Presentation

The first category of stakeholders is the public institutions in Luxembourg that take part in the development and implementation of the political actions in the national ICT sector. It is comprised of ministries, public administrations and other institutions set up and funded by public institutions.

This category contains the Ministry of the Economy (especially the Department of Electronic Commerce and Information Security), the Media and Communications department of the Ministry of State (in charge of the information society and of electronic communications), the *Institut Luxembourgeois de Régulation* (ILR), the *Commission nationale pour la Protection des Données* (CNPD) and ILNAS (Digital trust department).

Economic Interest Groupings (EIG) developed by public administrations are also part of this category, such as SMILE (*Security made in Lëtzebuerg*), ANEC (*Agence pour la Normalisation et l'Économie de la Connaissance*) and INCERT.

b) Current national delegates

Based on the ILNAS register of national delegates (version 67 of February 28, 2014), six persons of this category are currently registered in a technical committee related to ICT:

Public institutions	Person	Level	TC	Designation
ILNAS	Jean-Philippe HUMBERT	International	ISO/IEC JTC 1	Information Technology
ILNAS	Alain WAHL	International	ISO/TC 46/SC 11	Information and documentation; Archives/records management
Administration des Ponts et Chaussées	Georges SIMON	European	CEN/TC 278	Road transport and traffic telematics
ANEC GIE	Nicolas DOMENJOUR	International	ISO/IEC JTC 1/SC 27	IT Security techniques
			ISO/IEC JTC 1/SC 27/WG 1	Information security management systems
ANEC GIE	Hervé PETER	International	ISO/IEC JTC 1/SC 40	IT Service Management and IT Governance
GIE Incert	Benoit POLETTI	European	CEN/TC 224	Personal identification, electronic signature and cards and their related systems and operations
			CEN/TC 224/WG 15	European citizen card
			CEN/TC 224/ WG 16	Application Interface for smart cards used as Secure Signature Creation Devices

Public institutions	Person	Level	TC	Designation
GIE Incert	Benoit POLETTI	European	CEN/TC 224/WG 17	Protection Profiles in the context of SSCD
			CEN/TC 224/ WG 18	Interoperability of biometric recorded data
		International	ISO/IEC JTC 1/SC 17	Cards and personal identification
			ISO/IEC JTC 1/SC 17/WG 3	Identification cards – Machine readable travel documents
			ISO/IEC JTC 1/SC 17/WG 5	Registration Management Group (RMG)
			ISO/IEC JTC 1/SC 27	IT Security techniques
Archives nationales de Luxembourg	Nadine ZELEN	International	ISO/TC 46/SC 11	Information and documentation; Archives/records management
Archives nationales de Luxembourg	Joël THILL	International	ISO/TC 46/SC 11	Information and documentation; Archives/records management

c) Interests to participate in the standardization process

Based on the results of the standards watch, several subsectors of the ICT sector have been identified as relevant for public institutions. The following table proposes to draw links between subsectors and potential interests of public institutions⁶².

Public institutions	Information	Performance	Services	Projects	Training	Investments
Cloud computing	X	X		X		X
Data center	X			X		X
Telecommunications	X	X		X		X
Security	X	X	X	X	X	X
Software and system engineering	X			X		X
Data management	X			X		X
Electronic signature	X	X	X	X		X
E-archiving	X	X	X	X		X
Sensor networks	X			X		X
Governance of IT	X	X	X	X		X

- Public institutions may be interested in following all of the subsectors for information purposes as policy makers;
- Public institutions may be interested to follow “cloud computing” and “security” for performance purposes. These subsectors are a topic of interest for SMILE. Public institutions may also be interested to follow the telecommunications, electronic signature and e-

⁶² A feedback form is available in Section 12.4 in order to improve this report according to the stakeholders interests

archiving subsectors because they are active in these fields and in concurrence with other countries. Moreover the public policy intends to make Luxembourg a center of excellence for ICT networks and services;

- Public institutions may be interested to follow security, electronic signature and e-archiving for service purpose. SMILE and ILNAS offer services in this domain;
- Public institutions may be interested to follow all of the subsectors for research project purpose as policy makers and stakeholders of these projects;
- Public institutions may be interested to follow security for service purpose. SMILE provides training in this domain;
- Public institutions may be interested to follow all of the subsectors for investment purpose.

5.2.3.FEDERATIONS AND ASSOCIATIONS

a) Presentation

This category includes all federations and associations whose topics and activities are related to ICT. These federations and associations can be national or international. In the latter case, a national chapter needs to be active in Luxembourg.

Examples of federations and associations related to the ICT sector in Luxembourg are (non-exhaustive list):

- CLUSIL (*CLUb de la Sécurité de l'Information – Luxembourg*);
- APSI (*Association des Professionnels de la Société de l'Information*);
- CPSi (*Collège des Professionnels de la Sécurité de l'Information*);
- EuroCloud Luxembourg;
- Fedil - Business Federation Luxembourg;
- FedISA (*Fédération de l'ILM (Information Lifecycle Management), du Stockage et de l'Archivage*) Luxembourg;
- ISACA Luxembourg;
- itSMF Luxembourg;
- Support PSF (*Prestataire de Services Financiers*).

b) Current national delegates

Based on the ILNAS register of national delegates (version 67 of February 28, 2014), nobody is currently registered in a technical committee related to ICT for an economic actor of this category.

Note:

It is important to note that **several national delegates registered for an economic actor of another category** (e.g. consulting companies, data center, service providers, etc.) **are members of ICT federations or associations in Luxembourg**.

c) Interests to participate in the standardization process

Based on the results of the standards watch, several subsectors of the ICT sector have been identified as relevant for federations and associations. The following table proposes to draw links between subsectors and potential interests of federations and associations⁶³.

Federations and associations	Information	Performance	Services	Projects	Training	Investments
Cloud computing	X	X		X	X	
Data center	X	X		X	X	
Telecommunications	X	X		X	X	
Security	X	X		X	X	
Software and system engineering	X	X		X	X	
Data management	X	X		X	X	
Electronic signature	X	X		X	X	
E-archiving	X	X		X	X	
Sensor networks	X	X		X	X	
Governance of IT	X	X		X	X	

- Federations and associations may be interested to follow all of the subsectors (depending of the scope of the federation or association) for information purposes, in order to disseminate the information to its members;
- Federations and associations may be interested to follow all of the subsectors (depending of the scope of the federation or association) for performance purposes, mainly at the networking level, in order to increase the number of their members and their lobbying capabilities;
- Federations and associations do not generally develop and provide ICT services;
- Federations and associations may be interested to follow all of the subsectors (depending of the scope of the federation or association) for research project purposes. They may develop or be part of projects for their area of expertise;
- Federations and associations may be interested to follow all of the subsectors (depending of their scope) for training purposes;
- Federations and associations do not generally make investments.

⁶³ A feedback form is available in Section 12.4 in order to improve this report according to the stakeholders interests

5.2.4. TEACHERS AND TRAINERS

a) Presentation

The category of teachers and trainers is composed of schoolteachers, university professors and ICT training companies⁶⁴.

b) Current national delegates

Based on the ILNAS register of national delegates (version 67 of February 28, 2014), nineteen persons of this category are currently registered in a technical committee related to ICT:

Teachers and trainers	Person	Level	TC	Designation
MSD Partners S.à r.l.	Fabian HEUSKIN	International	ISO/IEC JTC 1/SC 7	Software and systems engineering
Telindus PSF S.A.	Cédric MAUNY	International	ISO/IEC JTC 1/SC 27	IT Security techniques
			ISO/IEC JTC 1/SC 27/WG 1	Information security management systems
			ISO/IEC JTC 1/SC 27/WG 2	Cryptography and security mechanisms
			ISO/IEC JTC 1/SC 27/WG 3	Security evaluation criteria
			ISO/IEC JTC 1/SC 27/WG 4	Security controls and services
			ISO/IEC JTC 1/SC 27/WG 5	Identity management and privacy technologies
Telindus Luxembourg S.A.	Jérémy THIMONT	International	ISO/IEC JTC 1/SC 27	IT Security techniques
CRP Henri Tudor	Yannick NAUDET	European	CEN/TC 310/WG 1	Advanced automation technologies and their applications; Systems architecture
CRP Henri Tudor	Béatrix BARAFORT	International	ISO/IEC JTC 1/SC 7	Software and systems engineering
			ISO/IEC JTC 1/SC 7/WG 10	Process assessment
			ISO/IEC JTC 1/SC 7/WG 26	Software testing
			ISO/IEC JTC 1/SC 40	IT Service Management and IT Governance
CRP Henri Tudor	Séverine MIGNON	International	ISO/IEC JTC 1/SC 7	Software and systems engineering
CRP Henri Tudor	Stéphane CORTINA	International	ISO/IEC JTC 1/SC 7	Software and systems engineering
			ISO/IEC JTC 1/SC 7/WG 10	Process Assessment
			ISO/IEC JTC 1/SC 40	IT Service Management and IT Governance

⁶⁴ A list of ICT training companies can be found on <http://www.lifelong-learning.lu>

Teachers and trainers	Person	Level	TC	Designation
CRP Henri Tudor	Alain RENAULT	International	ISO/IEC JTC 1/SC 7	Software and systems engineering
			ISO/IEC JTC 1/SC 7/WG 6	Evaluation and metrics
			ISO/IEC JTC 1/SC 7/WG 10	Process assessment
			ISO/IEC JTC 1/SC 40	IT Service Management and IT Governance
CRP Henri Tudor	Christophe FELTUS	International	ISO/IEC JTC 1/SC 7	Software and systems engineering
			ISO/IEC JTC 1/WG 42	Architecture
			ISO/IEC JTC 1/SC 40	IT Service Management and IT Governance
CRP Henri Tudor	Michel PICARD	International	ISO/IEC JTC 1/SC 7	Software and systems engineering
			ISO/IEC JTC 1/SC 7/WG 10	Process Assessment
			ISO/IEC JTC 1/SC 40	IT Service Management and IT Governance
CRP Henri Tudor	Hervé CHOLEZ	International	ISO/IEC JTC 1/SC 27	IT Security techniques
CRP Henri Tudor	Nicolas MAYER	International	ISO/IEC JTC 1/SC 27	IT Security techniques
CRP Henri Tudor	Stéphane JACQUEMART	European	CEN/TC 353	Information and Communication Technologies for Learning, Education and Training
		International	ISO/IEC JTC 1/SC 36	Information technology for learning, education and training
			ISO/IEC JTC 1/SC 36/WG 5	Quality assurance and descriptive frameworks
CRP Henri Tudor	Hélène MAYER	International	ISO/IEC JTC 1/SC 36	Information technology for learning, education and training
CRP Henri Tudor	Patrick PLICHART	International	ISO/IEC JTC 1/SC 36	Information technology for learning, education and training
Knowledge@work	Stéphanie ZUTTER	International	ISO/TC 46/SC 11	Information and documentation; Archives/records management
Altirian S.A.	Pierre DEWEZ	International	ISO/IEC JTC 1/SC 27	IT Security techniques
Altirian S.A.	René SAINT-GERMAIN	International	ISO/IEC JTC 1/SC 27	IT Security techniques
cours@home Luxembourg S.à r.l.	Olivier MONTEE	International	ISO/IEC JTC 1/SC 27	IT Security techniques

c) Interests to participate in the standardization process

Based on the results of the standards watch, several subsectors of the ICT sector have been identified as relevant for teachers and trainers. The following table proposes to draw links between subsectors and potential interests of teachers and trainers⁶⁵.

Teachers and trainers	Information	Performance	Services	Projects	Training	Investments
Cloud computing	X	X		X	X	
Data center	X	X		X	X	
Telecommunications	X	X		X	X	
Security	X	X		X	X	
Software and system engineering	X	X		X	X	
Data management	X	X		X	X	
Electronic signature	X	X		X	X	
E-archiving	X	X		X	X	
Sensor networks	X	X		X	X	
Governance of IT	X	X		X	X	

- Teachers and trainers may be interested to follow all of the subsectors (depending of their scope) for information purposes, in order to update their knowledge;
- Teachers and trainers are generally not concerned by performance aspects;
- Training companies and the training department of ICT companies propose e-learning services. They are interested in standards like ISO/IEC 19796-1 "quality management for IT LET" (IT for Learning Education and Training) – and also standards like the one in the editing phase concerning e-testing ISO/IEC 30119--ISO/IEC JTC 1/SC 36;
- Teachers and trainers are generally not concerned by research projects;
- Teachers and trainers may be interested to follow all of the subsectors (depending of their scope) for training purpose, in order to develop and update their training and to also identify new potential training;
- Teachers and trainers do not generally make investments.

⁶⁵ A feedback form is available in Section 12.4 in order to improve this report according to the stakeholders interests

5.2.5.RESEARCHERS

a) Presentation

The category of stakeholders called researchers encompasses all of the organizations playing a role in the Research and Development (R&D) domain in Luxembourg.

This category contains the University of Luxembourg, the public research centers dealing with ICT R&D (CRP Henri Tudor and CRP Gabriel Lippmann) and the public administrations managing or helping to develop ICT R&D in Luxembourg, such as the National Research Fund (FNR) or Luxinnovation.

b) Current national delegates

Based on the ILNAS register of national delegates (version 67 of February 28, 2014), twelve persons of this category are currently registered in a technical committee related to ICT:

Researchers	Person	Level	TC	Designation
CRP Henri Tudor	Yannick NAUDET	European	CEN/TC 310/WG 1	Advanced automation technologies and their applications; Systems architecture
CRP Henri Tudor	Béatrix BARAFORT	International	ISO/IEC JTC 1/SC 7	Software and systems engineering
			ISO/IEC JTC 1/SC 7/WG 10	Process assessment
			ISO/IEC JTC 1/SC 7/WG 26	Software testing
			ISO/IEC JTC 1/SC 40	IT Service Management and IT Governance
CRP Henri Tudor	Alain RENAULT	International	ISO/IEC JTC 1/SC 7	Software and systems engineering
			ISO/IEC JTC 1/SC 7/WG 6	Evaluation and metrics
			ISO/IEC JTC 1/SC 7/WG 10	Process assessment
			ISO/IEC JTC 1/SC 40	IT Service Management and IT Governance
CRP Henri Tudor	Stéphane CORTINA	International	ISO/IEC JTC 1/SC 7	Software and systems engineering
			ISO/IEC JTC 1/SC 7/WG 10	Process Assessment
			ISO/IEC JTC 1/SC 40	IT Service Management and IT Governance
CRP Henri Tudor	Hervé CHOLEZ	International	ISO/IEC JTC 1/SC 27	IT Security techniques
CRP Henri Tudor	Séverine MIGNON	International	ISO/IEC JTC 1/SC 7	Software and systems engineering

Researchers	Person	Level	TC	Designation
CRP Henri Tudor	Christophe FELTUS	International	ISO/IEC JTC 1/SC 7	Software and systems engineering
			ISO/IEC JTC 1/SC 7/WG 42	Architecture
			ISO/IEC JTC 1/SC 40	IT Service Management and IT Governance
CRP Henri Tudor	Michel PICARD	International	ISO/IEC JTC 1/SC 7	Software and systems engineering
			ISO/IEC JTC 1/SC 7/WG 10	Process Assessment
			ISO/IEC JTC 1/SC 40	IT Service Management and IT Governance
CRP Henri Tudor	Nicolas MAYER	International	ISO/IEC JTC 1/SC 27	IT Security techniques
CRP Henri Tudor	Stéphane JACQUEMART	European	CEN/TC 353	Information and Communication Technologies for Learning, Education and Training
		International	ISO/IEC JTC 1/SC 36	Information technology for learning, education and training
			ISO/IEC JTC 1/SC 36/WG 5	Quality assurance and descriptive frameworks
CRP Henri Tudor	Hélène MAYER	International	ISO/IEC JTC 1/SC 36	Information technology for learning, education and training
CRP Henri Tudor	Patrick PLICHART	International	ISO/IEC JTC 1/SC 36	Information technology for learning, education and training

c) Interests to participate in the standardization process

Based on the results of the standards watch, several subsectors of the ICT sector have been identified as relevant for researchers. The following table proposes to draw links between subsectors and potential interests of researchers⁶⁶.

Researchers	Information	Performance	Services	Projects	Training	Investments
Cloud computing	X		X	X	X	X
Data center	X		X	X	X	X
Telecommunications	X		X	X	X	X
Security	X	X	X	X	X	X
Software and system engineering	X	X	X	X	X	X
Data management	X		X	X	X	X
Electronic signature	X		X	X	X	X
E-archiving	X		X	X	X	X
Sensor networks	X		X	X	X	X
Governance of IT	X	X	X	X	X	X

- Researchers may be interested to follow all of the subsectors (depending of their scope) for information purposes in order to update their knowledge and for technology watch;
- Researchers are concerned by performance aspects for several subsectors;
- Researchers may be interested to follow all of the subsectors (depending of their scope) for service purposes, researchers developing innovative services;
- Researchers may be interested to follow all of the subsectors (depending of their scope) for research project purposes, researchers aiming at developing projects in their area of concern;
- Researchers may be interested to follow all of the subsectors (depending of their scope) for training purposes, researchers being regularly trainers in innovative fields;
- Researchers may be interested to follow all of the subsectors (depending of their scope) for investment purposes. This investment can be financial, when developing new technologies or techniques, or human when developing new knowledge.

⁶⁶ A feedback form is available in Section 12.4 in order to improve this report according to the stakeholders interests

5.2.6. INVESTORS

a) Presentation

This category encompasses investors aiming at investing money in ICT projects or companies for their development. In this category, we focus on private investors, the public funding organisms being already covered in the “Public institutions” or “Researchers” (for research-related funding) categories.

Examples of investors in Luxembourg are Genii Capital and Mangrove Capital Partners.

b) Current national delegates

Based on the ILNAS register of national delegates (version 67 of February 28, 2014), nobody is currently registered in a technical committee related to ICT for an economic actor of this category.

c) Interests to participate in the standardization process

Based on the results of the standards watch, several subsectors of the ICT sector have been identified as relevant for investors. The following table proposes to draw links between subsectors and potential interests of investors⁶⁷.

Investors	Information	Performance	Services	Projects	Training	Investments
Cloud computing	X	X				X
Data center	X	X				X
Telecommunications	X	X				X
Security	X	X				X
Software and system engineering	X	X				X
Data management	X	X				X
Electronic signature	X	X				X
E-archiving	X	X				X
Sensor networks	X	X				X
Governance of IT	X	X				X

- Investors may be interested to follow all of the subsectors for information purposes;
- Investors may be interested to follow all of the subsectors (depending of their interests) for performance purposes;
- Investors are generally not developing and providing ICT services. We consider they are only investing;
- Investors are generally not concerned by research projects. We consider they may only be interested in investing;
- Investors generally do not provide training;
- Investors may be interested to follow all of the subsectors in order to identify promising ICT technologies or services and thus invest.

⁶⁷ A feedback form is available in Section 12.4 in order to improve this report according to the stakeholders interests

5.2.7. CONFORMITY ASSESSMENT BODIES

a) Presentation

Based on the definitions of ISO/IEC 17000, “certification” can be defined as a third-party attestation of the conformity of a product, process, system, or person to requirements specified in a standard. Attestation of the conformity of a product, process, system, or person to requirements is performed through a conformity assessment. In ISO/IEC 17000, conformity assessment is defined as the “demonstration that specified requirements relating to a product, process, system, person or body are fulfilled”. A conformity assessment can be performed either by the supplier itself (first-party conformity assessment), by a person or organization having an interest in the object assessed, such as purchasers, customers, etc. (second-party conformity assessment), or by a third-party Conformity Assessment Body (CAB). Certification can only be obtained in the latter case. In Luxembourg, the SNCH (*Société Nationale de Certification et d’Homologation*) s.à r.l. already proposes ISO/IEC 27001 certification, which is in the field of information security. There are also other CABs in Luxembourg, not currently active as CABs for ICT standards, but potentially interested in new ICT certification standards, for instance Luxcontrol S.A., LQMS Luxembourg S.à r.l. or ESCEM a.s.b.l..

Conformity assessments can also be performed by public administrations in order to check the compliance with laws and regulations (e.g. *Commission de Surveillance du Secteur Financier* (CSSF) for financial institutions). A conformity assessment, conveying formal demonstration of the competence of the organization assessed, is also used to provide an accreditation to a CAB, or to a company wanting to be recognized as *Prestataires de services de certification* (PSC) in Luxembourg. In Luxembourg, accreditations of CAB are performed by OLAS (*Office Luxembourgeois d’Accréditation et de Surveillance*). Accreditation of PSC is performed by the Digital trust department of ILNAS.

b) Current national delegates

Based on the ILNAS register of national delegates (version 67 of February 28, 2014), nobody is currently registered in a technical committee related to ICT for an economic actor of this category. However, it is interesting to note that some delegates from ILNAS are registered in technical committees related to the conformity assessment area. Moreover, some members of ILNAS are registered in technical committees related to ICT, but they are already mentioned in the “Public institutions” category.

c) Interests to participate in the standardization process

Based on the results of the standards watch, several subsectors of the ICT sector have been identified as relevant for CAB. The following table proposes to draw links between subsectors and potential interests of CAB⁶⁸.

Conformity assessment bodies	Information	Performance	Services	Projects	Training	Investments
Cloud computing	X		X		X	
Data center	X		X		X	
Telecommunications	X		X		X	
Security	X		X		X	
Software and system engineering	X		X		X	
Data management	X					
Electronic signature	X		X		X	
E-archiving	X		X		X	X
Sensor networks	X					
Governance of IT	X		X		X	

- CABs may be interested to follow all of the subsectors for information purposes, mainly to detect new certification schemes and the evolution of existing ones;
- CABs are generally not concerned by performance aspects;
- CABs may be interested to follow the subsectors currently already proposing conformity standards (data center, telecommunications, security, software and system engineering, electronic signature, e-archiving) or planning to do so (cloud computing, governance of IT) in order to propose conformity assessment services;
- CABs are generally not concerned with research projects;
- CABs may be interested to follow the subsectors currently already proposing conformity standards (data center, telecommunications, security, software and system engineering, electronic signature, e-archiving) or planning to do so (cloud computing, governance of IT) in order to propose training;
- CABs generally do not invest.

⁶⁸ A feedback form is available in Section 12.4 in order to improve this report according to the stakeholders interests

5.2.8.DEVELOPMENT AND INTEGRATION COMPANIES

a) Presentation

The creation of an information system may include the design and construction of a customized architecture or application, its integration with new or existing hardware, packaged or custom software, and communications infrastructure.

In this context, integration means building computing systems by combining hardware and software products from multiple vendors. Development is a natural complementary activity, because system implementations may require original programming or manufacture of unique components.

The category entitled “Development and integration” encompasses organizations whose core business is software as well as systems development and integration.

Development and integration is an important business in Luxembourg, because of the high need for complex information systems (e.g. financial institutions, technology-based companies, data centers, etc.). For instance, some of important development and integration companies in Luxembourg are:

- Telindus PSF S.A.;
- Sogeti Luxembourg S.A.;
- CSC Computer Sciences Luxembourg S.A.;
- Microsoft Luxembourg;
- Logica Luxembourg S.A.;
- Dimension Data Financial Services S.A.;
- OpenText S.A.;
- Etc.

b) Current national delegates

Based on the ILNAS register of national delegates (version 67 of February 28, 2014), four persons of this category are currently registered in a technical committee related to ICT:

Development and integration	Person	Level	TC	Designation
Telindus PSF S.A.	Cédric MAUNY	International	ISO/IEC JTC 1/SC 27	IT Security techniques
			ISO/IEC JTC 1/SC 27/WG 1	Information security management systems
			ISO/IEC JTC 1/SC 27/WG 2	Cryptography and security mechanisms
			ISO/IEC JTC 1/SC 27/WG 3	Security evaluation criteria
			ISO/IEC JTC 1/SC 27/WG 4	Security controls and services
			ISO/IEC JTC 1/SC 27/WG 5	Identity management and privacy technologies
Telindus Luxembourg S.A.	Jérémy THIMONT	International	ISO/IEC JTC 1/SC 27	IT Security techniques
OpenText S.A.	Cyril MIEL	International	ISO/TC 46/SC 11	Information and documentation; Archives/records management

Development and integration	Person	Level	TC	Designation
Dimension Data Financial Services S.A.	Rudolphe HILBERT	International	ISO/IEC JTC 1/SC 7	Software and systems engineering
			ISO/IEC JTC 1/SC 7/WG 10	Process assessment
			ISO/IEC JTC 1/SC 40	IT Service Management and IT Governance

c) Interests to participate in the standardization process

Based on the results of the standards watch, several subsectors of the ICT sector have been identified as relevant for development and integration companies. The following table proposes to draw links between subsectors and potential interests of development and integration companies⁶⁹.

Development and integration	Information	Performance	Services	Projects	Training	Investments
Cloud computing	X	X	X	X	X	
Data center	X	X	X	X	X	
Telecommunications	X	X	X	X	X	
Security	X	X	X	X	X	
Software and system engineering	X	X	X	X	X	
Data management	X	X	X	X	X	
Electronic signature	X	X	X	X	X	
E-archiving	X	X	X	X	X	
Sensor networks	X	X	X	X	X	
Governance of IT	X	X	X	X	X	

- Development and integration companies may be interested to follow all of the subsectors for information purposes and technological watch;
- Development and integration companies may be interested to follow all of the subsectors for performance purposes, in order to gain competitive advantage over competitors through a better knowledge and use of standards;
- Development and integration companies may be interested to follow all of the subsectors at the service level, because new expertise areas, potentially interesting to propose development and integration services, may emerge;
- Development and integration companies may be interested to follow all of the subsectors (depending of their scope) for research project purposes. Development and integration companies can be associated with research projects;
- Development and integration companies may be interested to follow all of the subsectors (depending of their scope) for training purposes;
- Development and integration companies do not generally make investments.

⁶⁹ A feedback form is available in Section 12.4 in order to improve this report according to the stakeholders interests

5.2.9. CONSULTING COMPANIES

a) Presentation

In this category, consulting companies refer to companies aiming at helping organizations to improve their performance at the ICT level, primarily through the analysis of existing organizational problems and development of plans for improvement.

Organizations may draw upon the services of management consultants for a number of reasons including gaining external (and presumably objective) advice and access to the consultants' specialized expertise.

This category includes in Luxembourg more than 100 companies currently active as consulting companies in the ICT domain.

b) Current national delegates

Based on the ILNAS register of national delegates (version 67 of February 28, 2014), nineteen persons of this category are currently registered in a technical committee related to ICT:

Consulting companies	Person	Level	TC	Designation
EWEN Consult S.à r.l.	Jeannette EWEN	International	ISO/IEC JTC 1/SC 7/WG 7	Software and systems engineering; Life cycle management
Telindus PSF S.A.	Cédric MAUNY	International	ISO/IEC JTC 1/SC 27	IT Security techniques
			ISO/IEC JTC 1/SC 27/WG 1	Information security management systems
			ISO/IEC JTC 1/SC 27/WG 2	Cryptography and security mechanisms
			ISO/IEC JTC 1/SC 27/WG 3	Security evaluation criteria
			ISO/IEC JTC 1/SC 27/WG 4	Security controls and services
Telindus Luxembourg S.A.	Jérémy THIMONT	International	ISO/IEC JTC 1/SC 27/WG 5	Identity management and privacy technologies
			ISO/IEC JTC 1/SC 27	IT Security techniques
			ISO/IEC JTC 1/SC 27	IT Security techniques
			ISO/IEC JTC 1/SC 27	IT Security techniques
			ISO/IEC JTC 1/SC 27	IT Security techniques
itrust consulting S.à r.l.	Daniel MARNACH	International	ISO/IEC JTC 1/SC 7	Software and systems engineering
			ISO/IEC JTC 1/SC 7/WG 26	Software testing
			ISO/IEC JTC 1/SC 27	IT Security techniques
REVAL CONSULTING S.A.	Valérie MAURER	International	ISO/IEC JTC 1/SC 36	Information technology for learning, education and training

Consulting companies	Person	Level	TC	Designation
Pricewaterhouse Coopers S.à.r.l.	Xavier LISOIR	International	ISO/TC 46/SC 11	Information and documentation; Archives/records management
Pricewaterhouse Coopers S.à.r.l.	Lucas COLET	International	ISO/TC 46/SC 11	Information and documentation; Archives/records management
			ISO/TC 46/SC 11/WG 1	Metadata
			ISO/TC 46/SC 11/WG 7	JWG on Digital records preservation
			ISO/TC 46/SC 11/WG 8	Records management systems – Fundamentals and Vocabulary
			ISO/TC 46/SC 11/WG 9	Records management fundamentals – Requirements
			ISO/TC 46/SC 11/WG 10	Implementation Guidelines for Digitization of Records
			ISO/TC 46/SC 11/WG 11	Risk assessment for records systems
			ISO/TC 46/SC 11/WG 12	Digital records conversion and migration process
			ISO/TC 46/SC 11/WG 13	Revision of ISO15489-1 and ISO/TR 15489-2
Linklaters LLP	Sylvie FORASTIER	International	ISO/TC 46/SC 11	Information and documentation; Archives/records management
e-Business & Resilience Centre	Olivier ANTOINE	International	ISO/IEC JTC 1/SC 27	IT Security techniques
e-Business & Resilience Centre	Bérengère BROUTIN	International	ISO/IEC JTC 1/SC 27	IT Security techniques
e-Business & Resilience Centre	Christophe AJDONIK	International	ISO/IEC JTC 1/SC 27	IT Security techniques
OPENTEXT S.A.	Cyril MIEL	International	ISO/TC 46/SC 11	Information and documentation; Archives/records management
Ernst & Young Services S.A.	Julie BONNOT	International	ISO/IEC JTC 1/SC 36	Information technology for learning, education and training
Altirian S.A.	Pierre DEWEZ	International	ISO/IEC JTC 1/SC 27	IT Security techniques

Consulting companies	Person	Level	TC	Designation
Altirian S.A.	René SAINT-GERMAIN	International	ISO/IEC JTC 1/SC 27	IT Security techniques
KPMG Luxembourg S.à.r.l.	Michael HOFMANN	International	ISO/IEC JTC 1/SC 27/WG 1	IT Security techniques; Information security management systems
			ISO/IEC JTC 1/SC 27/WG 2	IT Security techniques; Cryptography and security mechanisms
			ISO/IEC JTC 1/SC 27/WG 3	IT Security techniques; Security evaluation criteria
			ISO/IEC JTC 1/SC 27/WG 4	IT Security techniques; Security controls and services
			ISO/IEC JTC 1/SC 27/WG 5	IT Security techniques; Identity management and privacy technologies
Systemic Area Network S.à.r.l.	Didier MONESTES	International	ISO/IEC JTC 1/SC 39	Sustainability for and by Information Technology
		European	CLC/TC 215	Electrotechnical aspects of telecommunication equipment

c) Interests to participate in the standardization process

Based on the results of the standards watch, several subsectors of the ICT sector have been identified as relevant for consulting companies. The following table proposes to draw links between subsectors and potential interests of consulting companies⁷⁰.

Consulting companies	Information	Performance	Services	Projects	Training	Investments
Cloud computing	X	X	X	X	X	
Data center	X	X	X	X	X	
Telecommunications	X	X	X	X	X	
Security	X	X	X	X	X	
Software and system engineering	X	X	X	X	X	
Data management	X	X	X	X	X	
Electronic signature	X	X	X	X	X	
E-archiving	X	X	X	X		X
Sensor networks	X	X		X		
Governance of IT	X	X	X	X	X	

⁷⁰ A feedback form is available in Section 12.4 in order to improve this report according to the stakeholders interests

- Consulting companies may be interested to follow all of the subsectors for information purposes and technological watch;
- Consulting companies may be interested to follow all of the subsectors for performance purposes, in order to gain competitive advantage over competitors through better knowledge and use of standards;
- Consulting companies may be interested to follow all of the subsectors at the service level, in order to propose new consulting services in emerging or evolving ICT expertise areas;
- Consulting companies may be interested to follow all of the subsectors (depending of their scope) for research project purposes. Consulting companies can be associated with research projects;
- Consulting companies may be interested to follow all of the subsectors for training purposes, consultants being regularly trainers in the context of consultancy missions;
- Consulting companies do not generally make investments.

5.2.10. DATA CENTER OPERATORS

a) Presentation

A data center or computer center (also datacenter) is a facility used to house computer systems and associated components, such as telecommunications and storage systems. It generally includes redundant or backup power supplies, redundant data communications connections, environmental controls (e.g. air conditioning, fire suppression) and security devices.

This category of actor is particularly active and in continuous development in Luxembourg. An ambitious ICT infrastructure investment plan has been adopted in order to make Luxembourg an international leader for data storage.

Some well-known data center operators in Luxembourg are for instance:

- Ebrc;
- Datacenter Luxembourg;
- European data hub;
- Luxconnect;
- Post Luxembourg;
- Telindus S.A.;
- Etc.

b) Current national delegates

Based on the ILNAS register of national delegates (version 67 of February 28, 2014), six persons of this category are currently registered in a technical committee related to ICT:

Data center operators	Person	Level	TC	Designation
Telindus PSF S.A.	Cédric MAUNY	International	ISO/IEC JTC 1/SC 27	IT Security techniques
			ISO/IEC JTC 1/SC 27/WG 1	Information security management systems
			ISO/IEC JTC 1/SC 27/WG 2	Cryptography and security mechanisms
			ISO/IEC JTC 1/SC 27/WG 3	Security evaluation criteria
			ISO/IEC JTC 1/SC 27/WG 4	Security controls and services
			ISO/IEC JTC 1/SC 27/WG 5	Identity management and privacy technologies
Telindus Luxembourg S.A.	Jérémy THIMONT	International	ISO/IEC JTC 1/SC 27	IT Security techniques
e-Business & Resilience Centre	Olivier ANTOINE	International	ISO/IEC JTC 1/SC 27	IT Security techniques
POST Luxembourg	Jean-Michel REMICHE	International	ISO/IEC JTC 1/SC 38	Distributed application platforms and services (DAPS)
			ISO/IEC JTC 1/SC 40	IT Service Management and IT Governance

Data center operators	Person	Level	TC	Designation
e-Business & Resilience Centre	Olivier ANTOINE	International	ISO/IEC JTC 1/SC 27	IT Security techniques
e-Business & Resilience Centre	Bérengère BROUTIN	International	ISO/IEC JTC 1/SC 27	IT Security techniques
e-Business & Resilience Centre	Christophe AJDONIK	International	ISO/IEC JTC 1/SC 27	IT Security techniques

c) Interests to participate in the standardization process

Based on the results of the standards watch, several subsectors of the ICT sector have been identified as relevant for data center operators. The following table proposes to draw links between subsectors and potential interests of data center operators⁷¹.

Data center operators	Information	Performance	Services	Projects	Training	Investments
Cloud computing	X	X	X	X		X
Data center	X	X	X	X		X
Telecommunications	X	X	X			X
Security	X	X				X
Software and system engineering	X	X				
Data management						
Electronic signature						
E-archiving	X	X	X	X		X
Sensor networks	X					X
Governance of IT	X	X				X

- Data center operators may be interested to follow the subsectors cloud computing, data center, telecommunications, security, software and system engineering, and e-archiving for information purposes and technological watch. Data management and electronic signature are generally out of their scope;
- Data center operators may be interested to follow the subsectors cloud computing, data center, telecommunications, security, software and system engineering, governance of IT and e-archiving in order to gain competitive advantage over competitors through better knowledge and use of standards. Data management and electronic signature are generally out of their scope;
- Data center operators may be interested to follow the subsectors cloud computing, data center, telecommunications and e-archiving at the service level. All of them are potential subsectors in which a data center operator may propose services;

⁷¹ A feedback form is available in Section 12.4 in order to improve this report according to the stakeholders interests

- Data center operators may be interested to follow the subsectors cloud computing, data center and e-archiving in order to participate in research projects, or if they have implemented this kind of “technology”;
- Data center operators are generally not providing training;
- Data center operators may be interested to follow the subsectors cloud computing, data center, telecommunications, sensor networks, governance of IT and e-archiving in order to invest in new technologies or approaches.

5.2.11. NETWORK AND TELECOMMUNICATIONS COMPANIES

a) Presentation

In the ICT domain, a network can be defined as a communication, data exchange, and resource-sharing system created by linking two or more computers and establishing standards, or protocols, so that they can work together. Telecommunications are the transmission of data (voice, data, graphics, video, etc.) over public or private networks.

This category, entitled “Network and telecommunications”, includes companies in Luxembourg setting up networks and telecommunication systems, regardless of whether they are private or public. It is important to note that network and telecommunications actors in Luxembourg are generally not only focused on network and telecommunications activities, but may be active in other categories such as data center operators, consulting companies, investors, etc. In this section, they are only considered for network and telecommunications activities. Their other activities are out of the scope, because they are considered in the other categories of Section 5.2.

Some well-known network and telecommunications actors in Luxembourg are:

- Post Luxembourg;
- Telecom Luxembourg;
- SES;
- Tango;
- Etc.

b) Current national delegates

Based on the ILNAS register of national delegates (version 67 of February 28, 2014), four persons of this category are currently registered in a technical committee related to ICT:

Network and telecommunications	Person	Level	TC	Designation
Netline S.A.	Pierre-Emmanuel LE LAY	International	ISO/IEC JTC 1/SC 6	Telecommunications and information exchange between systems
Telindus PSF S.A.	Cédric MAUNY	International	ISO/IEC JTC 1/SC 27	IT Security techniques
			ISO/IEC JTC 1/SC 27/WG 1	Information security management systems
			ISO/IEC JTC 1/SC 27/WG 2	Cryptography and security mechanisms
			ISO/IEC JTC 1/SC 27/WG 3	Security evaluation criteria
			ISO/IEC JTC 1/SC 27/WG 4	Security controls and services
			ISO/IEC JTC 1/SC 27/WG 5	Identity management and privacy technologies
Telindus Luxembourg S.A.	Jérémy THIMONT	International	ISO/IEC JTC 1/SC 27	IT Security techniques

Network and telecommunications	Person	Level	TC	Designation
POST Luxembourg	Jean-Michel REMICHE	International	ISO/IEC JTC 1/SC 38	Distributed application platforms and services (DAPS)
			ISO/IEC JTC 1/SC 40	IT Service Management and IT Governance

c) Interests to participate in the standardization process

Based on the results of the standards watch, several subsectors of the ICT sector have been identified as relevant for network and telecommunications companies. The following table proposes to draw links between subsectors and potential interests of network and telecommunications companies⁷².

Network and telecommunications	Information	Performance	Services	Projects	Training	Investments
Cloud computing	X	X	X			X
Data center	X	X	X	X		
Telecommunications	X	X	X	X		X
Security	X	X		X		
Software and system engineering	X	X		X		
Data management						
Electronic signature						
E-archiving	X	X	X	X		
Sensor networks	X	X	X	X		X
Governance of IT	X	X				

- Network and telecommunications companies may be interested to follow the subsectors cloud computing, data center, telecommunications, security, software and system engineering, sensor networks, governance of IT and e-archiving for information purposes and technological watch, because these subsectors may have a direct or indirect relationship with their business;
- Network and telecommunications companies may be interested to follow the subsectors cloud computing, data center, telecommunications, security, software and system engineering, sensor networks, governance of IT and e-archiving in order to gain competitive advantage over competitors through better knowledge and use of standards;
- Network and telecommunications companies may be interested to follow the subsectors cloud computing, data center, telecommunications, sensor networks and e-archiving at the service level, in order to propose new services in emerging or evolving areas related to their business;
- Network and telecommunications companies may be interested to follow the subsectors data center, telecommunications, security, software and system engineering, sensor networks and e-archiving in order to participate in research projects;

⁷² A feedback form is available in Section 12.4 in order to improve this report according to the stakeholders interests

- Network and telecommunications companies generally do not provide training;
- Network and telecommunications companies may be interested to follow the subsector cloud computing, sensor networks and telecommunications in order to invest in new technologies or approaches.

5.2.12. SERVICE PROVIDERS

a) Presentation

The category entitled “Service providers” encompasses organizations whose main activity is to provide ICT services to another party. In this category we consider any kind of ICT service provider, regardless of whether they address public administration or private companies, and regardless of whether they are focused on a particular sector such as the ICT sector, the financial sector, etc.

Obviously, the range of ICT services provided in Luxembourg is very large. Some promising and/or dynamic categories of ICT services are:

- Electronic signature (Luxtrust);
- Electronic archiving (LAB);
- Electronic vault (Seezam);
- Services dedicated to financial institutions (CETREL, Victor Buck Services, etc.);
- Internet services;
- Etc.

b) Current national delegates

Based on the ILNAS register of national delegates (version 67 of February 28, 2014), fifteen persons of this category are currently registered in a technical committee related to ICT:

Service providers	Person	Level	TC	Designation
Telindus PSF S.A.	Cédric MAUNY	International	ISO/IEC JTC 1/SC 27	IT Security techniques
			ISO/IEC JTC 1/SC 27/WG 1	Information security management systems
			ISO/IEC JTC 1/SC 27/WG 2	Cryptography and security mechanisms
			ISO/IEC JTC 1/SC 27/WG 3	Security evaluation criteria
			ISO/IEC JTC 1/SC 27/WG 4	Security controls and services
			ISO/IEC JTC 1/SC 27/WG 5	Identity management and privacy technologies
Telindus Luxembourg S.A.	Jérémy THIMONT	International	ISO/IEC JTC 1/SC 27	IT Security techniques
Victor Buck Services S.A.	Sébastien POGGI	International	ISO/IEC JTC 1/SC 27	IT Security techniques
UBS Fund Services Luxembourg	Dietmar GEHRING	International	ISO/IEC JTC 1/SC 7/WG 26	Software and systems engineering; Software Testing
KBL European Private Bankers S.A.	Jürgen BLUM	International	ISO/IEC JTC 1/SC 38	Distributed application platforms and services [DAPS]
Vectis PSF S.A.	Serge RAUCQ	International	ISO/TC 46/SC 11	Information and documentation; Archives/records management

Service providers	Person	Level	TC	Designation
CETREL S.A.	Myriam DJEROUNI	International	ISO/IEC JTC 1/SC 27	IT Security techniques
			ISO/IEC JTC 1/SC 38	Distributed application platforms and services (DAPS)
KPMG Luxembourg S.à.r.l	Michael HOFMANN	International	ISO/IEC JTC 1/SC 27/WG 1	IT Security techniques; Information security management systems
			ISO/IEC JTC 1/SC 27/WG 2	IT Security techniques; Cryptography and security mechanisms
			ISO/IEC JTC 1/SC 27/WG 3	IT Security techniques; Security evaluation criteria
			ISO/IEC JTC 1/SC 27/WG 4	IT Security techniques; Security controls and services
			ISO/IEC JTC 1/SC 27/WG 5	IT Security techniques; Identity management and privacy technologies
LUXAIR S.A.	Philippe PELLETIER	International	ISO/IEC JTC 1/SC 36	Information technology for learning, education and training
LUXAIR S.A.	Marie-Rose DECKER	International	ISO/IEC JTC 1/SC 36	Information technology for learning, education and training
e-Business & Resilience Centre	Olivier ANTOINE	International	ISO/IEC JTC 1/SC 27	IT Security techniques
e-Business & Resilience Centre	Bérengère BROUTIN	International	ISO/IEC JTC 1/SC 27	IT Security techniques
e-Business & Resilience Centre	Christophe AJDONIK	International	ISO/IEC JTC 1/SC 27	IT Security techniques
POST Luxembourg	Jean-Michel REMICHE	International	ISO/IEC JTC 1/SC 38	Distributed application platforms and services (DAPS)
			ISO/IEC JTC 1/SC 40	IT Service Management and IT Governance
OPENTEXT S.A.	Cyril MIEL	International	ISO/TC 46/SC 11	Information and documentation; Archives/records management

c) Interests to participate in the standardization process

Based on the results of the standards watch, several subsectors of the ICT sector have been identified as relevant for service providers. The following table proposes to draw links between subsectors and potential interests of service providers⁷³.

Service providers	Information	Performance	Services	Projects	Training	Investments
Cloud computing	X	X	X	X		X
Data center	X	X	X	X		X
Telecommunications	X	X	X	X		X
Security	X	X	X	X		X
Software and system engineering	X	X	X	X		X
Data management	X	X	X	X		X
Electronic signature	X	X	X	X		X
E-archiving	X	X	X	X		X
Sensor networks	X	X	X	X		X
Governance of IT	X	X	X	X		X

- Service providers may be interested to follow all of the subsectors (depending of their scope) for information purposes and technological watch;
- Service providers may be interested to follow all of the subsectors (depending of their scope) for performance purposes in order to gain competitive advantage over competitors through a better knowledge and use of standards;
- Service providers may be interested to follow all of the subsectors (depending of their scope) at the service level, in order to propose new ICT services in emerging or evolving areas;
- Service providers may be interested to follow all of the subsectors (depending of their scope) in order to participate to research projects in their service area;
- Service providers generally do not provide training;
- Service providers may be interested to follow all of the subsectors (depending of their scope) in order to invest.

⁷³ A feedback form is available in Section 12.4 in order to improve this report according to the stakeholders interests

5.2.13. CUSTOMERS AND CONSUMERS REPRESENTATIVES

a) Presentation

This category includes customers and consumers in the ICT sector in Luxembourg, meaning municipalities, local governments and non-ICT-focused companies.

Although there may be interest to inquire about standards developments in the sector, the participation of these stakeholders in standardization work seems very limited. However, it is important to note that major standardization organizations such as ISO currently aim to promote the involvement of customers and consumers in the standardization process.

For example, at the national level, representative consumer organizations are:

- ULC (*Union Luxembourgeoise des consommateurs*);
- CEC (*Centre européen des consommateurs*).

b) Current national delegates

Based on the ILNAS register of national delegates (version 67 of February 28, 2014), nobody is currently registered in a technical committee related to ICT for an economic actor of this category.

c) Interests to participate in the standardization process

Based on the results of the standards watch, several subsectors of the ICT sector have been identified as relevant for customers and consumers. The following table proposes to draw links between subsectors and potential interests of customers and consumers⁷⁴.

Customers and consumers	Information	Performance	Services	Projects	Training	Investments
Cloud computing	X	X				X
Data center	X					
Telecommunications	X	X				
Security	X	X				
Software and system engineering	X	X				
Data management	X	X				
Electronic signature	X					
E-archiving	X	X				X
Sensor networks	X					
Governance of IT	X	X				

- Customers and consumers may be interested to follow all of the subsectors for information purposes;
- Customers and consumers may be interested to follow the subsectors telecommunications, security, software and system engineering, and data management for performance purposes. These aspects can be competitive advantage over competitors even in a non-ICT-focused company. The same observation can be made for cloud computing and e-archiving;

⁷⁴ A feedback form is available in Section 12.4 in order to improve this report according to the stakeholders interests

- Customers and consumers generally neither develop nor provide ICT services;
- Customers and consumers are generally not concerned with research projects;
- Customers and consumers generally do not provide training;
- Customers and consumers could be interested to invest in cloud computing and e-archiving.

6. OPPORTUNITIES FOR THE NATIONAL MARKET

The purpose of the sector-based standards analysis is to involve identified national stakeholders in a standardization approach to support and stimulate the ICT sector in terms of competitiveness, visibility and performance.

Based on the standards analysis of the ICT sector, and especially the potential interests emerging from the actors, there are many opportunities for the national market. Convinced that national stakeholders have a real interest to seize these opportunities, ILNAS and ANEC GIE will jointly and actively contribute to inform them and support their normative steps. The identified opportunities should be seen by national stakeholders as a series of proposals which could lead to go further and to engage future actions in order to more rapidly take advantage of the standardization.

The opportunities listed below are available at the national level, according to the interests of the stakeholders in the ICT sector.

❖ **Participation in the ISO/IEC JTC 1 national forum: an information network about ICT standardization**

The national network "ISO/IEC JTC 1 national forum" related to standardization in the ICT sector, driven by ILNAS, allows the stakeholders to learn about recent normative developments, share information and share experiences. It facilitates the coordination of technical committees represented in Luxembourg. It also helps to reach a unanimous national position on major strategic standardization issues at the European and International level. The forum usually meets twice per year.

The ISO/IEC JTC 1 national forum, active since December 7, 2009, is composed of the chairpersons of the national mirror committees of the ISO/IEC JTC 1 subcommittees as well as the delegate of ILNAS that is currently chairing ISO/IEC JTC 1 at the national level. A first objective for the ISO/IEC JTC 1 national forum is to obtain the best coverage of ISO/IEC JTC 1, i.e. to have delegates in as many subcommittees of ISO/IEC JTC 1 as possible. The broader the coverage of ISO/IEC JTC 1 will be, the better the capability of Luxembourg to take a position on ICT standards issues will be. There are currently 8 subcommittees covered out of 20.

❖ **Particular involvement of national delegates (editor of European or International standards)**

The ICT sector is, at the national level, the most mature standardization sector. Luxembourg is registered as "O-member" of ISO/IEC JTC 1, and 52 delegates from Luxembourg are currently involved in ISO/IEC JTC 1 or in CEN technical committees from the ICT sector.

Some national delegates from the ICT sector have already been (co-)editors of standards documents such as technical reports (ISO/IEC TR 20000-4, ISO/IEC TR 20000-5 and ISO/IEC TR 27015:2012), International standards (ISO/IEC 27010) or other various standards documents (ISO/IEC JTC 1/SC 27/WG 5 Standing Document 2 – Part 1).

As defined in Chapter 3, an ISO/IEC JTC 1 national chapter is established when a delegate (or group of delegates) in Luxembourg is (co-)editor of an ISO/IEC JTC 1 standard and needs some input from an economic sector to develop the standard. ILNAS still strongly supports this tool and, depending of the interests and opportunities of the national delegates to take the responsibility of being (co-)editor of

standards, wishes to open new ISO/IEC JTC 1 national chapters to support national delegates in their role of standards editors.

❖ **Following of the standardization work performed in ICT *fora/consortia***

Past and current national initiatives for standardization in the ICT sector were dedicated to formal standards bodies that are acknowledged standards bodies and which develop *de jure* (or formal) standards such as ISO/IEC or CEN. *Fora* and *consortia* that developed *de facto* standards were not emphasized at all.

Considering the importance for the market of ICT standards developed by *fora/consortia*, with regards to the number and the range of standards published, it is interesting to follow ICT standardization work performed in *fora/consortia* at the national level. At the invitation of the chairman of the ISO/IEC JTC 1 national forum, a member of ICT *fora/consortia* may be requested to participate in a forum session.

However, it is important to see upstream if the national actors are interested in further following and participating to ICT *fora/consortia*. Moreover, based on the national market interest, a selection shall be done to follow a selected number of ICT *fora/consortia*. It is important to note that ICT is certainly one of the sectors having the highest number of active standardization *fora/consortia*⁷⁵.

❖ **Involvement at the strategic level of ICT standardization**

ISO/IEC JTC 1/SWG 3 on "Planning" (SWG-P) is a "Special" Working Group considering that it is not intended to develop standards. It covers planning activities of ISO/IEC JTC 1 and the definition of its action plans.

The main activities that govern the current work of the SWG on Planning are:

- Assist the ISO/IEC JTC 1 chairman and secretariat in developing/revising the JTC 1 Business Plan⁷⁶ and Long Term Business Plan⁷⁷;
- Recommend actions for ISO/IEC JTC 1 to successfully carry out the business plans;
- Connect with subcommittees business planning processes to produce a comprehensive ISO/IEC JTC 1 business plan;
- Encourage subcommittees participation in the development and execution of the overall ISO/IEC JTC 1 business plans;
- Provide direction for and carry out the Technology Watch function (described in Chapter 10);
- Analyze good practices for business planning both inside and outside ISO/IEC JTC 1 and make recommendations to ISO/IEC JTC 1 for improvement.

In 2012/2013, SWG-P focused its work to address the following technology areas:

- Social Networking: a report has been published on this technology area in 2011. It is regularly updated and improved but the SWG-P comes to the conclusion that is too early to start standardization work in this field of technology;
- Web Collaboration: a report has been published on this technology area in 2012. The SWG-P comes to the conclusion that is too early to start standardization work in this field of technology;

⁷⁵ Comprehensive list of ICT Standards Consortia, 17th Edition - August 2012 [Source: CEN and CENELEC]

⁷⁶ <http://isotc.iso.org/livelink/livelink?func=ll&objId=16301787&objAction=Open>

⁷⁷ <http://isotc.iso.org/livelink/livelink?func=ll&objId=8972739&objAction=Open>

- Mobile Applications: a report has been published on this technology area in 2012. Due to differing estimations as to the standardization potential for JTC 1 in this technology area, the SWG-P recommended establishing an Incubator Group (IG) on Mobile Applications. This IG has been created at the 2013 Plenary Meeting of ISO/IEC JTC 1 (4-9 November 2013) in order to obtain a well-defined proposal for possible new work items and some even more detailed research on this topic;
- Ubiquitous Computing: this topic is addressed by ISO/IEC JTC 1 SWG on Internet of Things which has been established at the 2012 Jeju Plenary Meeting of ISO/IEC JTC 1. This Special Working Group reports to SWG on Planning on a regular basis. SWG on Planning follows the work.

SWG-P proposes to investigate in the next term of its activities (2013/2014) the following technology areas:

- Big Data & Data Analytics;
- Smart Cities.

Moreover, ISO/IEC JTC 1 establishes Study Groups (SG) on Big Data and Smart Cities during its last Plenary Meeting for consideration of activities in these fields across all of JTC 1 and to provide a report with recommendations, and potentially other deliverables, to the 2014 JTC 1 Plenary.

In this context, it could be interesting for ILNAS to be involved in SWG-P. The motivations are the following:

- Participation aligned with the “Policy on ICT technical standardization 2013-2020”⁷⁸, allowing ILNAS to get involved at the strategic level of ISO/IEC JTC 1;
- Participation aligned with the “Policy on ICT technical standardization 2013-2020”, allowing ILNAS to anticipate future areas of standardization of ISO/IEC JTC 1 and, for instance, set up *ad hoc* projects for the benefit of the national market;
- Source of strategic information for the ISO/IEC JTC 1 national forum.

❖ **Benefit from the support offer by the national standards body**

As national standards body, ILNAS has to provide support to national delegates and to coordinate the activities of the different committees at the national level. These duties are of primary importance and well stated in the “Luxembourg’s Policy on ICT technical standardization 2013-2020” that particularly should achieve the organization and development of the ICT technical standardization representation at the national level.

A result expected from standards analysis focusing on the ICT sector is thus to raise awareness and increase the participation of the Luxembourg stakeholders in standardization technical committees, either at European or International level.

⁷⁸ <http://www.ilnas.public.lu/fr/publications/normalisation/etudes-nationales/policy-on-ict-technical-standardization-2013-2020.pdf>

❖ Profit from services in relation to standards evolutions

Services in relation to standards and their developments can be proposed to the ICT sector. It could be, for example, standards watch focusing on a specific subsector or a thematic folder associating regulatory requirements and standardization duties.

Identification of services to be developed answering potentially to the expectations of the national stakeholders of the sector would be realized according to the comments received after the release of this standards analysis report⁷⁹.

In 2013, ILNAS, supported by ANEC GIE, has developed on-demand products and services in order to support and improve the competitiveness of the national economic market through a better knowledge of standardization.

Currently, the products and services offer consists of:

- Coaching;
- Diagnosis;
- Awareness and training;
- Focused standards watch;
- Standards analysis;
- Information about links between research projects and standardization.

❖ Participate in research projects involving standardization

Research in ICT is very active in Luxembourg, with several actors active in this field, as presented in Section 5.2.5. Moreover, as mentioned by the CEN-CENELEC⁸⁰, the role of standardization is recognized as a bridge between research activities and the market, both by EU institutions and by R&D stakeholders. Indeed, standardization is identified in Horizon 2020 as one of the measures that will support the market take-up of research results and innovation.

With the support of Luxembourg's standards body, national stakeholders of the ICT technologies sector could have opportunities to be involved in these research projects.

Note:

ILNAS and CRP Henri Tudor conducted a joint research project called "NormaFI-IT" to analyze the field of digital trust through different angles and led to the publication of a White Paper entitled "Digital Trust - Towards excellence in ICT"⁸¹. A new version of this White Paper will be released in 2014 by ILNAS.

❖ Benefit from the existing training offers for the sector

Based on the training already provided to the ICT professionals, it could be interesting to integrate modules dedicated to standardization with a direct link with ICT. By training the trainers on the standardization activities and development related to this sector, it would guarantee the trainers and so the trainees to be in line with the state of the art at the European and International level.

⁷⁹ A feedback form is available in Section 12.4 in order to improve this report according to the stakeholders interests

⁸⁰ <http://www.cenelec.eu/research/Horizon2020/Pages/default.aspx>

⁸¹ http://www.ilnas.public.lu/fr/publications/confiance-numerique/etudes-nationales/ilnas-tudor-white-paper-digital-trust-june-2012-v1_0.pdf

In January 2014, ILNAS published its training courses catalog⁸² in the field of technical standardization for the year 2014. The catalog offers both awareness modules to understand the key standardization concepts and detailed modules to understand the standardization issues while developing its skills.

❖ **Improve the image of Luxembourg in the standardization landscape**

Through an enhancement of the participation in the standardization works and the implementation of the opportunities listed above, Luxembourg should strengthen its presence in the standardization field and significantly improve its image at European and International level.

To summarize, opportunities identified for the national market and available at the national level for the different ICT stakeholders are:

- Participation in the ISO/IEC JTC 1 national forum: an information network about ICT standardization;
- Particular involvement of national delegates (editor of European or International standards, Chairman of a national mirror committee);
- Following of the standardization work performed in ICT fora/consortia;
- Involvement at the strategic level of ICT standardization;
- Benefit from the support offer by the national standards body;
- Profit from services in relation to standards evolutions;
- Participate in research projects involving standardization;
- Benefit from the existing training offers for the sector;
- Improve the image of Luxembourg in the standardization landscape.

As long as the stakeholders of the sector wish to seize these opportunities, ILNAS supported by ANEC GIE can provide active contribution and support.

As the national standards body, ILNAS offers the possibilities to national stakeholders to follow specific standardization works of technical committees, either at the European or International level. It supports interested persons in their participation in standardization activities with appropriate information and training. Therefore, resources from ILNAS and ANEC GIE are specifically dedicated to these aspects and are able to efficiently support and inform the future national delegates⁸³.

To reinforce this support, a person is dedicated to be the specific point of contact for the delegates of the ICT sector. As such, the information and support provided would also stay as close as possible to the issues related to this sector.

⁸² <http://www.ilnas.public.lu/fr/publications/normalisation/brochures-information/catalogue-formation-2014.pdf>

⁸³ Declaration of interest in ICT standardization:

<http://www.ilnas.public.lu/fr/publications/normalisation/declarations-interet/declaration-interest-standardization-it.pdf>

7. ICT STANDARDS WATCH

The objective of the ICT standards watch is to identify the main organizations, and their related technical committees, developing standards in the field of ICT. This document takes into account every Standards Developing Organizations (SDO), i.e. **formal standards bodies** that are acknowledged standards bodies, developing *de jure* (or formal) standards, and *fora* and *consortia* developing *de facto* standards⁸⁴.

This chapter focuses on the presentation of technical committees related to formal standards bodies. Regarding *fora* and *consortia*, the related organizations are described in Chapter 8. In the ICT domain, two main formal standards bodies are in place. The first one is ISO/IEC JTC 1, at the International level, and its subcommittees (Section 7.1.1 to 7.1.22). The second one is the CEN at the European level, which established several technical committees related to ICT (Section 7.2.1 to 7.2.11).

In addition, technical committees ISO/TC 46 and CENELEC/TC 215 that are not directly related to the ICT domain as established in Section 4.1, but covering the e-archiving and data center topics have been added due to their relevance for the national market. Moreover, e-archiving and data center have been defined as subsectors in Section 5.1. ISO/TC 46 and CLC/TC 215 are thus monitored in this ICT standards watch (Section 7.3 and 7.4).


ETSI and ITU-T are other formal standards bodies focused on telecommunications. ETSI is presented as a whole (Section 7.5.1) and, moreover, a focus is performed on two technical committees particularly relevant with regards to the subsectors “Cloud computing” and “Electronic signature” (Section 7.5.2 to 7.5.3). In addition, two other technical committees have been selected due to their potential for the development of promising sectors, described in Chapter 10, such as Smart cities and Internet of Things (Section 7.5.4 to 7.5.5). Finally, ITU-T is also presented as a whole (Section 7.6).

7.1. ISO/IEC standardization committees

ISO is the world's largest developer and publisher of International Standards with more than 20,000 standards published and more than 4,000 standards under development. ISO is in charge of developing International Standards for all industry sectors. IEC prepares and publishes International Standards for all electrical, electronic, and related technologies – collectively known as “electrotechnology”. To deal with the consequences of substantial overlap in areas of standardization and work related to information technology, ISO and IEC formed a Joint Technical Committee known as the ISO/IEC JTC 1 in 1987.

⁸⁴ Hesser, W., Czaya, A., & Riemer, N. (2007). Development of Standards. In W. Hesser (Ed.), *Standardisation in Companies and Markets* (pp. 123-169). Hamburg: Helmut Schmidt University.

7.1.1.ISO/IEC JTC 1

General information			
Committee	ISO/IEC JTC 1	Title	Information technology
Creation date	1987	MEMBERS 	Participating countries (35): United States, Armenia, Australia, Austria, Belgium, Canada, China, Czech Republic, Côte d'Ivoire, Denmark, Finland, France, Germany, India, Ireland, Italy, Japan, Kazakhstan, Republic of Korea, Lebanon, Malaysia, Malta, Netherlands, Nigeria, Norway, Pakistan, Russian Federation, Singapore, South Africa, Spain, Sweden, Switzerland, United Arab Emirates, United Kingdom, Zimbabwe Observing countries (58): Algeria, Argentina, Azerbaijan, Belarus, Bosnia and Herzegovina, Brazil, Bulgaria, Chile, Colombia, Costa Rica, Croatia, Cuba, Cyprus, Ecuador, Egypt, El Salvador, Estonia, Ethiopia, Ghana, Greece, Hong Kong, Hungary, Iceland, Indonesia, Islamic Republic of Iran, Israel, Jamaica, Kenya, Democratic People's Republic of Korea, Libya, Lithuania, Luxembourg , Mauritius, Mexico, Mongolia, Montenegro, Morocco, New Zealand, Peru, Philippines, Poland, Portugal, Romania, Saudi Arabia, Serbia, Slovakia, Slovenia, Sri Lanka, Swaziland, Thailand, The former Yugoslav Republic of Macedonia, Tunisia, Turkey, Uganda, Ukraine, Uruguay, Uzbekistan, Viet Nam
Secretariat	ANSI (USA)		
Secretary	Mrs. Lisa Rajchel		
Chairperson	Ms. Karen Higginbottom		
Involvement of Luxembourg	2 delegates (JTC 1 and related WG only) 40 delegates (JTC 1 and related SC)		
Organizations in liaison	EC, Ecma International, ITU		
Web site	http://www.iso.org/iso/fr/jtc1_home		
Scope	Standardization in the field of information technology		
Structure	ISO/IEC JTC 1/SWG 1 Accessibility (SWG-A) ISO/IEC JTC 1/SWG 2 Directives (SWG-D) ISO/IEC JTC 1/SWG 3 Planning (SWG-P) ISO/IEC JTC 1/SWG 5 Internet of Things ISO/IEC JTC 1/SWG 6 Management ISO/IEC JTC 1/AHG 1 Incubator ISO/IEC JTC 1/AHG 2 Structure ISO/IEC JTC 1/SG 1 Smart Cities ISO/IEC JTC 1/SG 2 Big Data ISO/IEC JTC 1/WG 7 Sensor Networks ISO/IEC JTC 1/SC 2 Coded character sets ISO/IEC JTC 1/SC 6 Telecommunications and information exchange between systems ISO/IEC JTC 1/SC 7 Software and systems engineering ISO/IEC JTC 1/SC 17 Cards and personal identification ISO/IEC JTC 1/SC 22 Programming languages, their environments, and system software interfaces ISO/IEC JTC 1/SC 23 Digitally Recorded Media for Information Interchange and Storage ISO/IEC JTC 1/SC 24 Computer graphics, image processing, and environmental data representation ISO/IEC JTC 1/SC 25 Interconnection of information technology equipment ISO/IEC JTC 1/SC 27 IT Security techniques ISO/IEC JTC 1/SC 28 Office equipment		

	ISO/IEC JTC 1/SC 29	Coding of audio, picture, multimedia and hypermedia information
	ISO/IEC JTC 1/SC 31	Automatic identification and data capture techniques
	ISO/IEC JTC 1/SC 32	Data management and interchange
	ISO/IEC JTC 1/SC 34	Document description and processing languages
	ISO/IEC JTC 1/SC 35	User interfaces
	ISO/IEC JTC 1/SC 36	Information technology for learning, education and training
	ISO/IEC JTC 1/SC 37	Biometrics
	ISO/IEC JTC 1/SC 38	Distributed application platforms and services (DAPS)
	ISO/IEC JTC 1/SC 39	Sustainability for and by Information Technology
	ISO/IEC JTC 1/SC 40	IT Service Management and IT Governance
Standardization work		
Published standards	Total number of published ISO standards related to the technical committee and its SCs (number includes updates): 2687	
	Number of published ISO standards under the direct responsibility of JTC 1 (number includes updates): 450	
Standards under development	608	
Comments		
<p>ISO/IEC JTC 1 is currently the main standardization committee in the information and communication technology domain, regarding the number of published standards and the number of standards users. Among the standards developed by ISO/IEC JTC 1, the following standards are the best-selling and therefore particularly relevant for the economic market (source: ISO Customer Services – February 2014):</p> <ul style="list-style-type: none">- ISO/IEC 27001:2013, Information technology -- Security techniques -- Information security management systems – Requirements;- ISO/IEC 27002:2013, Information technology -- Security techniques -- Code of practice for information security management;- ISO/IEC 20000-1:2011, Information technology -- Service management -- Part 1: Service management system requirements;- ISO/IEC 27001:2005, Information technology -- Security techniques -- Information security management systems – Requirements;- ISO/IEC 20000-2:2012, Information technology -- Service management -- Part 2: Guidance on the application of service management systems;- ISO/IEC 27002:2005, Information technology -- Security techniques -- Code of practice for information security management;- ISO/IEC 27005:2011, Information technology -- Security techniques -- Information security risk management;- ISO/IEC 27013:2012, Information technology -- Security techniques -- Guidance on the integrated implementation of ISO/IEC 27001 and ISO/IEC 20000-1;- ISO/IEC 20000-3:2012, Information technology -- Service management -- Part 3: Guidance on scope definition and applicability of ISO/IEC 20000-1;- ISO/IEC 27003:2010, Information technology -- Security techniques -- Information security management system implementation guidance. <p>ISO/IEC JTC 1 also benefits from the rapid, market-driven work of <i>de facto</i> standards-setting organizations and industry <i>consortia</i>. This is amplified by having many technical experts participating not only in national standardization bodies but also in key <i>de facto</i> standards-setting bodies and industrial <i>fora</i>. Liaising and cooperating extends the expertise of ISO/IEC JTC 1's subcommittees and provides feedback on how ISO/IEC JTC 1 standards are being used. It also helps identify any gaps or inconsistencies that need to be addressed. By</p>		

working with other standards-setting organizations (SDOs), ISO/IEC JTC 1's ability to serve an integration function is enhanced.⁸⁵

ISO/IEC JTC 1/SWG 1 – Accessibility (SWG-A)

JTC 1 believes that the work in the area of information communication and technology standardization for accessibility is a major undertaking, encompassing many international, regional and local interests. Additionally, there are significant standards efforts taking place in ISO, IEC, ITU and the national and regional standards bodies as well as various *consortial/fora* and user groups.

As identified in its long term business plan and to be responsive to international, regional, national, and end user requirements in the area of accessibility, JTC 1 establishes a Special Working Group on Accessibility with the following Terms of Reference:

- Determine an approach, and implement, the gathering of user requirements, being mindful of the varied and unique opportunities (direct participation of user organizations, workshops, liaisons);
- Identify a mechanism to work proactively between meetings to make forward progress gather and publish an inventory of all known accessibility standards efforts;
- Identify areas/technologies where voluntary standards are not being addressed and suggest an appropriate body to consider the new work;
- Track public laws, policies/measures and guidelines to ensure the necessary standards are available through wide dissemination of the SWG materials, encourage the use of globally relevant voluntary standards;
- Assist *consortial/fora*, if desired, in submitting their specifications to the formal standards process.

ISO/IEC JTC 1/SWG 2 – Directives (SWG-D)

The SWG-Directives were implemented with Resolution 15 of the JTC 1 Plenary meeting in 2005 in Banff. Its role is to ensure compliance with the JTC 1 Directives, but also to implement changes to the JTC 1 Directives. SWG-D also ensures harmonization of procedures of ISO and IEC.

The 2005 JTC 1 Plenary established the Special Working Group on Directives (SWG-D) with the following Terms of Reference:

- The SWG-Directives operates under the direction of JTC 1 to maintain the JTC 1 Directives and implement changes to the JTC 1 Directives agreed by JTC 1. The SWG-Directives shall monitor the implementation of existing procedures, evaluating their effectiveness and making proposals for changes where found necessary;
- The SWG-Directives shall cooperate with ISO and IEC in the development of detailed harmonized procedures;
- Membership in the SWG-Directives is open to all P-members of JTC 1. O-members of JTC 1, Category A Liaison members of JTC 1, and SCs may also participate in the SWG-Directives;
- The SWG-Directives is empowered to issue 60 day JTC 1 Letter Ballots if necessary.

ISO/IEC JTC 1/SWG 3 – Planning (SWG-P)

ISO/IEC JTC 1/SWG 3 - Planning is a "special" working group in the sense that it does not intend to develop standards. It covers planning activities of the ISO / IEC JTC 1 and the definition of its action plans. Its role is to:

- Assist the JTC 1 Chairman and Secretariat in developing/revising the JTC 1 Strategic Business Plan;
- Recommend actions for JTC 1 to successfully execute the business plans;
- Connect with SC business planning processes;
- Encourage SC participation in the development and execution of the overall JTC 1 Business Plans;
- Perform the Environmental Scanning activity to identify new work areas of interest to JTC 1. SWG on Planning will analyze the provided information and will give a yearly report with its recommendations for new work areas to the JTC 1 plenary. Presentations to provide JTC 1 with more details on such proposed technology areas may supplement the report to the JTC 1 Plenary;
- Maintain a description of the JTC 1 planning process as per JTC 1 Standing Document 4;

⁸⁵ The force multiplier for ICT innovation, ISO/IEC joint technical committee 1 – JTC1, Information technology standards, 2011

- Maintain JTC 1 Standing Document 2, Historical Background of JTC 1, in close cooperation with, and under the guidance of, the editor of SD 2;
- Establish a working relationship with the ITU-T Technology Watch function, send the SWG on Planning's report to the ITU-T Technology Watch function and invite input from ITU-T Technology Watch function to the SWG for its planning on environmental scanning process;
- Support the JTC 1 Incubator function as defined in the JTC 1 Incubator Operating Principles and maintain the corresponding description of the operating principles;
- Perform the operational functions of a Parent Group, in cases where JTC 1 is designated as the Parent Group of an Incubator Group ISO/IEC JTC 1/SWG 2 – Directives (SWG-D).

ISO/IEC JTC 1/SWG 5 - Internet of Things (SWG - IoT)

JTC 1 recognizes the importance of Internet of Things (IoT) as a trend that will shape the definition of many standards in the ICT sector, and notes a growing interest in this area among a number of standards setting organizations. The vision for Internet of Things (IoT) is relevant to the mission of JTC 1 and intersects with the scope of a number of JTC 1 SCs, WGs and SWG on Planning. Therefore, JTC 1 establishes a Special Working Group on Internet of Things (IoT) with the following Terms of Reference:

- Identify market requirements and standardization gaps for IoT;
- Encourage JTC 1 SCs and WGs to address the need for ISO/IEC standards for IoT;
- Facilitate cooperation across JTC 1 entities;
- Promote JTC 1 developed standards for IoT and encourage them to be recognized and utilized by industry and other standards setting organizations;
- Facilitate the coordination of JTC 1 IoT activities with IEC, ISO, ITU and other organizations that are developing standards for IoT;
- Periodically report results and recommendations to JTC 1/SWG on Planning; and
- Provide a written report of activities and recommendations to JTC 1 in advance of each JTC 1 Plenary meeting;
- Study IoT Reference Architectures/Frameworks and provide a study report. This study report should be written so it could be referenced in a possible JTC 1 New Work Item Proposal on IoT. The report shall be made available to JTC 1 no later than the 2014 JTC 1 Plenary.

ISO/IEC JTC 1/SWG 6 - Management

A new SWG on Management was recently created with the following Terms of Reference:

The SWG on Management operates under the direction of JTC 1 to review and evaluate the organizational effectiveness of JTC 1 and make recommendations to JTC 1 to this effect. This includes:

- Review and evaluation of the JTC 1 structure on a regular basis;
- Development of recommendations on management aspects of JTC 1;
- Review of issues arising from overlapping/conflicting scopes, activities and projects as well as disagreements over project assignments. The SWG shall work with JTC 1 subgroup chairs and conveners to identify issues and to reach acceptable resolutions;
- Provide advice on matters of operational efficiency and management to the JTC 1 chairman;
- Review of the effective distribution of public information on JTC 1 activities and making suggestions for improvements.

ISO/IEC JTC 1/AHG 1 – Incubator

JTC 1 establishes an Ad Hoc Group on Incubator Function to determine the feasibility of, and provide recommendations on, the creation of an incubator function in JTC 1. The ad hoc terms of reference are as follows:

- Determine additional methods to assist JTC 1 in identifying potential work items or work areas;
- Methods to investigate include, but are not limited to:
 - o organization of workshops gathering active stakeholders in a given field,
 - o creation of incubator groups with members dedicated to the gathering and creation of initial documents that can be considered as project proposals,

- Propose operating principles for such events or groups, including the way to prepare or launch them, the desired participation (e.g. size, level of expertise), the need for any governing/steering structure, the outreach, optimum lifetime or any other important characteristics;
- Suggest methods to implement them into JTC 1 (e.g. in the JTC 1 planning process);
- Investigate various funding mechanisms.

ISO/IEC JTC 1/AHG 2 – Structure

ISO/IEC JTC 1/AHG 2 - Structure does not intend to develop standards. The 2011 JTC 1 Plenary re-established the Ad Hoc Group on Structure (AHS) with the following Terms of Reference:

- Collect and study information on areas where the organizational structure of JTC 1 (including its SCs, WGs and SWGs) could be improved or expanded to make JTC 1 more effective;
- Review, evaluate and make proposals to JTC 1 for possible changes to the current scopes of JTC 1 SCs, WGs and SWGs;
- Review, evaluate and make proposals to JTC 1 for possible changes to the current assignment of projects among JTC 1 SCs, WGs and SWGs;
- Evaluate alternatives and possible improvements to JTC 1 structure and the processes for managing that structure over time;
- Develop recommendations on process improvements and on specific actions to be taken, and share these with relevant JTC 1 SCs, WGs and SWGs where that would help to improve the progression of work;
- Develop a best practices guide for liaisons. Upon completion, this guide will be forwarded to SWG on the Directives for incorporation into the SD on Liaisons;
- Explore the requirements and make proposals to JTC 1 for a permanent group to manage aspects of JTC 1 structure, operational management and tools.

ISO/IEC JTC 1/SG 1 – Smart Cities

JTC 1 recognizes the importance of Smart Cities as a trend that will shape many standards in the ICT sector, and notes a growing interest in this area among a number of standards setting organizations. The topic Smart Cities is relevant to the mission of JTC 1 and intersects with the scope of a number of JTC 1 entities.

Therefore, JTC 1 has established a Study Group on Smart Cities during its 2013 Plenary Meeting with the following Terms of Reference:

- Provide a description of key concepts related to Smart Cities, establish the definition of Smart Cities based on the key concepts, and describe relevant terminology;
- Study and document the technological, market and societal requirements for the ICT standardization aspects of Smart Cities;
- Study and document current technologies that are being deployed to enable Smart Cities;
- Assess the current state of standardization activities relevant to Smart Cities within JTC 1, in other relevant ISO and IEC TCs, in other SDOs and in *consortia*;
- Identify and propose how JTC 1 should address the ICT standardization needs of Smart Cities;
- Provide a report with recommendations, and potentially other deliverables, to the 2014 JTC 1 Plenary.

Membership in the SG on Smart Cities is open to:

- JTC 1 National Bodies, JTC 1 Liaisons and approved JTC 1 PAS Submitters;
- JTC 1 /SCs, JTC 1/(S)WGs, relevant ISO and IEC TCs;
- Members of ISO and IEC central offices;
- Invited standards setting organizations that are engaged in Smart Cities standardization as approved by SG on Smart Cities.

ISO/IEC JTC 1/SG 2 – Big Data


JTC 1 has established a Study Group on Big Data during its 2013 Plenary Meeting for consideration of Big Data activities across all of JTC 1 with the following terms of reference:

- Survey the existing ICT landscape for key technologies and relevant standards /models/studies /use cases and scenarios for Big Data from JTC 1, ISO, IEC and other standards setting organizations;
- Identify key terms and definitions commonly used in the area of Big Data;
- Assess the current status of Big Data standardization market requirements, identify standards gaps, and propose standardization priorities to serve as a basis for future JTC 1 work;
- Provide a report with recommendations and other potential deliverables to the 2014 JTC 1 Plenary.

Membership in the SG on Big Data is open to:


- JTC 1 National Bodies, JTC 1 Liaisons and approved JTC 1 PAS Submitters;
- JTC 1 /SCs, JTC 1/WGs, relevant ISO and IEC TCs;
- Members of ISO and IEC central offices;
- Invited standards setting organizations that are engaged in Big Data standardization as approved by the SG on Big Data.

7.1.2.ISO/IEC JTC 1/WG 7

General information			
Committee	ISO/IEC JTC 1/WG 7	Title	Sensor networks
Creation date	2009		Participating countries (35): United States, Armenia, Australia, Austria, Belgium, Canada, China, Czech Republic, Côte d'Ivoire, Denmark, Finland, France, Germany, India, Ireland, Italy, Japan, Kazakhstan, Republic of Korea, Lebanon, Malaysia, Malta, Netherlands, Nigeria, Norway, Pakistan, Russian Federation, Singapore, South Africa, Spain, Sweden, Switzerland, United Arab Emirates, United Kingdom, Zimbabwe
Secretariat	KATS (Republic of Korea)		
Secretary	Ms. Jooran Lee		
Convenor	Dr. Yongjin Kim		
Involvement of Luxembourg	NO (no registered delegate)		
Organizations in liaison	OGC, IEEE Instrumentation and Measurement Society TC 9	MEMBERS 	Observing countries (58): Algeria, Argentina, Azerbaijan, Belarus, Bosnia and Herzegovina, Brazil, Bulgaria, Chile, Colombia, Costa Rica, Croatia, Cuba, Cyprus, Ecuador, Egypt, El Salvador, Estonia, Ethiopia, Ghana, Greece, Hong Kong, Hungary, Iceland, Indonesia, Islamic Republic of Iran, Israel, Jamaica, Kenya, Democratic People's Republic of Korea, Libya, Lithuania, Luxembourg , Mauritius, Mexico, Mongolia, Montenegro, Morocco, New Zealand, Peru, Philippines, Poland, Portugal, Romania, Saudi Arabia, Serbia, Slovakia, Slovenia, Sri Lanka, Swaziland, Thailand, The former Yugoslav Republic of Macedonia, Tunisia, Turkey, Uganda, Ukraine, Uruguay, Uzbekistan, Viet Nam
Web site	http://isotc.iso.org/livelink/livelink/open/jtc1wg7		
Scope	<p>1) In the area of generic solutions for sensor networks, undertake standardization activities that support and can be applied to the technical work of all relevant JTC 1 entities and to other standards organizations. This includes activities in sensor networks such as the following:</p> <ul style="list-style-type: none"> - Standardization of terminology; - Development of a taxonomy; - Standardization of reference architectures; - Development of guidelines for interoperability; - Standardization of specific aspects of sensor networks. <p>2) In the area of application - oriented sensor networks, identify gaps and commonalities that may impact standardization activities within the scope of JTC 1. Further, share this information with relevant entities within and outside of JTC 1. Unless better pursued within another JTC 1 entity, the following standardization activities may be pursued as projects by this Working Group:</p> <ul style="list-style-type: none"> - Addressing the technology gaps within the scope of JTC 1 entities; - Exploiting technology opportunities where it is desirable to provide common approaches to the use of sensor networks across application domains; - Addressing emerging areas related to M2M and IoT. <p>3) In order to foster communication and sharing of information between groups working in the field of sensor networks:</p> <ul style="list-style-type: none"> - Seek liaison relationships with all relevant JTC 1 SCs/WGs; - Seek liaison relationships with other organizations outside JTC 1 including but not limited to: relevant ISO TCs, IEC TCs and ITU-T SGs, IEEE 1451, IEEE 1588, IEEE 		

	P2030, IEEE 802.15, Open Geospatial Consortium, ZigBee Alliance, IETF 6LoWPAN, IETF ROLL WG, ETSI, IPSO Alliance, EPCglobal, ISA 100, LONMARK, KNX Association, Zwave Alliance; <ul style="list-style-type: none"> - Consider the possibility of conducting joint projects with relevant ITU-T SG; - Seek input from relevant research projects and <i>consortia</i>.
Structure	/
Standardization work	
Published standards	5
Standards under development	5
Comments	
<p>The scope of ISO/IEC JTC 1/WG 7 has been updated during the 27th Meeting of ISO/IEC JTC 1 in November 2012 in Jeju Island (Korea) [Resolution 44].</p> <p>ISO/IEC JTC 1/WG 7 is, amongst other, in charge of the development of the ISO/IEC 29182 series of standards for Sensor Network Reference Architecture (SNRA). This series aims to provide guidance to facilitate the design and development of sensor networks, to improve interoperability of sensor networks, and to make sensor network components plug-and-play, so that it becomes fairly easy to add/remove sensor nodes to/from an existing sensor network. Several parts of the series are already published (1, 2, 3, 4 and 5).</p> <p>The current work program includes:</p> <ul style="list-style-type: none"> - ISO/IEC DIS 29182-6, Sensor networks: Sensor Network Reference Architecture (SNRA) -- Part 6: Application; - ISO/IEC DIS 29182-7, Sensor networks: Sensor Network Reference Architecture (SNRA) -- Part 7: Interoperability guidelines; - ISO/IEC DIS 30101, Information technology -- Sensor Networks: Sensor Network and its interfaces for smart grid system; - ISO/IEC DIS 30128, Information technology -- Sensor Networks -- Generic Sensor Network Application Interface. 	

7.1.3.ISO/IEC JTC 1/SC 2

General information			
Committee	ISO/IEC JTC 1/SC 2	Title	Coded character sets
Creation date	1987	MEMBERS 	Participating Countries (28): Japan, Austria, Canada, China, Egypt, Finland, France, Germany, Greece, Hungary, Iceland, India, Indonesia, Ireland, Democratic People's Republic Korea, Republic of Korea, Lithuania, Mongolia, Norway, Poland, Russian Federation, Serbia, Sri Lanka, Thailand, Tunisia, USA, Ukraine, United Kingdom Observing Countries (22): Armenia, Belgium, Bosnia and Herzegovina, Cuba, Czech Republic, Estonia, Ethiopia, Ghana, Hong Kong, Islamic Republic of Iran, Israel, Italy, Kazakhstan, Malaysia, Morocco, Netherlands, Romania, Slovenia, Sweden, Switzerland, Turkey, Viet Nam
Secretariat	JISC(Japan)		
Secretary	Ms. Toshiko Kimura		
Chairperson	Dr. Yoshiki Mikami		
Involvement of Luxembourg	NO (no registered delegate)		
Organizations in liaison	CCSDS, EC, ISOC, ITU, UNCTAD, UNECE, WIPO, WMO		
Web site	http://www.iso.org/iso/home/standards_development/list_of_iso_technical_committees/iso_technical_committee.htm?commid=45050		
Scope	Standardization of graphic character sets and their characteristic including string ordering, associated control functions, their coded representation for information interchange and code extension techniques. Excluded: audio and picture coding.		
Structure	JTC 1/SC 2/WG 2	Universal coded character set	
Standardization work			
Published standards	Number of published ISO standards under the direct responsibility of JTC 1/SC 2 (number includes updates): 52		
Standards under development	3		
Comments			
Noteworthy standards of ISO/IEC JTC 1/SC 2 are:			
<ul style="list-style-type: none">- ISO 646:1972, Information technology -- ISO 7-bit coded character set for information interchange;- ISO/IEC 8859 series of standards entitled "8-bit single-byte coded graphic character sets";- ISO/IEC 10646:2012, Information technology -- Universal Coded Character Set (UCS) (published for the first time in 1993, this standard is currently under revision).			


7.1.4.ISO/IEC JTC 1/SC 6

General information			
Committee	ISO/IEC JTC 1/SC 6	Title	Telecommunications and information exchange between systems
Creation date	1964	MEMBERS 	Participating Countries (21): Republic of Korea, Austria, Belgium, Canada, China, Czech Republic, Finland, Germany, Greece, Jamaica, Japan, Kazakhstan, Kenya, Luxembourg , Netherlands, Russian Federation, Spain, Switzerland, Tunisia, United Kingdom, United States Observing Countries (29): Argentina, Bosnia and Herzegovina, Colombia, Cuba, Cyprus, France, Ghana, Hong Kong, Hungary, Iceland, India, Indonesia, Islamic Republic of Iran, Ireland, Italy, Malaysia, Malta, New Zealand, Norway, Philippines, Poland, Romania, Saudi Arabia, Serbia, Singapore, Slovenia, Thailand, Turkey, Ukraine
Secretariat	KATS (Republic of Korea)		
Secretary	Ms. Jooran Lee		
Chairperson	Prof. Dae Young Kim		
Involvement of Luxembourg	1 delegate		
Organizations in liaison	CEPT, CERN, EC, ETSI, Ecma International, ICAO, ISOC, ITSO, ITU, OASIS, UNCTAD, UNECE, UPU, WMO		
Web site	http://www.iso.org/iso/standards_development/technical_committees/list_of_iso_technical_committees/iso_technical_committee.htm?commid=45072		
Scope	Standardization in the field of telecommunications dealing with the exchange of information between open systems including system functions, procedures, parameters as well as the conditions for their use. The standardization encompasses protocols and services of lower layers including physical, data link, network, and transport as well as those of upper layers including but not limited to Directory and ASN.1. Future Network has recently been added as an important work scope. A considerable part of the work is done in effective cooperation with ITU-T and other standardization bodies including IEEE 802 and Ecma International.		
Structure	JTC 1/SC 6/WG 1 JTC 1/SC 6/WG 7 JTC 1/SC 6/WG 10	Physical and data link layers Network, transport and future network Directory, ASN.1 and Registration	
Standardization work			
Published standards	Number of published ISO standards under the direct responsibility of JTC 1/SC 6 (number includes updates): 351		
Standards under development	34		
Comments			
ISO/IEC JTC 1/SC 6 is, amongst other, in charge of the development of the ISO/IEC 29181 series of standards entitled “Future Network -- Problem Statement and Requirements”, that aims to specify problem statement and requirements for the various issues of Future Network such as overall aspects, naming and addressing, switching and routing, mobility, security, media transport, and service composition. Several parts of the series are already published (1, 3, 4, 6 and 7).			

Examples of noteworthy standards developed by ISO/IEC JTC 1/SC 6 are:


- ISO/IEC 8824 series of standards entitled "Information technology -- Abstract Syntax Notation One (ASN.1)";
- ISO/IEC 9594 series of standards entitled "Information technology -- Open Systems Interconnection -- The Directory";
- ISO/IEC TR 20002:2012, Information technology -- Telecommunications and Information Exchange Between Systems -- Managed P2P: Framework.

7.1.5.ISO/IEC JTC 1/SC 7

General information			
Committee	ISO/IEC JTC 1/SC 7	Title	Software and systems engineering
Creation date	1987	MEMBERS 	Participating Countries (40): Canada, Argentina, Australia, Belgium, Brazil, China, Colombia, Czech Republic, Côte d'Ivoire, Denmark, Finland, France, Germany, India, Ireland, Israel, Italy, Jamaica, Japan, Kazakhstan, Republic of Korea, Luxembourg , Malaysia, Mexico, Netherlands, New Zealand, Peru, Poland, Portugal, Romania, Russian Federation, Slovakia, South Africa, Spain, Sweden, Switzerland, Thailand, Ukraine, United Kingdom, United States Observing Countries (20): Austria, Bosnia and Herzegovina, Cuba, Cyprus, Estonia, Ethiopia, Ghana, Hong Kong, Hungary, Iceland, Indonesia, Islamic Republic of Iran, Kenya, Morocco, Norway, Philippines, Serbia, The former Yugoslav Republic of Macedonia, Turkey, Uruguay
Secretariat	SCC (Canada)		
Secretary	Dr. Witold Suryn		
Chairperson	Mr. François Coallier		
Involvement of Luxembourg	11 delegates		
Organizations in liaison	AES, Ecma International, IEEE, INCOSE, ISACA, ITU, PMI, WMO, itSMF		
Web site	http://www.iso.org/iso/standards_development/technical_committees/list_of_iso_technical_committees/iso_technical_committee.htm?commid=45086		
Scope	Standardization of processes, supporting tools and supporting technologies for the engineering of software products and systems. Note: The processes, tools and technologies are within the scope of JTC 1 terms of references and exclude specific tools and technologies that have been assigned by JTC 1 to other of its SC's.		
Structure	JTC 1/SC 7/AG 1 Life Cycle Processes Harmonization Advisory Group (LCPHAG) JTC 1/SC 7/SWG 1 JTC 1/SC7 Business Planning Group (BPG) JTC 1/SC 7/SWG 5 Standards management group JTC 1/SC 7/SWG 22 Vocabulary validation JTC 1/SC 7/WG 2 System software documentation JTC 1/SC 7/WG 4 Tools and environment JTC 1/SC 7/WG 6 Evaluation and metrics JTC 1/SC 7/WG 7 Life cycle management JTC 1/SC 7/WG 10 Process assessment JTC 1/SC 7/WG 19 Open distributed processing and modeling languages JTC 1/SC 7/WG 20 Software and systems bodies of knowledge and professionalization JTC 1/SC 7/WG 21 Software asset management JTC 1/SC 7/WG 24 SLC Profile and guidelines for VSE JTC 1/SC 7/WG 26 Software testing JTC 1/SC 7/WG 28 Joint between ISO/IEC JTC 1/SC 7 and ISO/TC 159/SC 4: Common Industry Formats for Usability Reports JTC 1/SC 7/WG 42 Architecture		

Standardization work	
Published standards	Number of published ISO standards under the direct responsibility of JTC 1/SC 7 (number includes updates): 152
Standards under development	46
Comments	
<p>The main standards published by the subcommittee are:</p> <ul style="list-style-type: none"> - ISO/IEC 15288:2008, Systems and software engineering -- System life cycle processes; - ISO/IEC 19759:2005, Software Engineering -- Guide to the Software Engineering Body of Knowledge (SWEBOK); - ISO/IEC 20000-1:2011, Information technology -- Service management -- Part 1: Service management system requirements; - ISO/IEC 20000-2:2012, Information technology -- Service management -- Part 2: Guidance on the application of service management systems; - ISO/IEC 15504 series of standards concerning Process assessment (10 parts); - ISO/IEC 12207:2008, Systems and software engineering -- Software life cycle processes; - ISO/IEC 38500:2008, Corporate governance of information technology; - ISO/IEC 25000 series of standards concerning Software Product Quality Requirements and Evaluation (also known as the SQuaRE series); - ISO/IEC/IEEE 29119 parts 1, 2 and 3:2013, Systems and software engineering -- Software Testing. <p>It is important to note that ISO/IEC 20000 and ISO/IEC 38500 series of standards are now under the responsibility of the subcommittee ISO/IEC JTC 1/SC 40 since the 2013 JTC 1 Plenary Meeting. Indeed, SC 40 has been formed through a merger of working groups previously attached to SC 7 and JTC 1. It is also important to note that the ISO/IEC 15504 series of standards is following a major revision and will be derived in the ISO/IEC 33000 series.</p>	


7.1.6.ISO/IEC JTC 1/SC 17

General information			
Committee	ISO/IEC JTC 1/SC 17	Title	Cards and personal identification
Creation date	1969	<div>MEMBERS</div> <div></div>	Participating Countries (33): United Kingdom, Armenia, Australia, Austria, Belgium, Canada, China, Czech Republic, Denmark, France, Germany, India, Israel, Italy, Japan, Kenya, Republic of Korea, Luxembourg , Malaysia, Netherlands, Norway, Poland, Portugal, Romania, Russian Federation, Singapore, Slovakia, Slovenia, South Africa, Spain, Sweden, Switzerland, United States Observing Countries (16): Bosnia and Herzegovina, Estonia, Finland, Ghana, Hungary, Iceland, Indonesia, Islamic Republic of Iran, Ireland, Kazakhstan, Lithuania, New Zealand, Serbia, Thailand, Turkey, Ukraine
Secretariat	BSI (United Kingdom)		
Secretary	Mr. Chris Starr		
Chairperson	Mr. Richard A. Mabbott		
Involvement of Luxembourg	1 delegate		
Organizations in liaison	AMEX, CCETT, ECBS, Ecma International, IATA, ICAO, ICMA, ILO, MasterCard, UNECE, VISA, Visa EU		
Web site	http://www.iso.org/iso/standards_development/technical_committees/list_of_iso_technical_committees/iso_technical_committee.htm?commid=45144		
Scope	Standardization in the area of: <ul style="list-style-type: none">- Identification and related documents;- Cards and devices associated with their use in inter-industry applications and International interchange.		
Structure	JTC 1/SC 17/WG 1 JTC 1/SC 17/WG 3 JTC 1/SC 17/WG 4 JTC 1/SC 17/WG 5 JTC 1/SC 17/WG 8 JTC 1/SC 17/WG 9 JTC 1/SC 17/WG 10 JTC 1/SC 17/WG 11	Physical characteristics and test methods for ID-cards Identification cards – Machine readable travel documents Integrated circuit card with contacts Registration Management Group (RMG) Integrated circuit cards without contacts Optical memory cards and devices Motor vehicle driver license and related documents Application of biometrics to cards and personal identification	
Standardization work			
Published standards	Number of published ISO standards under the direct responsibility of JTC 1/SC 17 (number includes updates): 112		
Standards under development	56		
Comments			
ISO/IEC JTC 1 subcommittee SC 17, Cards and personal identification, is responsible for the development of a large portfolio of card standards in support of interoperability and data interchange.			
At a minimum, the standards define the physical dimensions of the card and the geometry of the terminals which read those cards (e.g. the slot in an ATM). Then, depending on the reading technology, the standards define how the card “couples” with the card terminal and thereby communicates with the underlying application (e.g. motorized mag strip readers in ATMs, magnetic stripe swipe readers in Point-of-Sale terminals, slot readers in hotel card key locks).			

At their most basic level, standards maintain interoperability between cards and the card readers that read them. For a closed system or national implementation, interoperability is important so that components, such as the cards or the chips on smart cards sourced on the open market from various manufacturers, will interoperate, with a high degree of confidence, with card readers sourced from different manufacturers.

Two of the most sophisticated technologies involve microprocessors embedded in the card, also known as “smart cards”. These are “cards with contacts” and “contactless cards”. Cards with contacts are usually inserted manually into a “dip reader” whereas contactless cards use radio frequency coupling to enable “touch and go” for rapid transit ticket gates and “wave and pay” to make low value purchases in retail outlets such as fast food restaurants. Electronic passports (ePassports) and citizen identification cards are further examples where contactless standards have been adopted.


7.1.7.ISO/IEC JTC 1/SC 22

General information			
Committee	ISO/IEC JTC 1/SC 22	Title	Programming languages, their environments and system software interfaces
Creation date	1985	<div>MEMBERS</div> <div></div>	Participating Countries (21): United States, Austria, Canada, China, Denmark, Finland, France, Germany, Ireland, Italy, Japan, Kazakhstan, Republic of Korea, Netherlands, Portugal, Romania, Russian Federation, Spain, Switzerland, Ukraine, United Kingdom Observing Countries (25): Argentina, Bosnia and Herzegovina, Bulgaria, Cuba, Czech Republic, Egypt, Ghana, Greece, Hungary, Iceland, India, Indonesia, Islamic Republic of Iran, Kenya, Democratic People's Republic Korea, Malaysia, New Zealand, Norway, Poland, Serbia, Singapore, Slovenia, Sweden, Thailand
Secretariat	ANSI (USA)		
Secretary	Ms. Marisa Peacock		
Chairperson	Mr. Rex Jaeschke		
Involvement of Luxembourg	NO (no registered delegate)		
Organizations in liaison	Ecma International, Linux Foundation		
Web site	http://www.iso.org/iso/standards_development/technical_committees/list_of_iso_technical_committees/iso_technical_committee.htm?commid=45202		
Scope	<p>SC 22 is responsible for the standardization of programming languages (such as COBOL, Fortran, Ada, C, C++ and Prolog) and their environments (such as POSIX). SC 22 also produces common language-independent specifications to facilitate standardized bindings between programming languages and system services, as well as greater interaction between programs written in different languages.</p> <p>The most recently created WG has a project to document the vulnerabilities of various programming languages.</p> <p>Program portability between different implementations of the same language is a key goal.</p>		
Structure	JTC 1/SC 22/WG 4 JTC 1/SC 22/WG 5 JTC 1/SC 22/WG 9 JTC 1/SC 22/WG 14 JTC 1/SC 22/WG 17 JTC 1/SC 22/WG 21 JTC 1/SC 22/WG 23	COBOL Fortran Ada C Prolog C++ Programming Language Vulnerabilities	
Standardization work			
Published standards	Number of published ISO standards under the direct responsibility of JTC 1/SC 22 (number includes updates): 95		
Standards under development	9		
Comments			
ISO/IEC JTC 1/SC 22 is responsible for the standardization of programming languages, their environments and systems software interfaces. (specialized languages or environments assigned to the work program of another Subcommittee or Technical Committee are excluded).			


Examples of programming languages standardized through ISO/IEC JTC 1/SC 22 are:

- PLIP
- Pascal
- APL
- COBOL
- Fortran
- ALGOL
- PL/I
- Basic
- Ada
- C
- POSIX
- ISLisp
- Prolog
- FIMS
- C++
- PCTE
- Ruby
- C#

7.1.8.ISO/IEC JTC 1/SC 23


General information			
Committee	ISO/IEC JTC 1/SC 23	Title	Digitally Recorded Media for Information Interchange and Storage
Creation date	1987	MEMBERS 	Participating Countries (7): Japan, China, Republic of Korea, Netherlands, Russian Federation, Switzerland, United States Observing Countries (20): Argentina, Belgium, Bosnia and Herzegovina, Bulgaria, Cuba, Czech Republic, Finland, France, Ghana, Hungary, Iceland, India, Indonesia, Islamic Republic of Iran, Italy, Kazakhstan, Poland, Romania, Serbia, Thailand
Secretariat	JISC(Japan)		
Secretary	Ms. Toshiko Kimura		
Chairperson	Mr. Key Yamashita		
Involvement of Luxembourg	NO (no registered delegate)		
Organizations in liaison	Ecma International, WIPO		
Web site	http://www.iso.org/iso/standards_development/technical_committees/list_of_iso_technical_committees/iso_technical_committee.htm?commid=45240		
Scope	Standardization in the field of removable digital storage media utilizing optical, holographic and magnetic recording technologies, and flash memory technologies for digital information interchange, including: <ul style="list-style-type: none">- Algorithms for the lossless comprehension of data;- Volume and file structure;- Methods for determining the life expectancy of digital storage media;- Methods for error monitoring of digital storage media.		
Structure	JTC 1/SC 23/WG 6 JTC 1/SC 23/WG 7	iVDR Cartridge Joint between ISO/IEC JTC 1/SC 23, ISO/TC 42, and ISO/TC 171/SC 1	
Standardization work			
Published standards	Number of published ISO standards under the direct responsibility of JTC 1/SC 23 (number includes updates): 142		
Standards under development	1		
Comments			
Examples of standards developed by ISO/IEC JTC 1/SC 23 are:			
<ul style="list-style-type: none">- ISO/IEC 10995:2011, Information technology -- Digitally recorded media for information interchange and storage -- Test method for the estimation of the archival lifetime of optical media;- ISO/IEC 12862:2011, Information technology -- 120 mm [8,54 Gbytes per side] and 80 mm [2,66 Gbytes per side] DVD recordable disk for dual layer (DVD-R for DL).			
Currently, the work program only includes the following standard:			
<ul style="list-style-type: none">- ISO/IEC CD 16963, Information technology -- Digitally recorded media for information interchange and storage -- Test method for the estimation of lifetime of optical media for long-term data storage.			

7.1.9.ISO/IEC JTC 1/SC 24

General information			
Committee	ISO/IEC JTC 1/SC 24	Title	Computer graphics, image processing and environmental data representation
Creation date	1987		Participating Countries (10): United Kingdom, Australia, China, Egypt, France, Japan, Republic of Korea, Portugal, Russian Federation, United States Observing Countries (23): Argentina, Austria, Belgium, Bosnia and Herzegovina, Bulgaria, Canada, Cuba, Czech Republic, Finland, Ghana, Hungary, Iceland, India, Indonesia, Islamic Republic of Iran, Italy, Kazakhstan, Malaysia, Poland, Romania, Serbia, Slovakia, Thailand
Secretariat	BSI (United Kingdom)		
Secretary	Dr. Charles A. Whitlock		
Chairperson	Professor Ha-Jine Kimn		
Involvement of Luxembourg	NO (no registered delegate)		
Organizations in liaison	SEDRIS Organization, WIPO		
Web site	http://www.iso.org/iso/standards_development/technical_committees/list_of_iso_technical_committees/iso_technical_committee.htm?commid=45252		
Scope	<p>Standardization of interfaces for information technology based applications relating to:</p> <ul style="list-style-type: none">- computer graphics;- image processing;- environmental data representation;- support for the augmented reality continuum (ARC);- interaction with, and visual presentation of, information. <p><u>Included are the following related areas:</u> Modeling and simulation, related reference models; virtual reality with accompanying augmented reality/augmented virtuality aspects, related reference models; application program interfaces; functional specifications; representation models; interchange formats, encodings and their specifications, including metafiles; device interfaces; testing methods; registration procedures; presentation and support for creation of multimedia, hypermedia, and mixed reality documents.</p> <p><u>Excluded:</u> Character and image coding; coding of multimedia and hypermedia document interchange formats; JTC 1 work in user system interfaces and document presentation: ISO/TC 207 work on ISO 14000 environment management, ISO/TC 211 work on geographic information and geomatics; and software environments as described by ISO/IEC JTC 1/SC 22.</p>		
Structure	JTC 1/SC 24/WG 6 JTC 1/SC 24/WG 7 JTC 1/SC 24/WG 8 JTC 1/SC 24/WG 9	Augmented reality continuum presentation and interchange Image processing and interchange Environmental representation Augmented reality continuum concepts and reference model	
Standardization work			
Published standards	Number of published ISO standards under the direct responsibility of JTC 1/SC 24 (number includes updates): 80		

Standards under development	8
Comments	
<p>Examples of standards developed by ISO/IEC JTC 1/SC 23 are:</p> <ul style="list-style-type: none"> - ISO/IEC 11072:1992, Information technology -- Computer graphics -- Computer Graphics Reference Model; - ISO/IEC 18041-4:2007, Information technology -- Computer graphics, image processing and environmental data representation -- Environmental Data Coding Specification (EDCS) language bindings -- Part 4: C; - ISO/IEC 19777-2:2006, Information technology -- Computer graphics and image processing -- Extensible 3D (X3D) language bindings -- Part 2: Java. 	

7.1.10. ISO/IEC JTC 1/SC 25

General information			
Committee	ISO/IEC JTC 1/SC 25	Title	Interconnection of information technology equipment
Creation date	1987	MEMBERS 	Participating Countries (29): Germany, Australia, Austria, Belgium, Canada, China, Czech Republic, Denmark, Finland, France, India, Ireland, Israel, Italy, Japan, Kazakhstan, Republic of Korea, Lebanon, Mexico, Netherlands, Norway, Poland, Russian Federation, Singapore, Spain, Sweden, Switzerland, United Kingdom, United States Observing Countries (18): Argentina, Bosnia and Herzegovina, Croatia, Cuba, Ghana, Greece, Hong Kong, China, Hungary, Iceland, Indonesia, Kenya, Malaysia, New Zealand, Philippines, Romania, Serbia, Turkey, Ukraine
Secretariat	DIN (Germany)		
Secretary	Dr.-Ing. Walter von Pattay		
Chairperson	Mr. Gerd Weking		
Involvement of Luxembourg	NO (no registered delegate)		
Organizations in liaison	EC, Ecma International, ITU, UNCTAD, UNECE		
Web site	http://www.iso.org/iso/standards_development/technical_committees/list_of_iso_technical_committees/iso_technical_committee.htm?commid=45270		
Scope	<p>Standardization of microprocessor systems; and of interfaces, protocols, architectures and associated interconnecting media for information technology equipment and networks, generally for commercial and residential environments, to support embedded and distributed computing environments, storage systems, other input/output components, home and building electronic systems including customer premises smart grid applications for electricity, gas, water and heat.</p> <p>NOTE: This scope includes requirements for components, assemblies and subsystems. However, standardization of cables, waveguides and connectors remains within the relevant product technical committees and subcommittees of IEC. The scope includes the development of network interfaces, in liaison with committees for external utility networks, to support smart grid applications at the customer premises.</p>		
Structure	JTC 1/SC 25/TG 1 JTC 1/SC 25/WG 1 JTC 1/SC 25/WG 3 JTC 1/SC 25/WG 4	Project Team: Taxonomy and Terminology (PTTT) Home electronic systems Customer premises cabling Interconnection of computer systems and attached equipment	
Standardization work			
Published standards	Number of published ISO standards under the direct responsibility of JTC 1/SC 25 (number includes updates): 160		
Standards under development	37		
Comments			
<p>Some standards in development or developed, that are representative of the work of ISO/IEC JTC 1/SC 25 are:</p> <ul style="list-style-type: none">- ISO/IEC TR 29108:2013, Information technology -- Terminology for intelligent homes;- ISO/IEC 14165 series of standards concerning Fiber Channel. <p>Standards for Generic cabling, SCSI, Fiber Channel and Intelligent homes and buildings are at some of the priorities of the subcommittee.</p>			

7.1.11. ISO/IEC JTC 1/SC 27

General information				
Committee	ISO/IEC JTC 1/SC 27	Title	IT Security techniques	
Creation date	1990		Participating Countries (53): Germany, Argentina, Algeria, Australia, Austria, Belgium, Brazil, Canada, Chile, China, Cyprus, Czech Republic, Côte d'Ivoire, Denmark, Estonia, Finland, France, India, Ireland, Israel, Italy, Jamaica, Japan, Kazakhstan, Kenya, Republic of Korea, Luxembourg , Malaysia, Mauritius, Mexico, Morocco, Netherlands, New Zealand, Norway, Peru, Poland, Romania, Russian Federation, Singapore, Slovakia, Slovenia, South Africa, Spain, Sri Lanka, Sweden, Switzerland, Thailand, The Former Yugoslav Republic of Macedonia, Ukraine, United Arab Emirates, United Kingdom, United States, Uruguay Observing Countries (16): Belarus, Bosnia and Herzegovina, Costa Rica, El Salvador, Ghana, Hong Kong, Hungary, Iceland, Indonesia, Islamic Republic of Iran, Lithuania, Portugal, Saudi Arabia, Serbia, Swaziland, Turkey	
Secretariat	DIN (Germany)			
Secretary	Mrs. Krystyna Passia			
Chairperson	Dr. Walter Fumy			
Involvement of Luxembourg	18 delegates			
Organizations in liaison	CCETT, Cloud security alliance, ECBS, ENISA, EPC, Ecma International, ISACA, ISSEA, ITU, MasterCard International, MasterCard Europe			
Web site	http://www.iso.org/iso/standards_development/technical_committees/list_of_iso_technical_committees/iso_technical_committee.htm?commid=45306			
Scope	<p>The development of standards for the protection of information and ICT. This includes generic methods, techniques and guidelines to address both security and privacy aspects, such as:</p> <ul style="list-style-type: none">- Security requirements capture methodology;- Management of information and ICT security; in particular, information security management systems (ISMS), security processes, security controls and services;- Cryptographic and other security mechanisms, including but not limited to mechanisms for protecting the accountability, availability, integrity and confidentiality of information;- Security management support documentation including terminology, guidelines as well as procedures for the registration of security components;- Security aspects of identity management, biometrics and privacy;- Conformance assessment, accreditation and auditing requirements in the area of information security;- Security evaluation criteria and methodology. <p>SC 27 engages in active liaison and collaboration with appropriate bodies to ensure the proper development and application of SC 27 standards and technical reports in relevant areas.</p>			

Structure	JTC 1/SC 27/SWG-T	Transversal Items
	JTC 1/SC 27/SG-PKI	Study Group on Framework for PKI Policy/Practices/Audit
	JTC 1/SC 27/WG 1	Information security management systems
	JTC 1/SC 27/WG 2	Cryptography and security mechanisms
	JTC 1/SC 27/WG 3	Security evaluation testing and specification
	JTC 1/SC 27/WG 4	Security controls and services
	JTC 1/SC 27/WG 5	Identity management and privacy technologies
Standardization work		
Published standards	Number of published ISO standards under the direct responsibility of JTC 1/SC 27 (number includes updates): 131	
Standards under development	67	
Comments		
<p>SC 27 is an internationally recognized center of information and IT security standards expertise serving the needs of business sectors as well as governments. Its work covers the development of standards for the protection of information and ICT.</p>		
Working Groups		
<p>The scope of the WG 1 covers all aspects of standardization related to information security management systems: requirements, methods and processes, security controls, sector and application specific use of ISMS, governance, information security economics and accreditation, certification and auditing of ISMS.</p>		
<p>The scope of the WG 2 covers both cryptographic and non-cryptographic techniques and mechanisms including confidentiality, entity authentication, non-repudiation, key management and data integrity (e.g.: message authentication, hash-functions, digital signatures, etc.).</p>		
<p>The scope of the WG 3 covers aspects related to security engineering, with particular emphasis on, but not limited to standards for IT security specification, evaluation, testing and certification of IT systems, components, and products. The following aspects may be distinguished: security evaluation criteria, methodology for application of the criteria, security functional and assurance specification of IT systems, components and products, testing methodology for determination of security functional and assurance conformance, accreditation schemes, administrative procedures for testing, evaluation and certification.</p>		
<p>The WG 4 is developing and maintaining International Standards, Technical Specifications and Technical Reports for information security in the area of Security Controls and Services, to assist organizations in the implementation of the ISO/IEC 27000-series of ISMS International Standards and Technical Reports. Also the Scope of WG 4 includes evaluating and developing International Standards for addressing existing and emerging information security issues and needs and other security aspects that resulted from the proliferation and use of ICT and Internet related technology in organizations (such as multinationals corporations, SMEs, government departments, and non-profit organizations).</p>		
<p>Finally, WG 5 is responsible of the development and maintenance of standards and guidelines addressing security aspects of identity management, biometrics and privacy.</p>		
Standards		
<p>The best-known standard developed by SC 27 are ISO/IEC 27001:2013, Information technology -- Security techniques -- Information security management systems -- Requirements and ISO/IEC 27002:2013, Information technology -- Security techniques -- Code of practice for information security controls. Organizations setting up an ISMS certified compliant with ISO/IEC 27001 are increasingly numerous⁸⁶.</p>		

⁸⁶ Source: [ISO survey 2012](#)

It is important to note that the committee works in liaison with many other JTC 1/SCs on the development of standards related to security for specific subsectors. For example, SC 27 is currently developing two standards related to the security for cloud computing (in liaison with SC 38):

- ISO/IEC DIS 27017, Information technology -- Security techniques -- Code of practice for information security controls for cloud computing services based on ISO/IEC 27002;
- ISO/IEC DIS 27018, Information technology -- Security techniques -- Code of practice for data protection controls for public cloud computing services.

Study Group on Framework for PKI Policy/Practices/Audit (SG-PKI)

As per Resolution 28 of the 25th SC 27 Plenary meeting in Sophia Antipolis (France, 29th – 30th April 2013), the SG-PKI has been created with the following scope:

“To gauge interest in the development of an internationally accepted and standardized approach to the management, operation, assessment, and certification of PKI Trust Service Providers at varying levels of assurance. This includes management, procedural, assurance and technical standards”.

The deliverable of this Study Period will be a report to SC27 of the Study Group’s findings. Principal elements of this report will be:


- To define the precise scope and objectives of the work to be done;
- The identification of how the existing catalogue of SC 27 and other standards already support the stated scope;
- The applicability of this Study to non-PKI Trust Service Providers;
- A consideration on whether it is appropriate to address assurance levels and, if so, propose how to do so;
- A justification study of why there is a need for any new standard(s) in support of the scope’s objectives, as a basis for NWIPs for SC27 NB’s consideration.

At the national level, **two delegates** are involved in this study group.

7.1.12. ISO/IEC JTC 1/SC 28

General information			
Committee	ISO/IEC JTC 1/SC 28	Title	Office equipment
Creation date	1989	 MEMBERS	Participating Countries (12): Japan, Austria, China, Germany, Italy, Republic of Korea, Netherlands, Philippines, Russian Federation, Thailand, United Kingdom, United States Observing Countries (19): Argentina, Belgium, Bosnia and Herzegovina, Czech Republic, Finland, France, Ghana, Hungary, India, Indonesia, Islamic Republic of Iran, Kazakhstan, Kenya, Malaysia, Poland, Romania, Saudi Arabia, Serbia, South Africa
Secretariat	JISC (Japan)		
Secretary	Mr. Motokuni Sugiyama		
Chairperson	Mr. Akira Saito		
Involvement of Luxembourg	NO (no registered delegate)		
Organizations in liaison	CIE, ICC, WMO		
Web site	http://www.iso.org/iso/standards_development/technical_committees/list_of_iso_technical_committees/iso_technical_committee.htm?commid=45314		
Scope	Standardization of basic characteristics, test methods and other related items, excluding such interfaces as user system interfaces, communication interfaces and protocols, of office equipment and products such as Printers, Copying Equipments, Digital scanners, Facsimile equipment and systems composed of combinations of office equipment.		
Structure	JTC 1/SC 28/AG JTC 1/SC 28/WG 2 JTC 1/SC 28/WG 3 JTC 1/SC 28/WG 4 JTC 1/SC 28/WG 5	Advisory Group Consumables Productivity Image quality assessment Office Colour	
Standardization work			
Published standards	Number of published ISO standards under the direct responsibility of JTC 1/SC 28 (number includes updates): 48		
Standards under development	7		
Comments			
Inventory of published ISO/IEC JTC 1/SC 28 standards concerns specification sheets descriptors, productivity (throughput) measurement methods, printed image quality evaluation methods, toner/ink cartridges yield measurement methods, declaration of quality of product made of reused parts and accessibility guidelines for office equipment.			
The fact that the frontier of ISO/IEC JTC 1/SC 28 is contiguous with scopes of ISO/TC 42, TC 130 and TC 171 necessitates tight liaisons with those technical committees among others. Also, ISO/IEC JTC 1/SC 28 has always been an active member of the ISO Steering Committee on Image Technology (SCIT).			

7.1.13. ISO/IEC JTC 1/SC 29

General information			
Committee	ISO/IEC JTC 1/SC 29	Title	Coding of audio, picture, multimedia and hypermedia information
Creation date	1991	 MEMBERS	Participating Countries (24): Japan, Australia, Austria, Belgium, Canada, China, Finland, France, Germany, India, Israel, Italy, Republic of Korea, Netherlands, Poland, Portugal, Russian Federation, Singapore, Spain, Sweden, Switzerland, Ukraine, United Kingdom, United States Observing Countries (17): Bosnia and Herzegovina, Czech Republic, Denmark, Greece, Hong Kong, Hungary, Indonesia, Islamic Republic of Iran, Ireland, Malaysia, Morocco, Norway, Romania, Serbia, Slovakia, South Africa, Turkey
Secretariat	JISC (Japan)		
Secretary	Mr. Shinji Watanabe		
Chairperson	Mr. Kohtaro Asai		
Involvement of Luxembourg	NO (no registered delegate)		
Organizations in liaison	3GPP, AES, AGICOA, ATSC, CIE, CISAC, ETSI, FIAPF, IMTC, ISOC, ITU, MMA, SMPTE, WIPO		
Web site	http://www.iso.org/iso/standards_development/technical_committees/list_of_iso_technical_committees/iso_technical_committee.htm?commid=45316		
Scope	Standardization of coded representation of audio, picture, multimedia, and hypermedia information - and sets of compression and control functions for use with such information - such as: <ul style="list-style-type: none">- Audio information;- Bi-level and Limited Bits-per-pixel Still Pictures;- Digital Continuous-tone Still Pictures;- Computer Graphic Images;- Moving Pictures and Associated Audio;- Multimedia and Hypermedia Information for Real-time Final Form Interchange;- Audio Visual Interactive Script ware. Excluded: Character Coding		
Structure	JTC 1/SC 29/WG 1 JTC 1/SC 29/WG 11	Coding of still pictures Coding of moving pictures and audio	
Standardization work			
Published standards	Number of published ISO standards under the direct responsibility of JTC 1/SC 29 (number includes updates): 485		
Standards under development	97		
Comments			
<p>Coding of audio, picture, multimedia and hypermedia information provides efficient way to represent, preserve and convey entertainment, art, news, education, record of experiences and so on. People can enjoy any kind of media anywhere they want, employing handheld devices equipped with wireless capabilities. This does not mean just consuming media but generating media as well.</p> <p>The coding technologies have a significant role in any service and activity employing digital media information. SC 29 has been working to standardize coding of multimedia and their control function, interface with other elements, middleware for general and/or specific applications. Many International standards from SC 29 have been adopted and used, and those standards have been contributing to the industry.</p>			

There are still emerging needs for digital media representation with higher quality or advanced features such as Ultra HD with scalability in some applications, 3D and free viewpoint video with rich media interface. Moreover, pervasiveness of digital information is bringing about new opportunities for the industry to create user experiences built from various media. Regarding these requirements, the industry needs further efficiency in compression, composition, description and manipulation of digital media. Thus, we have a lot of opportunities to fulfill such requirements.

Examples of success standards developed by ISO/IEC JTC 1/SC 29 are:


- ISO/IEC 10918-1:1994, Information technology -- Digital compression and coding of continuous-tone still images: Requirements and guidelines;
- ISO/IEC 10918-5:2013, Information technology -- Digital compression and coding of continuous-tone still images: JPEG File Interchange Format (JFIF);
- ISO/IEC 11172:1993, Information technology -- Coding of moving pictures and associated audio for digital storage media at up to about 1,5 Mbit/s -- Parts 1 to 3;
- ISO/IEC 15444-1:2004, Information technology -- JPEG 2000 image coding system: Core coding system;
- ISO/IEC 23001 series of standards concerning MPEG systems technologies.

7.1.14. ISO/IEC JTC 1/SC 31

General information			
Committee	ISO/IEC JTC 1/SC 31	Title	Automatic identification and data capture techniques
Creation date	1996	<div>MEMBERS</div> <div></div>	Participating Countries (31): United States, Australia, Austria, Belgium, Brazil, Canada, China, Colombia, Czech Republic, Denmark, France, Germany, India, Ireland, Israel, Japan, Kenya, Republic of Korea, Malaysia, Netherlands, Peru, Philippines, Romania, Russian Federation, Singapore, Slovakia, South Africa, Spain, Sweden, Switzerland, United Kingdom Observing Countries (12): Bosnia and Herzegovina, Finland, Ghana, Hong Kong, Hungary, Indonesia, Islamic Republic of Iran, Italy, Kazakhstan, New Zealand, Serbia, Thailand
Secretariat	ANSI (USA)		
Secretary	Mr. Frank M. Sharkey		
Chairperson	Mr. Dan Kimball		
Involvement of Luxembourg	NO (no registered delegate)		
Organizations in liaison	AIM, ETSI, Ecma International, GS1, IATA, ITU, UPU		
Web site	http://www.iso.org/iso/standards_development/technical_committees/list_of_iso_technical_committees/iso_technical_committee.htm?commid=45332		
Scope	Standardization of data formats, data syntax, data structures, data encoding, and technologies for the process of automatic identification and data capture and of associated devices utilized in inter-industry applications and international business interchanges and for mobile applications.		
Structure	JTC 1/SC 31/WG 1 JTC 1/SC 31/WG 2 JTC 1/SC 31/WG 4 JTC 1/SC 31/WG 5 JTC 1/SC 31/WG 6 JTC 1/SC 31/WG 7	Data carrier Data structure Radio frequency identification for item management Real time locating systems Mobile Item Identification and Management (MIIM) Security for item management	
Standardization work			
Published standards	Number of published ISO standards under the direct responsibility of JTC 1/SC 31 (number includes updates): 107		
Standards under development	46		
Comments			
<p>Technologies such as bar coding and radiofrequency identification (RFID) provide quick, accurate and cost-effective ways to identify, track, acquire and manage data and information about items, personnel, transactions and resources. These are known as the automatic identification and data capture (AIDC) technologies.</p> <p>AIDC is an industry term that describes the identification and/or direct collection of data into a microprocessor-controlled device, such as a computer system or a programmable logic controller (PLC), without the use of a keyboard. AIDC technologies provide a reliable means not only to identify but also to track items. It is possible to encode a wide range of information, beginning with a basic item or the identification of a person, to comprehensive details about the item or person, e.g. item description, size, weight, color, etc.</p> <p>ISO/IEC JTC 1/SC 31, Automatic identification and data capture techniques, is responsible for more than 100 published or in-progress standards in this area. These standards address bar code symbologies (how a bar code is created and read), RFID air interface (how an RFID tag is read), real-time locating systems, and mobile</p>			

item identification (which explains how a device such as a phone is used to read and access data as well as providing standards to define how the data associated with the technology are stored and read).


7.1.15. ISO/IEC JTC 1/SC 32

General information			
Committee	ISO/IEC JTC 1/SC 32	Title	Data management and interchange
Creation date	1997	MEMBERS 	Participating Countries (14): United States, Canada, China, Czech Republic, Côte d'Ivoire, Egypt, Finland, Germany, India, Japan, Republic of Korea, Portugal, Russian Federation, United Kingdom Observing Countries (19): Austria, Belgium, Bosnia and Herzegovina, France, Ghana, Hungary, Indonesia, Islamic Republic of Iran, Ireland, Italy, Kazakhstan, Netherlands, Norway, Poland, Romania, Serbia, Spain, Sweden, Switzerland
Secretariat	ANSI (USA)		
Secretary	Dr. Timothy D. Schoechle		
Chairperson	Mr. Jim Melton		
Involvement of Luxembourg	NO (no registered delegate)		
Organizations in liaison	CISAC, ITSO, ITU, Infoterm, SWIFT, UNECE, WMO		
Web site	http://www.iso.org/iso/standards_development/technical_committees/list_of_iso_technical_committees/iso_technical_committee.htm?commid=45342		
Scope	Standards for data management within and among local and distributed information systems environments. SC32 provides enabling technologies to promote harmonization of data management facilities across sector-specific areas. Specifically, SC32 standards include: <ul style="list-style-type: none">- Reference models and frameworks for the coordination of existing and emerging standards;- Definition of data domains, data types and data structures, and their associated semantics;- Languages, services and protocols for persistent storage, concurrent access, concurrent update and interchange of data;- Methods, languages, services, and protocols to structure, organize, and register metadata and other information resources associated with sharing and interoperability, including electronic commerce.		
Structure	JTC 1/SC 32/WG 1 JTC 1/SC 32/WG 2 JTC 1/SC 32/WG 3 JTC 1/SC 32/WG 4	eBusiness MetaData Database language SQL/Multimedia and application packages	
Standardization work			
Published standards	Number of published ISO standards under the direct responsibility of JTC 1/SC 32 (number includes updates): 73		
Standards under development	31		
Comments			
ISO/IEC JTC 1/SC 32 is especially in charge of standardizing the SQL language and developing XML-related standards.			
Examples of standards developed by ISO/IEC JTC 1/SC 32 are:			
<ul style="list-style-type: none">- ISO/IEC 9075-1:2011, Information technology -- Database languages -- SQL -- Part 1: Framework (SQL/Framework);- ISO/IEC 11179-1:2004, Information technology -- Metadata registries (MDR) -- Part 1: Framework;			

- ISO/IEC 19503:2005, Information technology -- XML Metadata Interchange (XMI);
- ISO/IEC 19763-1:2007, Information technology -- Metamodel framework for interoperability (MFI) -- Part 1: Reference model.

The subcommittee is currently revising the ISO/IEC 9075 series of standards concerning the SQL database language.

7.1.16. ISO/IEC JTC 1/SC 34


General information			
Committee	ISO/IEC JTC 1/SC 34	Title	Document description and processing languages
Creation date	1998	MEMBERS 	Participating Countries (28): Japan, Armenia, Bulgaria, Canada, Chile, China, Czech Republic, Denmark, Egypt, Finland, France, Germany, India, Italy, Republic of Korea, Lebanon, Malaysia, Malta, Netherlands, Pakistan, Poland, Russian Federation, Slovakia, South Africa, Sri Lanka, Thailand, United Kingdom, United States Observing Countries (27): Australia, Austria, Belgium, Bosnia and Herzegovina, Brazil, Croatia, Cyprus, Côte d'Ivoire, Greece, Hong Kong, Hungary, Indonesia, Islamic Republic of Iran, Ireland, Israel, Kazakhstan, Lithuania, Mexico, Norway, Portugal, Romania, Serbia, Spain, Sweden, Switzerland, Turkey, Ukraine
Secretariat	JISC (Japan)		
Secretary	Ms. Toshiko Kimura		
Chairperson	Professor Sam Gyun Oh		
Involvement of Luxembourg	NO (no registered delegate)		
Organizations in liaison	Ecma International, ISUG, OASIS		
Web site	http://www.iso.org/iso/standards_development/technical_committees/list_of_iso_technical_committees/iso_technical_committee.htm?commid=45374		
Scope	Standardization in the field of document structures, languages and related facilities for the description and processing of compound and hypermedia documents, including: <ul style="list-style-type: none">- Languages for describing document logical structures and their support facilities;- Languages for describing document-like objects in web environments;- Document processing architecture and formatting for logical documents;- Languages for describing interactive documents;- Multilingual font information interchange and related services;- Final-form document architecture and page information interchange;- Hypermedia document structuring language and application resources;- API's for document processing.		
Structure	JTC 1/SC3 4/WG 1 JTC 1/SC 34/WG 2 JTC 1/SC 34/WG 3 JTC 1/SC 34/WG 4 JTC 1/SC 34/WG 5 JTC 1/SC 34/WG 6 JTC 1/SC 34/JWG 7	Information description Information presentation Information association Office Open XML Document Interoperability OpenDocument Format Joint JTC 1/SC 34 – TC 46/SC 4 – IEC/TC 100/TA 10 WG: EPUB	
Standardization work			
Published standards	Number of published ISO standards under the direct responsibility of JTC 1/SC 34 (number includes updates): 62		
Standards under development	14		
Comments			
ISO/IEC JTC 1/SC 34 has inherited from its predecessors (ISO/TC 97/SC 18/WG 8 and ISO/IEC JTC 1/SC 18/WG 8) the responsibility for the maintenance of many important standards that have been hugely influential in the			

development of the World Wide Web.

These standards include ISO 8879 (SGML), ISO/IEC 10179 (DSSSL) and ISO/IEC 10744 (HyTime). These standards still inform work on new standards development within ISO/IEC JTC 1/SC 34, as well as continuing to influence the work of other bodies such as OASIS and W3C.

Moreover, international standardization of IDPF EPUB, currently lead by SC 32, would strongly encourage the wider adoption of EPUB, especially in public sector applications.

7.1.17. ISO/IEC JTC 1/SC 35

General information				
Committee	ISO/IEC JTC 1/SC 35		Title	User interfaces
Creation date	1998			Participating Countries (19): France, Canada, China, Denmark, Finland, Germany, Greece, India, Italy, Japan, Republic of Korea, Russian Federation, South Africa, Spain, Sweden, Switzerland, Ukraine, United Kingdom, United States Observing Countries (17): Austria, Belgium, Bosnia and Herzegovina, Bulgaria, Czech Republic, Ghana, Hungary, Indonesia, Islamic Republic of Iran, Ireland, Israel, Kenya, Netherlands, New Zealand, Poland, Romania, Serbia
Secretariat	AFNOR (France)			
Secretary	Mr. Philippe Magnabosco			
Chairperson	Mr. Khalid Choukri			
Involvement of Luxembourg	NO (no registered delegate)			
Organizations in liaison	W3C			
Web site	http://www.iso.org/iso/standards_development/technical_committees/list_of_iso_technical_committees/iso_technical_committee.htm?commid=45382			
Scope	Standardization in the field of user-system interfaces in information and communication technology (ICT) environments and support for these interfaces to serve all users, including people having accessibility or other specific needs, with a priority of meeting the JTC 1 requirements for cultural and linguistic adaptability. This includes: <ul style="list-style-type: none">- User interface accessibility (requirements, needs, methods, techniques and enablers);- Cultural and linguistic adaptability and accessibility (such as evaluation of cultural and linguistic adaptability of ICT products, harmonized human language equivalents, localization parameters, voice messaging menus, etc.);- User interface objects, actions and attributes;- Methods and technologies for controlling and navigating within systems, devices and applications in visual, auditory, tactile and other sensorial modalities (such as by voice, vision, movement, gestures, etc.);- Symbols, functionality and interactions of user interfaces (such as graphical, tactile and auditory icons, graphical symbols and other user interface elements);- Visual, auditory, tactile and other sensorial input and output devices and methods in ICT environments (for devices such as keyboards, displays, mice, etc.);- User interfaces for mobile devices, hand-held devices and remote interactions.			
Structure	JTC 1/SC 35/WG 1	Keyboards and input interfaces		
	JTC 1/SC 35/WG 2	Graphical user interface and interaction		
	JTC 1/SC 35/WG 4	User interfaces for mobile devices		
	JTC 1/SC 35/WG 5	Cultural and linguistic adaptability		
	JTC 1/SC 35/WG 6	User interfaces accessibility		
	JTC 1/SC 35/WG 7	User interfaces object, actions and attributes		
	JTC 1/SC 35/WG 8	User interfaces for remote interactions		
Standardization work				
Published standards	Number of published ISO standards under the direct responsibility of JTC 1/SC 35 (number includes updates): 51			

Comments

SC 35 is currently increasing its activity in the field of Voice interfaces (ISO/IEC 17549 series) and Gesture-based interfaces (ISO/IEC 30113 series), while pursuing work on Accessibility APIs (ISO/IEC 13066 series) and considering further development in the field of User interface components accessibility (ISO/IEC 20071 series).

Examples of standards developed by ISO/IEC JTC 1/SC 35 are:

- ISO/IEC 9995-1:2009, Information technology -- Keyboard layouts for text and office systems -- Part 1: General principles governing keyboard layouts;
- ISO/IEC TR 11581-1:2011, Information technology -- User interface icons -- Part 1: Introduction to and overview of icon standards;
- ISO/IEC 18036:2003, Information technology -- Icon symbols and functions for World Wide Web browser toolbars.

7.1.18. ISO/IEC JTC 1/SC 36

General information			
Committee	ISO/IEC JTC 1/SC 36	Title	Information technology for learning, education, and training
Creation date	1999	<div>MEMBERS</div> <div></div>	Participating Countries (24): Republic of Korea, Algeria, Australia, Canada, China, Denmark, France, Germany, India, Italy, Jamaica, Japan, Kenya, Luxembourg , Netherlands, Norway, Portugal, Russian Federation, Slovakia, South Africa, Spain, Tunisia, Ukraine, United Kingdom Observing Countries (22): Belgium, Bosnia and Herzegovina, Colombia, Czech Republic, Finland, Ghana, Hong Kong, Hungary, Indonesia, Islamic Republic of Iran, Ireland, Kazakhstan, Malaysia, New Zealand, Romania, Saudi Arabia, Serbia, Singapore, Sweden, Switzerland, Turkey, United States
Secretariat	KATS (Republic of Korea)		
Secretary	Ms Eunsook Kim		
Chairperson	Mr. Erlend Øverby		
Involvement of Luxembourg	7 delegates		
Organizations in liaison	ADL, AICC, AUF, IMS, Infoterm, LETSI, LTSC		
Web site	http://www.iso.org/iso/standards_development/technical_committees/list_of_iso_technical_committees/iso_technical_committee.htm?commid=45392		
Scope	<p>Standardization in the field of information technologies for learning, education, and training to support individuals, groups, or organizations, and to enable interoperability and reusability of resources and tools.</p> <p>Excluded: The SC shall not create standards or technical reports that define educational standards, cultural conventions, learning objectives, or specific learning content.</p> <p>In the area of work of this SC, standards and technical reports will not duplicate work done by other ISO or IEC TCs, SCs, or WGs with respect to their component, specialty, or domain. Instead, when appropriate, normative or informative references to other standards shall be included. Examples include documents on specialty topics such as multimedia, web content, cultural adaptation, and security.</p>		
Structure	JTC 1/SC 36/AG 1 JTC 1/SC 36/WG 1 JTC 1/SC 36/WG 2 JTC 1/SC 36/WG 3 JTC 1/SC 36/WG 4 JTC 1/SC 36/WG 5 JTC 1/SC 36/WG 6 JTC 1/SC 36/WG 7	Business planning and communications Vocabulary Collaborative technology Learner information Management and delivery of learning, education and training Quality assurance and descriptive frameworks Platform, Services, and specification integration ITLET - Culture, language and individual needs	
Standardization work			
Published standards	Number of published ISO standards under the direct responsibility of JTC 1/SC 36 (number includes updates): 34		
Standards under development	32		

Comments


Since its inception, ISO/IEC JTC 1/SC 36 has successfully adapted to create standards for growing and changing markets by adopting and adhering to the essential principles of global openness, transparency, consensus, and technical coherence. In ISO/IEC JTC 1/SC 36, these principles are implemented through development of International Standards representative of all interested National Member Bodies, and Liaison Organizations, by utilizing proven and value-added processes.

These principles also have enabled the production of global and market relevant standards and technical reports, which are recognized and implemented by global users to:

- Facilitate global trade;
- Improve quality, security, and consumer protection;
- Global dissemination of technologies and good practices, all of which contribute to economic and social progress.

SC36 is currently focused on studying and reviewing technologies in the areas such as of mobile learning, concept mapping, integration of automated processes for supporting collaborative activities, managing and exchanging participant information (e-portfolio implementation; semantic information models), and e-Assessment with particular focus on e-Testing, quality of e-Assessments, and quality and validation of single e-Assessment items.

7.1.19. ISO/IEC JTC 1/SC 37


General information			
Committee	ISO/IEC JTC 1/SC 37	Title	Biometrics
Creation date	2002	<div>MEMBERS</div> <div></div>	Participating Countries (28): United States, Australia, China, Czech Republic, Egypt, Finland, France, Germany, India, Israel, Italy, Japan, Republic of Korea, Malaysia, New Zealand, Norway, Poland, Portugal, Russian Federation, Singapore, South Africa, Spain, Sweden, Thailand, Ukraine, United Kingdom Observing Countries (13): Austria, Belgium, Bosnia and Herzegovina, Canada, Ghana, Hungary, Indonesia, Islamic Republic of Iran, Ireland, Kenya, Netherlands, Romania, Serbia, Switzerland
Secretariat	ANSI (USA)		
Secretary	Mrs. Lisa Rajchel		
Chairperson	<i>Vacant</i>		
Involvement of Luxembourg	NO (no registered delegate)		
Organizations in liaison	IBIA, ILO, ITU		
Web site	http://www.iso.org/iso/standards_development/technical_committees/list_of_iso_technical_committees/iso_technical_committee.htm?commid=313770		
Scope	<p>Standardization of generic biometric technologies pertaining to human beings to support interoperability and data interchange among applications and systems. Generic human biometric standards include: common file frameworks; biometric application programming interfaces; biometric data interchange formats; related biometric profiles; application of evaluation criteria to biometric technologies; methodologies for performance testing and reporting and cross jurisdictional and societal aspects.</p> <p>Excluded is the work in ISO/IEC JTC 1/SC 17 to apply biometric technologies to cards and personal identification.</p> <p>Excluded is the work in ISO/IEC JTC 1/SC 27 for biometric data protections techniques, biometric security testing, evaluations, and evaluations methodologies.</p>		
Structure	JTC 1/SC 37/WG 1 JTC 1/SC 37/WG 2 JTC 1/SC 37/WG 3 JTC 1/SC 37/WG 4 JTC 1/SC 37/WG 5 JTC 1/SC 37/WG 6	Harmonized biometric vocabulary Biometric technical interfaces Biometric data interchange formats Biometric functional architecture and related profiles Biometric testing and reporting Cross-Jurisdictional and Societal Aspects of Biometrics	
Standardization work			
Published standards	Number of published ISO standards under the direct responsibility of JTC 1/SC 37 (number includes updates): 93		
Standards under development	52		
Comments			
The goal of ISO/IEC JTC 1/SC 37 is to ensure a high priority, focused, and comprehensive approach worldwide for the rapid development and approval of formal international biometric standards. These standards are necessary to support the rapid deployment of significantly better, open systems standard-based security			

solutions for purposes such as homeland defense and the prevention of ID theft.

Biometrics provide for secure transactions, positive identification and better informed human judgment. The deployment of standards-based, high-performance, interoperable biometric solutions is expected to increase levels of security for critical infrastructures that have not, until now, been properly served by other technologies. ISO/IEC JTC 1/SC 37, Biometrics, is responsible for the development of a large portfolio of biometric standards in support of interoperability and data interchange. These standards support a diverse range of systems and applications designed to provide the reliable verification and identification of individuals.

Topics addressed by these standards include biometric data interchange formats for a number of biometric modalities (e.g. finger, face, iris, signature/sign, vascular data), biometric technical interface standards (e.g. APIs), biometric performance and conformance testing methodology standards, biometric application profiles, biometric sample quality standards, and standards in support of cross-jurisdictional issues related to the utilization of biometric technologies in commercial applications. Moreover, a harmonized biometric vocabulary [ISO/IEC 2982-37:2012] that will serve the standards community as well as other customers has been developed.

7.1.20. ISO/IEC JTC 1/SC 38


General information			
Committee	ISO/IEC JTC 1/SC 38	Title	Distributed application platforms and services (DAPS)
Creation date	2009	 MEMBERS	Participating Countries (26): United States, Australia, Austria, Brazil, Canada, China, Denmark, Finland, France, Germany, India, Ireland, Italy, Japan, Republic of Korea, Luxembourg , Netherlands, Poland, Portugal, Russian Federation, Singapore, South Africa, Spain, Sweden, Switzerland, United Kingdom Observing Countries (8): Belgium, Bosnia and Herzegovina, Czech Republic, Hong Kong, New Zealand, Norway, Serbia, Uruguay
Secretariat	ANSI (USA)		
Secretary	Ms. Marisa Peacock		
Chairperson	Dr. Donald Deutsch		
Involvement of Luxembourg	3 delegates		
Organizations in liaison	DMTF, INLAC, ITU, OASIS, OGF, SNIA		
Web site	http://www.iso.org/iso/standards_development/technical_committees/list_of_iso_technical_committees/iso_technical_committee.htm?commid=601355		
Scope	Standardization for interoperable Distributed Application Platforms and Services including: <ul style="list-style-type: none">- Web Services;- Service Oriented Architecture (SOA);- Cloud Computing.		
Structure	JTC 1/SC 38/WG 1 JTC 1/SC 38/WG 2 JTC 1/SC 38/WG 3	Web services Service Oriented Architecture (SOA) Cloud computing	
Standardization work			
Published standards	Number of published ISO standards under the direct responsibility of JTC 1/SC 38 (number includes updates): 4		
Standards under development	6		
Comments			
<p>Established by ISO/IEC JTC 1 at its 2009 Plenary meeting in Tel Aviv (Israel), SC 38 on Distributed Application Platforms & Services works in three related technology areas: Web Services, Service Oriented Architecture (SOA), and Cloud Computing.</p> <p>Cloud computing is the delivery of computing as a service rather than a product, whereby shared resources, software, and information are provided to computers and other devices as a utility (like the electricity grid) over a network (typically the internet).</p> <p>ISO/IEC JTC 1/SC 38, Distributed application platforms and services (DAPS), is responsible for the development of standards to support distributed computing paradigms, including cloud computing. In addition to establishing standards for Web services and service oriented architecture (SOA), technologies that are necessary facilitators for cloud computing, a taxonomy, terminology and value proposition for cloud computing are also being developed. Based on an understanding of the market/business/user requirements for cloud computing standards and a survey of related standardization activities within ISO/IEC JTC 1 and other standards setting organizations, new cloud computing standardization initiatives will be proposed and initiated. Web services and SOA standards define interoperable technologies that provide the foundation for cloud</p>			

computing. By initiating standardization activities only after first identifying cloud computing standardization requirements, ISO/IEC JTC 1/SC 38 will address the public and private sector needs for standards that address end-user requirements and facilitate the rapid deployment of cloud computing.

The current work program concerning cloud computing includes:

- ISO/IEC DIS 17788, Information technology -- Distributed application platforms and services -- Cloud computing -- Overview and Vocabulary;
- ISO/IEC DIS17789, Information Technology -- Cloud Computing -- Reference Architecture;
- ISO/IEC NP 19086, Information Technology -- Distributed application platforms and services -- Cloud computing -- Service Level Agreement (SLA) Framework and Terminology.

7.1.21. ISO/IEC JTC 1/SC 39


General information			
Committee	ISO/IEC JTC 1/SC 39	Title	Sustainability for and by Information Technology
Creation date	2012	MEMBERS 	Participating Countries (18): United States, Belgium, Canada, China, Finland, France, Germany, Italy, Japan, Kenya, Republic of Korea, Luxembourg , Netherlands, Norway, Russian Federation, Singapore, South Africa, United Kingdom Observing Countries (5): Australia, Austria, Czech Republic, Ireland, , Poland, Spain
Secretariat	ANSI (USA)		
Secretary	Ms. Sally Seitz		
Chairperson	Mr. Jay Taylor		
Involvement of Luxembourg	1 delegate		
Organizations in liaison	TGG		
Web site	http://www.iso.org/iso/standards_development/technical_committees/list_of_iso_technical_committees/iso_technical_committee.htm?commid=654019		
Scope	<p>Standardization related to the intersection of resource efficiency and IT which supports environmentally and economically viable development, application, operation and management aspects.</p> <p>To avoid any duplication of work and to support innovation, SC 39 will engage in active liaison and collaboration with:</p> <ul style="list-style-type: none">- Other JTC 1 entities;- ISO/TC 207, ISO/TC 242, ISO/TC 257;- IEC/TC 100, IEC/TC 108, IEC/TC 111, SMB/SG 4, IEC/PC 118, IEC/TC 57/WG 21, IEC/TC 8 and SMB/SG 3;- ITU-T/SG 5;- Any other appropriate body including external organizations (e.g. <i>consortia</i>).		
Structure	JTC 1/SC 39/WG 1 JTC 1/SC 39/WG 2	Resource Efficient Data Centres Green ICT	
Standardization work			
Published standards	Number of published ISO standards under the direct responsibility of JTC 1/SC 39 (number includes updates): 0		
Standards under development	4		
Comments			
The creation of ISO/IEC JTC 1/SC 39 was officially decided on during the 2011 JTC 1 Plenary meeting held in San Diego, California.			
The current work program includes:			
<ul style="list-style-type: none">- ISO/IEC NP 30131, Information technology -- Data Centres -- Taxonomy and Maturity Model;- ISO/IEC WD 30132, Information technology -- IT Sustainability -- Guidance for the Development of Energy Efficient ICT Products;			

- ISO/IEC CD 30134-1, Information Technology -- Data Centres -- Key performance indicators -- Part 1: Overview and general requirements;
- ISO/IEC CD 30134-2, Information Technology -- Data Centres -- Key performance indicators -- Part 2: Power usage effectiveness (PUE).

The future series of standards ISO/IEC 30134 will provide a set of key performance indicators for data centers. The second part of this series ,concerning PUE, is already under development but several other metrics are under discussion:

- Renewable Energy Factor (REF);
- IT Equipment Energy Efficiency for Servers ($ITEE_{sv}$);
- IT Equipment Utilization for Servers ($ITEU_{sv}$);
- Green Energy Coefficient (GEC);
- Carbon Usage Effectiveness (CUE);
- Water Usage Effectiveness (WUE).

7.1.22. ISO/IEC JTC 1/SC 40

General information			
Committee	ISO/IEC JTC 1/SC 40	Title	IT Service Management and IT Governance
Creation date	2013	MEMBERS 	Participating Countries (20): Australia, Brazil, Canada, China, Denmark, Finland, France, India, Italy, Japan, Republic of Korea, Luxembourg , Netherlands, Russian Federation, Singapore, South Africa, Spain, Sweden, United Kingdom, United States Observing Countries (5): Austria, Belgium, Czech Republic, New Zealand , Switzerland
Secretariat	SA (Australia)		
Secretary	Mrs. Jenny Mance		
Chairperson	Mr. John Sheridan		
Involvement of Luxembourg	8 delegates		
Organizations in liaison	OASIS, itSMFI		
Web site	http://www.iso.org/iso/standards_development/technical_committees/list_of_iso_technical_committees/iso_technical_committee.htm?commid=5013818		
Scope	<p>Standardization of IT Service Management and IT Governance.</p> <p>Develop standards, tools, frameworks, best practices and related documents for IT Service Management and IT Governance, including areas of IT activity such as audit, digital forensics, governance, risk management, outsourcing, service operations and service maintenance, but excluding subject matter covered under the scope and existing work programs of JTC 1/SC 27 and JTC 1/SC 38.</p> <p>The work will initially cover:</p> <ul style="list-style-type: none">- Corporate Governance of IT: the development of the ISO/IEC 38500 series standards and related documents;- Operational aspects of Governance of IT: work in ISO/IEC 30120 series and interfaces with the management of IT as well as the role of governance in the area of business innovation;- All aspects relating to IT service management and IT-Enabled Services/Business Process Outsourcing.		
Structure	/		
Standardization work			
Published standards	Number of published ISO standards under the direct responsibility of JTC 1/SC 40 (number includes updates): 5		
Standards under development	12		
Comments			
<p>ISO/IEC JTC 1/SC 40 is a new subcommittee created during the 2013 JTC 1 Plenary Meeting. It will initially pursue the work of three working groups which have been disbanded on December 1, 2013:</p> <ul style="list-style-type: none">- ISO/IEC JTC 1/WG 8: Governance of IT;- ISO/IEC JTC 1/SC 7/WG 25: IT Service Management;- ISO/IEC JTC 1/SC 7/WG 27: IT Enabled Services/Business Process Outsourcing Lifecycle Processes (ITES/BPO).			


The following standards are currently under development:

- ISO/IEC 38500 series standards on corporate governance of IT;
- ISO/IEC 30120 series standards on operational aspects of governance of IT;
- ISO/IEC 20000 series standards on IT service management;
- ISO/IEC 30105 series standards on ITES-BPO.

7.2. CEN standardization committees

CEN, the European Committee for Standardization, and CENELEC, the European Committee for Electrotechnical Standardization, are now collaborating on their standards work in the domain of Information and Communication Technologies (ICT). The standardization work is, however, hosted at the CEN level except for the technical committee CENELEC/TC 215, particularly relevant for the data center subsector as described in the section 7.4. The following sections present the 11 TCs that have their work program in the ICT (Information and Communication Technologies) sector of CEN.

7.2.1.CEN/TC 224

General information			
Committee	CEN/TC 224	Title	Personal Identification, Electronic Signature and Cards
Creation date	1989	MEMBERS 	33 members of CEN/CENELEC
Secretariat	AFNOR (France)		
Secretary	Ms. C. De Condé		
Chairperson	Mr. D. Lescriva		
Involvement of Luxembourg	1 delegate		
Organizations in liaison	ANEC, CCC, EPC, ERTICO, ETSI, Euro Commerce, FRONTEX, GlobalPlatform, Master Card Europe, UIC, VISA International		
Web site	http://standards.cen.eu/dyn/www/f?p=204:7:0:::FSP_LANG_ID,FSP_ORG_ID:25,6205&cs=1A98C573151AB3D7A22712120D94364C1#1		
Scope	<p>Intersectorial ICT committee focused on Personal identification, electronic signature, cards and other smart secure devices for applications such as Banking, Transport, Telecommunication and e-Government. Supportive Identification, Authentication and Signature (IAS) services for eBusiness. Interoperability of biometric recorded data.</p> <p>The priorities for CEN/TC 224 are to develop European standards related to:</p> <ul style="list-style-type: none">- Harmonized identification and authentication of European citizen;- Electronic Signatures for eGovernment and eBusiness;- Confidence of consumers, taking into account requirements for people with special needs;- Interoperable public transport applications;- Biometrics for European specific requirements.		
Structure	CEN/TC 224/WG 6 CEN/TC 224/WG 9 CEN/TC 224/WG 11 CEN/TC 224/WG 15 CEN/TC 224/WG 16 CEN/TC 224/WG 17 CEN/TC 224/WG 18	User Interface Telecommunication applications Transport applications European citizen card Application Interface for smart cards used as Secure Signature Creation Devices Protection Profiles in the context of SSCD Interoperability of biometric recorded data	
Standardization work			
Published standards	47		
Standards under development	20		

Comments

As a matter of principle, CEN/TC 224 does not duplicate the work of ISO/IEC JTC 1/SC 17, but instead either transposes some of the related International Standards or uses them as the basis for specific European works. In a number of cases, the ultimate objective of the work of CEN/TC 224 is to contribute to international standardization.

The **current objectives** of CEN/TC 224 are to elaborate standards on:

- General card characteristics and technologies:

Parallel development of ENs and of the revised versions of International standards regarding the development of driver license and other e-Governments applications;

- Man machine interface:

Design principles for the user interface, key pads, coding of user requirements for people with special needs, physical accessibility to card reading devices;

- Inter-sector electronic purse:

Definitions, concepts and structures, security architecture, data elements and interchanges, data objects;

- Telecommunications integrated circuit cards and terminals:

Test methods and conformance testing, including the amendment of the related base standards;

- Surface transport applications:

Data elements for the various types of surface transport applications (public transport, tachograph, driver license, freight, etc.), interface definition for integrated circuit cards used in automatic fee collection systems using on DSRC and GSM.

Additional objectives of CEN/TC 224 are to consider the requirements for further standardization in the following areas:


- Driver license:

Further developments related to the European harmonization of tachograph and driver's license systems based on the smart card technology should be considered in cooperation with the European Commission (DG VII). The appropriate liaison mechanism with ISO/IEC JTC 1/SC 17 should also be considered, if international work starts on this topic;

- e-Government:

Considering the 28 countries within the European Union since 2004, European biometrics visa and passport regulations, European governments will need to reinforce the identification and its harmonization of European citizen. Cards should be the best support for citizen's personal information, privacy data protection and for interoperability in the electronic signature domain.

7.2.2.CEN/TC 225

General information			
Committee	CEN/TC 225	Title	AIDC Technologies
Creation date	1989	<div>MEMBERS</div> <div></div>	33 members of CEN/CENELEC
Secretariat	NEN (Netherlands)		
Secretary	Mr. M. Peelen		
Chairperson	Mr. H. Barthel		
Involvement of Luxembourg	NO (no registered delegate)		
Organizations in liaison	ECISS, EDIFICE, EDMA (Brussels), EFPIA, EHIBCC, EUCOMED, EuroCommerce, GS1, ODETTE, UPU		
Web site	http://standards.cen.eu/dyn/www/f?p=204:7:0:::FSP_ORG_ID:6206&cs=1E12277AECC001196A7556B8DBCDF0A1C		
Scope	Standardization - within a European context - of automatic identification and data capture (AIDC) technologies and applications, in particular: <ul style="list-style-type: none">- The data carriers (currently barcode, RFID, OCR) and their means of communication with reader systems, and in the case of RFID, environmental sensors;- The necessary data architecture, including security of data access;- The necessary conformance and performance test specifications;- Normative and informative guidance for applications of AIDC systems, including both technical and societal aspects.		
Structure	CEN/TC 225/WG 1 CEN/TC 225/WG 3 CEN/TC 225/WG 4 CEN/TC 225/WG 5 CEN/TC 225/WG 6	Optical Readable Media Security and data structure Automatic ID applications RFID, RTLS and on board sensors Internet of Things - Identification, Data Capture, and Edge Technologies	
Standardization work			
Published standards	17		
Standards under development	12		
Comments			
When preparing standards for Europe, CEN/TC 225 will take into account the technical specifications, standards and regulations currently available or being prepared at International levels. In particular, the technical work in ISO/IEC JTC 1/SC 31 (Automatic Identification and Data Capture (AIDC) techniques) and ISO/IEC JTC 1/SC 27 (Privacy) will be taken into account.			


CEN/TC 225 will deliver EN standards and technical reports to:

- Close the standardization gaps identified by the EC M436 mandate process;
- Guide the deployment of AIDC systems in public and private enterprises within Europe;
- Ensure the deployments are secure and protect personal privacy issues identified by the EC M436 mandate process;
- Standards and industrial guidelines for the unique identification of all types of objects supporting the free global movement of goods, enhanced health and safety aspects in industries and in governmental sector;
- Special focus will be given to the Future Internet and the Internet of Things which includes unique identification schemes, privacy and security aspects.

Furthermore, CEN/TC 225 will:

- Focus on issues arising from the EC M436 mandate process and rapidly develop EN/TR to deliver the objectives of the EC Mandate;
- Use and refine the resulting frameworks, especially in relation to PIA's (Privacy Impact Assessment), to build application guidelines and standards;
- Promote the CEN/TC 225 WG work plans to mirror committees in all CEN member states;
- Establish and maintain effective liaisons with other ESOs (European Standards Organization), global standards organizations, trade associations and regulatory bodies;
- Evaluate the need for adopting ISO/IEC 18000 (and related) standards as EN standards;
- Take into account technical standards and regulations currently available or being prepared at International levels. In particular account will be taken of the technical work in ISO/IEC JTC 1/SC 31;
- Use the Vienna Agreement to ensure alignment of European AIDC standards with the ISO environment.


7.2.3.CEN/TC 247

General information			
Committee	CEN/TC 247	Title	Building Automation, Controls and Building Management
Creation date	1990	<div>MEMBERS</div> <div></div>	33 members of CEN/CENELEC
Secretariat	SNV (Switzerland)		
Secretary	Ms. Barbara Mullis		
Chairperson	Mr. R. Ullmann		
Involvement of Luxembourg	NO (no registered delegate)		
Organizations in liaison	/		
Web site	http://standards.cen.eu/dyn/www/f?p=204:7:0::::FSP_ORG_ID:6228&cs=1B5974C9B3FD83E512BE27B1A4221DC20		
Scope	CEN/TC247 is responsible for the standardization of Building Automation and Controls (BAC) and Building Management (BM) including Open Data Communication for residential and non-residential buildings. These standards include the definitions, requirements, functionality and test methods of building automation products and systems for automatic control of building services installations and the primary integration measures including application interfaces, systems and services to ensure an efficient technical, commercial and infrastructural building management.		
Structure	CEN/TC 247/WG 3 CEN/TC 247/WG 4 CEN/TC 247/WG 6	Building Automation and Control and Building Management Systems Open System Data Transmission Electronic control equipment for HVAC applications, integrated room automation, controls, and management systems	
Standardization work			
Published standards	22		
Standards under development	22		
Comments			
<p>The structure of the CEN/TC 247 and its working group covers all the standardization needs and requirements in the field of Building Automation, Controls and Building Management.</p> <p>The CEN/TC 247 has currently the following program of work:</p> <ul style="list-style-type: none">- At International level the standard series EN ISO 16484 is carried out by CEN/TC 247 and ISO/TC205 “Building environment design” and ISO/TC 205/WG3 “Building control systems design”. CEN/TC 247 has an efficient liaison with ISO/TC 205. The work of both TCs is covered by the Vienna Agreement. The lead of most work items are taken by CEN;- For standardizing in the field of Home Automation CEN/TC 247 has an efficient liaison with			


CENELEC/TC 205 "Home and Building Electronic Systems (HBES)" especially for Home and Building Control Networks;

- Standards for requirements of electromagnetic compatibility, electrical safety and environmental conditions in BACS and HBES have been developed by the Joint Working Group "General Technical Requirements" of CEN/TC 247 and CENELEC /TC205;
- The CEN/TC 247 standardization activities, reflecting the requirements and test set ups especially for energy efficient products and systems, supports the European certification schema and quality assurance system of the Building Automation Industry;
- CEN/TC 247 is strongly involved in the different EU-Directives regarding energy performance of buildings. A standard had been developed (EN 15232) under the Mandate M 343 to CEN for the elaboration and adoption of standards for a methodology calculating the integrated energy performance of buildings and estimating the environmental impact;
- CEN/TC 247 participates in the Sector Forum for Energy and fosters horizontal information exchange with EN ISO 50001 based activities.

7.2.4.CEN/TC 251

General information			
Committee	CEN/TC 251	Title	Health Informatics
Creation date	1990	MEMBERS 	33 members of CEN/CENELEC
Secretariat	NEN (Netherlands)		
Secretary	Mrs. S. Golyardi		
Chairperson	Mr. R. Stegwee		
Involvement of Luxembourg	NO (no registered delegate)		
Organizations in liaison	COCIR, EC, GS1, HL7, Normapme		
Web site	http://standards.cen.eu/dyn/www/f?p=204:7:0::::FSP_ORG_ID:6232&cs=18CA078392807EDD402B798AAEF1644E1		
Scope	Standardization in the field of Health Information and Communications Technology (ICT) to achieve compatibility and interoperability between independent systems and to enable modularity. This includes requirements on health information structure to support clinical and administrative procedures, technical methods to support interoperable systems, as well as requirements regarding safety, security, and quality.		
Structure	CEN/TC 251/WG 1 CEN/TC 251/WG 2 CEN/TC 251/WG 4	Information models Terminology and knowledge representation Technology for interoperability	
Standardization work			
Published standards	91		
Standards under development	25		
Comments			
<p>CEN/TC 251 will seek to remain engaged with other standards development organizations, <i>consortia</i>, and <i>fora</i> to enhance efforts to coordinate its work with other organizations that have similar goals, such that stakeholder wishes for fewer, but more universal, global standards for health informatics in Europe.</p> <p>If this is to be achieved then the number of commercial and user organizations engaged in the TC and actively participating through NSBs has to be increased. For the next five years market indications are that the production of standards profiles in response to use cases as proposed in the M/403-2007 eHealth-INTEROP phase 1 Report will be the driver of most CEN/TC 251 work. The work of the TC will therefore be in cooperation with the CEN Workshop proposed to deliver the M/403-2007 eHealth-INTEROP phase 2 work, and on specifically targeted items to fill gaps in existing global provision, or to clarify ambiguities in that provision.</p> <p>CEN/TC 251 Health informatics will in general stimulate the development of ISO standards in areas where there is specific need and in so doing ensure they meet European requirements. Where necessary it may develop European standards to address regional legislative demands.</p>			

7.2.5.CEN/TC 278


General information			
Committee	CEN/TC 278	Title	Road transport and traffic telematics
Creation date	1991	MEMBERS 	33 members of CEN/CENELEC
Secretariat	NEN (Netherlands)		
Secretary	Mr. M. Peelen		
Chairperson	Mr. L. Eggink		
Involvement of Luxembourg	1 delegate		
Organizations in liaison	ASECAP, EPC, ERFA, ERTICO ITS, FIA – Europe, UITP		
Web site	http://standards.cen.eu/dyn/www/f?p=204:7:0:::FSP_ORG_ID:6259&cs=1EA16FFFE1883E02CD366E9E7EADFA6F7		
Scope	<p>The standards developed by CEN/TC 278 will support:</p> <ul style="list-style-type: none">- Improving the safety of road users;- Improving the efficiency of traffic flows and tackling congestion;- Providing pan-European services for information and payment;- Providing road users with accurate, timely and relevant information;- Improving economic efficiency through the application of fair and efficient pricing mechanisms;- Including social and environmental benefits and reduced costs;- Promoting the use of multi-modal door-to-door travel services to encourage optimum use of available transport modes;- Promoting the safe and economic movement of goods;- Optimizing the detection and management of traffic incidents;- Integrating environmental concerns in the design, operation and use of systems facilitating the development of the industrial and service sectors involved (equipment manufacturers, network operators, service providers, etc.) in a fair and competitive environment.		
Structure	CEN/TC 278/WG 1 CEN/TC 278/WG 2 CEN/TC 278/WG 3 CEN/TC 278/WG 7 CEN/TC 278/WG 8 CEN/TC 278/WG 9 CEN/TC 278/WG 10 CEN/TC 278/WG 12 CEN/TC 278/WG 13 CEN/TC 278/WG 14 CEN/TC 278/WG 15 CEN/TC 278/WG 16	Electronic fee collection and access control (EFC) Freight, Logistics and Commercial Vehicle Operations Public transport (PT) ITS spatial data Road traffic data (RTD) Dedicated Short Range Communication (DSRC) Man-machine interfaces (MMI) Automatic Vehicle Identification and Automatic Equipment Identification (AVI/AEI) Architecture and terminology After theft systems for the recovery of stolen vehicles eSafety Cooperative systems	

Standardization work	
Published standards	136
Standards under development	45
Comments	
<p>CEN/TC 278's vision statement for ITS standardization in Europe in the first quarter of the twenty-first century is: "To provide a family of Standards and related specifications, interoperable on a pan-European basis, that will enable services to be provided to travelers (be they drivers, pedestrians or users of public transport); to provide services to transport and highway managers and operators; to commercial fleet managers and commercial service providers, utilizing information technology to maximize efficiency, safety, and the quality of service provided.</p> <p>To ensure that by co-operating in international standardization, International Standards provide the best solutions for European stakeholders.</p> <p>Based on the considerations above, CEN/TC 278 proposes the following objectives and strategic directions for its future work:</p> <ul style="list-style-type: none"> - Electronic fee collection and access control; - Automatic vehicle and equipment identification; - Freight and fleet management; - Telematics in public transport; - Road and traffic data; - Parking systems; - Human-machine interfaces; - Architecture and terminology; - Recovery of stolen vehicles; - eSafety; - Cooperative ITS. 	

7.2.6.CEN/TC 287


General information			
Committee	CEN/TC 287	Title	Geographic Information
Creation date	1991		33 members of CEN/CENELEC
Secretariat	BSI (United Kingdom)		
Secretary	Mr. M. Ford		
Chairperson	Dr. R. Walker		
Involvement of Luxembourg	NO (no registered delegate)		
Organizations in liaison	AGILE, BRISEIDE Project, DGIWG, EGIDA Project, ENVIROFI Project, EUROGI, EuroGeographics, EuroSDR, GEO, GISIG, GeoViQua Project, IEEE - SA / SCC 40, JRC Ispra, OGC, OMG, SMART-ISLANDS Project, TaToo Project		
Web site	http://standards.cen.eu/dyn/www/f?p=204:7:0::::FSP_ORG_ID:6268&cs=1463041AEB6C5E614A612D0C224DCB350		
Scope	Standardization in the field of digital geographic information for Europe: The committee will produce a structured framework of standards and guidelines, which specify a methodology to define, describe, and transfer geographic data and services. This work will be carried out in close co-operation with ISO/TC 211 in order to avoid duplication of work. The standards will support the consistent use of geographic information throughout Europe in a manner that is compatible with international usage. They will support a spatial data infrastructure at all levels in Europe.		
Structure	CEN/TC 287/WG 5	Spatial Data Infrastructure	
Standardization work			
Published standards	49		
Standards under development	9		
Comments			
<p>The main objective is to facilitate the development and usage of geographical information in Europe by:</p> <ul style="list-style-type: none">- Adopting where appropriate the ISO/TC 211 standards series as CEN standards;- Developing and maintaining standards, specifications and profiles of standards;- Developing technical guidance and best practice documentation;- Collaborating with other standards related initiatives;- Educating the user community and promoting the use of standards for geographic information.			

7.2.7.CEN/TC 294


General information			
Committee	CEN/TC 294	Title	Communication systems for meters and remote reading of meters
Creation date	1991	<div>MEMBERS</div> <div></div>	33 members of CEN/CENELEC
Secretariat	DIN (Germany)		
Secretary	Mr. B. Hein		
Chairperson	Mr. O. Pfaff		
Involvement of Luxembourg	NO (no registered delegate)		
Organizations in liaison	AQUA, DLMS User Association, E.V.V.E., ECOS, ETSI, EUREAU, ESMIG, FARECOGAZ, KNX Association, Marcogaz, ZigBee Alliance		
Web site	http://standards.cen.eu/dyn/www/f?p=204:7:0::::FSP_ORG_ID:6275&cs=142047F7359698DA6A5B4BE4DE6571AF8		
Scope	Standardization of communication systems for meters and remote reading of meters for all kind of fluids and energies distributed by network and not limited to household meters.		
Structure	CEN/TC 294/WG 2 CEN/TC 294/WG 4 CEN/TC 294/WG 5 CEN/TC 294/WG 6	Application layer for communication systems for and remote reading of all meters within the scope Data exchange for meters on bus-systems and interface Radio meter data exchange Wireless mesh networking - Communication systems for meter data exchange	
Standardization work			
Published standards	7		
Standards under development	5		
Comments			
<p>CEN/TC 294 already specified a set of standards which are to be maintained and extended according market needs and new technologies t and to maintain the state of the art. At the moment CEN/TC 294 responds in its work to the EC/EFTA mandate M/441 in the fields of measuring instruments for the development of an open architecture for utility meters involving communication protocols enabling interoperability.</p> <p>CEN/TC 294 standards do not impose identical solutions on all smart metering systems in Member States, nor are they a best practice solution or recommendations. The standards which have been developed should be seen as a common standards “toolbox” to facilitate smart metering deployments.</p> <p>This approach recognizes that Member States will have their own priorities and will undertake their own cost</p>			

benefit analysis. Beside this there are differences in national architectures for smart metering systems and between utility meters to be connected, taking into account technical constraints for interfacing communication systems.

7.2.8.CEN/TC 310

General information			
Committee	CEN/TC 310	Title	Advanced Automation Technologies and their Applications
Creation date	1993	MEMBERS 	33 members of CEN/CENELEC
Secretariat	BSI (United Kingdom)		
Secretary	Dr. M. J. Leggett		
Chairperson	Mr. H. G. Mason		
Involvement of Luxembourg	1 delegate		
Organizations in liaison	/		
Web site	http://standards.cen.eu/dyn/www/f?p=204:7:0::::FSP_ORG_ID:6291&cs=1FB8DE3E2415169C5A629164496F80A52		
Scope	Standardization activities in the field of advanced automation technologies to ensure the availability of the standards required by European industry for the operation and integration of the elements of automation systems.		
Structure	CEN/TC 310/WG 1	Systems architecture	
Standardization work			
Published standards	9		
Standards under development	2		
Comments			
<p>The mission of CEN/TC 310 is to undertake standardization activities in the field of Advanced Manufacturing Technologies (AMT) to ensure the availability of the standards required by European industry for the operation and integration of the elements of AMT systems.</p> <p>The specific objectives of CEN/TC 310 are to:</p> <ul style="list-style-type: none">- Act as focal point within Europe for standardization in Advanced Manufacturing Technologies;- Undertake the leading technical responsibility for the general strategy for standardization in the field of AMT, and to document an agreed upon European strategy in this Business Plan;- Develop standards for AMT systems and elements that are not included in the work program of other European TCs;- Support and accommodate the standardization needs of European industry, if different from, or with a higher priority than, International standards being developed;- Create a wider understanding and awareness of the importance of AMT standardization driven by market needs for European industry, the European Commission, and national Governments;- Encourage the awareness of AMT standardization by improving the availability of information between interested parties.			


7.2.9.CEN/TC 353

General information			
Committee	CEN/TC 353	Title	Information and Communication Technologies for Learning, Education and Training
Creation date	2007	MEMBERS 	33 members of CEN/CENELEC
Secretariat	UNI (Italy)		
Secretary	Mr. C. Sirocchi		
Chairperson	Mr. C. Stracke		
Involvement of Luxembourg	1 delegate		
Organizations in liaison	/		
Web site	http://standards.cen.eu/dyn/www/f?p=204:7:0:::FSP_ORG_ID:580446&cs=15AD42370A941BEC38A49B673D09BFEF6		
Scope	Produce standards in the field of information and communication technologies relating to learning, education and training. The European Standards (EN), Technical Specifications (TS) and Technical Reports (TR) that are developed will have a well-defined European scope. These may include: <ul style="list-style-type: none">- Development of CEN Workshop Agreement (CWA) and other specifications into standards, if appropriate;- Developments of national standards into European Standards.		
Structure	CEN/TC 353/WG 1 CEN/TC 353/WG 2	Interoperability Business Planning, Communications & Prospectives (BPCP)	
Standardization work			
Published standards	8		
Standards under development	2		
Comments			
The objective of the TC is to encourage the effective development and use of relevant and appropriate standards for European information and communication technologies for learning, education and training.			
The following work priorities have been defined within the TC: <ul style="list-style-type: none">- European Policies: Development of European standards for the realization, dissemination, implementation and exploitation of European policies such as European Qualifications Framework (EQF), the Europass documents. Development of European standards for the realization, dissemination, implementation and exploitation of European key strategies such as European mobility and lifelong learning expressed in EU2020 and other communications by the European Union;- Competencies: Development of a well-defined European data model and guidelines for expressing, referencing and capturing measurable characteristics of simple and complex competencies, and identification of existing competency maps and taxonomies and development of guidelines on			


taxonomies and vocabularies;

- Quality: Development of frameworks, specifications, and guidelines to improve the quality and transparency of organizations, processes, products, and services. Localization of International standards (e.g., ISO/IEC 19796-1). Providing guidance to stakeholders involved in quality development. Improvement of quality competencies for European stakeholders;
- Interoperability and Frameworks: Development of European learning, education and training vocabularies and frameworks; Provide interoperability specifications for the exchange a range of European curriculum information; Development of a practical approach towards interoperability between existing and future repositories for learning whose purpose is the safe storage or delivery, and also administration and configuration management for learning objects; Integration with systems e.g. knowledge management systems; sharing of education related data, services, content and tools achieved through clearer technical agreements between all parties, without losing the value of expression typical of each European community's language and culture.

7.2.10. CEN/TC Project Committee 365

General information			
Committee	CEN/TC Project Committee 365	Title	Internet Filtering
Creation date	2007	<div>MEMBERS</div> <div></div>	33 members of CEN/CENELEC
Secretariat	AENOR (Spain)		
Secretary	Ms. P. Garcia Lopez		
Chairperson	Mr. Jose Maria Gomez Hidalgo		
Involvement of Luxembourg	NO (no registered delegate)		
Organizations in liaison	-		
Web site	http://standards.cen.eu/dyn/www/f?p=204:7:0:::FSP_ORG_ID:625771&cs=1F652BC44F0DDC3A32C5C992CAE9778AF		
Scope	Standardization in the area of 'Internet Filtering' with the objective to define a set of standards in the form of a European Technical Specification that will give internet users more confidence in choosing a suitable filtering product or service.		
Structure	/		
Standardization work			
Published standards	1		
Standards under development	0		
Comments			
CEN/PC 365 has published the Technical Specification CEN/TS 16080:2013 to define a set of criteria on how Web filters shall perform and shall give Internet users more confidence in choosing a suitable product or service in order to help protecting children online.			

7.2.11. CEN/TC Project Committee 428

General information			
Committee	CEN/TC Project Committee 428	Title	Professions for Information and Communication Technology (ICT)
Creation date	2007	MEMBERS 	33 members of CEN/CENELEC
Secretariat	UNI (Italy)		
Secretary	Mrs. V. Salsano		
Chairperson	/		
Involvement of Luxembourg	NO (no registered delegate)		
Organizations in liaison	-		
Web site	http://standards.cen.eu/dyn/www/f?p=204:7:0::::FSP_ORG_ID:1218399&cs=1600F0DD849DA04F3E3B900863CB58F72		
Scope	The new Project Committee will look into all the relevant aspects for the matching the supply and demand for eSkills and aims to provide general and comprehensive e-Competences that can then be adapted and customized into different ICT business contexts.		
Structure	/		
Standardization work			
Published standards	/		
Standards under development	/		
Comments			
This TC is still under construction.			

7.3. ISO/TC 46


ISO/TC 46 is not directly related to the ICT domain as defined in Section 4.1, but it covers the e-archiving topic. E-archiving being defined as a subsector in Section 5.1, ISO/TC 46 has also been selected as part of the ICT standards watch and is surveyed in this section.

General information			
Committee	ISO/TC 46	Title	Information and documentation
Creation date	1947		Participating Countries (38): Argentina, France, Armenia, Australia, Austria, Belgium, Bulgaria, Canada, China, Croatia, Czech Republic, Denmark, Egypt, Estonia, Finland, Germany, Islamic Republic of Iran, Ireland, Italy, Japan, Kenya, Democratic People's Republic of Korea, Republic of Korea, Morocco, Netherlands, Norway, Poland, Portugal, Russian Federation, South Africa, Spain, Sweden, Switzerland, Thailand, The former Yugoslav Republic of Macedonia, Ukraine, United Kingdom, United States
Secretariat	AFNOR (France)		
Secretary	Mrs. Sabine Donnard Cusse		
Chairperson	Mrs. Françoise Pellé		
Involvement of Luxembourg	9 delegates		
Organizations in liaison	CIDOC, CISAC, DOI, EC, IAEA, ICA, ICSTI, IFLA, IIF, ISAN, ISOC, ISSN International Center, ITU, UN, UNCTAD, UNECE, UNESCO, UPU, WIPO	MEMBERS 	Observing Countries (33): Belarus, Bosnia and Herzegovina, Colombia, Cuba, Ecuador, Ethiopia, Greece, Hong Kong, Hungary, Iceland, India, Indonesia, Israel, Kazakhstan, Lithuania, Luxembourg , Malaysia, Republic of Moldova, Mongolia, New Zealand, Pakistan, Romania, Saudi Arabia, Serbia, Singapore, Slovakia, Slovenia, Sri Lanka, Sudan, Syrian Arab Republic, United Republic of Tanzania, Tunisia, Turkey
Web site	http://www.iso.org/iso/home/standards_development/list_of_iso_technical_committees/iso_technical_committee.htm?commid=48750		
Scope	Standardization of practices relating to libraries, documentation and information centers, publishing, archives, records management, museum documentation, indexing and abstracting services, and information science.		
Structure	TC 46/MA ISO 3166 Maintenance Agency TC 46/MG ISO 3166 Maintenance Group TC 46/WG 2 Coding of country names and related entities TC 46/WG 3 Conversion of written languages TC 46/WG 4 Terminology of information and documentation TC 46/WG 7 Presentation of periodicals TC 46/SC 4 Technical interoperability TC 46/SC 8 Quality - Statistics and performance evaluation TC 46/SC 9 Identification and description TC 46/SC 10 Requirements for document storage and conditions for preservation TC 46/SC 11 Archives/records management		

Standardization work	
Published standards	<p>Total number of published ISO standards related to the TC and its SCs (number includes updates): 110</p> <p>Number of published ISO standards under the direct responsibility of TC 46 (number includes updates): 32</p>
Standards under development	20
Comments	
<p>The ISO/TC 46/SC 11 is the subcommittee particularly relevant for e-archiving. At the national level, all of the delegates participate at this level of ISO/TC 46. Its scope is the following: Standardization of best practices in managing archives and records by providing a managerial framework, as well as standards and guidance, for the design and application of records practices and processes to ensure authoritative and reliable information and evidence of business activity in organizations.</p> <p>Examples of standards developed by ISO/TC 46 are:</p> <ul style="list-style-type: none"> - ISO 5127:2001, Information and documentation – Vocabulary (under revision); - ISO 15489-1:2001, Information and documentation -- Records management -- Part 1: General (under revision); - ISO/TR 15489-2:2001, Information and documentation -- Records management -- Part 2: Guidelines (under revision); - ISO 30301:2011, Information and documentation -- Management systems for records – Requirements. 	

7.4. CENELEC/TC 215

CENELEC/TC 215 (CLC/TC 215) is not directly related to the ICT domain as defined in Section 4.1, but it covers the data center topic. Data center being defined as a subsector in Section 5.1, CLC/TC 215 has also been selected as part of the ICT standards watch and is surveyed in this section.

General information			
Committee	CLC/TC 215	Title	Electrotechnical aspects of telecommunication equipment
Creation date	1991	MEMBERS 	33 members of CEN/CENELEC
Secretariat	Germany		
Secretary	Dipl.-Ing. Thomas Wegmann		
Chairperson	Mr. Dominique Roche		
Involvement of Luxembourg	1 delegate		
Organizations in liaison	EC, EURALARM, Green Grid TLP		
Web site	http://www.cenelec.eu/dyn/www/f?p=104:7:3429473679812716::::FSP_LANG_ID,FSP_ORG_ID:25,818#1		
Scope	<ul style="list-style-type: none">- To address standardization in the field of electrotechnical aspects of telecommunication equipment and associated infrastructures and liaise with other standardization bodies as appropriate;- To prepare harmonized standards (EN, TS or TR) covering all aspects of generic and application-specific telecommunications cabling (e.g. ISDN, LAN and others) within all types of premises;- These documents also cover the requirements and recommendations for building infrastructures related to the effective installation and operation of associated telecommunication equipment by reference to the existing or forthcoming standards provided by the relevant committees or using technical inputs from them;- To provide contributions to ETSI standards (EN and/or other deliverables) in areas related to those detailed above;- To serve as a mediator in those cases where in accordance with the CENELEC-ETSI-Agreement ETSI indicates to CENELEC the need of standardization activities (EN/TS/TR or contributions to ETSI deliverables) of electrotechnical aspects related to its work;- Identification of the appropriate TC within CENELEC, thereby providing proper assignment of the technical work to the responsible group of experts;- Where an appropriate TC within CENELEC cannot be identified, TC 215 may decide to establish a Working Group to resolve a specific task;- To review international standardization results of ISO/IEC JTC 1 as far as telecommunication equipment with respect to Customer Premises Cabling and Energy Efficient Data Centers are concerned. This includes coordination of harmonization and assignment to the responsible organization in close cooperation with CEN bearing in mind JTC 1 being a joint ISO/IEC-Committee.		


Structure	CLC/TC 215/WG 01	Cabling design
	CLC/TC 215/WG 01-04	Testing of installed cabling
	CLC/TC 215/WG 02	Cabling installation – Quality assurance and installation practices
	CLC/TC 215/WG 03	Facilities and infrastructures
Standardization work		
Published standards	Number of published EN standards under the direct responsibility of CLC/TC 215 (number includes updates): 37	
Standards under development	10	
Comments		
<p>CENELEC/TC 215 Working Group 3 is the competent European body to prepare European Standards in the field data centers. A liaison between CLC/TC 215 and ISO/IEC JTC 1/SC 39 was established to transpose the international standardization at the European level.</p> <p>In response to expressed European market needs for a holistic set of standards addressing a variety of subjects including energy efficiency enablement, TC 215/WG 3 currently focuses on the development of series EN 50600 "Information technology - Data center facilities and infrastructures".</p> <p>Series EN 50600 specifies requirements and recommendations to support the various parties involved in the design, planning, procurement, integration, installation, operation and maintenance of facilities and infrastructures within data centers.</p> <p>The first part has been published in 2012:</p> <ul style="list-style-type: none">- EN 50600-1:2012, Information technology - Data centre facilities and infrastructures - Part 1: General concepts <p>The following parts are still under development:</p> <ul style="list-style-type: none">- prEN 50600-2-1, Information technology - Data centre facilities and infrastructures - Part 2-1: Building construction;- prEN 50600-2-2, Information technology - Data centre facilities and infrastructures - Part 2-2: Power distribution;- prEN 50600-2-3, Information technology - Data centre facilities and infrastructures - Part 2-3: Environmental control;- prEN 50600-2-4, Information technology - Data centre facilities and infrastructures - Part 2-4: Telecommunications Cabling Infrastructure;- prEN 50600-2-5, Information technology - Data centre facilities and infrastructures - Part 2-5: Security systems.		

7.5. ETSI - European Telecommunications Standards Institute

The European Telecommunications Standards Institute (ETSI) produces globally applicable standards for ICT including fixed, mobile, radio, converged, broadcast and internet technologies. ETSI is officially recognized by the European Union as a European Standards Organization. The high quality of its work and its open approach to standardization has helped it evolve into a European roots - global branches operation with a solid reputation for technical excellence. ETSI is a not-for-profit organization with more than 750 ETSI member organizations drawn from 62 countries across five continents worldwide.

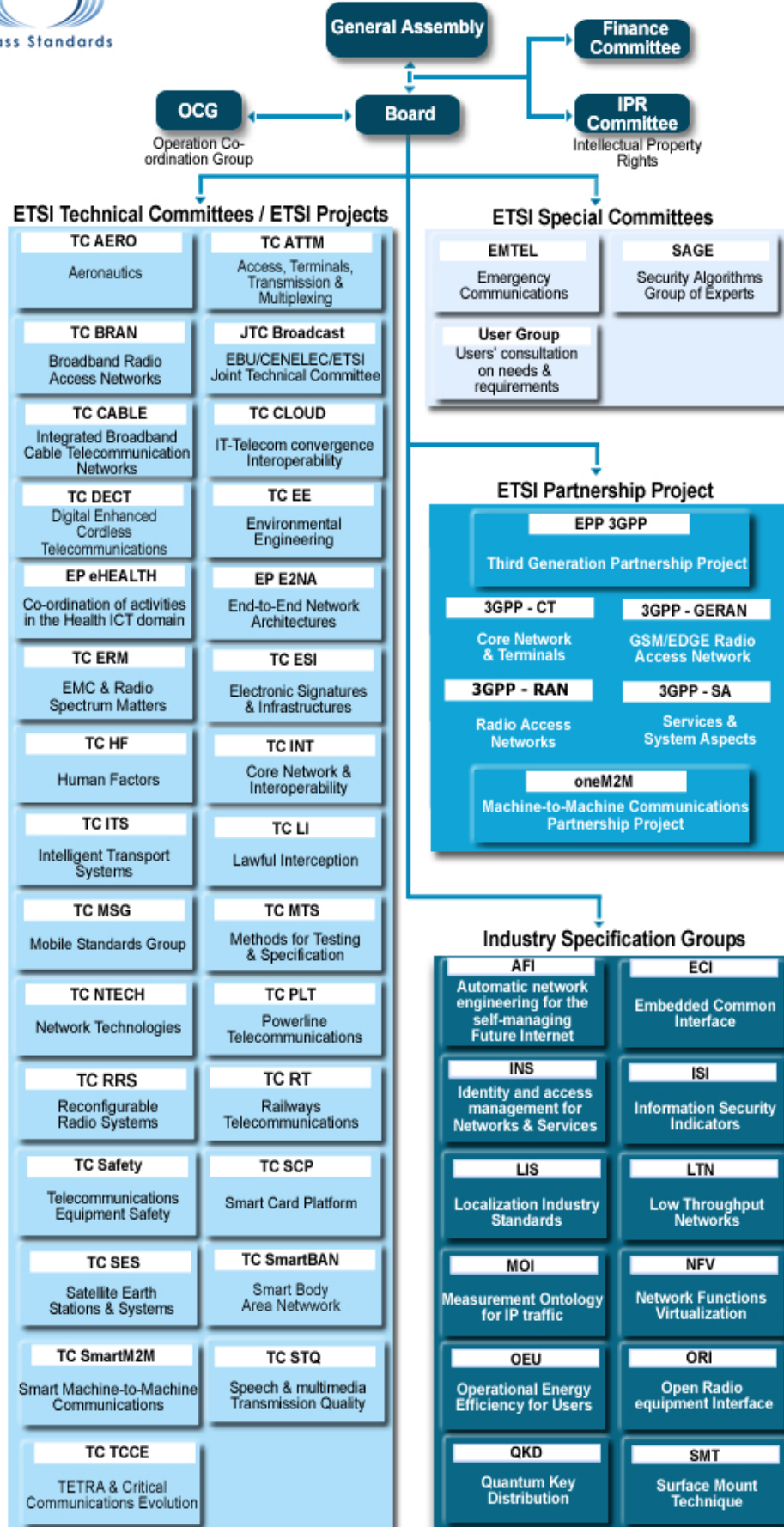
In this section, an ID-Card is provided for ETSI in general. By its scope – specifically focused on telecommunications – the whole of ETSI is considered as related to the “telecommunications” subsector. Firstly, a focus is performed on two technical committees, “TC CLOUD” and “TC ESI”, because of their relevance with regards to the subsectors “Cloud computing” and “Electronic signature”. Secondly, two other technical committees have been selected due to their potential for the development of promising sectors, described in Chapter 10, such as Smart cities and Internet of Things.

7.5.1.ETSI – European Telecommunications Standards Institute

General information			
Standard body	ETSI	Title	European Telecommunications Standards Institute
Creation date	1988	<div>MEMBERS</div> 	More than 750 ETSI member organizations drawn from 62 countries across 5 continents worldwide
Chairperson	Mr. Luis Jorge Romero Saro		
Involvement of Luxembourg	6 members (ILNAS, FBConsulting, eWitness, P&T, SES S.A., SnT)		
Web site	http://www.etsi.org/website/homepage.aspx		
Scope	The European Telecommunications Standards Institute (ETSI) produces globally applicable standards for Information and Communications Technologies (ICT), including fixed, mobile, radio, converged, broadcast and internet technologies.		
Executive summary	<p>High quality and low time-to-market are ETSI’s constant aims and it continually strives to collaborate with research bodies. ETSI is active in vital complementary areas such as interoperability and offers event services related to standardization including forum hosting.</p> <p>The international reputation of ETSI is built on openness, discussion, consensus, and direct input from their members. ETSI is officially recognized by the European Union as a European Standards Organization. The quality of its work and its open approach to standardization has helped it to evolve into a European roots - global branches operation with a good reputation for technical excellence.</p> <p>The following ETSI standards are used in Luxembourg by ILNAS to supervise/accredit Certification Service Providers:</p> <ul style="list-style-type: none">- ETSI TS 101 456 “Policy requirements for certification authorities issuing qualified certificates”;- ETSI TS 102 042 “Policy requirements for certification authorities issuing public key certificates”;- ETSI TS 102 023 “Policy requirements for time-stamping authorities”.		

ETSI Structure


Last update: 21 November 2013




Structure

Standardization work	
Published standards	Over 30000 standards and reports
Standards under development	More than 900


7.5.2.ETSI/TC CLOUD

General information			
Committee	TC CLOUD	Title	Technical Committee (TC) on Cloud Computing
Creation date	/	MEMBERS 	
Chairperson	Mr. Michael Fisher		
Involvement of Luxembourg	/		
Organizations in liaison	ATIS, ITU-T, OGF, TTA		
Web site	http://portal.etsi.org/portal/server.pt/community/CLOUD/310		
Scope	<p>TC CLOUD addresses interoperability aspects of end-to-end applications and develop formal test specifications to support them.</p> <p>The technical scope of TC CLOUD is broad. It includes:</p> <ul style="list-style-type: none">- Resource and service access;- Protocols and middleware;- Security.		
Executive summary	<p>The goal of TC CLOUD is to address issues associated with the convergence between IT (Information Technology) and Telecommunications. The focus is on scenarios where connectivity goes beyond the local network. This includes not only Cloud computing but also the emerging commercial trend towards Cloud computing which places particular emphasis on ubiquitous network access to scalable computing and storage resources.</p> <p>Since TC CLOUD has particular interest in interoperable solutions in situations which involve contributions from both the IT and Telecom industries, the emphasis is on the Infrastructure as a Service (IaaS) delivery model. TC CLOUD focuses on interoperable applications and services based on global standards and the validation tools to support these standards. Evolution towards a coherent and consistent general purpose infrastructure is envisaged. This will support networked IT applications in business, public sector, academic and consumer environments.</p> <p>The approach is to complement existing activities in ETSI and other standards development organizations. TC CLOUD is expected to fulfill a specific role as a forum in which to develop consensus within the telecommunication sector, which can then be represented in other bodies. It can also act to introduce new requirements into networking (e.g. NGN) standards that support new application paradigms, such as Grid and Cloud.</p>		
Structure	/		
Standardization work			
Published standards	17		
Standards under development	1		

7.5.3.ETSI/TC ESI


General information			
Committee	TC ESI	Title	Technical Committee (TC) on Electronic Signatures and Infrastructures
Creation date	/	MEMBERS 	
Chairperson	Mr. Riccardo Genghini		
Involvement of Luxembourg	/		
Organizations in liaison	CAB Forum, ENISA, ISO, ISO/IEC JTC 1, ISOC/IETF, ITU, OASIS, UNECE, UPU		
Web site	http://portal.etsi.org/portal/server.pt/community/ESI/307		
Scope	TC ESI is the lead body within ETSI in relation to Electronic Signatures and Infrastructures, including the preparation of reports and other necessary activities, by: <ul style="list-style-type: none">- Developing generic standards, guides and reports relating to electronic signatures and related trust infrastructures to protect electronic transactions and ensure trust and confidence with business partners;- Liaising with other ETSI bodies in relation to electronic signatures and related trust infrastructures;- Liaising with bodies external to ETSI in relation to electronic signatures and related trust infrastructures;- Establishing a continuing work plan in relation to electronic signatures and related trust infrastructures.		
Executive summary	<p>The action addresses some basic needs of secure electronic commerce and of secure electronic document exchange in general by providing specifications for a selected set of technical items that have been found both necessary and sufficient to meet minimum interoperability requirements. Examples of business transactions based on electronic signatures and public key certificates are purchase requisitions, contracts and invoice applications.</p> <p>The lack of standards to support the use of electronic signatures and public key certificates has been identified as one of the greatest impediments to electronic commerce. The deployment of vendor-specific new infrastructures is currently in progress. It is recognized by different parties that there is an urgent need for standards to provide the basis for an open electronic commerce environment. Speedy specifications in this area will make it possible to influence early developments.</p> <p>The ETSI strategy is in line with, and endorsed by the initiative of the EU Commission to establish a harmonized infrastructure for electronic signatures.</p>		
Structure	/		
Standardization work			
Published standards	133		
Standards under development	70		

7.5.4.ETSI/TC SmartM2M

General information			
Committee	TC SmartM2M	Title	Smart Machine-to-Machine Communications
Creation date	/	 MEMBERS	/
Chairperson	Mrs. Arndt Marylin		
Involvement of Luxembourg	/		
Organizations in liaison	ATIS, Broadband Forum, CEN, CENELEC, Continua Health Alliance, DLMS, ESMIG, GSM Association, HGI, IEEE, IPSO Alliance, ISOC/IETF, ITU, OASIS, OMA, T&D Europe, TIA, TTA, TTC, ULE Alliance, ZigBee Alliance		
Web site	http://portal.etsi.org/portal/server.pt/community/SmartM2M		
Scope	The scope of TC Smart M2M is: <ul style="list-style-type: none">- To develop and maintain an end-to-end overall telecommunication high level architecture for M2M;- To identify gaps where existing standards and provide specifications to fill these gaps.		
Executive summary	<u>Responsibility:</u> <ul style="list-style-type: none">- TC Smart M2M primarily provides specifications for M2M services and applications. Much of the work will focus on aspects of the Internet of Things (IoT) and Smart Cities;- TC Smart M2M supports European policy and regulatory requirements including mandates in the area of M2M and the Internet of Things;- TC Smart M2M work includes the identification of EU policy and regulatory requirements on M2M services and applications to be developed by oneM2M, and the conversion of the oneM2M specifications into European Standards.		
	<u>Areas of activity:</u> The activities of TC Smart M2M will include the following: <ul style="list-style-type: none">- Be a center of expertise in the area of M2M and Internet of Things (IoT) to support M2M services and applications;- Maintain ETSI M2M published specifications;- Produce specifications as needed for regulatory purposes;- Transpose the output of oneM2M to TC M2M.		
	TC Smart M2M aims at referring to existing work done elsewhere, or encouraging existing groups to fulfil Smart M2M requirements. The TC will undertake necessary work that is not being provided for elsewhere.		

Structure	/
Standardization work	
Published standards	24
Standards under development	5

7.5.5.ETSI/TC ITS

General information			
Committee	TC ITS	Title	Intelligent Transport Systems
Creation date	/	MEMBERS 	
Chairperson	Mr. Annoni Marco		
Involvement of Luxembourg	/		
Organizations in liaison	APT, ARIB, CEN, CENELEC, CEPT, ECC, ENISA, ERTICO, IEEE, IPv6 Forum, ISO, ISOC/IETF, ITU, RITA, SAE International, TIA, TISA, TTC, UNECE		
Web site	http://portal.etsi.org/portal/server.pt/community/ITS		
Scope	TC ITS shall have responsibility: <ul style="list-style-type: none">- Development and maintenance of Standards, Specifications and other deliverables to support the development and implementation of ITS Service provision across the network, for transport networks, vehicles and transport users, including interface aspects and multiple modes of transport and interoperability between systems, but not including ITS application standards, radio matters, and EMC;- Scope includes communication media, and associated physical layer, transport layer, network layer, security, lawful intercept and the provision of generic web services.		
Executive summary	TC ITS is responsible for standardization to support the development and implementation of Intelligent Transport Systems (ITS) service provision across the network, for transport networks, vehicles and transport users, including interface aspects, multiple modes of transport and interoperability between systems.		
Structure	WG 1 Application Requirements and Services WG 2 Architecture and Cross Layer WG 3 Transport and Network WG 4 Media and Medium Related WG 5 Security		
Standardization work			
Published standards	116		
Standards under development	89		


7.6. ITU-T - International Telecommunication Union - Telecommunication Standardization Sector

The International Telecommunication Union - Telecommunication Standardization Sector (ITU-T) is an “intergovernmental public-private partnership organization” which brings together experts from around the world to develop International standards known as ITU-T Recommendations which act as defining elements in the global infrastructure of information and communication technologies.

From its inception in 1865, ITU-T has driven a contribution-led, consensus-based approach to standards development in which all countries and companies, no matter how large or small, are afforded equal rights to influence the development of ITU-T Recommendations. From its beginnings as a body standardizing international telegraph exchange, through its formative role in telecommunications, and in today’s converged ICT ecosystem, ITU-T has provided the world’s best facilities to the global standardization community and remains the world’s only truly global ICT standards body.⁸⁷

In this section, an ID-Card is provided for ITU-T in general. By its scope – specifically focused on telecommunications – the whole of ITU-T is considered as related to the “telecommunications” subsector.

⁸⁷ <http://www.itu.int/en/ITU-T/about/Pages/default.aspx>

General information			
Forum / Consortium	ITU-T	Title	ITU - Telecommunication Standardization Sector
Creation date	1865	MEMBERS 	193 countries and over 700 private-sector entities and academic institutions
Chairperson	Malcolm Johnson		
Involvement of Luxembourg	3 members <i>(Service des médias et des Communications, ILR, POST Telecom)</i>		
Web site	http://www.itu.int/ITU-T/index.html		
Scope	The International Telecommunication Union (ITU) is the United Nations specialized agency in the field of telecommunications. The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of ITU. ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.		
Executive summary	The main products of ITU-T are normative Recommendations. Recommendations are standards that define how telecommunication networks operate and interwork. ITU-T Recommendations are non-binding, however they are generally complied with due to their high quality and because they guarantee the interconnectivity of networks and enable telecommunication services to be provided on a worldwide scale.		
Structure	<u>Advisory Group</u> Telecommunication Standardization Advisory Group (TSAG)		
	<u>Study Groups</u> <ul style="list-style-type: none">- SG 2: Operational aspects of service provision and telecommunications management- SG 3: Tariff and accounting principles including related telecommunication economic and policy issues- SG 5: Environment and climate change- SG 9: Television and sound transmission and integrated broadband cable networks- SG 11: Signaling requirements, protocols and test specifications- SG 12: Performance, QoS and QoE- SG 13: Future networks including mobile and NGN- SG 15: Networks, Technologies and Infrastructures for Transport, Access and Home- SG 16: Multimedia coding, systems and applications- SG 17: Security		
	<u>Focus Groups</u> <ul style="list-style-type: none">- Focus Group on Smart Sustainable Cities (FG-SSC)- Focus Group on Smart Cable Television (FG SmartCable)- Focus Group on Bridging the Gap: from Innovation to Standards (FG Innovation)- Focus Group on Disaster Relief Systems, Network Resilience and Recovery (FG-DR&NRR)- Focus Group on M2M Service Layer (FG M2M)- Focus Group on Smart Water Management (FG-SWM)		
	<u>Joint Coordination Activities</u> <ul style="list-style-type: none">- Joint Coordination Activity on Software-Defined Networking (JCA-SDN)- Joint Coordination Activity on technical aspects of telecommunication networks to support the Internet (JCA-Res178)- Joint Coordination Activity on Child Online Protection (JCA-COP)- Joint Coordination Activity for Cloud Computing (JCA-Cloud)		

- Joint Coordination Activity on Internet of Things (JCA-IoT)
- Joint Coordination Activity on ICT and climate change (JCA-ICT&CC)
- Joint Coordination Activity on Accessibility and Human factors (JCA-AHF)
- Joint Coordination Activity for Identity Management (JCA-IdM)
- Joint Coordination Activity on IPTV (JCA-IPTV)
- Joint Coordination Activity on Conformance and Interoperability Testing (JCA-CIT)

Global Standards Initiative

- Internet of Things Global Standards Initiative (IoT-GSI)
- IPTV Global Standards Initiative (IPTV-GSI)

Committees

- Standardization Committee for Vocabulary

Standardization work

**Published
standards**

Over 4000 ITU-T Recommendations

**Standards
under
development**

/

8. FORA/CONSORTIA

As acknowledged by CEN, much of the key standardization activity in ICT is carried out by industry *consortia* rather than in formal standards organizations such as CEN and ISO⁸⁸. ICT *fora* and *consortia* develop *de facto* standards widely spread in the ICT sector. The purpose of this chapter is thus to present some well-known ICT *fora* and *consortia*.

This work does not pretend to be exhaustive and the *fora/consortia* analyzed are only a selection of *fora/consortia* related to the ICT domain (extracted from the CEN list of standards-related *fora* and *consortia* presented in Section 12.3) we consider as the most relevant for the current national market. It is important to note that ICT is certainly one of the sectors having the highest number of active SDO. It is thus not realistic to detail and analyze them all.

We have especially included in this chapter all of the Publicly Available Specifications (PAS) Submitters of ISO/IEC JTC 1. The work quality of these organizations is recognized by ISO/IEC JTC 1, and they are approved to submit PAS as drafts for review and approval as International ISO/IEC JTC 1 standards⁸⁹.


⁸⁸ Comprehensive list of ICT Standards Consortia, 17th Edition - August 2012 (Source: CEN and CENELEC)

⁸⁹ http://jtc1info.org/?page_id=517 (the list may be incomplete)

8.1. IETF - Internet Engineering Task Force

General information			
Forum / Consortium	IETF	Title	Internet Engineering Task Force
Creation date	1986	MEMBERS 	No formal membership
Chairperson	Jari Arkko		
Involvement of Luxembourg	No membership		
Web site	http://www.ietf.org/		
Scope	The mission of the IETF is to make the Internet work better by producing high quality, relevant technical documents that influence the way people design, use, and manage the Internet.		
Executive summary	<p>The IETF is a large open international community of network designers, operators, vendors, and researchers concerned with the evolution of the internet architecture and the smooth operation of the internet.</p> <p>The IETF does not standardize transmission hardware (they leave that to organizations like the IEEE and the ITU) and does not standardize specialized application layer protocols. For example, they leave HTML and XML standards to the World-Wide Web Consortium. But the IETF does standardize all the protocol layers in between, from IP itself up to general applications like email and HTTP.</p> <p>Documents published by the IETF are RFC (Request For Comments). Some of the main RFC are: RFC 821 - Simple Mail Transfer Protocol, RFC 2616 - Hypertext Transfer Protocol -- HTTP/1.1, RFC 1738 - Uniform Resource Locators (URL), RFC 959 - File Transfer Protocol, RFC 1510 - The Kerberos Network Authentication Service (V5), etc.</p>		
Structure	<p><u>Areas :</u></p> <ul style="list-style-type: none">- Applications Area- Internet Area- Operations and Management Area- Real-time Applications and Infrastructure Area- Routing Area- Security Area- Transport Area		
Standardization work			
Published standards	6854 RFC		
Standards under development	145		

8.2. W3C - World Wide Web Consortium

General information			
Forum / Consortium	W3C	Title	World Wide Web Consortium
Creation date	1994	MEMBERS 	391 members
Director	Tim Berners-Lee		
Involvement of Luxembourg	/		
Web site	http://www.w3.org/		
Scope	The W3C mission is to lead the World Wide Web to its full potential by developing protocols and guidelines that ensure the long-term growth of the Web		
Executive summary	W3C standards define an Open Web Platform for application development that has the unprecedented potential to enable developers to build rich interactive experiences, powered by vast data stores, which are available on any device. Although the boundaries of the platform continue to evolve, industry leaders speak nearly in unison about how HTML5 will be the cornerstone for this platform. But the full strength of the platform relies on many more technologies that W3C and its partners are creating, including CSS, SVG, WOFF, the Semantic Web stack, XML, and a variety of APIs.		
Structure	<u>Working Groups:</u> <ul style="list-style-type: none">- Audio- Authoring Tool Accessibility Guidelines- Browser Testing and Tools- CSV on the Web- Cascading Style Sheets (CSS)- Device APIs- Education and Outreach- Efficient XML Interchange- Evaluation and Repair Tools- Forms- Geolocation- Government Linked Data- HTML- Independent User Interface (Indie UI)- Internationalization- Linked Data Platform (LDP) Math- Media Annotations- Model-Based User Interfaces- Multimodal Interaction- Near Field Communications- Pointer Events- Protocols and Formats- RDF- RDFa- Research and Development- SVG- System Applications- Timed Text- Tracking Protection- User Agent Accessibility Guidelines		

- Voice Browser
- Web Application Security
- Web Applications
- Web Content Accessibility Guidelines
- Web Cryptography
- Web Notification
- Web Performance
- Web Real-Time Communications
- WebFonts
- XML Core
- XML Processing Model
- XML Query
- XML Security
- XSLT

Interest Groups :

- Digital Publishing
- HTML5 Chinese
- HTML5 Japanese
- HTML5 Korean
- Internationalization (I18n)
- Internationalization Tag Set (ITS)
- Patents and Standards
- Privacy
- Semantic Web Health Care and Life Sciences
- Semantic Web
- WAI
- Web Security
- Web and Mobile
- Web and TV

Coordination Groups :

- Data Activity
- WAI
- XML

Permanent Groups :

- Technical Architecture Group (TAG)
- Advisory Board (AB)

Standardization work


**Published
standards**

230

**Standards
under
development**


183

8.3. IEEE-SA - Institute of Electrical and Electronics Engineers Standards Association

General information			
Forum / Consortium	IEEE-SA	Title	Institute of Electrical and Electronics Engineers Standards Association
Creation date	1963	MEMBERS 	200 corporate members
President	Karen Bartleson		
Involvement of Luxembourg	/		
Web site	http://standards.ieee.org/		
Scope	IEEE's core purpose is to foster technological innovation and excellence for the benefit of humanity. The IEEE-SA is an organization within IEEE that develops global standards in a broad range of industries, including: power and energy, biomedical and health care, information technology, telecommunication, transportation, nanotechnology, information assurance, and many more.		
Executive summary	<p>The IEEE Standards Association (IEEE-SA) is a leading consensus building organization that nurtures, develops and advances global technologies, through IEEE external link. It brings together a broad range of individuals and organizations from a wide range of technical and geographic points of origin to facilitate standards development and standards related collaboration. With collaborative thought leaders in more than 160 countries, it promotes innovation, enables the creation and expansion of international markets and helps protect health and public safety. Collectively, its work drives the functionality, capabilities and interoperability of a wide range of products and services that transform the way people live, work and communicate.</p> <p>Among the most important standards of IEEE are: IEEE 802 family of standards dealing with local area networks and metropolitan area networks, IEEE P1901 dealing with power line communications, IEEE Standard for Floating-Point Arithmetic (IEEE 754), IEEE 1394 interface ("FireWire "), etc..</p>		
Structure	<u>Topics:</u> <ul style="list-style-type: none">- Aerospace Electronics- Antennas & Propagation- Batteries- Communications- Computer Technology- Consumer Electronics- Electromagnetic Compatibility- Green & Clean Technology- Healthcare IT- Industry Applications- Instrumentation & Measurement- Nanotechnology- National Electrical Safety Code- Nuclear Power- Power & Energy- Power Electronics- Smart Grid- Software & Systems Engineering- Transportation- Wired & Wireless		

Standardization work	
Published standards	2175
Standards under development	599

8.4. DMTF - Distributed Management Task Force


General information			
Forum / Consortium	DMTF	Title	Distributed Management Task Force
Creation date	1992		160 member companies and organizations, and more than 4,000 active participants crossing 43 countries
Chairperson	Winston Bumpus		
Involvement of Luxembourg	/		
Web site	http://www.dmtf.org/		
Scope	DMTF enables more effective management of millions of IT systems worldwide by bringing the IT industry together to collaborate on the development, validation and promotion of systems management standards.		
Executive summary	<p>DMTF’s technologies are designed to work together to address the industry’s needs and requirements for interoperable distributed management. These standards provide well-defined interfaces that build upon each other, delivering end-to-end management capabilities and interoperability.</p> <p>DMTF standards encompass the Common Information Model (CIM) and the Open Virtualization Format (OVF).</p>		
Structure	<p><u>DMTF Initiatives</u></p> <ul style="list-style-type: none">- Common Diagnostic Model (CDM)- Common Information Model (CIM)- Cloud Management Initiative (CLOUD)- Desktop and Mobile Architecture for System Hardware (DASH)- Systems Management Architecture for Server Hardware (SMASH)- Virtualization Management (VMAN)		
Standardization work			
Published standards	414		
Standards under development	1 known work in progress ⁹⁰		

⁹⁰ The DMTF makes available certain specifications for a limited period of time as a Work in Progress

8.5. Ecma International (previously called ECMA)

General information			
Forum / Consortium	Ecma International	Title	Ecma International
Creation date	1961	MEMBERS	64 member organizations
Chairperson	Ms. I. Valet-Harper		
Involvement of Luxembourg	/		
Web site	http://www.ecma-international.org/		
Scope	Standardization of Information and Communication Technology (ICT) and Consumer Electronics (CE).		
Executive summary	<p>The aims of Ecma are:</p> <ul style="list-style-type: none">- To develop, in cooperation with the appropriate national, European and international organizations Standards and Technical Reports in order to facilitate and standardize the use of Information Communication Technology (ICT) and Consumer Electronics (CE);- To encourage the correct use of Standards by influencing the environment in which they are applied;- To publish these Standards and Technical Reports in electronic and printed form; the publications can be freely copied by all interested parties without restrictions. <p>Many of the Ecma International standards are then adopted as ISO, ISO/IEC, or ETSI standards. Ecma International is currently recognized as an organization in liaison with ISO/IEC JTC 1.</p>		
Structure	<ul style="list-style-type: none">- TC 12 Safety- TC 20 (EMC and EMF)- TC 26 Acoustics- TC 31 Information Storage- TC 32 Multimedia Coding and Communications- TC 38 Product-related environmental attributes- TC 39 ECMAScript- TC 43 Universal 3D (U3D)- TC 45 Office Open XML Formats- TC 46 Open XML Paper Specification (OpenXPS)- TC 47 Near Field Communications- TC 48 High Rate Wireless Communications- TC 49 Programming Languages- TC 50 Close Proximity Electric Induction Data Transfer- TC 51 Access Systems		
Standardization work			
Published standards	324		
Standards under development	Unknown		

8.6.OASIS - Organization for the Advancement of Structured Information Standards

General information			
Forum / Consortium	OASIS	Title	Organization for the Advancement of Structured Information Standards
Creation date	1993	MEMBERS 	More than 5000 participants representing over 600 organizations and individual members in 100 countries
Chairperson	/		
Involvement of Luxembourg	/		
Web site	http://www.oasis-open.org/		
Scope	OASIS promotes industry consensus and produces worldwide standards for security, Cloud computing, SOA, Web services, the Smart Grid, electronic publishing, emergency management, and other areas.		
Executive summary	<p>OASIS (Organization for the Advancement of Structured Information Standards) is a not-for-profit consortium that drives the development, convergence and adoption of open standards for the global information society. OASIS open standards offer the potential to lower cost, stimulate innovation, grow global markets, and protect the right of free choice of technology.</p> <p>OASIS is distinguished by its transparent governance and operating procedures. Members themselves set the OASIS technical agenda, using a lightweight process expressly designed to promote industry consensus and unite disparate efforts. Completed work is ratified by open ballot. Governance is accountable and unrestricted.</p> <p>The consortium produces more Web services standards than any other organization along with standards for security, e-business, and standardization efforts in the public sector and for application-specific markets. OASIS has especially developed the Standard Generalized Markup Language (SGML) and ebXML.</p>		
Structure	<p><u>OASIS Committee Categories:</u></p> <ul style="list-style-type: none">- Big Data- Cloud- Conformance- Content Technologies- e-Commerce- Emergency Management- Government/Legal- Healthcare- IoT/M2M- Localization- Messaging- Privacy/Identity- Security- Smart Grid- SOA- Standards Adoption- Supply Chain- Web Services		


Standardization work	
Published standards	107
Standards under development	Unknown

8.7. OMG - Object Management Group

General information			
Forum / Consortium	OMG	Title	Object Management Group
Creation date	1989	MEMBERS 	311 member organizations
Chairperson	Richard Soley		
Involvement of Luxembourg	/		
Web site	http://www.omg.org/index.htm		
Scope	OMG Task Forces develop enterprise integration standards for a wide range of technologies: Real-time, Embedded and Specialized Systems, Analysis & Design, Architecture-Driven Modernization and Middleware. This also includes an even wider range of industries: Business Modeling and Integration, C4I, Finance, Government, Healthcare, Legal Compliance, Life Sciences Research, Manufacturing Technology, Robotics, Software-Based Communications and Space.		
Executive summary	OMG’s mission is to develop, with its worldwide membership, enterprise integration standards that provide real-world value. OMG is also dedicated to bringing together end-users, government agencies, universities and research institutions in its communities of practice to share experiences in transitioning to new management and technology approaches like Cloud Computing. OMG has especially developed the following standards: Unified Modeling Language™ (UML®), Model Driven Architecture® (MDA®), Common Object Request Broker Architecture (CORBA®), MOF™, and Interface Definition Language (IDL™).		
Structure	<p><u>Domain Technology Committee</u></p> <ul style="list-style-type: none">- Business Modeling and Integration DTF- Consultation, Command, Control, Communications & Intelligence (C4I) DTF- Emergency, Crisis and Major Event Management Domain Special Interest Group (ECMEM DSIG)- Finance DTF- Government Information Sharing and Services DTF- Healthcare DTF- Life Sciences Research DTF- Manufacturing Technology and Industrial Systems DTF- Robotics DTF- Space DTF- Mathematical Formalism SIG- Regulatory Compliance DSIG- Super Distributed Objects DSIG- Systems Engineering DSIG <p><u>Platform Technology Committee</u></p> <ul style="list-style-type: none">- Analysis and Design PTF- Architecture-Driven Modernization PTF- Middleware and Related Services PTF- System Assurance PTF- Agent PSIG- Data Distribution Services PSIG- Japan PSIG- Korea PSIG- Ontology PSIG- Software Defined Networking Working Group- Telecommunications PSIG		

Standardization work	
Published standards	219
Standards under development	Unknown

8.8. OGF - Open Grid Forum

General information			
Forum / Consortium	OGF	Title	Open Grid Forum
Creation date	2006	MEMBERS 	Over 400 organizations in more than 50 countries
Chairperson	Steven Newhouse		
Involvement of Luxembourg	/		
Web site	http://www.ogf.org/		
Scope	<p>OGF is the premier open, world-wide community for the development and adoption of best practices and standards for grid and other applied distributed computing technologies.</p> <p>Applied distributed computing environments include everything from distributed high performance computing resources (traditional 'Grids') to horizontally scaled transactional systems supporting Service Oriented Architectures to Clouds, across all scales and for all application domains.</p> <p>Applied distributed computing environments take advantage of many technologies, e.g. virtualization, multi-Core, web services, SOA, etc. OGF will, where necessary, develop expertise in these areas in support of its mission, either through direct activity or through partnerships with other organizations.</p>		
Executive summary	<p>OGF is an open community committed to driving the rapid evolution and adoption of applied distributed computing. Applied Distributed Computing is critical to developing new, innovative, and scalable applications and infrastructures that are essential to productivity in the enterprise and within the science community. OGF accomplishes its work through open forums that build the community, explore trends, share best practices and consolidate these best practices into standards.</p> <p>The OGF community reflects the near universal interest in and applicability of distributed systems, and includes leaders and practitioners drawn from academia, enterprises, vendors and government organizations. OGF is open to everyone who is willing to participate, to discuss trends, share experiences, solve problems, and develop standards that accelerate the adoption, use and development of applied distributed computing technologies and environments.</p>		
Structure	<p><u>Applications</u></p> <ul style="list-style-type: none">- Distributed Resource Management Application API Working Group (drmaa-wg)- Grid Remote Procedure Call WG (gridrpc-wg)- Simple API for Grid Applications WG (saga-wg) <p><u>Architecture</u></p> <ul style="list-style-type: none">- OGSA Naming WG (ogsa-naming-wg)- Open Grid Services Architecture WG (ogsa-wg)- Production Grid Infrastructure WG (pgi-wg)- Reference Model WG (rm-wg) <p><u>Compute</u></p> <ul style="list-style-type: none">- Grid Resource Allocation Agreement Protocol WG (graap-wg)- Grid Scheduling Architecture Research Group (gsa-rg)- High Performance Computing Profile WG (hpcp-wg)		

- Job Submission Description Language WG (jsdl-wg)
- OGSA Basic Execution Services WG (ogsa-bes-wg)
- OGSA Resource Selection Services WG (ogsa-rss-wg)

Data

- Data Format Description Language WG (dfdl-wg)
- Database Access and Integration Services WG (dais-wg)
- Digital Repositories RG (dr-rg)
- Grid File System Working Group (gfs-wg)
- Grid Storage Management WG (gsm-wg)
- GridFTP WG (gridftp-wg)
- Info Dissemination WG (infod-wg)
- OGSA ByteIO WG (byteio-wg)
- OGSA Data Movement Interface WG (ogsa-dmi-wg)

Infrastructure

- Firewall Virtualization for Grid Applications WG (fvga-wg)
- Grid High-Performance Networking RG (ghpn-rg)
- Infrastructure Services On-Demand Provisioning RG (ISOD-RG)
- Network Mark-up Language WG (nml-wg)
- Network Measurement and Control WG (nmc-wg)
- Network Measurements WG (nm-wg)
- Network Service Interface WG (nsi-wg)
- Open Cloud Computing Interface WG (occi-wg)

Liaison

- Standards development organizations Collaboration on networked Resources Management (scrm-wg)

Management

- Access to Remote Instrumentation in a distributed environment WG (ari-wg)
- Distributed Computing Infrastructure Federation WG (dcifed-wg)
- GLUE WG (glue)
- Usage Record WG (ur-wg)

Security

- Certificate Authority Operations WG (caops-wg)
- FedSec Community Group (fedsec-cg)
- Firewall Issues RG (fi-rg)
- IDEL (idel-wg)
- Levels of authentication Assurance Research Group (LoA-RG)
- OGSA Authorization WG (ogsa-authz-wg)
- VOMS-PROC WG (voms-proc-wg)

Standardization work


Published standards

205


Standards under development

Unknown


8.9. TOG - The Open Group

General information			
Forum / Consortium	TOG	Title	The Open Group
Creation date	1996	MEMBERS 	470 members
President	Allen Brown		
Involvement of Luxembourg	1 member (CRP Henri Tudor)		
Web site	http://www.opengroup.org/		
Scope	The Open Group works with customers and suppliers of IT products and services as well as with <i>consortia</i> and other standards organizations to capture, clarify and integrate current and emerging requirements, establish standards and policies, and share best practices. Our standards ensure openness, interoperability and consensus.		
Executive summary	<p>The Open Group is a global consortium that enables the achievement of business objectives through ICT standards. With more than 400 member organizations, the Open Group has a diverse membership that spans all sectors of the ICT community — customers, systems and solutions suppliers, tool vendors, integrators and consultants, as well as academics and researchers to:</p> <ul style="list-style-type: none">- Capture, understand and address current and emerging requirements, and establish policies and share best practices;- Facilitate interoperability, develop consensus, and evolve and integrate specifications and open source technologies;- Offer a comprehensive set of services to enhance the operational efficiency of <i>consortia</i>;- Operate the industry’s premier certification service. <p>The Open Group has especially developed standards on the following topics: Single UNIX Specification, LDAP, and CORBA implementations.</p>		
Structure	<p><u>Subject Areas</u></p> <ul style="list-style-type: none">- Enterprise Architecture- Cloud Computing- Enterprise Management- Identity Management- Platform- Products Lifecycle- Real-time & Embedded Systems- Security- Semantic Interoperability- Service-Oriented Architecture- Trusted Technology		
Standardization work			
Published standards	About 200		
Standards under development	Unknown		

8.10. SNIA - Storage Networking Industry Association

General information			
Forum / Consortium	SNIA	Title	Storage Networking Industry Association
Creation date	1997	MEMBERS 	About 400 member companies
Chairman	Wayne M. Adams		
Involvement of Luxembourg	/		
Web site	http://www.snia.org		
Scope	SNIA lead the storage industry worldwide in developing and promoting standards, technologies and educational services to empower organizations in the management of information.		
Executive summary	<p>As a not-for-profit association, the SNIA enables its members to develop robust solutions for storing and managing the massive volumes of information generated by today’s businesses. For more than a decade SNIA has worked to bring recognition of storage issues to the ICT world, making storage less complicated for the end user. As a result, the SNIA has adopted the role of industry catalyst for the development of storage solution specifications and technologies, global standards, and storage education.</p> <p>From vendors, to channel partners, to end-users, SNIA members are dedicated to providing the industry with a high level of knowledge exchange and thought-leadership. Its members also share a common goal: to promote acceptance, deployment, and confidence in storage-related architectures, systems, services, and technologies, across ICT and business communities.</p>		
Structure	<u>Technical Work Groups (TWG)</u> <ul style="list-style-type: none">- Cloud Storage TWG- Disk Resource Management TWG- Fibre Channel TWG- File Systems Management TWG- Green Storage TWG- Hypervisor Storage Interfaces TWG- I/O Traces, Tools & Analysis TWG- Linear Tape File Systems TWG- Long Term Retention TWG- NDMP Software TWG- NVM Programming TWG- Security TWG- SMI-S Core TWG- Solid State Storage TWG- Storage Media Library TWG		
Standardization work			
Published standards	Unknown		
Standards under development	Unknown		

8.11. TCG - Trusted Computing Group

General information			
Forum / Consortium	TCG	Title	Trusted Computing Group
Creation date	2003	MEMBERS 	About 100 member organizations
President	Dr. Joerg Borchert		
Involvement of Luxembourg	/		
Web site	http://www.trustedcomputinggroup.org/		
Scope	TCG recognizes International standards in the field of IT security as the most appropriate method to ensure efficacy, interoperability, adoption and user acceptance. TCG takes into consideration international market requirements through international membership and welcomes participation from industry, academia, and governments in a unified, worldwide Trusted Computing standards development process.		
Executive summary	<p>Security is built into an increasing number of general purpose ICT products, and security standards are fundamental to the integrity and sustainability of the global ICT infrastructure. The Trusted Computing Group (TCG) believes that open, interoperable, and internationally vetted standards are critical for the success of trusted computing, and that the multilateral approach to creating such standards is most effective.</p> <p>In support of open security standards, TCG encourages all nations to adopt global best practices around standards development and adoption. An open process fully supports worldwide participation from industry, academia, and government with fair and transparent development and decision processes. Specifications must be fully transparent and available to all participants, both during development and for implementation. TCG supports the use of published, peer reviewed standards and cryptographic algorithms.</p>		
Structure	<u>Workgroups</u> <ul style="list-style-type: none">-- Embedded Systems- Infrastructure- Mobile Platform- PC Client- Server- Storage- Trusted Multi-tenant Infrastructure- Trusted Network Connect- Trusted Platform Module- TCG Software Stack- Virtualized Platform		
Standardization work			
Published standards	Unknown		
Standards under development	Unknown		

8.12. UPnP Forum

General information			
Forum / Consortium	UPnP Forum	Title	Universal Plug and Play Forum
Creation date	1999	MEMBERS 	More than 1000 companies
President	Dr. Alan Messer		
Involvement of Luxembourg	1 member (Actimage)		
Web site	http://www.upnp.org/		
Scope	UPnP technology targets home networks, proximity networks and networks in small businesses and commercial buildings. It enables data communication between any two devices under the command of any control device on the network. UPnP technology is independent of any particular operating system, programming language, or network technology.		
Executive summary	<p>The Forum's goals are to allow devices to connect seamlessly and to simplify network implementation in the home and corporate environments. Toward this end, UPnP Forum members work together to define and publish UPnP device control protocols built upon open, internet-based communication standards.</p> <p>The UPnP architecture offers pervasive peer-to-peer network connectivity of PCs of all form factors, intelligent appliances, and wireless devices. The UPnP architecture is a distributed, open networking architecture that leverages TCP/IP and the Web to enable seamless proximity networking in addition to control and data transfer among networked devices in the home, office, and everywhere in between.</p>		
Structure	<p>The following committees are actively working on new and updated UPnP standards:</p> <ul style="list-style-type: none">- Audio / Video Working Committee (AV)- Friendly Devices Working Committee (FRIENDLYDEVICES)- Multi-Screen Working Committee (MULTI-SCREEN)		
Standardization work			
Published standards	About 1200		
Standards under development	Unknown		

8.13. OGC - The Open Geospatial Consortium

General information			
Forum / Consortium	OGC	Title	The Open Geospatial Consortium
Creation date	1994	MEMBERS 	473 companies, government agencies and universities
President	Jeffrey Harris		
Involvement of Luxembourg	1 member (CRP Henri Tudor)		
Web site	http://www.opengeospatial.org/		
Scope	The OGC provides a consensus process that communities of interest use to solve problems related to the creation, communication and use of spatial information. A community of interest might be those people who are interested in ocean observation, or those who are interested in 3D modeling of urban environments, or those who are interested in volunteered location information during disasters. These communities sort roughly into ten domains: Aviation, Built Environment & 3D, Business Intelligence, Defence & Intelligence (D&I), Emergency Response & Disaster Management, Geosciences & Environment, Government & Spatial Data Infrastructure, Mobile Internet & Location Services, Sensor Webs, University and Research.		
Executive summary	<p>The Forum's goals are to provide free and openly available standards to the market, tangible value to Members, and measurable benefits to users, to lead worldwide in the creation and establishment of standards that allow geospatial content and services to be seamlessly integrated into business and civic processes, the spatial web and enterprise computing. The OGC wants to facilitate the adoption of open, spatially enabled reference architectures in enterprise environments worldwide, to advance standards in support of the formation of new and innovative markets and applications for geospatial technologies and to accelerate market assimilation of interoperability research through collaborative consortium processes.</p> <p>The OGC mission is finally to serve as a global forum for the collaboration of developers and users of spatial data products and services, and to advance the development of International standards for geospatial interoperability.</p>		
Structure	<p><u>Domain Working Groups:</u></p> <ul style="list-style-type: none">- 3DIM DWG (3DIM DWG)- Architecture DWG (Arch DWG)- Aviation DWG (Aviation DWG)- Business Intelligence and Decision Support (BIDS) DWG (BIDS DWG)- Catalog DWG (Cat DWG)- Coordinate Reference System DWG (CRS DWG)- Coverages DWG (Coverages DWG)- Data Preservation DWG (PreservDWG)- Data Quality DWG (DQ DWG)- Defense and Intelligence DWG (D and I DWG)- Earth Systems Science DWG (ESS WG)- Emergency & Disaster Management DWG (EDM DWG)- Energy and Utilities DWG (EnergyUtilities)- Geo Rights Management (GeoRM) DWG (GeoRM DWG)- Geography Markup Language (GML) DWG (GML DWG)- Geometry DWG (GeometryDWG)- Geosemantics DWG (Semantics)- Health DWG (Health DWG)		

	<ul style="list-style-type: none"> - Hydrology DWG (Hydrology DWG) - Land and Infrastructure DWG (LandInfraDWG) - Law Enforcement And Public Safety DWG (LEAPS DWG) - Location Services DWG (LS DWG) - Mass Market DWG (MassMarket DWG) - Metadata DWG (Metadata DWG) - Meteorology & Oceanography DWG (Met Ocean DWG) - Oblique Imagery DWG (ObliqueImageryD) - Security DWG (SecurityDWG) - Sensor Web Enablement DWG (SensorWeb DWG) - Temporal DWG (Temporal DWG) - University DWG (Univ DWG) - Web Feature Service DWG (WFS DWG) - Workflow DWG (Workflow DWG)
Standardization work	
Published standards	59
Standards under development	Unknown

9. ICT AND ECONOMIC INTERSECTORAL APPROACH

Today, ICT is predominant and is a keystone of our economy. ICT can be considered as a horizontal support of many other sectors in the worldwide economy. The examples of sectors where ICT is a cornerstone are numerous and obvious: aeronautics, automotive, energy, biomedical, logistics, space, etc.

In the frame of the standards analysis of different sectors in Luxembourg, the ICT sector can be seen as a sector-supporting sector. The following sections describe the link established between the ICT sector and other sectors. Sections 9.1 to 9.4 present sectors already analyzed by ILNAS *via* a standards analysis, or carefully studied by the Digital trust department of ILNAS (archiving sector). Then, Section 9.5 is dedicated to potential sectors to be analyzed in the future *via* a standards analysis.

9.1. ICT AS A SUPPORTING SECTOR OF THE ARCHIVING SECTOR

9.1.1. Standardization in the archiving sector and ICT

Archiving can be defined as the process of identifying, indexing, classifying, accessing, selecting, exploiting, communicating, exchanging and preserving, paper-based and digital information⁹¹. In general, archives consist of documents that have been selected for permanent or long-term preservation on grounds of their enduring cultural, historical, or evidentiary value. In the context of the ICT sector, we focus on digital archives.

Another important concept of this sector is records that are the evidence of what the organization does or has done in the past. They capture its business activities and transactions, such as contract negotiations, business correspondence, personnel files, and financial statements, to name just a few. In order to be compliant with regulations or for management purpose, records have to keep their legal value. They need therefore to have the following properties: authenticity, reliability, integrity and usability.

ILNAS published on February 4, 2013, a document entitled “Technical regulation requirements and measures for certifying Digitization or Archiving Service Providers (PSDC)”⁹². This technical regulation sets out the requirements and measures required for an organization to set up an information security management system and an operational management system specifically for digitization and archiving processes. It is used for conformity evaluation audits on organizations performing digitization or archiving processes. If the criteria of verification established by the law related to electronic archiving and by the *ad hoc* quality system of ILNAS (Digital trust department) are confirmed, ILNAS will proceed to the registration of the concerned moral person in the PSDC list (mentioning the processes related to the supervision) thus establishing the “PSDC” status.

The “PSDC” status results from the verification by ILNAS (Digital trust department) of the compliance of the Digitization or Archiving Service Provider with the technical regulation requirements and measures certifying PSDCs. Such a verification being based on, e.g., the results of a conformity assessment performed by an accredited conformity assessment body, involves ILNAS (Digital trust department) granting the related organization one of the following Digitization or Archiving Service Provider (hereinafter “PSDC”) statuses:

- PSDC-DC: Digitization and archiving service provider;

⁹¹ ILNAS, White Paper “Digital Trust - Towards excellence in ICT”, 2012, http://www.ilnas.public.lu/fr/publications/confiance-numerique/etudes-nationales/ilnas-tudor-white-paper-digital-trust-june-2012-v1_0.pdf

⁹² <http://www.ilnas.public.lu/fr/confiance-numerique/archivage-electronique/documents-obtention-statut-psdc/index.html>

- PSDC-D: Digitization service provider;
- PSDC-C: Archiving service provider.

9.1.2. Technical Committees related to ICT in the archiving sector

Two technical committees have been identified as very relevant for this subsector, both of them at the International level:

[ISO/TC 46](#) - Information and documentation

[ISO/TC 171](#) - Document management applications

Moreover, several organizations at the national level are interested and participate in these technical committees.

9.2. ICT AS A SUPPORTING SECTOR OF THE ENERGY SECTOR

9.2.1. Standardization in the energy sector and ICT

In line with the priorities set by the Government of the Grand Duchy of Luxembourg, the sector of energy has been identified as a carrier for the national economy⁹³. In this context, five subsectors have been defined in the frame of the standards watch of the energy sector conducted by ILNAS in order to survey it:

- Energy management and energy efficiency;
- Fuels;
- Power engineering;
- Renewable energy;
- Smart grids.

Within the different subsectors of the energy sector, smart grids are at the intersection between energy and ICT. A smart grid is a grid using computer technologies to optimize production and distribution of energy. The objective is to better link the supply and demand between producers and consumers in order to save energy. The term smart grid is often associated with the concept of smart meter that provides to the consumer a fine-grained monitoring and billing of its energy consumption.

To reduce energy consumption, "smart" technology development is strongly encouraged. Smart grids should therefore reduce energy loss and improve security of supply by taking into account the behavior of producers and consumers. This is a transverse subsector, which can affect multiple energy sources.

The European Commission published a Communication on April 12, 2011, in which it plans to intervene in this area to ensure that standards are put in place by the end of 2012. Besides the definition of a network code, the European Commission intends to ensure that in developing standards, the devices are well suited for smart grids. It will also monitor at the national and European level the development of ICT standards to facilitate the implementation of smart grids.

The European Commission is also considering legal provisions to ensure compliance with the privacy of consumers (particularly in terms of data protection) and will ask the European standards bodies to adopt a privacy by design approach.

Finally, the European Commission intends to establish regulatory incentives to encourage network operators to generate their revenue through efficiency gains rather than selling more energy. The EC also wants to encourage greater regional cooperation and European integration, particularly through the European Network of Transmission System Operators for Electricity (ENTSO-E).

Thus, on October 25, 2012, the EU adopted the Directive 2012/27/EU⁹⁴ on energy efficiency. This Directive establishes a common framework of measures for the promotion of energy efficiency within the Union in order to ensure the achievement of the Union's 2020 20% headline target on energy efficiency and to pave the way for further energy efficiency improvements beyond that date. It lays down rules designed to remove barriers in the energy market and overcome market failures that impede efficiency in the supply and use of energy, and provides for the establishment of indicative national energy efficiency targets for 2020.

⁹³ <http://www.ilnas.public.lu/fr/publications/normalisation/etudes-nationales/standards-analysis-energy-sector-october-2013.pdf>

⁹⁴ <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2012:315:0001:0056:EN:PDF>

9.2.2. Technical Committees related to ICT in the energy sector

Two technical committees have been selected as relevant for this subsector, respectively one at the International level and one at the European level.

International Level

Technical Committee

[IEC/SG 3](#) – Strategic Group on Smart Grid

ISO/IEC JTC 1/WG 7 – Sensor Networks

The technical committee ISO/IEC JTC 1/WG 7 is working on a family of standards on Sensor Networks (ISO/IEC 29182), which find applications in the energy sector, specifically Sensor network-based smart grid systems and automated meter reading.

Five parts of this family of standards have already been published since 2013 (two other parts are currently under development):

- *ISO/IEC 29182-1:2013, Information technology -- Sensor networks: Sensor Network Reference Architecture (SNRA) -- Part 1: General overview and requirements;*
- *ISO/IEC 29182-2:2013, Information technology -- Sensor networks: Sensor Network Reference Architecture (SNRA) -- Part 2: Vocabulary and terminology;*
- *ISO/IEC 29182-3:2013, Information technology -- Sensor networks: Sensor Network Reference Architecture (SNRA) -- Part 3: Reference architecture views;*
- *ISO/IEC 29182-4:2013, Information technology -- Sensor networks: Sensor Network Reference Architecture (SNRA) -- Part 4: Entity models;*
- *ISO/IEC 29182-5:2013, Information technology -- Sensor networks: Sensor Network Reference Architecture (SNRA) -- Part 5: Interface definitions.*

Moreover, the following International Standard is currently under development to characterize the requirements for sensor networks to support smart grid technologies for power generation, distribution, networks, energy storage, load efficiency, control and communications and associated environmental challenges:

- *ISO/IEC DIS 30101, Information technology -- Sensor Networks: Sensor Network and its interfaces for smart grid system.*

European Level

Technical Committee

CEN/CENELEC/ETSI [JWG Smart Grids](#)

9.3. ICT AS A SUPPORTING SECTOR OF THE BIOMEDICAL TECHNOLOGIES SECTOR

9.3.1. Standardization in the biomedical technologies sector and ICT

In line with the priorities set by the Government of the Grand Duchy of Luxembourg, the sector of biomedical technologies has been identified as a carrier for the national economy. The biomedical technologies sector covers several areas: from pharmaceutical activities to medical devices and health informatics. Following discussions with public authorities, the scope was slightly reduced for the standards analysis conducted by ILNAS: while dentistry activities continue to be included, veterinary activities have been excluded. Finally, the biomedical technologies sector, as defined in the dedicated standards analysis⁹⁵, covers five subsectors:

- Medical devices;
- Medical equipment;
- Medical services;
- Diagnostics;
- eHealth.

Within the different subsectors of the biomedical technologies sector, eHealth is at the intersection between biomedical technologies and ICT. eHealth is a recent term, dating back to at least 1999, and various different definitions have been used over time to designate ICT applications in the health domain.

For the Journal of Medical Internet Research – JMIR, eHealth “[...] *is an emerging field in the intersection of medical informatics, public health and business, referring to health services and information delivered or enhanced through the internet and related technologies*”⁹⁶.

From the European Commission, eHealth is “[...] *the ICT tools and services for health. It covers the interaction between patients and health-service providers, institution-to-institution transmission of data, or peer-to-peer communication between patients and/or health professionals*”⁹⁷.

According the World Health Organization (WHO) definition, “*eHealth is the transfer of health resources and health care by electronic means. It encompasses three main areas:*

- *The delivery of health information, for health professionals and health consumers, through the internet and telecommunications;*
- *Using the power of ICT and e-commerce to improve public health services, e.g. through the education and training of health workers;*
- *The use of e-commerce and e-business practices in health systems management*”⁹⁸.

The notion of eHealth covers all aspects of health. The eHealth objective is not simply to exchange files between public health institutions, but also to increase the use of eHealth technologies to bring about necessary reforms in health systems and thereby to move towards the overall improvement of health on a global scale. (Source: ITU).

⁹⁵ <http://www.ilnas.public.lu/fr/publications/normalisation/etudes-nationales/standards-analysis-biomedical-october-2013.pdf>

⁹⁶ <http://www.jmir.org/2001/2/e20/>

⁹⁷ http://europa.eu/rapid/press-release_MEMO-12-959_en.htm

⁹⁸ <http://www.who.int/trade/glossary/story021/en/>

The eHealth sector includes many dimensions, as:

- *Telemedicine/Telehealth*: the use of medical information exchanged from one site to another *via* electronic communications (telecommunication and IT) to improve patients' health status (source: American Telemedicine Association);
- *Electronic health records*: electronic record of patient health information generated by one or more healthcare professionals (general practitioners, specialists, etc.) (source: HIMSS – Healthcare Information and Management Systems Society);
- *mHealth*: Global Observatory for eHealth defined in 2011, mHealth or mobile health as medical and public health practice supported by mobile devices, such as mobile phones, patient, monitoring devices, personal digital assistants (PDA), and other wireless devices (source: Global Observatory for eHealth/WHO);
- And also Virtual healthcare teams, Consumer health informatics, Health knowledge management, Healthcare Information Systems, Medical research using Grids, etc.

9.3.2. Technical Committees related to ICT in the biomedical technologies sector

Seven technical committees have been selected as relevant for this subsector, respectively four at the International level and three at the European level.

International Level

Technical Committees

[ISO/TC 215](#) – Health informatics

[ISO/TC 276](#) – Biotechnology

[ITU-T/SG 16](#) – Multimedia (e-health and standardization)

Furthermore, the technical committee ISO/IEC JTC 1/WG 7 is currently preparing a family of standards on Sensor Networks (ISO/IEC 29182), which find applications in eHealth, such as patient localization inside large hospitals, remote monitoring of vital parameters, position and posture monitoring, hospital personnel and equipment tracking, automation of inventory management, and optimization of patient flow in hospital.

Other International Initiatives

NEMA / [DICOM](#) – Digital imaging and communication in medicine

Health Level Seven International / [HL7](#)

HL7 is a global authority on standards for interoperability of health information technology with members in over 55 countries. It provides a framework and related standards for the exchange, integration, sharing, and retrieval of electronic health information.

European Level

Technical Committees

[CEN/TC 251](#) – Health informatics *linked with ISO/TC 215*

Other Initiatives

ETSI / [eHEALTH](#) – ETSI Project Ehealth *linked with the “eHealth-INTEROP” project*

ETSI Project eHEALTH co-ordinates ETSI's activities in the Information Communication Technology (ICT)

Other Initiatives

CEN/CENELEC/ETSI Project – [eHealth-INTEROP](#)

This joint project addresses the requirements of the European Commission mandate to the European Standards Organizations (ESOs) on standardization in the field of e-health. This mandate (M/403) aims to provide a consistent set of standards to address the needs of this rapidly evolving field for the benefit of future healthcare provision.

9.4. ICT AS A SUPPORTING SECTOR OF THE SPACE SECTOR

9.4.1. Standardization in the space sector and ICT

The analysis of European and International standards in the space sector has been initiated by ILNAS in order to develop an information and exchange network for space-related standardization knowledge in the Grand-Duchy of Luxembourg. The space sector, as defined in the dedicated standards analysis⁹⁹, covers four subsectors:

- Aerospace equipment and infrastructure;
- Earth observation technologies;
- Telecommunications & Broadcasting;
- Space related technologies.

Within the different subsectors of this standards analysis, numerous technical committees of “Telecommunications & Broadcasting” and “Space related technologies” are at the intersection between space sector and ICT.

Indeed, on the one hand, the telecommunication sector, considered as part of ICT, is one of the main types of space application, currently the most important and the most dynamic market for this issue. On the other hand, space related technologies encompasses for example the services and value-added products and technologies that are derived from the use of space systems and/or data, and the provision of consulting and engineering services: the main part of these issues are directly linked with ICT.

9.4.2. Technical Committees related to ICT in the space sector

Seven International technical committees have been selected as relevant for this subsector:

[ITU-T/SG 13](#) – Future networks including cloud computing, mobile and next-generation networks

[ITU-T/SG 16](#) – Multimedia

[ISO/IEC JTC 1/SC 2](#) – Coded character sets

[ISO/IEC JTC 1/SC 23](#) – Digitally Recorded Media for Information Interchange and Storage

[ISO/IEC JTC 1/SC 24](#) – Computer graphics, image processing and environmental data representation

[ISO/IEC JTC 1/SC 27](#) – IT Security techniques

[ISO/IEC JTC 1/SC 29](#) – Coding of audio, picture, multimedia and hypermedia information

⁹⁹ <http://www.ilnas.public.lu/fr/publications/normalisation/etudes-nationales/standards-analysis-space-sector-november-2013.pdf>

9.5. OTHER SECTORS WHERE ICT ACTS AS A SUPPORTING SECTOR

ICT is a supporting sector for other sectors not currently covered by the sector-based standards analysis. After a systematic review of ISO, IEC, CEN and CENELEC technical committees, the following sectors were identified as being ICT-supported, meaning that technical committees related to this sector develop ICT-related standards:

- **Financial sector**
 - o [ISO/TC 68](#) – Financial services
 - o [CEN/TC 263](#) – Secure storage of cash, valuables and data media
 - o ISO/IEC JTC 1/WG 7 – Sensor Networks (Automation of facilities management and security)
- **Automotive sector**
 - o [ISO/TC 22](#) – Road vehicles
 - o [ISO/TC 23](#) – Tractors and machinery for agriculture and forestry
 - o [ISO/TC 184](#) – Automation systems and integration
 - o [ISO/TC 204](#) – Intelligent transport systems
 - o [CEN/TC 278](#) – Road transport and traffic telematics
 - o [CEN/TC 337](#) – Winter maintenance and road service area maintenance equipment
 - o [ETSI/TC ITS](#) – Intelligent Transport Systems
 - o ISO/IEC JTC 1/WG 7 – Sensor Networks (Intelligent transportation and traffic)
- **Railway sector**
 - o [CLC/TC 9X](#) – Electrical and electronic applications for railways
 - o [ETSI/TC RT](#) – Railways Telecommunications
 - o ISO/IEC JTC 1/WG 7 – Sensor Networks (Logistics and Supply Chain Management; Automation of facilities management and security)
- **Cinematography, photography, audio and graphic technology sector**
 - o [ISO/TC 36](#) – Cinematography
 - o [ISO/TC 42](#) – Photography
 - o [ISO/TC 130](#) – Graphic technology
 - o [IEC/TC 100](#) – Audio, video and multimedia systems and equipment
 - o [CLC/SR 100](#) – Audio, video and multimedia systems and equipment
 - o [CLC/TC 100X](#) – Audio, video and multimedia systems and equipment and related sub-systems
- **Geographic information/Geomatics sector**
 - o [ISO/TC 211](#) – Geographic information/Geomatics
 - o [CEN/TC 287](#) – Geographic Information
- **Ergonomics sector**
 - o [ISO/TC 159](#) – Ergonomics
 - o [CEN/TC 122](#) – Ergonomics
- **Processes, data elements and documents in commerce, industry and administration sector**
 - o [ISO/TC 154](#) – Processes, data elements and documents in commerce, industry and administration
 - o ISO/IEC JTC 1/WG 7 – Sensor Networks (Automation, monitoring, and control of industrial production processes)
- **Computer-aided design (CAD) sector**
 - o [ISO/TC 10](#) – Technical product documentation
 - o [CEN/SS F01](#) – Technical drawings

- **Maritime sector**
 - o [ISO/TC 8](#) - Ships and marine technology
 - o ISO/IEC JTC 1/WG 7 – Sensor Networks (Logistics and Supply Chain Management; Automation of facilities management and security; Ship tracking and container tracking; Ocean observing systems)
- **Manufacturing sector**
 - o [ISO/TC 29](#) - Small tools
 - o [IEC/TC 65](#) – Industrial-process measurement, control and automation
 - o [IEC/TC 22](#) – Power electronic systems and equipment
 - o [CEN/TC 310](#) – Advanced Automation Technologies and their Applications
 - o [CLC/SR 65](#) – Industrial-process measurement, control and automation
 - o [CLC/TC 65X](#) – Industrial-process measurement, control and automation
 - o ISO/IEC JTC 1/WG 7 – Sensor Networks (Logistics and Supply Chain Management; Automated inventory management; Security systems and theft prevention; Automation, monitoring, and control of industrial production processes)
- **Safety sector**
 - o [IEC/TC 108](#) – Safety of electronic equipment within the field of audio/video, information technology and communication technology
 - o [CLC/TC 108X](#) – Safety of electronic equipment within the fields of Audio/Video, Information Technology and Communication Technology
 - o ISO/IEC JTC 1/WG 7 – Sensor Networks (Environment observation, forecasting, and protection)
- **Building sector**
 - o [CEN/TC 247](#) – Building Automation, Controls and Building Management
 - o ISO/IEC JTC 1/WG 7 – Sensor Networks (Remote habitat monitoring and automation; Smart homes)
- **Public sector**
 - o ISO/IEC JTC 1/WG 7 – Sensor Networks (Homeland security; Civil protection and public safety)
- **Agriculture sector**
 - o ISO/IEC JTC 1/WG 7 – Sensor Networks (Automation and control of agriculture processes)
- **Research, Development and Innovation sector**
 - o ISO/IEC JTC 1/WG 7 – Sensor Networks
- **E-commerce & e-business sector**
 - o [CEN/WS eCAT](#) - eCataloguing (Multilingual catalogue strategies for ecommerce and ebusiness)

10. PROMISING STANDARDIZATION AREAS

It has long been demonstrated and accepted that ICT contributes to increase productivity, competitiveness and thus constitutes a major source of leverage for the modern economy. However, beyond economic stakes, ICT also represents an effective solution to meet current societal and environmental challenges.

In this frame, standardization plays a key role in defining the future ICT as an important source of knowledge and good practices.

According to the “Luxembourg’s Standardization Strategy 2014-2020”¹⁰⁰, the different topics addressed in this chapter should be seen as niche opportunities for the national economic development of the ICT sector.

The present chapter therefore focuses firstly on how standardization can be an incubator to transform technology trends in effective standardization activities (Section 10.1), and secondly on several fundamental concepts that will deeply change the way we live in the coming decades. Notably, the Standards Developing Organizations (SDO) are currently studying and developing standards in order to guarantee the implementation of Smart Cities (Section 10.2), the efficient comprehension and use of big data (Section 10.3), and the deployment of the Internet of Things (Section 10.4).

10.1. TURNING TECHNOLOGY TRENDS INTO STANDARDIZATION

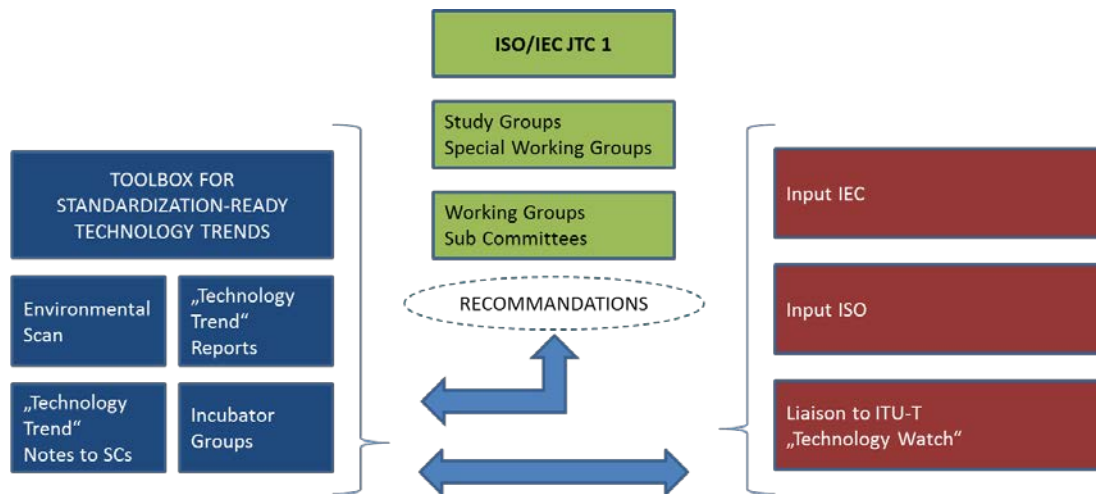
ISO, IEC and ITU-T have developed processes to guarantee a successful standardization roadmap in line with the market needs. In this frame, they also established working groups intended to identify technology trends defined as “mature” for standardization work. The most relevant group for ICT related works is the [ISO/IEC JTC 1/SWG-P](#) (Special Working Group on Planning) which leads the following activities in this innovation context:

- Perform the Environmental Scanning activity to identify new work areas of interest to ISO/IEC JTC 1;
- Initiate “Technology Trend” reports with regard to dedicated topics to identify standardization environment and gaps;
- Establish and maintain a working relationship with the ITU-T Technology Watch function;
- Support the ISO/IEC JTC 1 Incubator function.

SWG-P has developed a toolkit to support perspective setting regarding standardization-ready technology trends which can be summarized as presented in Figure 7 below:

¹⁰⁰ <http://www.ilnas.public.lu/fr/publications/normalisation/etudes-nationales/luxembourg-standardization-strategy-2014-2020.pdf>

Figure 7: ISO/IEC JTC 1/SWG-P tools to support perspective setting regarding standardization-ready technology trends¹⁰¹



- Environmental Scan: by conducting an environmental scan (online survey), SWG-P is expected to identify relevant technology trends, to highlight challenges and opportunities for ISO/IEC JTC 1 and to make recommendations to ISO/IEC JTC 1 on what actions it should take;
- Technology Trend Reports: relevant identified technological areas (by Environmental Scan, National Body or expert proposal) could be subject of further research. Maturity aspects and business relevance are important criteria;
- Technology Trend Notes to SCs: SWG-P provides notes to relevant subcommittees, regarding a studied technological area, in order to obtain feedbacks on effective and needed standardization work;
- Incubator Groups: they can be created to study the standardization potential of a specific technological area based on a minimal set of formal rules to avoid any restriction of collaboration;
- Liaisons between SWG-P, ISO, IEC and ITU-T ensure the coordination of the future standardization work, thanks to exchanges on technology trends;
- SWG-P provides recommendations to ISO/IEC JTC 1 and its SCs and SGs in order to develop the standards needed in link with technology trends identified.

In this context and in relation with this process, ISO/IEC JTC 1 has established Study Groups (SG) on Big Data and Smart Cities during its last Plenary Meeting (November 2013) for consideration of activities in these fields across all of ISO/IEC JTC 1 and to provide a report with recommendations, and potentially other deliverables, to the 2014 ISO/IEC JTC 1 Plenary.

¹⁰¹ Source: ISO/IEC JTC 1/SWG-P

10.2. SMART CITIES

A smart city can be defined as “a ‘knowledge’, ‘digital’, ‘cyber’ or ‘eco’ city ; representing a concept open to a variety of interpretations, depending on the goals set out by a smart city’s planners. We might refer to a smart city as an improvement on today’s city both functionally and structurally, using information and communication technology (ICT) as an infrastructure” ¹⁰².

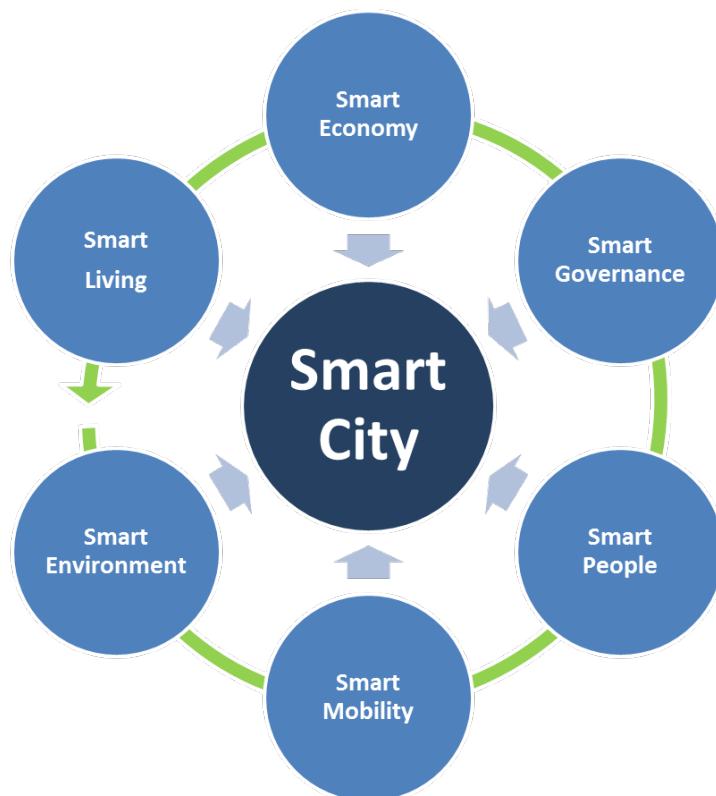
Smart cities concept is very large and complex, it encompasses many economic sectors. Furthermore, it is a growing concept interesting public authorities to develop cities in accordance with current economic, societal and environmental challenges.

“For more than 75% of EU citizens their city is their home – it is where they mostly live, work, and play. Cities are the major source of European economic activity and of innovation. But the global economy is developing and changing fast and European cities need to rise to new challenges and develop and improve. Our cities are also a major source of greenhouse gases and local pollution and we need concerted action to put this right. We can and we should make cities better places to live and to work in. Our cities can become cleaner and healthier and use less energy. They can be Smart Cities” ¹⁰³.

In this framework, the ICT sector plays a key role to define the city of the future. Smart cities represent a good example of the economic intersectoral approach where ICT holds an important place.

Smart cities can be seen as a combination of different components that need standardization to interoperate and form a coherent whole as presented in Figure 8 below:

Figure 8: Components of the Smart City



¹⁰² A. Murray, M. Minevich, and A. Abdoullaev, “Being smart about smart cities,” KM World, October 2011

¹⁰³ European Commission – MEMO/13/884 (14/10/2013)

Standardization work is currently in progress for each component of the smart cities and many technical committees from all standards development organizations are working together to improve existing solutions and create the required standards. The following technical committees have been selected as relevant for the development of smart city as a whole but each component is individually prone to numerous standardization activities:

International Level

Technical committee

[ISO/TC 268 – Sustainable Development in communities](#)

Other initiatives

ISO/IEC JTC 1/SG 1 – Study Group on Smart Cities

[IEC System Evaluation Group \(SEG\) on Smart Cities](#)

[ITU-T/FG-SSC – Focus Group on Smart Sustainable Cities](#)

European Level

Technical committee

[ETSI/TC SmartM2M - Smart Machine-to-Machine Communications](#)

Other initiative

[CEN-CENELEC Coordination Group “Smart Sustainable Cities and Communities” \(SSCC-CG\)](#)

10.3. BIG DATA

In recent years, Big Data has become a major topic in the field of ICT with the exponential growing of data. It will transform the way we use and manage these data. It has the potential to benefit both public and private sectors and from all economic stakeholders through an increasing of productivity and competitiveness but also with prospective analysis possibilities offer by the new analytics tools. To achieve and implement the necessary developments for the efficient understanding and use of big data, standardization plays a key role.

International Data Corporation (IDC) defines Big Data as *"A new generation of technologies and architectures designed to economically extract value from very large volumes of a wide variety of data by enabling high-velocity capture, discovery, and/or analysis"*.

Gartner proposes the following definition: *"Big data is high-volume, high-velocity and high-variety information assets that demand cost-effective, innovative forms of information processing for enhanced insight and decision making"*.

The NIST Big Data Public Working Group (NBD-WG) has finally defined big data as *"advanced techniques that harness independent resources for building scalable data systems when the characteristics of the datasets require new architectures for efficient storage, manipulation, and analysis"*.

Gartner defined data growth challenges and opportunities as being three-dimensional ("3Vs") and this model is currently accepted. It consists in:

- Volume: the amount of generated data has exponentially increased the past years and continues to grow;
- Velocity: data must be collected in shorter time frames;
- Variety: data formats are numerous.

Several organizations and researchers agreed to add new "Vs": "Value", "Veracity" (the quality and provenance of data) or "Variability" (data can change during their processing or lifecycle).

Currently, one of the most important standardization challenges is to define the Big Data Reference Architecture due to the broad variety of processes, technologies, services, etc. The NIST Big Data Public Working Group is developing a document in this context, it must serve as *"an authoritative source of information about a specific subject area that guides and constrains the instantiations of multiple architectures and solutions"*.

The following international technical committees are relevant concerning Big Data standardization:

Technical committees

[ISO/IEC JTC 1/SC 32 – Data Management and Interchange](#)

[ITU-T/SG13 – Future networks including cloud computing, mobile and next-generation networks](#)

Other initiatives

[ISO/IEC JTC 1/SG 2 – Study Group on Big Data](#)

[NBD-WG – NIST Big Data Public Working Group](#)

10.4. INTERNET OF THINGS (IoT)

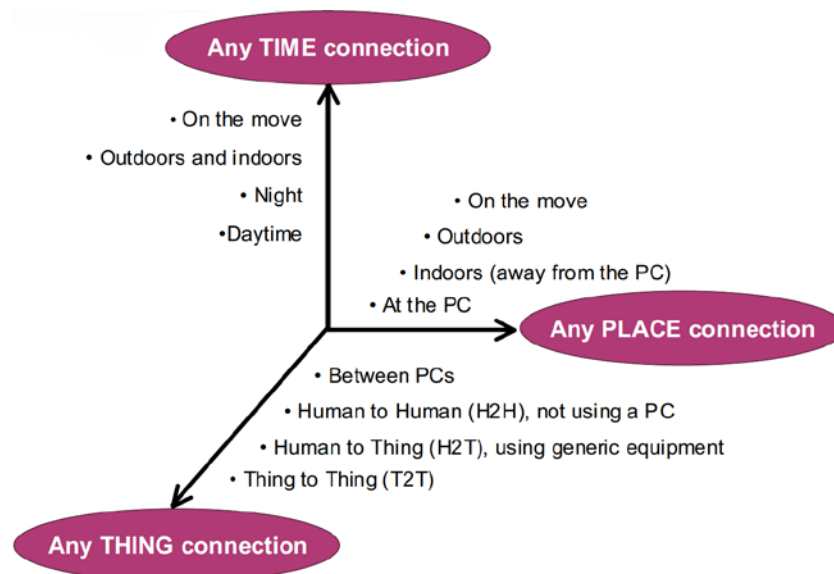
ITU-T defines the Internet of Things as “a global infrastructure for the Information Society, enabling advanced services by interconnecting (physical and virtual) things based on, existing and evolving, interoperable information and communication technologies”.

ETSI proposes the following definition of IoT: “Communication between two or more entities that do not necessarily need any direct human intervention”.

IoT thus consists of a network of objects capable of detecting and communicating information between each other. Although IoT is already part of daily life, many challenges which should be allowed by the effective implementation of this global infrastructure have still to be developed. IoT will allow achieving most of the future ICT innovations: Smart Cities, Smart Grids, etc. It is moreover directly linked with many other innovative technologies: sensor networks, RFID, M2M, Big Data, future networks, nanotechnologies, etc.

Finally, IoT should allow having access to a new vision of the Internet framework: the Internet of services. A new dimension has thus been added to the world of ICT: anytime connection, any place connection and anything connection as presented in Figure 9 below.

Figure 9: A new dimension (Source: ITU adapted from Nomura Research Institute)



Many services can be imagined with the technological advances, all objects can play an active role thanks to their connection to the Internet: real-time traffic updates thanks to mobile tracking, building automation and controls, automatic energy management, intelligent shopping applications, vehicle auto-diagnosis, assistance for elderly or disabled people living independent, etc.

In this frame, standardization is needed to develop a common way to follow and ensure interoperability of IoT infrastructure.

The following technical committees are relevant concerning Internet of Things standardization:

International level:

Technical committees

ISO/IEC JTC 1/WG 7 – Sensor Networks

[ISO/IEC JTC 1/SC 31 – Automatic identification and data capture techniques](#)

[ITU-T/SG11 – Protocols and test specifications](#)

[ITU-T/SG13 – Future networks including cloud computing, mobile and next-generation networks](#)

[ITU-T/SG16 – Multimedia](#)

Other initiatives

ISO/IEC JTC 1/SWG 5 – Internet of Things

The role of the SWG 5 is to identify and convey the needs and gaps in the IoT world in terms of standardization.

[ITU-T/ JCA-IoT – Joint Coordination Activity on Internet of Things](#)

The scope of the JCA-IoT is to coordinate the ITU-T work on the “Internet of Things” including networks aspects of identification of things, and ubiquitous sensor network (USN).

[ITU-T/IoT-GSI – Internet of Things Global Standards Initiative](#)

The purpose of IoT-GSI is to provide a visible single location for information on and development of IoT standards, these being the detailed standards necessary for IoT deployment and to give service providers the means to offer the wide range of services expected from the IoT. In collaboration with other bodies, IoT-GSI harmonizes different approaches to the IoT architecture worldwide. ITU-T/SG 11, 13 and 16 are related groups of IoT-GSI.

[ITU-T/FG M2M – Focus Group on M2M Service Layer](#)

The Focus Group on the M2M service layer (FG M2M) will study activities currently undertaken by various standards developing organizations in the field of M2M service layer specifications to identify key requirements for a common M2M service layer.

FG M2M will identify a minimum set of common requirements of vertical markets, focusing initially on the health-care market and application programming interfaces (APIs) and protocols supporting e-health applications and services, and draft technical reports in these areas.

European Level

Technical committee

[ETSI/TC SmartM2M – Smart Machine-to-Machine Communications](#)

[CEN/TC 225 – AIDC technologies](#)

Other initiatives

[European Commission expert groups – Internet of Things Expert Group – Subgroup “Standards”](#)

The task of the experts group on the Internet of Things shall be to: (a) advise the Commission on how best to address the technical, legal and organizational challenges at European level; (b) bring about an exchange of experience and good practice and solicit oral and written contributions within a group of multiple stakeholders, including international input where needed; (c) contribute to a shared vision for the development and deployment of the Internet of Things in the framework of the Digital Agenda for Europe, a flagship of the Europe 2020 Strategy.

11. CONCLUSION

ICT is today one of the most dynamic and promising sectors at the International and national levels. As an economic sector itself, it is a major source of growth and economic development, but maybe more importantly, it is a supporting sector for most of the other economic sectors (health, energy, space, automotive, etc.), being a source of progress and providing added value to these sectors.

In this context, standards contribute to the promotion and sharing of good practices and techniques available in the ICT sector. It promotes recognition of the quality and performance of a product, system or service. It also facilitates dialogue and exchanges between various stakeholders. In this sense, it represents an important economic lever to improve business productivity. In a nutshell, standards play a key role, by facilitating trades and guaranteeing some fundamental characteristics such as interoperability, quality, security and risk management.

As described in the national standardization strategy 2014-2020¹⁰⁴, ICT is a horizontal sector supporting many future innovative developments which will be thus constantly analyzed and developed by ILNAS according to the "Luxembourg's Policy on ICT technical standardization 2013-2020"¹⁰⁵. ICT is indeed one of the most competitive economic sectors in the Grand Duchy of Luxembourg, having communication infrastructures of high quality, hosting European headquarters of some world-leading ICT companies (Skype, Amazon, iTunes, RTL, PayPal, etc.) and with a market composed of many companies, associations, administrations and experts.

The purpose of this standards analysis is to inform the national stakeholders of the ICT sector about the main standardization activities and to offer them guidance for a future potential involvement in the standardization process. This document is based on several years of experience in ICT standardization activities at the national level and therefore constitutes a sector-based "snapshot" for fostering and strengthening the national ICT sector in its involvement in standardization work.

In this frame, the standards analysis is evolving depending on the interests for the national stakeholders of the ICT sector. Published for the first time in November 2012, the present report constitutes the third version of this analysis which will continue to be updated on a regular basis according to the market interest. The main added value of this analysis lies in the focus on ICT *fora* and *consortia* (Chapter 8), developing *de facto* standards, the highlight of ICT as a sector supporting other economic sectors at the standards level (Chapter 9), and the prospective developments of standardization in line with technological trends, that could lead to exploit niche opportunities for economic developments at the national level (Chapter 10).

Finally, this analysis highlights the potential interest for the national stakeholders and the opportunities for the national market to participate in the standardization process. However, standardization is performed on a voluntary-based approach, and each stakeholder is free to be involved and to define its level of commitment. It is therefore important that stakeholders understand the stakes related to standardization in the ICT sector. They can thus take a position in order to participate in standardization activities within one or more technical committees at the European or International level. Following the motto of the national standardization strategy 2014-2020: "*Technical standardization as a service*", ILNAS and ANEC GIE stand ready to assist each initiative in this process.

¹⁰⁴ <http://www.ilnas.public.lu/fr/publications/normalisation/etudes-nationales/luxembourg-standardization-strategy-2014-2020.pdf>

¹⁰⁵ <http://www.ilnas.public.lu/fr/publications/normalisation/etudes-nationales/policy-on-ict-technical-standardization-2013-2020.pdf>

12. APPENDIX

12.1. LIST OF ACRONYMS¹⁰⁶

ACRONYM	TITLE
3GPP	3rd Generation Partnership Project
AB	Advisory Board
ADL	Advanced Distributed Learning
AEI	Automatic Equipment Identification
AENOR	<i>Asociación Española de Normalización y Certificación</i>
AFNOR	<i>Association Française de Normalisation</i>
AGICOA	The Association for the International Collective Management of Audiovisual Works
AHG	Ad Hoc Group
AHS	Ad Hoc Group on Structure
AICC	Aviation Industry CBT Committee
AIDC	Automatic Identification and Data Capture
AMEX	American Express
AMT	Advanced Manufacturing Technologies
ANEC	European Association for the Co-ordination of Consumer Representation in Standardization
ANEC GIE	<i>Agence pour la Normalisation et l'Economie de la Connaissance</i>
ANSI	American National Standards Institute
API	Application programming interface
APSI	<i>Association des Professionnels de la Société de l'Information</i>
ARC	Augmented Reality Continuum
ASN.1	Abstract Syntax Notation One
ATIS	Alliance for Telecommunications Industry Solutions
ATM	Automated Teller Machine
ATSC	The Advanced Television System Committee

¹⁰⁶ Several acronyms for *fora* and *consortia* can be found in the section 12.3

ACRONYM	TITLE
AUF	<i>Agence Universitaire de la Francophonie</i>
AVI	Automatic Vehicle Identification
BAC	Building Automation and Controls
BM	Building Management
BSI	British Standards Institute
CAB	Conformity Assessment Body
CAD	Computer-Aided Design
CCETT	Common Study Center of Telediffusion and Telecommunication
CCSDS	Consultative Committee for Space Data Systems
CD	Committee Draft
CEC	<i>Centre Européen des Consommateurs</i>
CEN	European Committee for Standardization
CENELEC (CLC)	European Committee for Electrotechnical Standardization
CEPT	European Conference of Postal and Telecommunications Administrations
CERN	European Organization for Nuclear Research
CIDOC	International Documentation Committee, International Council of Museums
CIE	International Commission on Illumination
CISAC	International Confederation of Societies of Authors and Composers
CLUSIL	<i>CLUb de la Sécurité de l'Information – Luxembourg</i>
CNPD	<i>Commission Nationale pour la Protection des Données</i>
COCIR	European Coordination Committee of the Radiological, Electromedical and Healthcare IT Industry
CRP	Public Research Center
CSS	Cascading Style Sheets
CSSF	<i>Commission de Surveillance du Secteur Financier</i>
CWA	CEN Workshop Agreement
DAPS	Distributed Application Platforms and Services
DICOM	Digital Imaging and Communication in Medicine

ACRONYM	TITLE
DIN	<i>Deutsches Institut für Normung</i>
DIS	Draft International Standard
DNS	Domain Name System
DOI	International Digital Object Identifier Foundation
DSRC	Dedicated Short Range Communication
DSSSL	Document Style Semantics and Specification Language
DVD	Digital Versatile Disc
EC	European Commission
ECBS	European Committee for Banking Standards
ECISS	European Committee for Iron and Steel Standardization
ECOS	European Environmental Citizens Organisation for Standardisation
EDCS	Environmental Data Coding Specifications
EDMA	European Diagnostic Manufacturers Association
EETS	European Electronic Toll Services
EFC	Electronic Fee Collection
EFPIA	European Federation of Pharmaceutical Industries and Associations
EFTA	European Free Trade Association
EHIBCC	European Health Industry Business Communications Council
EIG	Economic Interest Grouping
EMC	ElectroMagnetic Compatibility
EMF	ElectroMagnetic field
EN	European Standard
ENISA	European Network and Information Security Agency
ENTSO-E	European Network of Transmission System Operators for Electricity
EPC	<i>Conseil Européen des Paiements</i>
EPUB	Electronic Publication
ERFA	European Rail Freight Association

ACRONYM	TITLE
ESI	Electronic Signatures and Infrastructures
ESMIG	European Smart Metering Industry Group
ESO	European Standards Organizations
ETSI	European Telecommunications Standards Institute
EU	European Union
EUCOMED	The European Medical Technology Industry Association
EUREAU	European federation of national associations of drinking water suppliers and waste water services
FARECOGAZ	The European Association of Manufacturers of Gas Meters, Gas Pressure Regulators and associated Safety Devices and Stations
FedISA	<i>Fédération de l'ILM (Information Lifecycle Management), du Stockage et de l'Archivage</i>
FG	Focus Group
FIA	<i>Fédération Internationale de l'Automobile</i>
FIAPF	International Federation of Film Producers Associations
FNR	National Research Fund
GDP	Gross Domestic Product
GEO	Group on Earth Observations
GISIG	Geographical Information Systems International Group
GSM	Global System for Mobile Communications
HBES	Home and Building Electronic Systems
HTTP	Hypertext Transfer Protocol
HVAC	Heating, Ventilation and Air-Conditioning
IAEA	International Atomic Energy Agency
IATA	International Air Transport Association
ICAO	International Civil Aviation Organization
ICC	International Color Consortium
ICMA	International Card Manufacturers Association

ACRONYM	TITLE
ICS	International Classification for Standards
ICSTI	International Council for Scientific and Technical Information
ICT	Information and Communication Technology
IDC	International Data Corporation
ID-Cards	Identification Cards
IEC	International Electrotechnical Commission
IFLA	International Federation of Library Associations and Institutions
IG	Incubator Group
IIF	International Institute of Refrigeration
ILNAS	<i>Institut Luxembourgeois de la Normalisation, de l'Accréditation, de la Sécurité et qualité des produits et services</i>
ILO	International Labour Organization
ILR	<i>Institut Luxembourgeois de Régulation</i>
INCOSE	International Council on Systems Engineering
INLAC	Latinoamerican Institute for Quality Assurance
IoT	Internet of Things
IP	Internet Protocol
ISACA	Information Systems Audit and Control Association
ISAN	International Standard Audiovisual Number
ISDN	Integrated Services Digital Network
ISMS	Information Security Management System
ISO	International Organization for Standardization
ISOC	Internet Society
ISSEA	International Systems Security Engineering Association
ISSN	International Standard Serial Number
ISUG	The International SGML/XML Users' Group
IT	Information Technology
ITES-BPO	IT Enabled Services-Business Process Outsourcing

ACRONYM	TITLE
ITLET	Information Technology for Learning Education and Training
ITS	Intelligent Transport Systems
ITSO	International Telecommunications Satellite Organization
ITU	International Telecommunication Union
ITU-T	International Telecommunication Union's Telecommunication Standardization Sector
iVDR	Information Versatile Disk for Removable usage
JFIF	JPEG File Interchange Format
JISC	Japanese Industrial Standards Committee
JMIR	Journal of Medical Internet Research
JTC	Joint Technical Committee
JWG	Joint Working Group
KATS	Korean Agency for Technology and Standards
LAN	Local Architecture Network
LDAP	Lightweight Directory Access Protocol
LETSI	International Federation for Learning-Education-Training Systems Interoperability
LTE	Long Term Evolution (4G LTE)
LTSC	IEEE Learning Technology Standards Committee
M2M	Machine-to-Machine communication
MDR	Metadata Registries
MFI	Metadata Framework for Interoperability
MIIM	Mobile Item Identification and Management
MMI	Man-Machine Interface
MoU	Memorandum of Understanding
MSP	European Multi-Stakeholder Platform on ICT Standardization
NB	National Body
NEN	Netherlands Standardization Institute

ACRONYM	TITLE
NFC	Near field communication
NIST	National Institute of Standards and Technology
NP	New Proposal
NWIP	New Work Item Proposal
ODR	Online Dispute Resolution
OLAS	<i>Office Luxembourgeois d'Accréditation et de Surveillance</i>
OLN	<i>Organisme luxembourgeois de normalisation</i>
O-member	Observing member
OSI	Open systems interconnection
PAS	Public Available Specification
PC	Project Committee
PDA	Personal Digital Assistant
PKI	Public Key Infrastructures
PIA	Privacy Impact Assessment
PLC	Programmable Logic Controller
P-member	Participating member
PMI	Project Management Institute
PSC	<i>Prestataire de Services de Certification</i>
PSDC	<i>Prestataire de Services de Dématérialisation et/ou de Conservation</i>
PSF	<i>Prestataire de Services Financiers</i>
R&D	Research and Development
RFC	Request For Comments
RFID	Radio-Frequency Identification
RITA	Research and Innovative Technology Administration (U.S. Department of Transportation)
RMG	Registration Management Group
RTLS	Real-Time Locating Systems

ACRONYM	TITLE
RTP	Real-time Transport Protocol
SA	Standards Australia
SAML	Security assertion markup language
SC	Subcommittee
SCC	Standards Council of Canada
SCSI	Small Computer System Interface
SD	Standing Document
SDO	Standards Developing Organizations
SEDRIS	The Source for Environmental Data Representation & Interchange
SG	Strategic Group/Study Group
SGML	Standard Generalized Markup Language
SIP	Session Initiation Protocol
SLA	Service Level Agreement
SMB	Standardization Management Board
SMILE	<i>Security made in Lëtzebuerg</i>
SMPTE	Society of Motion Picture and Television Engineers
SNCH	<i>Société Nationale de Certification et d'Homologation</i>
SNRA	Sensor Network Reference Architecture
SOA	Service Oriented Architecture
SQL	Structured Query Language
SSCD	Secure Signature-Creation Device
SVG	Scalable Vector Graphics
SWEBOK	Software Engineering Body of Knowledge
SWG	Special Working Group
SWIFT	Society for Worldwide Interbank Financial Telecommunication
TC	Technical Committee
TCP	Transmission Control Protocol

ACRONYM	TITLE
TLS	Transport Layer Security
TR	Technical Report
TS	Technical Specification
TTA	Telecommunications Technology Association
TTC	Telecommunication Technology Committee
UCS	Universal Character Set
UI	User Interface
UIC	International Union of Railways
UITP	International Association of Public Transport
ULC	<i>Union Luxembourgeoise des Consommateurs</i>
UN	United Nations
UNCTAD	United Nations Conference on Trade and Development
UNECE	United Nations Economic Commission for Europe
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNI	<i>Ente Nazionale Italiano di Unificazione</i>
USB	Universal Serial Bus
UPnP	Universal Plug and Play
UPU	Universal Postal Union
URL	Uniform Resource Locator
VSE	Virtual Storage Extended
WAI	Web Accessibility Initiative
WD	Working Draft
WG	Working Group
WHO	World Health Organization
WIPO	World Intellectual Property Organization
WMO	World Meteorological Organization
XBRL	eXtensible Business Reporting Language

ACRONYM	TITLE
XMI	XML Metadata Interchange
XML	Extensible Markup Language
XMPP	Extensible Messaging and Presence Protocol

12.2. PARTICIPATION IN THE STANDARDIZATION PROCESS

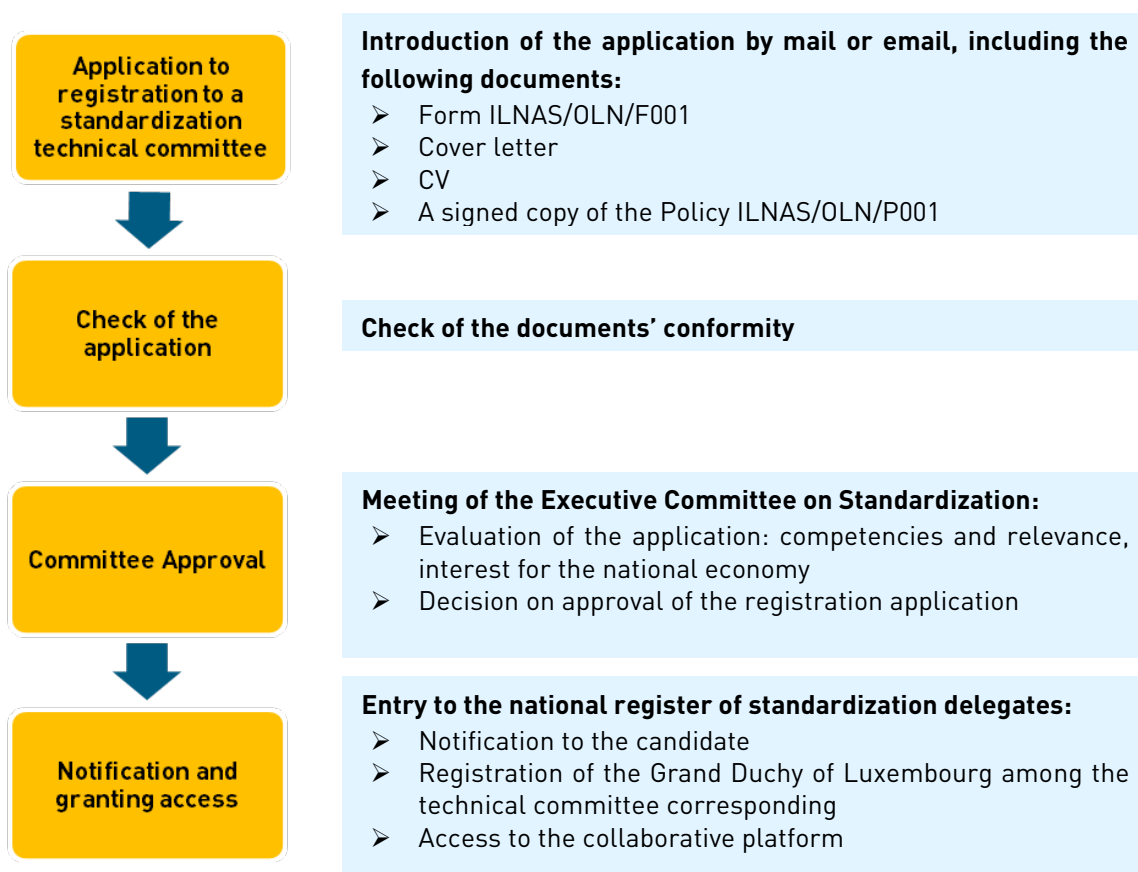
ILNAS, as the national standards body, is a member of European and International standards organizations. In this frame, ILNAS *via* the OLN can surround itself with experts from administrations, public services, professional organizations, groups, associations, or institutions interested in standardization, as well as all persons or legal entities interested in participating in standardization. In order to provide all national socio-economic stakeholders access to standardization processes, the registration as national delegate is entirely free of charge in Luxembourg.

To propose a framework for the standardization work of the national delegates and their participation in standardization technical committees, ILNAS has released a policy giving the main specifications and requirements to the delegates regarding standardization processes and activities. This document, entitled “*Politique relative à la participation dans les comités techniques de normalisation*,” is referenced as [ILNAS/OLN/P001](#).

❖ Registration process to a standardization technical committee

Figure 10 below summarizes the process for registering as a national delegate to a standardization technical committee.

Figure 10: Registration process for a standardization technical committee



Detailed information on the registration process is available through the following link: <http://www.ilnas.public.lu/fr/normes-normalisation/participation-aux-travaux-de-normalisation/comites-techniques>.

❖ Register of national delegates in standardization

ILNAS publishes regularly the list of the national delegates in standardization. This register can be reached through the following link: <http://www.ilnas.public.lu/fr/normes-normalisation/participation-aux-travaux-de-normalisation/comites-techniques>.

❖ Rights and duties of a national delegate in standardization

According to the actual version of the Policy (ILNAS/OLN/P001 - version 3), national delegates in standardization have the right to:

- Access any documents of the technical committee through a collaborative platform;
- Work on standards under development of a technical committee;
- Take a position during the validation or approval process;
- Participate in European and/or International meetings;
- Give suggestions for improvement to the OLN;
- Use the logo "Member of the ILNAS Network" in technical contributions.



In return, national delegates have to respect some duties, such as:

- Respect of the policy [ILNAS/OLN/P001](#) and the logo charters "Member of the ILNAS Network" ([ILNAS/OLN/A003](#));
- Commitment of nondisclosure of the technical committee's documents to third parties;
- Active participation in the standardization process is required;
- Information to OLN of the organization of European or International meetings in Luxembourg;
- Providing a periodic activities report to the OLN (personal activities, active participation, commentaries, etc.).

In conclusion, if you have skills and experience in the field of ICT, or if you want to anticipate future requirements and influence the market, then do not hesitate to join the standardization process. A simple registration form has to be completed and introduced with the required documents (CV, cover letter, a signed copy of the policy). After your application approval, ILNAS will grant you full access to standardization works and you will become a full member of the standards network.

ILNAS, supported by ANEC GIE, provides active support to new delegates in order to give them all the necessary information to efficiently participate in the standardization process.

12.3. LIST OF ALL IDENTIFIED STANDARDS-RELATED *FORA* AND *CONSORTIA* OF THE ICT SECTOR

Source: **List of standards-related *Fora* and *Consortia* established by CEN** (Edition 17 - August 2012)

Consortia included on the list must meet certain criteria, which include that:

- The organization must be international in outlook and scope, not simply an instrument of single-nation policy;
- The organization must have an active and international membership;
- The organization must not be setup specifically as a single-vendor, government, or proprietary technology advocacy group;
- The organization's work must be of importance to the areas of ICT standardization or its processes.

N°
1394 TA - The 1394 High Performance Serial Bus Trade Association
A
AACS - Advanced Access Content System
ACCELLERA
ACM - Association of Computing Machinery
AES - Audio Engineering Society
AFEI - Association For Enterprise Integration
AIIM - Association for Information and Image Management
AIM - Association for Automatic Identification and Mobility
AMWA - Advanced Media Workflow Association
ARMA International
ARTS - Association for Retail Technology Standards
ASTM International
ATIS - Alliance for Telecommunications Industry Solutions
AUTOSAR - Automotive Open System Architecture Partnership
B
BioAPI
Bluetooth - Bluetooth Consortium
Broadband Forum
BSF - Broadband Services Forum
C
Cablelab - Cable Laboratories
CalConnect.org - Calendaring and Scheduling Consortium
CANENA - Council for Harmonization of Electrotechnical Standardization of the Nations of the Americas
CDG - CDMA Development Group
CDISC - Clinical Data Interchange Standards Consortium
CEA - The Consumer Electronics Association
CELF - Consumer Electronics Linux Forum
CEPIS - Council of European Professional Informatics Societies
ChES - Coalition for Healthcare eStandards Inc.
CIPA - Camera and Imaging Products Association
CISQ - Consortium for IT Software Quality
CLSI - Clinical and Laboratory Standards Institute
CompTIA - Computing Technology Industry Association
CTIA - Cellular Telecommunications & Internet Association
CVC - Component Vendor Consortium

D

[DCMI](#) - Dublin Core Metadata Initiative
[DDEX](#) - Digital Data Exchange
[DDWG](#) - Digital Display Working Group, The
[DECT Forum](#) - Digital Enhanced Cordless Telecommunications
[DIGITAL EUROPE](#)
[DLNA](#) - Digital Living Network Alliance
[DMPF](#) - The Digital Media Project
[DMR](#) - Digital Mobile Radio
[DMTF](#) - Distributed Management Task Force, Inc.
[DRM](#) - Digital Radio Mondiale
[DVB](#) - Digital Video Broadcasting Project
[DVD Forum](#)

E

[ebIX](#) - European forum for energy Business Information eXchange
[Echonet](#) - Echonet Consortium
[Eclipse.org](#)
[ECMA](#) - An International Europe-based Industry Association for Standardizing Information and Communication Systems
[ECSS](#) - European Cooperation for Space Standardization
[EDA Consortium](#) - Electronic Design Automation Consortium
[EDIFICE](#) - The European B2B forum for the Electronics Industry
[EEMBC](#) - Embedded Microprocessor Benchmark Consortium
[EIA](#) - Electronic Industries Alliance
[EIC](#) - Emergency Interoperability Consortium
[EIDQ](#) - Association for the Directory Information and Related Search Industry
[EMF](#) - European Multimedia Forum
[Energestics](#)
[EPASOrg](#) - Driving Interoperability in Card Payments
[EPCglobal](#)
[EPIC](#) - European Photonics Industry Consortium
[ERTICO](#) - Intelligence Transport System and Services Europe
[ETIS](#) - The Global IT Association for Telecommunications
[EuroGeographic](#)
[EUROGI](#) - EUROpean umbrella Organization for Geographic Information
[EUROSMART](#) - European Smart Card Industry Association

F

[FCIA](#) - Fibre Channel Industry Association
[FEMTO Forum](#)
[FIPA](#) - Foundation for Intelligent Physical Agents
[FlexRay Consortium](#)
[FSTC](#) - Financial Services Technology Consortium

G

[GlobalPlatform](#)
[Globus Alliance](#)
[GmSA](#) - Global Mobile Suppliers Association
[GS1](#) - (Formerly EAN)
[GSA](#) - Gaming Standards Association
[GSDi](#) - Global Spatial Data Infrastructure
[GVF](#) - Global Very Small Aperture Terminal (VSAT) Forum

H

[HIBCC](#) - Health Industry Business Communications Council, The
[HIMSS](#) - Healthcare Information and Management Systems Society
[HL7](#) - Health Level Seven
[HomePlug](#) - HomePlug Powerline Alliance
[HomePNA](#) - Home Phoneline Networking alliance
[HR-XML](#) - Human Resource XML Consortium

I

[I3A](#) - International Imaging Industry Association
[IBIA](#) - International Biometric Industry Association
[IBTA](#) - InfiniBand Trade Association
[ICA](#) - International Communications Association
[ICH](#) - Interoperability Clearinghouse
[IDEAlliance](#) - International Digital Enterprise Alliance
[IDEMA](#) - International Disk Drive Equipment and Materials Association
[IDPF](#) - International Digital Publishing Forum
[IEEE](#) - Institute of Electrical and Electronic Engineers
[IEST](#) - Institute of Environmental Sciences and Technology
[IETF](#) - Internet Engineering Task Force
[IFSF](#) - International Forecourt Standards Forum
[IHE](#) - Integrating the Healthcare Enterprise
[IIA](#) - Internet Industry Association
[IMS Forum](#)
[IMTC](#) - The International Multimedia Teleconferencing Consortium
[INC](#) - Industry Numbering Committee
[INCITS](#) - International Committee for Information Technology Standards
[iNEMI](#) - International Electronics Manufacturing Initiative
[Intergeo](#)
[Internet2](#) - Internet 2 Initiative
[INTUG](#) - International Telecommunication User Group
[IPC](#) - Association Connecting Electronic Industries
[IPTC](#) - International Press Telecommunications Council
[IPv6Forum](#) - Internet Protocol version 6 Forum
[IrDA](#) - The Infrared Data Association
[ISA](#) - The Instrumentation, Systems, and Automation Society
[ISC](#) - Internet Systems Consortium
[ISF](#) - Information Security Forum
[ISMA](#) - Internet Streaming Media Alliance
[ITS America](#) - Intelligent Transportation Society of America
[itSMF](#) - IT Service Management Forum
[IVI Foundation](#) - Interchangeable Virtual Instruments Foundation
[IWA](#) - International Webmasters Association

J

[JCF](#) - Java Card Forum
[JEDEC](#)

K

[Khronos Group](#)
[KNX](#) - KONNEX Association

L

[Liberty Alliance Project](#)

[LIFT](#) - Leadership in Fibre Laser Technology

[Linux Foundation](#)

[LonMark International](#)

[LXI](#) - LXI Consortium

M

[MDA](#) - Mobile Data Association

[MEF](#) - Metro Ethernet Forum

[MIPC](#) - Mobile Imaging and Printing Consortium

[MIPI](#) - Mobile Industry Processor Interface

[MMA](#) - Midi Manufacturers Association

[Mobey Forum](#)

[MPEG Industry Forum](#)

[MSF](#) - Multiservice Switching Forum

N

[NANOG](#) - North American Network Operators Group

[NCOIC](#) - Network Centric Operations Industry Consortium

[NCPDP](#) - National Council for Prescription Drug Programs, Inc.

[NFC Forum](#) - Near Field Communication Forum

[NIL Com](#) - The NIL (Nanoimprint Lithography) Consortium

[NISO](#) - National Information Standards Organization

[NPES](#) - Association for Suppliers of Printing, Publishing and Converting Technologies

O

[OAG](#) - Open Applications Group

[OAI](#) - Open Archives Initiative

[OASIS](#) - Organization for the Advancement of Structured Information Standards

[OCP-IP](#) - Open Core Protocol International Partnership

[ODVA](#) - Open DeviceNet Vendor Association, Inc.

[OGC](#) - Open GIS Consortium

[OGF](#) - Open Grid Forum

[OIF](#) - Optical Internetworking Forum

[OIPE](#) - Open IPTV Forum

[OMA](#) - Open Mobile Alliance

[OMG](#) - Object Management Group

[OMTP](#) - Open Mobile Terminal Platform Group

[ONFI](#) - Open NAND Flash Interface

[OPA](#) - Online Privacy Alliance

[OpenAjax Alliance](#)

[OpenForum Europe](#)

[Open Travel](#)

[OSCRE](#) - Open Standards Consortium for Real Estate

[OSE](#) - Open Security Exchange

[OSGI](#) - Open Services Gateway Initiative

[OSI](#) - Open Source Initiative

[OTA](#) - Open Travel Alliance

[OW2](#) - OW2 Consortium

P

[PC104 Consortium](#)

[PCCA](#) – portable Computer and Communications Association

[PCI SIG](#) – Peripheral Component Interconnect Special Working Group

[PDES](#)

[PHS MoU Group](#) – Personal Handyphone System Memorandum of Understanding Group

[PICMG](#) – PCI Industrial Computer Manufacturers Group

[PIDX](#) – Petroleum Industry Data Exchange Committee

[Power.org](#)

[Project Mesa](#)

[PWG](#) – Printer Working Group

R

[RapidIO Trade Association](#)

[RosettaNet](#)

S

[SA Forum](#) – Service Availability Forum

[SATA-IO](#) – Serial ATA International Organization

[SCSI TA](#) – Small Computer System Interface Trade Association

[SEMATECH](#)

[SIA](#) – Security Industry Association

[SIF](#) – SIF Association

[SIFA](#) – Schools Interoperability Framework Association

[SIM Alliance](#) – Subscriber Identification Module Alliance

[SIP Forum](#)

[SISO](#) – Simulation Interoperability Standards Organization

[Smart Card Alliance](#)

[SMDG](#)

[SNIA](#) – Storage Networking Industry Association

[SPC](#) – Storage Performance Council

[SSCI](#) – Systems and Software Consortium, Inc.

[Symbian](#)

T

[TAHI](#) – The Application Home Initiative

[TCG](#) – Trusted Computing Group

[TD SCDMA Forum](#)

[TEI-C](#) – Text Encoding Initiative Consortium

[TETRA MoU Association](#) – Terrestrial Trunked Radio

[The Zhaga Consortium](#)

[TIA](#) – Telecommunications Industry Association

[TISA](#) – Traveller Information Services Association

[TMF](#) – TeleManagement Forum

[TOG](#) – The Open Group

[TPC](#) – Transaction Processing Performance Council

[TWIST](#) – Transaction Workflow Innovation Standards Team

U

[UMTS Forum](#) – Universal Mobile Telecommunications System Forum

[Unicode Consortium](#)

[UniForum](#) – The International Association of Open Systems Professionals

[UPnP](#) – Universal Plug and Play Forum

[USB-IF](#) – Universal Serial Bus Implementers' Forum

[USPI](#) – Uitgebereid Samenwerkingsverband Procesindustrie Nederland

V

[VESA](#) – Video Electronics Standards Association
[VICS](#) - Voluntary Interindustry Commerce Standards Association
[VITA](#) - VMEBus International Trade Association
[Voice XML Forum](#) – The Voice Extensible Markup Language Forum
[VOIPSA](#) - Voice over IP Security Association
[VPNC](#) - Virtual Private Network Consortium

W

[W3C](#) – World Wide Web Consortium
[WASC](#) - Web Application Security Consortium
[WEB3D](#) – WEB3D Consortium
[WEDI](#) - Workgroup for Electronic Data Interchange
[WfMC](#) – Workflow Management Coalition
[WHAT](#) - Web Hypertext Application Technology
[Wi-Fi Alliance](#)
[WinnF](#) - Wireless Innovation Forum
[WiMAX Forum](#) – Worldwide Microwave Interoperability Forum
[WiMedia Alliance](#)
[WINA](#) - Wireless Industrial Networking Alliance
[WorldDAB Forum](#) – World Digital Audio Broadcast Forum
[WPC](#) - Wireless Power Consortium
[WS-I](#) – Web Services Interoperability Organization

X

[XII - XBRL International](#) – eXtensible Business Reporting Language
[X.org](#)

Z

[ZigBee](#) - The ZigBee Alliance

12.4. FEEDBACK FORM

The national standards analysis of the ICT sector is likely to evolve rapidly, according to the standardization and technological developments but also taking into account the national market interests.

A feedback thus could allow the identification of services to be developed potentially, to meet expectations of the national stakeholders of the sector according to the comments received after the release of this standards analysis report.

Finally, feedbacks will allow us to better target the potential interests of each stakeholder category for ICT subsectors and eventually to define new subsectors of interest for the national market.

❖ General Information

☐ Mr. ☐ Mrs.

Last name:

First Name:

Company:

Title:

Address:

Zip code:

City:

Phone:

Email:

❖ Interests in standardization subsectors

Please indicate your(s) category(ies) of stakeholders (See [Section 5.2.1](#)):

.....

Please complete the following matrix of interest according to the definition of potential interests (See [Section 4.3](#)) and ICT subsectors (See [Table 6](#)):

	Information	Performance	Services	Projects	Training	Investments
Cloud computing						
Data center						
Telecommunications						
Security						
Software and system engineering						
Data management						
Electronic signature						
E-archiving						
Sensor networks						
Governance of IT						

❖ Future developments

In your opinion, what are the additional subsectors that could be developed in this standards analysis (See **Table 6**)?

.....

.....

.....

Which economic sectors (where ICT can be seen as a horizontal-support) would you like to see analyzed from a standardization point of view (See **Chapter 9**)?

.....

.....

.....

From your point of view, what are the most promising technologies of the ICT sector for the coming decade?

.....

.....

.....

Do you have other comments concerning the national standards analysis of the ICT sector?

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

Thank you for your feedback!

12.5. DECLARATION OF INTEREST IN ICT STANDARDIZATION

You are interested in standardization and you would like to be contacted to discover all arising opportunities?

At this purpose, please return the application form and we will contact you as soon as possible.

☐ **I am interested in training sessions in standardization**

☐ **I am interested in participating in standardization**

☐ **I am interested in the following areas:**

- | | |
|--|--|
| <input type="checkbox"/> Telecommunications and information exchange between systems (SC6) | <input type="checkbox"/> Software and systems engineering (SC7) |
| <input type="checkbox"/> Cards and personal identification (SC17) | <input type="checkbox"/> Interconnection of information technology equipment (SC25) |
| <input type="checkbox"/> IT security techniques (SC27) | <input type="checkbox"/> Coding of audio, picture, multimedia and hypermedia (SC29) |
| <input type="checkbox"/> Document description and processing languages (SC34) | <input type="checkbox"/> Automatic identification and data capture techniques (SC31) |
| <input type="checkbox"/> Information technology for learning, education and training (SC36) | <input type="checkbox"/> User interfaces (SC35) |
| <input type="checkbox"/> Biometrics (SC37) | <input type="checkbox"/> Distributed application platforms and services (SC38) |
| <input type="checkbox"/> Sustainability for and by Information Technology (SC39) | <input type="checkbox"/> IT Service Management and IT Governance (SC40) |
| <input type="checkbox"/> Programming languages, their environments and system software interfaces (SC22) | |
| <input type="checkbox"/> Other: | |

☐ **I would like to register for the following technical subcommittees (SC):**
.....
.....

Last Name:	First Name:
Company:	Title:
Address:	
Zip code and City:	
Phone:	
Email:	

12.6. CONTACTS

ILNAS

Digital trust department
Département de la confiance numérique
Southlane Tower I – 1, Avenue du Swing
L-4367 Belvaux

Email: confiance-numerique@ilnas.etat.lu

Phone: (+352) 24 77 43 50

<http://www.ilnas.public.lu>



Institut luxembourgeois de la normalisation,
de l'accréditation, de la sécurité et qualité
des produits et services

ANEC GIE

Southlane Tower I – 1, Avenue du Swing
L-4367 Belvaux

Email: anec@ilnas.etat.lu

Phone: (+352) 24 77 43 70

<http://www.ilnas.public.lu>



ANEC
AGENCE POUR LA NORMALISATION ET
L'ÉCONOMIE DE LA CONNAISSANCE

ILNAS

Institut luxembourgeois de la normalisation,
de l'accréditation, de la sécurité et qualité
des produits et services



ANEC
AGENCE POUR LA NORMALISATION ET
L'ÉCONOMIE DE LA CONNAISSANCE

CONTACT :

ILNAS & ANEC

Southlane Tower I · 1, avenue du Swing · L-4367 Belvaux

Tel. : (+352) 24 77 43 -70 · Fax : (+352) 24 79 43 -70

E-mail : anec@ilnas.etat.lu

www.ilnas.lu