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STANDARDS ANALYSIS
ICT SECTOR
LUXEMBOURG

ANS/AN03

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

Executive summary

The survey and analysis of European and International standards in the Information and Communication Technology (ICT) sector has been initiated by the Institut Luxembourgeois de la Normalisation, de l'Accréditation, de la Sécurité et qualité des produits et services (ILNAS). Realized in the frame of the implementation of the national standardization strategy 2010-2020, 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.

The ICT sector is already an active sector at the national standardization level with 42 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 first to provide useful information to the national stakeholders regarding standardization activities in the field of ICT and second 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 37) and non-formal standardization technical committees (about 13 *fora/consortia*) is provided in the present report. 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, this analysis will be updated on a regularly basis according to the market interest.

Foreword

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 and Foreign Trade in Luxembourg. It was created based on the law of May 20, 2008, and started its operations 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 JTC1. 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, ILNAS has drawn up a national standardization strategy[1], which was approved by the Minister of the Economy and Foreign Trade on June 10, 2010.

This national standardization strategy, directly related to the 2020 strategy of the European Union, is primarily based on the following guiding principle: "Setting standards means setting the market."
The goals of the standardization strategy are:

- to better support the national economy in terms of competitiveness, visibility, and performance;
- to promote a homogenous standardization culture at the national level;
- to improve the international position of the Grand Duchy of Luxembourg in standardization organizations;
- to launch an innovative and federative way for the national standardization process.

Thus, the act of participating in the standardization process does not only allow for future standards to be anticipated but also allows the market to be guided by meeting its interests at any level. This strategy, including its operational objectives that are regularly updated, will be implemented through a sector-based economic approach and where national needs are identified.

To give new impetus to standardization in Luxembourg, this strategy is based on the five pillars hereafter mentioned:

- A sector-based standards approach as a support for the national economy,
- Innovation and research development in the frame of standardization,
- A sector-based development of ILNAS, Luxembourg's national standards body,
- Standardization training and public awareness,
- The creation and development of the Economic Interest Grouping "*Agence pour la Normalisation et l'Économie de la Connaissance*" (ANEC).

[1] http://www.ilnas.public.lu/fr/publications/normalisation/etudes-nationales/ilnas-strategie-normalisation-2010-2020.pdf

Beginning in October 2010, ILNAS has been supported by ANEC in implementing this strategy. The role of ANEC is to support the development of standardization activities at a 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 help of ANEC, can effectively contribute to the economic diversification policy pursued by the government in the expertise niches of tomorrow.

In this context, ILNAS Digital Trust department commissioned ANEC to complete the task of a survey and 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.

Table of Contents

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 standardization level. Driven by the Digital Trust department of ILNAS, several tools have already been set up (ISO/IEC JTC1 national forum; ISO/IEC JTC1 national day; ISO/IEC JTC1 national chapter), and 42 national delegates are currently active in the ICT sector.

Initiated by ILNAS for the first time, 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, the aim is to involve national stakeholders in a global approach to standardization in this sector in the Grand Duchy of Luxembourg in order to support 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 survey and analysis of European and International standards related to ICT have 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 levels; identification and description of technical standardization 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,
- 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. In the second step, the potential interests to take part in the standardization process are then 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.

Furthermore, and to complete the standards analysis, 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, etc. **Chapter 9** completes this report by highlighting 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.

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 later 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 and Foreign Trade, 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 standardization organization. The national standards body recognized at national level is eligible to be a national member of the corresponding International and European standards organizations.

❖ ANEC:

This acronym designates the *"Agence pour la Normalisation et l'Economie de la Connaissance".* Created in October 2010, the role of ANEC is to implement the national standardization strategy established by ILNAS in order to support the development of standardization activities at a 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.[2] 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.[3]

❖ 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.[4] 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 that has as its principal function the preparation, approval or adoption of standards that are made available to the public.[5] 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).

[2] Official Journal of the European Communities 2000/C141/01
[3] Based on the definition proposed in the standard EN 45020:2006: Standardization and related activities – General vocabulary
[4] Based on the definition proposed in the standard EN 45020:2006: Standardization and related activities – General vocabulary
[5] Based on the definition proposed in the standard EN 45020:2006: Standardization and related activities – General vocabulary

❖ STANDARDIZATION TECHNICAL COMMITTEE:

A technical decision-making body with a precise title, scope and work program, within a European and/or International standardization organism, essentially to manage the preparation of deliverables as standards in accordance with an agreed upon business plan.[6]

❖ 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 standards.[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.[8]

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 actors 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.

[6] Based on the information available on the CEN website/BOSS.
[7] Based on the information available on the CEN website/CEN Workshop Agreements.
[8] Based on the information available on the CEN website/Glossary.

2.3. STANDARDIZATION LANDSCAPE

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

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

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

- the International Organization for Standardization (**ISO**),
- the International Electrotechnical Commission (**IEC**).

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

- CENELEC and IEC are specialized in electrotechnical standards,
- ETSI is focused on telecommunications standards,
- CEN and ISO are in charge of the other types of standards in the other sectors.

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

Table 1: Characteristics of European and International Standards Organizations[9]

European and International Standards Bodies		Date of Creation	Number of Members	Number of Published Standards
ISO	International Organization for Standardization	1946	164	19497
IEC	International Electrotechnical Commission	1906	82	7279
CEN	European Committee for Standardization	1961	33	14775
CENELEC	European Committee for Electrotechnical Standardization	1973	33	6656
ETSI	European Telecommunications Standards Institute	1988	804[10] (64 countries)	31357

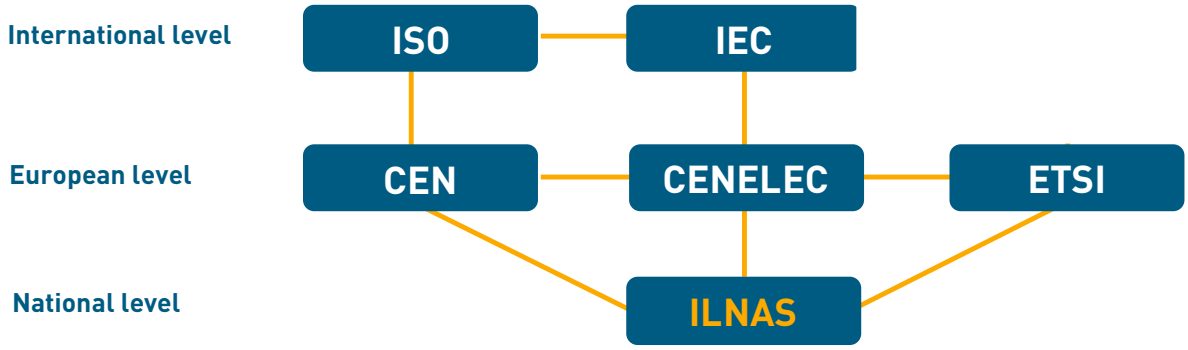
From a national perspective, one or several standardization bodies protect national interests from within the European and International standardization organizations. In Luxembourg, ILNAS – the only official national standards organization – is a member of the European and International standards organizations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

[9] Source: Websites of organizations – November 2012 (excepted CEN data established on 30.09.2012)

[10] ETSI has a specific way of working compared to the other recognized organizations, as it works through the direct participation of industry stakeholders

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

Figure 1: Interactions between the Standardization Organizations



A strong collaboration exists between the European and International standards bodies. 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.

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 standards; in that respect, the European and International organizations do not duplicate work.

Agreements also exist between the standards bodies 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 levels

Organization	Members	Method of adopting standards	Integration into the collections of national standards
International ISO and IEC	National bodies from countries members of ISO (164) and IEC (82)	1 country = 1 voice	Voluntary
European CEN and CENELEC	National bodies from the EU and EFTA[11] countries (33)	Weighted Vote (Treaty of Nice)	Required: countries must eliminate conflicting provisions from their collections

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 States[12]

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**

[11] EFTA: "European Free Trade Association" whose current members are Norway, Switzerland, Iceland and Liechtenstein
[12] 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, and 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.

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 JTC1 as follows: "Information Technology includes the specification, design and development of systems and tools dealing with the capture, representation, processing, security, transfer, interchange, presentation, management, organization, storage and retrieval of information"[13].

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 important[14] and most of the other dynamic sectors (healthcare, education, cultural industries, etc.) are massively investing in ICT[15]. The coming trends show that the sector is still innovating at the technological level (media tablets, cloud computing, etc.) but also at the social level, with more and more use of ICT in the daily life of the consumers (Internet of Things, NFC (Near field communication) payments, etc.)[16].

The ICT sector is directly responsible for 5% of European GDP (Gross Domestic Product), with a market value of EUR 660 billion annually, but it contributes far more to overall productivity growth[17]. 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 there are more than 250 million daily internet users in Europe and that virtually all Europeans own mobile phones have changed lifestyles.

In 2010, the European Commission published "A Digital Agenda for Europe"[18]. 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 Strategy[19], 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 Commission[20], ICT is much more important than the figures suggest, playing a key role in everything from promoting innovation throughout the economy to meeting the demographic challenge of an aging society. ICT plays a crucial role in:

- improving competitiveness throughout the economy in the face of globalization, boosting innovation, creativity, and efficiency;
- scientific and technological development in areas as diverse as medicine and physics;
- modernizing sectors as diverse as education, security, energy and transport, and making Europe's large public sector more efficient;
- tackling social challenges and improving quality of life while meeting the challenge of an aging society.

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

[13] ISO/IEC JTC1, ISO/IEC JTC 1 Long Term Business Plan, 2010
[14] http://ipts.jrc.ec.europa.eu/publications/pub.cfm?id=4379
[15] http://ipts.jrc.ec.europa.eu/publications/pub.cfm?id=4479
[16] http://www.gartner.com/it/page.jsp?id=1826214
[17] http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2011:0311:FIN:EN:PDF
[18] http://ec.europa.eu/information_society/digital-agenda/index_en.htm
[19] http://ec.europa.eu/europe2020/index_en.htm
[20] http://ec.europa.eu/information_society/tl/research/index_en.htm

Finally, at the national level, ICT is considered a key economic sector. Within the national program 2009-2014[21], to have a developed ICT sector is a cornerstone, especially to support the other economic sectors. 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.

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[22]. Interoperability is thus a key concept in today's ICT landscape. 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 JTC1. It is today clearly established that the committee ISO/IEC JTC1 "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 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".

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 Programme about ICT standardization entitled "2010-2013 ICT Standardisation Work Programme for industrial innovation"[23].

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 for CEN, including 11 technical committees under its supervision, the other ICT-related topics being tackled at the International level by ISO/IEC JTC1, 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.

[21] http://www.gouvernement.lu/gouvernement/programme-2009/programme-2009/07-ecocomex/index.html
[22] http://en.wikipedia.org/wiki/Information_and_communications_technology
[23] http://ec.europa.eu/enterprise/sectors/ict/files/ict-policies/2010-2013_ict_standardisation_work_programme_1st_update_en.pdf

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 more than 200 *fora* and *consortia*[24].

At the national level, the ICT sector is an already active standardization sector: 42 national delegates are currently active in the ICT sector. In order to support this development, three tools have been established by ILNAS to manage ICT standardization:

- **ISO/IEC JTC1 national forum**

A communication platform between ICT standardization actors in Luxembourg has been set up through the concept of "ISO/IEC JTC1 national forum". It is composed of the chairpersons of the national mirror committees of the ISO/IEC JTC1 subcommittees and the delegates of ILNAS who are currently chairing ISO/IEC JTC1 at the national level. The forum normally meets on a quarterly basis. The objectives of the ISO/IEC JTC1 national forum are:

- To follow the different topics of ISO/IEC JTC1: votes, comments, feedback from the ISO/IEC JTC1 plenary meetings;
- To facilitate information exchange between ILNAS and the chairpersons of the national mirror committees related to ISO/IEC JTC1 subcommittees;
- To promote communication and exchanges between the chairpersons of the national mirror committees related to ISO/IEC JTC1 subcommittees;
- To prepare the annual ISO/IEC JTC1 national day and the ISO/IEC JTC1 plenary meeting.

The ISO/IEC JTC1 national forum is led by Mr. Jean-Philippe HUMBERT from ILNAS, and currently composed of the following members:

- Mr. Reza RAZAVI (Chairman ISO/IEC JTC1/WG7)
- Mr. Pierre BOUTOU (Acting as Chairman ISO/IEC JTC1/SC6)
- Ms. Béatrix BARAFORT (Chairwoman ISO/IEC JTC1/SC7)
- Mr. Benoit POLETTI (Acting as Chairman ISO/IEC JTC1/SC17)
- Mr. Cédric MAUNY (Chairman ISO/IEC JTC1/SC27)
- Mr. Stéphane JACQUEMART (Chairman ISO/IEC JTC1/SC36)
- Mr. Jürgen BLUM (Acting as Chairman ISO/IEC JTC1/SC38)

- **ISO/IEC JTC1 national day**

ISO/IEC JTC1 national day is the yearly event aiming at informing the national market about current trends and developments of ICT standardization and promoting ICT standardization in Luxembourg. In 2011, it took the form of a conference, held on World Standards Day (October 14, 2011) at the Chamber of Commerce, on the topic: "International Standards – Creating confidence globally". The focus in 2011 was on cloud computing, which is a clearly hot ICT standardization topic.

- **ISO/IEC JTC1 national chapters**

An ISO/IEC JTC1 national chapter is established when a delegate (or group of delegates) in Luxembourg is (co-)editor of an ISO/IEC JTC1 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.

[24] http://www.cen.eu/cen/Sectors/Sectors/ISSS/Consortia/Pages/default.aspx

A first chapter was already opened in 2009, in the frame of the ISO/IEC 27015 standard 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 JTC1/SC27 national mirror committee.

Note:

To ensure 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"[25]. It was released during a conference held on June 11, 2012, that attracted a large number of national actors in ICT.

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

4. METHOD FOR THE STANDARDS ANALYSIS

In order to meet the national standardization strategy issues,[26] especially the first pillar dedicated to a sector-based approach of standardization, 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 1976[27]
- CEN
- ETSI

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.

[26] http://www.ilnas.public.lu/fr/publications/normalisation/etudes-nationales/index.html
[27] ISO/IEC Directives, Part 1, ninthedition, 2012

❖ 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.

At the International level, ISO and IEC formed a Joint Technical Committee known as the ISO/IEC JTC1 in 1987. The scope of ISO/IEC JTC1 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 deals with standardization of telecommunications. ETSI and its subsectors are thus fully in the scope of the standards watch.

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.

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 and its subcommittees 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.

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 report.

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 step 1 and the categories of stakeholders are simplified.

4.3. LINKS BETWEEN STAKEHOLDERS AND THE STANDARDS WATCH RESULTS

After having compiled the selected technical committees in relation to the ICT sector into subsectors, and having categorized the different stakeholders, 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 3: Example of a specific matrix of standards analysis

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

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. FOCUS ON ICT *FORA/CONSORTIA* AND ON ICT 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**[28]. 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 step 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. 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 step 1, a survey of all of the formal standards bodies (ISO, IEC, CEN and CENELEC – ETSI having already been completely selected in the standards watch described in step 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 codes[29]:

- 35 INFORMATION TECHNOLOGY. OFFICE MACHINES
- 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.

[28] http://www.cen.eu/cen/Sectors/Sectors/ISSS/Consortia/Pages/default.aspx
[29] http://www.iso.org/iso/ics6-en.pdf

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. Provided that the stakeholders want to seize these opportunities, ILNAS and ANEC will jointly actively contribute to them and support them. These opportunities should be seen by the national market as a series of proposals in order to go further and to engage future actions in order 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 for identifying **37 standardization technical committees** (European and International) directly related to the ICT sector that are described in Chapter 7.

In order to facilitate the identification of potential relations between the national ICT market and the standards watch results, the technical committees identified have been classified into subsectors. In total, eight subsectors have been defined. The definition of the subsectors relies on the standards watch and the 37 standardization technical committees identified in the field of ICT. Based on the scope of the technical committees identified, logical links are established between these technical committees in order to categorize them in subsectors. Six subsectors were defined using this approach (subsector 1 to 6). Then, the list of subsectors is completed with topics particularly relevant for ILNAS and the current national market: electronic signature and e-archiving, each of them representing a new subsector. For these new subsectors, the standards watch is extended to new technical committees potentially out of the scope defined in Section 4.1 in order to establish a link between these subsectors and technical committees.

Note:
In the future revision of the present analysis, the fast-growing domains "Governance of IT" and "Sensor Networks" will be specifically considered as additional subsectors.

The subsectors are described in Table 4.Nevertheless, within ISO/IEC JTC1 and the CEN ICT sector, 14 technical committees are not related to subsectors and are listed in Table 7.

Table 4: ICT subsectors

Subsector 1 - Cloud computing	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. Cloud computing is defined in NIST SP 800-145[30] as "a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable resources (e.g. networks, servers and storage systems), applications and services that can be rapidly provisioned and released with minimal management effort or service provider interaction". The main characteristics of a cloud computing system are[31]: - On-demand self-service: computing services such as processor and storage can be automatically provided (provisioned), monitored and managed by individual users when needed without human intervention or interaction with each service's provider. - Broad network access: computing services are delivered to heterogeneous devices over standard networks. - Resource pooling: ICT resources are shared across multiple applications and users in a non-dedicated manner. - Rapid elasticity: ICT resources can be expanded and reduced quickly and on an as-needed basis. Capabilities provided may appear unlimited to users who can obtain any quantity of any ICT resource at any time. - Measured service: the use of ICT resources is tracked for each application and user.
Subsector 2 - Data center	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.[32] 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.
Subsector 3 - Telecommunications	The telecommunications sector covers any remote transmission, emission, and reception of signs, signals, writing, images, sounds or intelligence of any nature by wire, radio, optical link, or other electromagnetic systems[33].
Subsector 4 – Software and system engineering	According to ISO/IEC 2382-1:1993 concerning Fundamental terms in ICT, software engineering is defined as "the systematic application of scientific and technological knowledge, methods, and experience to the design, implementation, testing, and documentation of software". 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.

[30] NIST Special Publication 800-145, The NIST Definition of Cloud Computing, National Institute of Standards and Technology, 2011
[31] Source: ISO Focus+, November - December 2011
[32] The future of data centres in Europe – Luxembourg: where else?, PricewaterhouseCoopers, 2010
[33] Definition extracted from the Telecommunications Act of 1984 by Oftel (currently named Ofcom)

Subsector 5 - Security	Security aims at protecting the confidentiality, integrity and availability of information and/or processes in an organization: - 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. This subsector deals thus with a large scope of standards at the hardware, software, network or management level.
Subsector 6 - Data management	This subsector 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 (a) 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) and (b) on various supports such as recorded media, hard drives or smartcards.
Subsector 7 – Electronic signature	An electronic signature is a mechanism to authenticate the author of an electronic document (like the handwritten signature for a paper document), and to ensure its integrity. Directive 1999/93/EC of the European Parliament and of the Council[34] on a Community framework for electronic signatures establishes a harmonized electronic signature similar to the handwritten signature. 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).
Subsector 8 – E-archiving	Archiving can be defined as the process of identifying, indexing, classifying, accessing, selecting, exploiting, communicating, exchanging and preserving, both paper-based and digital information. 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.

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

Following the definition of the subsectors categorizing the ICT sector, the identified technical committees are classified. Table 5 below lists the 23 standardization technical committees (included ETSI as a whole) that are related to the selected ICT subsectors. 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.

Table 5: Identified technical committees by ICT subsectors

SUBSECTOR	ORIGIN*	TECHNICAL COMMITTEE (TC)	ID-CARD Ref. Page
CLOUD COMPUTING	INT	ISO/IEC JTC 1/SC 38 – Distributed application platforms and services (DAPS)	98
	INT	ETSI/TC CLOUD – Cloud Computing	122
DATA CENTER	INT	ISO/IEC JTC 1/SC 39 - Sustainability for and by Information Technology	99
TELECOMMUNICATIONS	EU	CEN/TC Project Committee 365 – Internet Filtering	115
	INT	ISO/IEC JTC 1/SC 6 – Telecommunications and information exchange between systems	71
	INT	ISO/IEC JTC 1/SC 25 - Interconnection of information technology equipment	81
	EU	ETSI – European Telecommunications Standards Institute	119
SECURITY	INT	ISO/IEC JTC 1/SC 27 - IT Security techniques	82
	INT	ISO/IEC JTC 1/SC 37 - Biometrics	96
SOFTWARE AND SYSTEM ENGINEERING	INT	ISO/IEC JTC 1/SC 7 – Software and systems engineering	72
	INT	ISO/IEC JTC 1/SC 22 - Programming languages, their environments and system software interfaces	76
	INT	ISO/IEC JTC 1/SC 29 - Coding of audio, picture, multimedia and hypermedia information	85
DATA MANAGEMENT	EU	CEN/TC 225 – AIDC Technologies	103
	INT	ISO/IEC JTC 1/SC 2 – Coded character sets	70
	INT	ISO/IEC JTC 1/SC 23 - Digitally Recorded Media for Information Interchange and Storage	78
	INT	ISO/IEC JTC 1/SC 24 - Computer graphics, image processing and environmental data representation	79
	INT	ISO/IEC JTC 1/SC 31 - Automatic identification and data capture techniques	87
	INT	ISO/IEC JTC 1/SC 32 - Data management and interchange	88
	INT	ISO/IEC JTC 1/SC 34 - Document description and processing languages	90
ELECTRONIC SIGNATURE	EU	CEN/TC 224 – Personal Identification, Electronic Signature and Cards	101
	INT	ISO/IEC JTC 1/SC 17 – Cards and personal identification	74
	INT	ETSI/TC ESI – Electronic Signatures and Infrastructures	123
E-ARCHIVING	INT	ISO/TC 46 – Information and documentation	116

** EU: European origin and INT: International origin*

In summary, the 23 technical committees, which are potentially interesting regarding the national ICT subsectors are distributed in Table 6 below. The reader should note that ETSI as a whole is also related to the "telecommunications" subsector.

Table 6: Distribution of the selected technical committees in the ICT sector

Subsector	European TC	International TC	Total
Subsector 1 – Cloud computing	0	2	**2**
Subsector 2 – Data center	0	1	**1**
Subsector 3 – Telecommunications	1	3	**4**
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	1	2	**3**
Subsector 8 – E-archiving	0	1	**1**
Total	**3**	**20**	**23**

Finally, the standards watch has identified 14 technical committees that are focused on ICT standardization, but that are not related to any subsector (Table 4). 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 7.

Table 7: Technical committees not related to subsectors

SDO	ORIGIN*	TECHNICAL COMMITTEE (TC)	ID-CARD Ref. Page
ISO/IEC	INT	ISO/IEC JTC 1 - Information technology	62
	INT	ISO/IEC JTC 1/WG 7 – Sensor networks	67
	INT	ISO/IEC JTC 1/WG 8 – Governance of IT	69
	INT	ISO/IEC JTC 1/SC 28 - Office equipment	84
	INT	ISO/IEC JTC 1/SC 35 - User interfaces	92
	INT	ISO/IEC JTC 1/SC 36 - Information technology for learning, education and training	94
CEN	EU	CEN/TC 247 Building - Automation, Controls and Building Management	105
	EU	CEN/TC 251 - Health Informatics	107
	EU	CEN/TC 278 - Road transport and traffic telematics	108
	EU	CEN/TC 287 - Geographic Information	110
	EU	CEN/TC 294 - Communication systems for meters and remote reading of meters	111
	EU	CEN/TC 304 - Information and Communication Technologies - European Localization Requirements	112
	EU	CEN/TC 310 - Advanced Automation Technologies and their Applications	113
	EU	CEN/TC 353 - Information and Communication Technologies for Learning, Education and Training	114

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.

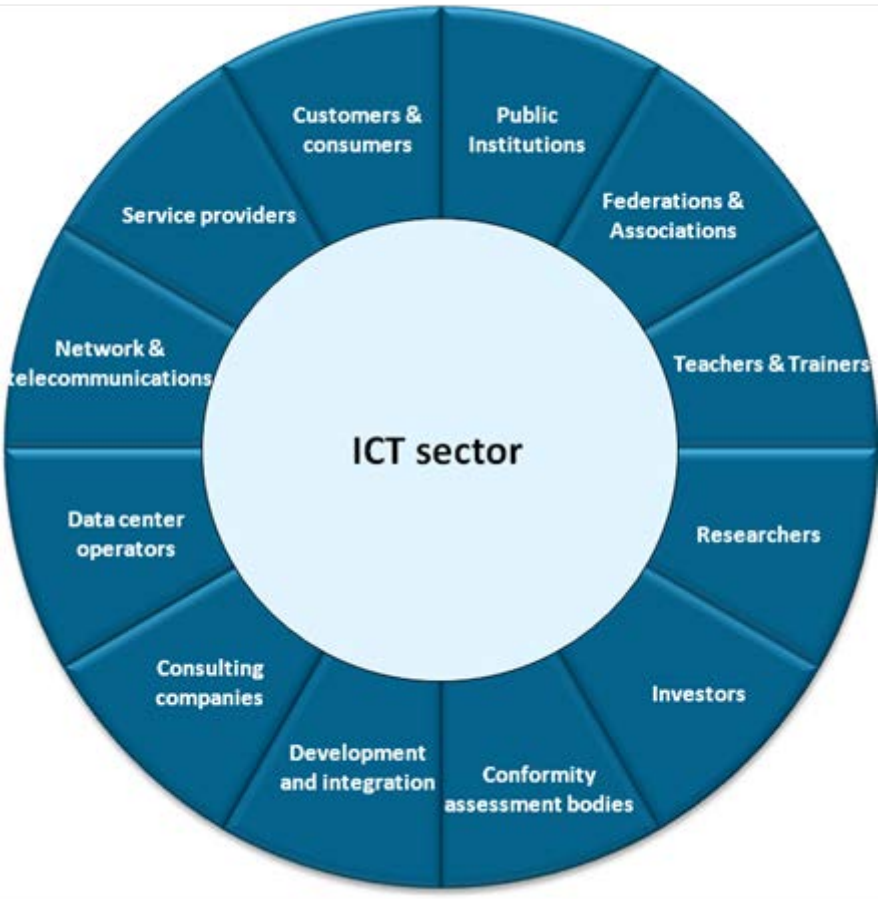
The potential interests for participating in standardization works for national stakeholders of the ICT sector are defined in current section.

The national panorama of stakeholders of the ICT sector gives a vision of the situation based on the experience and expertise of ILNAS/ANEC. It reflects the situation at a certain moment 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 matrices.

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 (Figure 2). The categories of actors we identified are represented in the picture below. All of them are presented and analyzed in the following sections.

Figure 4: Illustration of the categories of national stakeholders of the ICT sector



Each category of stakeholders is described in detail in the following sections of this report.

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 and Foreign Trade (especially the Department of Electronic Commerce and Information Security), the Ministry for Communication and Media (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, especially the Digital Trust department.

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

b) Current national delegates

Based on the ILNAS register of national delegates (version 53 of October 18, 2012), three 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 JTC1	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

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 institutions.

Public institutions	Cloud computing	Data center	Telecommunications	Security	Software and system engineering	Data management	Electronic signature	E-archiving
Information	X	X	X	X	X	X	X	X
Performance	X		X	X			X	X
Services				X			X	X
Projects	X	X	X	X	X	X	X	X
Training				X				
Investments	X	X	X	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-archiving subsectors because they are active in these fields and in concurrence with other countries.
- 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*)
- 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 53 of October 18, 2012), two persons of this category are currently registered in a technical committee related to ICT:

Public institutions	Person	Level	TC	Designation
Archives nationales de Luxembourg	Nadine ZEIEN	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

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 associations.

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

- 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.

5.2.4. TEACHERS AND TRAINERS

a) Presentation

The category of teachers and trainers is composed of schoolteachers, university professors and ICT training companies[35].

b) Current national delegates

Based on the ILNAS register of national delegates (version 53 of October 18, 2012), seventeen 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 JTC1/SC7	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 PSF S.A.	Jérémy THIMONT	International	ISO/IEC JTC 1/SC 27	IT Security techniques
CRP Henri Tudor	Yannick NAUDET	European	CEN/TC 310/WG1	Advanced automation technologies and their applications; Systems architecture
CRP Henri Tudor	Béatrix BARAFORT	International	ISO/IEC JTC1/SC7	Software and systems engineering
			ISO/IEC JTC 1/SC 7/WG 10	Process assessment
			ISO/IEC JTC 1/SC 7/WG 25	IT Service management
			ISO/IEC JTC 1/SC 7/WG 26	Software testing
			ISO/IEC JTC 1/SC 7/WG 40	Governance of IT

[35] 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 JTC1/SC7 ISO/IEC JTC 1/SC 7/WG 10 ISO/IEC JTC 1/SC 7/WG 23 ISO/IEC JTC 1/SC 7/WG 25	Software and systems engineering Process assessment System quality management IT Service management
CRP Henri Tudor	Stéphane CORTINA	International	ISO/IEC JTC1/SC7 ISO/IEC JTC 1/SC 7/WG 10 ISO/IEC JTC 1/SC 7/WG 25	Software and systems engineering Process Assessment IT Service management
CRP Henri Tudor	Christophe FELTUS	International	ISO/IEC JTC1/SC7	Software and systems engineering
CRP Henri Tudor	Séverine MIGNON	International	ISO/IEC JTC1/SC7	Software and systems engineering
CRP Henri Tudor	Michel PICARD	International	ISO/IEC JTC1/SC7	Software and systems engineering
CRP Henri Tudor	Marion LEPMETS	International	ISO/IEC JTC1/SC7 ISO/IEC JTC 1/SC 7/WG 7 ISO/IEC JTC 1/SC 7/WG 10 ISO/IEC JTC 1/SC 7/WG 25	Software and systems engineering Life cycle Management Process Assessment IT Service management
CRP Henri Tudor	Frédéric GIRARD	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	International	ISO/IEC JTC 1/SC 36 ISO/IEC JTC 1/SC 36/WG 5	Information technology for learning, education and training 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

Teachers and trainers	Person	Level	TC	Designation
CRP Henri Tudor	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 11	Digital records conversion and migration process
			ISO/TC 46/SC 11/WG 13	Revision of ISO15489-1 and ISO/TR 15489-2

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 trainers.

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

- 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 JTC1 SC36.
- 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.

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 53 of October 18, 2012), fourteen 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/WG1	Advanced automation technologies and their applications; Systems architecture
CRP Henri Tudor	Béatrix BARAFORT	International	ISO/IEC JTC1/SC7	Software and systems engineering
			ISO/IEC JTC 1/SC 7/WG 10	Process assessment
			ISO/IEC JTC 1/SC 7/WG 25	IT Service management
			ISO/IEC JTC 1/SC 7/WG 26	Software testing
			ISO/IEC JTC 1/SC 7/WG 40	Governance of IT
CRP Henri Tudor	Alain RENAULT	International	ISO/IEC JTC1/SC7	Software and systems engineering
			ISO/IEC JTC 1/SC 7/WG 10	Process assessment
			ISO/IEC JTC 1/SC 7/WG 23	System quality management
			ISO/IEC JTC 1/SC 7/WG 25	IT Service management
CRP Henri Tudor	Stéphane CORTINA	International	ISO/IEC JTC1/SC7	Software and systems engineering
			ISO/IEC JTC 1/SC 7/WG 10	Process Assessment
			ISO/IEC JTC 1/SC 7/WG 25	IT Service management
CRP Henri Tudor	Christophe FELTUS	International	ISO/IEC JTC1/SC7	Software and systems engineering

Researchers	Person	Level	TC	Designation
CRP Henri Tudor	Séverine MIGNON	International	ISO/IEC JTC1/SC7	Software and systems engineering
CRP Henri Tudor	Michel PICARD	International	ISO/IEC JTC1/SC7	Software and systems engineering
CRP Henri Tudor	Marion LEPMETS	International	ISO/IEC JTC1/SC7 ISO/IEC JTC 1/SC 7/WG 7 ISO/IEC JTC 1/SC 7/WG 10 ISO/IEC JTC 1/SC 7/WG 25	Software and systems engineering Life cycle Management Process Assessment IT Service management
CRP Henri Tudor	Frédéric GIRARD	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	International	ISO/IEC JTC 1/SC 36 ISO/IEC JTC 1/SC 36/WG 5	Information technology for learning, education and training 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

Researchers	Person	Level	TC	Designation
CRP Henri Tudor	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 11	Digital records conversion and migration process
			ISO/TC 46/SC 11/WG 13	Revision of ISO15489-1 and ISO/TR 15489-2

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 researchers.

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

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 53 of October 18, 2012), 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 investors.

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

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 53 of October 18, 2012), 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 CAB.

Conformity assessment bodies	Cloud computing	Data center	Telecommunications	Security	Software and system engineering	Data management	Electronic signature	E-archiving
Information	X	X	X	X	X	X	X	X
Performance								
Services	X	X	X	X	X		X	X
Projects								
Training	X	X	X	X	X		X	X
Investments								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) 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) in order to propose training.
- CABs generally do not invest.

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.
- Etc.

b) Current national delegates

Based on the ILNAS register of national delegates (version 53 of October 18, 2012), four persons of this category are currently registered in a technical committee related to ICT:

Development and integration	Person	Level	TC	Designation
Sogeti Luxembourg S.A.	Christophe RECEVEUR	International	ISO/IEC JTC1/SC7	Software and systems engineering
Dimension Data Financial Services S.A.	Rudolphe HILBERT	International	ISO/IEC JTC1/SC7 ISO/IEC JTC 1/SC 7/WG 10 ISO/IEC JTC 1/SC 7/WG 25	Software and systems engineering Process assessment IT Service management
Telindus PSF S.A.	Jérémy THIMONT	International	ISO/IEC JTC 1/SC 27	IT Security techniques

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

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 companies.

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

- 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.

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 53 of October 18, 2012), eleven persons of this category are currently registered in a technical committee related to ICT:

Consulting companies	Person	Level	TC	Designation
Deloitte S.A.	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
			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

Consulting companies	Person	Level	TC	Designation
Impact Consulting S.à r.l.	Pierre BOUTOU	International	ISO/IEC JTC 1/WG 7 ISO/IEC JTC 1/SC 6	Information technology; Sensor networks Telecommunications and information exchange between systems
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 ISO/IEC JTC 1/SC 27/WG 1 ISO/IEC JTC 1/SC 27/WG 2 ISO/IEC JTC 1/SC 27/WG 3 ISO/IEC JTC 1/SC 27/WG 4 ISO/IEC JTC 1/SC 27/WG 5	IT Security techniques Information security management systems Cryptography and security mechanisms Security evaluation criteria Security controls and services Identity management and privacy technologies
Telindus PSF S.A.	Jérémy THIMONT	International	ISO/IEC JTC 1/SC 27	IT Security techniques
itrust consulting S.à r.l.	Carlo HARPES	International	ISO/IEC JTC 1/SC 27	IT Security techniques
itrust consulting S.à r.l.	Matthieu AUBIGNY	International	ISO/IEC JTC 1/SC 27	IT Security techniques
Strategy and Governance S.à r.l.	Christophe BURTIN	International	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
Pricewaterhouse Coopers S.à.r.l.	Xavier LISOIR	International	ISO/TC 46/SC 11	Information and documentation; Archives/records management
Linklaters LLP	Sylvie FORASTIER	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 consulting companies. The following table proposes to draw links between subsectors and potential interests of consulting companies.

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

- 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
- Etc.

b) Current national delegates

Based on the ILNAS register of national delegates (version 53 of October 18, 2012), five persons of this category are currently registered in a technical committee related to ICT:

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
Telindus PSF S.A.	Cédric MAUNY	International	ISO/IEC JTC 1/SC 27 ISO/IEC JTC 1/SC 27/WG 1 ISO/IEC JTC 1/SC 27/WG 2 ISO/IEC JTC 1/SC 27/WG 3 ISO/IEC JTC 1/SC 27/WG 4 ISO/IEC JTC 1/SC 27/WG 5	IT Security techniques Information security management systems Cryptography and security mechanisms Security evaluation criteria Security controls and services Identity management and privacy technologies
Telindus PSF S.A.	Jérémy THIMONT	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 operators.

Data center operators	Cloud computing	Data center	Telecommunications	Security	Software and system engineering	Data management	Electronic signature	E-archiving
Information	X	X	X	X	X			X
Performance	X	X	X	X	X			X
Services	X	X						X
Projects	X	X						X
Training								
Investments	X	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, 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 and e-archiving at the service level. All of them are potential subsectors in which a data center operator may propose services.
- 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 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:

- P&T Luxembourg
- Telecom Luxembourg
- SES
- Tango
- Etc.

b) Current national delegates

Based on the ILNAS register of national delegates (version 53 of October 18, 2012), two 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 PSF S.A.	Jérémy THIMONT	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 network and telecommunications companies. The following table proposes to draw links between subsectors and potential interests of network and telecommunications companies.

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

- Network and telecommunications companies 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, because these subsectors may have a direct or indirect relationship with their business.
- Network and telecommunications companies may be interested to follow the subsectors data center, telecommunications, security, software and system engineering, 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, 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, and e-archiving in order to participate in research projects.
- Network and telecommunications companies generally do not provide training.
- Network and telecommunications companies may be interested to follow the subsector cloud computing 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, Learch, etc.)
- 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 53 of October 18, 2012), eight persons of this category are currently registered in a technical committee related to ICT:

Service providers	Person	Level	TC	Designation
AAS (Ambient Activity Systems) S.à r.l.	Reza RAZAVI	International	ISO/IEC JTC 1/WG 7	Information technology; Sensor networks
UBS Fund Services Luxembourg	Dietmar GEHRING	International	ISO/IEC JTC 1/SC 7/WG 26	Software and systems engineering; Software Testing
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 PSF 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

Service providers	Person	Level	TC	Designation
Luxembourg e-Archiving S.A.	Stéphane REVEL	International	ISO/IEC JTC 1/SC 27	IT Security techniques
CETREL 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

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 providers.

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

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 actors 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.

b) Current national delegates

Based on the ILNAS register of national delegates (version 53 of October 18, 2012), 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 consumers.

Customers and consumers	Cloud computing	Data center	Telecommunications	Security	Software and system engineering	Data management	Electronic signature	E-archiving
Information	X	X	X	X	X	X	X	X
Performance	X		X	X	X	X		X
Services								
Projects								
Training								
Investments	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.
- 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, it remains many opportunities for the national market. Provided that the stakeholders want to seize these opportunities, ILNAS and ANEC can jointly and actively contribute in order to support them.

The opportunities listed below are obviously subject to the views of stakeholders in the ICT sector of Luxembourg.

❖ Strengthening of the ISO/IEC JTC1 national forum as an information network about ICT standardization

The national network "ISO/IEC JTC1 national forum" related to standardization in the ICT sector, driven by ILNAS, allows the stakeholders to learn, 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 on a quarterly basis.

The ISO/IEC JTC1 national forum is composed of the chairpersons of the national mirror committees of the ISO/IEC JTC1 sub-committees as well as the delegate of ILNAS that is currently chairing ISO/IEC JTC1 at the national level. A first objective for the ISO/IEC JTC1 national forum is to obtain the best coverage of ISO/IEC JTC1, i.e. to have delegates in as many subcommittees of ISO/IEC JTC1 as possible. The broader the coverage of ISO/IEC JTC1, the better the capability of Luxembourg to take a position on ICT standards issues. There are currently 6 sub-committees covered out of 19.

❖ Promotion and support the involvement of national delegates as 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 JTC1, and 33 delegates from Luxembourg are currently involved in ISO/IEC JTC1 or in CEN technical committees from the ICT sector. Finally, the ISO/IEC JTC1 national forum has been active since December 7, 2009.

Some national delegates from the ICT sector have already been (co-)editors of standards documents such as technical reports (ISO/IEC 20000-4 and ISO/IEC 20000-5), International standards (ISO/IEC 27010) or other various standards documents (ISO/IEC JTC 1/SC27 WG 5 Standing Document 2 – Part 1).

As defined in Chapter 3, an ISO/IEC JTC1 national chapter is established when a delegate (or group of delegates) in Luxembourg is (co-)editor of an ISO/IEC JTC1 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 JTC1 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 and 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 could be interesting to follow ICT standardization work performed in *fora/consortia* at the national level. At the invitation of the chairman of the ISO/IEC JTC1 national forum, a member of an 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*[36].

❖ Involvement at the strategic level of ICT standardization

ISO/IEC JTC1/SWG3 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 JTC1 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 JTC1 chairman and secretariat in developing/revising the JTC 1 Business Plan and Long Term Business Plan
- Recommend actions for ISO/IEC JTC1 to successfully carry out the business plans
- Connect with subcommittees business planning processes to produce a comprehensive ISO/IEC JTC1 business plan
- Encourage subcommittees participation in the development and execution of the overall ISO/IEC JTC1 business plans
- Provide direction for and carry out the Technology Watch function
- Analyze best practices for business planning both inside and outside ISO/IEC JTC1 and make recommendations to ISO/IEC JTC1 for improvement

In 2011/2012, SWG-P focused its work to address the following technology areas:

- Green of ICT
- Social Networking
- Web Collaboration
- Mobile Applications
- Augmented Reality
- Ubiquitous Computing

[36] List of standards-related Fora and Consortia established by CEN (Edition 17 - December 2011) http://www.cen.eu/cen/Sectors/Sectors/ISSS/Consortia/Pages/default.aspx

SWG-P proposes to investigate in the next term of its activities (2012/2013) the following technology areas:

- Social Networking (continue)
- Web collaboration (continue)

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

- Participation aligned with the national standardization strategy 2010-2020[37], allowing ILNAS to get involved at the strategic level of ISO/IEC JTC1
- Participation aligned with the national standardization strategy 2010-2020, allowing ILNAS to anticipate future areas of standardization of ISO/IEC JTC1 and, for instance, set up *ad hoc* projects for the benefit of the national market
- Source of strategic information for the ISO/IEC JTC1 national forum

❖ Supporting national delegates involved in standardization

As Luxembourg's standards body, ILNAS has as its missions 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 national standardization strategy through the following objectives:

- Ensure the sector-based economic approach of the "*Organisme Luxembourgeois de Normalisation*" (pillar III)
- Provide support to technical committees and delegates in standardization (pillar V).

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 a European or an International level, in this sector.

❖ Providing 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 report.

[37] http://www.ilnas.public.lu/fr/publications/normalisation/etudes-nationales/

❖ Following 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 CENELEC[38], many EU calls for research and innovation place standardization as a key activity, deliverable or expected outcome of future projects.

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"[39]. It was released during a conference held on June 11, 2012, that attracted a large number of national actors in ICT.

❖ Strengthen 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.

❖ Strengthen 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 the European and International level.

[38] http://www.cencenelec.eu/News/Publications/Publications/LinkingResearch.pdf
[39] http://www.ilnas.public.lu/fr/publications/confiance-numerique/etudes-nationales/ilnas-tudor-white-paper-digital-trust-june-2012-v1_0.pdf

To summarize, opportunities identified for the national market related to the standardization activities of the ICT sector are:

- Strengthening of the ISO/IEC JTC1 national forum as an information network about ICT standardization
- Promotion and support the involvement of national delegates as editor of European or International standards
- Follow-up of the standardization work performed in ICT *fora/consortia*
- Involvement at the strategic level of ICT standardization
- Supporting national delegates involved in standardization
- Providing services in relation to standards evolutions
- Following research projects involving standardization
- Strengthen the existing training offers for the sector
- Strengthen 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 can provide active contribution and support.

As for being Luxembourg's 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 are specifically dedicated to these aspects and are able to efficiently support and inform the future national delegates.

To reinforce this support, it is proposed to dedicate a person that would 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.

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* standards[40].

This chapter focuses on the presentations 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 JTC1, at the International level, and its subcommittees (Section 7.1.1 to 7.1.22). The second one is the CEN (European Committee for Standardization), which established several technical committees related to ICT (Section 7.2.1 to 7.2.11). ISO/TC 46 is not directly related to the ICT domain as established in Section 4.1, but it covers the e-archiving topic. E-archiving, being defined as a subsector in Section 5, ISO/TC 46, is also surveyed in this ICT standards watch (Section 6.3). ETSI is another formal standards body focused on telecommunications. It is presented as a whole (Section 7.4.1) and, moreover, a focus is performed on two technical committees particularly relevant with regards to the subsectors "Cloud computing" and "Electronic signature" (Section 7.4.2 to 7.4.3).

7.1. ISO/IEC standardization committees

ISO (International Organization for Standardization) is the world's largest developer and publisher of International Standards with more than 19000 standards published and more than 4000 standards under development. ISO is in charge of developing International Standards for all industry sectors. The International Electrotechnical Commission (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 JTC1 in 1987.

[40] 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 JTC1

General information			
Committee	**ISO/IEC JTC1**	**Title**	**Information technology**
Creation date	1987	**MEMBERS** 	**Participating countries (35):** USA, Armenia, Australia, Austria, Belgium, Canada, China, Czech Republic, Côte d'Ivoire, Denmark, Finland, France, Germany, India, Ireland, Italy, Jamaica, Japan, Kenya, Republic of Korea, Lebanon, Malaysia, Malta, Netherlands, New Zealand, Nigeria, Norway, Pakistan, Russian Federation, Singapore, South Africa, Spain, Sweden, Switzerland, United Arab Emirates, United Kingdom **Observing countries (56):** 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, Kazakhstan, Democratic People's Republic of Korea, Libya, Lithuania, **Luxembourg**, Mauritius, Mexico, Mongolia, Morocco, 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	**3 delegates (JTC1 and related WG only)** **33 delegates (JTC1 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 JTC1/SWG3 Planning ISO/IEC JTC1/SWG2 SWG- Directives ISO/IEC JTC1/SWG1 Accessibility (SWG-A) ISO/IEC JTC1/SWG Internet of Things ISO/IEC JTC1/SWG Management ISO/IEC JTC1/AHG2 Structure ISO/IEC JTC1/AHG1 Incubator ISO/IEC JTC1/WG7 Sensor Networks ISO/IEC JTC1/WG8 Governance of IT ISO/IEC JTC1/SC2 Coded character sets ISO/IEC JTC1/SC6 Telecommunications and information exchange between systems ISO/IEC JTC1/SC7 Software and systems engineering ISO/IEC JTC1/SC17 Cards and personal identification ISO/IEC JTC1/SC22 Programming languages, their environments, and system software interfaces ISO/IEC JTC1/SC23 Digitally Recorded Media for Information Interchange and Storage ISO/IEC JTC1/SC24 Computer graphics, image processing, and environmental data representation ISO/IEC JTC1/SC25 Interconnection of information technology equipment ISO/IEC JTC1/SC27 IT Security techniques ISO/IEC JTC1/SC28 Office equipment ISO/IEC JTC1/SC29 Coding of audio, picture, multimedia and hypermedia information ISO/IEC JTC1/SC31 Automatic identification and data capture techniques		

	ISO/IEC JTC1/SC32	Data management and interchange
	ISO/IEC JTC1/SC34	Document description and processing languages
	ISO/IEC JTC1/SC35	User interfaces
	ISO/IEC JTC1/SC36	Information technology for learning, education and training
	ISO/IEC JTC1/SC37	Biometrics
	ISO/IEC JTC1/SC38	Distributed application platforms and services (DAPS)
	ISO/IEC JTC1/SC39	Sustainability for and by Information Technology
Standardization work		
Published standards	Total number of published ISO standards related to the technical committee and its SCs (number includes updates): 2542 Number of published ISO standards under the direct responsibility of JTC1 (number includes updates): 330	
Standards under development	648	
Comments		

ISO/IEC JTC1 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 JTC1, the following standards are particularly relevant (source: ISO/IEC JTC1 best-selling standards from the www.iso.org Web site since 2008):

- ISO/IEC 20000-1 (Information technology -- Service management -- Part 1: Service management system requirements)
- ISO/IEC 20000-2 (Information technology -- Service management -- Part 2: Guidance on the application of service management systems)
- ISO/IEC 27001 (Information technology -- Security techniques -- Information security management systems – Requirements)
- ISO/IEC 27002 (Information technology -- Security techniques -- Code of practice for information security management)
- ISO/IEC 27003 (Information technology -- Security techniques -- Information security management system implementation guidance)
- ISO/IEC 27004 (Information technology -- Security techniques -- Information security management – Measurement)
- ISO/IEC 27005 (Information technology -- Security techniques -- Information security risk management)
- ISO/IEC 38500 (Corporate governance of information technology)
- ISO/IEC 24762 (Information technology -- Security techniques -- Guidelines for information and communications technology disaster recovery services)

ISO/IEC JTC1 also benefits from the rapid, market-driven work of *de facto* standards-setting organizations and industry consortia. This is amplified by having many technical experts participating not only in national standardization bodies but also in key *de facto* standards-setting bodies and industrial *fora*. Liaising and cooperating extends the expertise of ISO/IEC JTC1's subcommittees and provides feedback on how ISO/IEC JTC1 standards are being used. It also helps identify any gaps or inconsistencies that need to be addressed. By working with other standards-setting organizations (SDOs), ISO/IEC JTC1's ability to serve an integration function is enhanced.[41]

ISO/IEC JTC1/SWG3 – Planning (SWG-P)

ISO/IEC JTC1/SWG3 - 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 JTC1 and the definition of its action plans. Its role is to:
1. Assist the JTC 1 Chairman and Secretariat in developing/revising the JTC 1 Strategic Business Plan
2. Recommend actions for JTC 1 to successfully execute the business plans

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

3. Connect with SC business planning processes
4. Encourage SC participation in the development and execution of the overall JTC 1 Business Plans
5. 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
6. Maintain a description of the JTC 1 planning process as per JTC 1 Standing Document 4
7. 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
8. 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
9. Support the JTC 1 Incubator function as defined in the JTC 1 Incubator Operating Principles and maintain the corresponding description of the operating principles (see JTC 1 N11312)
10. 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 JTC1/SWG2 – Directives (SWG-D)

ISO/IEC JTC1/SWG2 – 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 JTC1/SWG1 – 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 consortia/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 consortia/fora, if desired, in submitting their specifications to the formal standards process

ISO/IEC JTC1/SWG on 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:

1. Identify market requirements and standardization gaps for IoT;
2. Encourage JTC 1 SCs and WGs to address the need for ISO/IEC standards for IoT;
3. Facilitate cooperation across JTC 1 entities;
4. Promote JTC 1 developed standards for IoT and encourage them to be recognized and utilized by industry and other standards setting organizations;
5. Facilitate the coordination of JTC 1 IoT activities with IEC, ISO, ITU and other organizations that are developing standards for IoT;
6. Periodically report results and recommendations to JTC 1/SWG on Planning; and
7. Provide a written report of activities and recommendations to JTC 1 in advance of each JTC 1 Plenary meeting.

ISO/IEC JTC1/SWG on 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 convenors 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 JTC1/AHG2 – Structure

ISO/IEC JTC1/AHG2 - 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 JTC1/AHG1 – 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:
    - organization of workshops gathering active stakeholders in a given field
    - 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.

7.1.2.ISO/IEC JTC1/WG7

<table>
<tr><th colspan="4">General information</th></tr>
<tr><td>Committee</td><td>ISO/IEC JTC1/WG7</td><td>Title</td><td>Sensor networks</td></tr>
<tr><td>Creation date</td><td>2009</td><td rowspan="5">MEMBERS
  </td><td rowspan="5">Participating Countries (35):
USA, Armenia, Australia, Austria, Belgium, Canada, China, Côte d'Ivoire, Czech Republic, Denmark, Finland, France, Germany, India, Ireland, Italy, Jamaica, Japan, Kenya, Republic of Korea, Lebanon, Malaysia, Malta, Netherlands, Nigeria, Norway, Pakistan, Russian Federation, Singapore, South Africa, Spain, Sweden, Switzerland, United Arab Emirates, United Kingdom

Observing Countries (4):
Algeria, Belarus, Kazakhstan, Luxembourg</td></tr>
<tr><td>Secretariat</td><td>ANSI (USA)</td></tr>
<tr><td>Secretary</td><td>Ms. Jooran Lee</td></tr>
<tr><td>Convenor</td><td>Dr. Yongjin Kim</td></tr>
<tr><td>Involvement of Luxembourg</td><td>2 delegates</td></tr>
<tr><td>Organizations in liaison</td><td>OGC, IEE</td><td></td><td></td></tr>
<tr><td>Web site</td><td colspan="3">http://www.iso.org/iso/standards_development/technical_committees/other_bodies/iso_technical_committee.htm?commid=600487</td></tr>
<tr><td>Scope</td><td colspan="3">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:
a) Standardization of terminology.
b) Development of a taxonomy.
c) Standardization of reference architectures.
d) Development of guidelines for interoperability.
e) Standardization of specific aspects of sensor networks
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:
a) Addressing the technology gaps within the scope of JTC 1 entities.
b) Exploiting technology opportunities where it is desirable to provide common approaches to the use of sensor networks across application domains.
c) Addressing emerging areas related to M2M and IoT
3) In order to foster communication and sharing of information between groups working in the field of sensor networks:
a) Seek liaison relationships with all relevant JTC 1 SCs/WGs.
b) 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.
c) Consider the possibility of conducting joint projects with relevant ITU-T SG.
d) Seek input from relevant research projects and consortia.</td></tr>
<tr><td>Structure</td><td colspan="3">/</td></tr>
</table>

Standardization work	
Published standards	/
Standards under development	9
Comments	
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].	

7.1.3.ISO/IEC JTC1/WG8

<table>
<tr><th colspan="4">General information</th></tr>
<tr><td>Committee</td><td>ISO/IEC JTC1/WG8</td><td>Title</td><td>Governance of IT</td></tr>
<tr><td>Creation date</td><td>2012</td><td rowspan="6">MEMBERS
  </td><td rowspan="6">Participating Countries (16)

Observing Countries (12)</td></tr>
<tr><td>Secretariat</td><td>SA (Australia)</td></tr>
<tr><td>Secretary</td><td>Julia Dropmann</td></tr>
<tr><td>Convenor</td><td>Mr. Philip Brown</td></tr>
<tr><td>Involvement of Luxembourg</td><td>NO (no registered delegate)</td></tr>
<tr><td>Organizations in liaison</td><td>ISACA, itSMFInternational</td></tr>
<tr><td>Web site</td><td colspan="3">/</td></tr>
<tr><td>Scope</td><td colspan="3">1. To develop standards and related documents for the Governance of IT including tools and frameworks for governance, but excluding management, architecture, and portfolio management activities, as covered under the scope of JTC 1/SC 7.

2. The work program will comprise the following work items:
- ISO/IEC NP/CD 38500 Revision of ISO/IEC 38500:2008 Corporate Governance of InformationTechnology
- ISO/IEC DTR 38502 Information Technology – Governance of IT- Framework and Model
- ISO/IEC WDTS 38501 - Corporate Governance of IT Implementation Guide
- ISO/IEC WD 30120 Information technology - Software Engineering - IT Audit – Audit guidelines for Governance of IT
- ISO/IEC CD 30121 Information technology – Software Engineering – Governance of Digital Forensic Risk Framework

3. To pursue the existing liaison relationships of JTC 1/WG 6 and SC 7/WG 40 as follows:
- JTC 1/SC 27
- JTC 1/SC 27/WG 4
- JTC 1/SC 38
- TC 159
- ISACA
- itSMF</td></tr>
<tr><td>Structure</td><td colspan="3">/</td></tr>
<tr><th colspan="4">Standardization work</th></tr>
<tr><td>Published standards</td><td colspan="3">1</td></tr>
<tr><td>Standards under development</td><td colspan="3">3</td></tr>
<tr><th colspan="4">Comments</th></tr>
<tr><td colspan="4">ISO/IEC JTC 1/WG 8 has been created by the resolution 30 adopted at the 27th Meeting of ISO/IEC JTC 1 in November 2012 in Jeju Island (Korea).</td></tr>
</table>

7.1.4.ISO/IEC JTC1/SC2

General information			
Committee	**ISO/IEC JTC1/SC2**	**Title**	**Coded character sets**
Creation date	1987	**MEMBERS** 	**Participating Countries (30):** 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, Romania, Russian Federation, Serbia, Sri Lanka, Sweden, Thailand, Tunisia, USA, Ukraine, United Kingdom **Observing Countries (20):** Armenia, Belgium, Bosnia and Herzegovina, Cuba, Czech Republic, Estonia, Ethiopia, Ghana, Hong Kong, Islamic Republic of Iran, Israel, Italy, Kazakhstan, Malaysia, Morocco, Netherlands, Slovenia, 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, UNU-IIST, W3C, 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 ordery, associated control functions, their coded representation for information interchange and code extension techniques. Excluded: audio and picture coding.		
Structure	JTC1/SC2/WG2 Universal coded character set		
Standardization work			
Published standards	Number of published ISO standards under the direct responsibility of JTC1/SC2 (number includes updates): 51		
Standards under development	2		
Comments			
Noteworthy standards of ISO/IEC JTC1/SC2 are: - ISO 646:1972 (Information technology — ISO 7-bit coded character set for information interchange) - ISO/IEC 10646-1:1993 (Information technology -- Universal Multiple-Octet Coded Character Set (UCS) - Part 1: Architecture and Basic - Multilingual Plane)			

7.1.5.ISO/IEC JTC1/SC6

General information			
Committee	**ISO/IEC JTC1/SC6**	**Title**	**Telecommunications and information exchange between systems**
Creation date	1964	**MEMBERS** 	**Participating Countries (20):** Republic of Korea, Austria, Belgium, Canada, China, Czech Republic, Finland, Germany, Greece, Japan, Kazakhstan, Kenya, **Luxembourg**, Netherlands, Russian Federation, Spain, Switzerland, Tunisia, USA, United Kingdom **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, FRF, ICAO, IEEE-CS, ISOC, ITSO, ITU, MCF, MFA Forum, 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	JTC1/SC6/WG1 Physical and data link layers JTC1/SC6/WG7 Network, transport and future network JTC1/SC6/WG8 Directory (the former directory rapporteur group of WG7) JTC1/SC6/WG9 ASN.1 and registration (the former ASN.1 rapporteur group of WG7)		
Standardization work			
Published standards	Number of published ISO standards under the direct responsibility of JTC1/SC6 (number includes updates): 335		
Standards under development	64		
Comments			

Examples of standards developed by ISO/IEC JTC1/SC6 are:

- ISO/IEC WD TR 20002, Telecommunications and Information Exchange Between Systems -- Managed P2P: Framework
- ISO/IEC PDTR 29181-1, Telecommunications and Information Exchange Between Systems -- Future Networks: Problem Statement and Requirements -- Part 1: Overall aspects
- ISO/IEC 8802-11:2005, Information technology -- Telecommunications and information exchange between systems -- Local and metropolitan area networks -- Specific requirements -- Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) specifications

7.1.6.ISO/IEC JTC1/SC7

<table>
<tr><th colspan="4">General information</th></tr>
<tr><td>Committee</td><td>ISO/IEC JTC1/SC7</td><td>Title</td><td>Software and systems engineering</td></tr>
<tr><td>Creation date</td><td>1987</td><td rowspan="6">MEMBERS
  </td><td rowspan="6">Participating Countries (39):
Canada, Argentina, Australia, Belgium, Brazil, China, Colombia, Czech Republic, Côte d'Ivoire, Denmark, Finland, France, Germany, India, Ireland, Israel, Italy, Japan, Kazakhstan, Republic of Korea, Luxembourg, Malaysia, Mexico, Netherlands, New Zealand, Peru, Poland, Portugal, Romania, Russian Federation, Slovakia, South Africa, Spain, Sweden, Switzerland, Thailand, USA, Ukraine, United Kingdom

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, Uruguay</td></tr>
<tr><td>Secretariat</td><td>SCC (Canada)</td></tr>
<tr><td>Secretary</td><td>Dr. Witold Suryn</td></tr>
<tr><td>Chairperson</td><td>Mr. François Coallier</td></tr>
<tr><td>Involvement of Luxembourg</td><td>12 delegates</td></tr>
<tr><td>Organizations in liaison</td><td>AES, EAFPUG, ESI software, Ecma International, IEEE-CS, IFPUG, INCOSE, IPMA, ITU, NATO, OMG, PMI, The SPICE User Group, WMO, ISACA, itSMF</td></tr>
<tr><td>Web site</td><td colspan="3">http://www.iso.org/iso/standards_development/technical_committees/list_of_iso_technical_committees/iso_technical_committee.htm?commid=45086</td></tr>
<tr><td>Scope</td><td colspan="3">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 JTC1 terms of references and exclude specific tools and technologies that have been assigned by JTC1 to its other SC's.</td></tr>
<tr><td>Structure</td><td colspan="3">JTC1/SC7/AG 1 Life Cycle Processes Harmonization Advisory Group (LCPHAG)
JTC1/SC7/SWG5 Standards management group
JTC1/SC7/SWG22 Vocabulary validation
JTC1/SC7/WG2 System software documentation
JTC1/SC7/WG4 Tools and environment
JTC1/SC7/WG6 Evaluation and metrics
JTC1/SC7/WG7 Life cycle management
JTC1/SC7/WG10 Process assessment
JTC1/SC7/WG19 Open distributed processing and modeling languages
JTC1/SC7/WG20 Software and systems bodies of knowledge and professionalization
JTC1/SC7/WG21 Software asset management
JTC1/SC7/WG23 System quality management
JTC1/SC7/WG24 SLC Profile and guidelines for VSE
JTC1/SC7/WG25 IT Service management
JTC1/SC7/WG26 Software testing
JTC1/SC7/WG27 IT enabled services/ BPO (ITES/BPO)
JTC1/SC7/WG28 Joint between ISO/IEC JTC1/SC7 and ISO/TC 159/SC4: Common Industry Formats for Usability Reports
JTC1/SC7/WG40 Governance of IT
JTC1/SC7/WG42 Architecture</td></tr>
</table>

Standardization work	
Published standards	Number of published ISO standards under the direct responsibility of JTC1/SC7 (number includes updates): 145
Standards under development	51

Comments

In 2000, the name of ISO/IEC SC7 changed to "Software and System Engineering". The main standards published by the subcommittee after the year 2000 are:

- ISO/IEC 15288 on System life cycle processes in 2002
- ISO/IEC 19759 that is the Guide to the Software Engineering Body of Knowledge (SWEBOK) in 2005
- ISO/IEC 20000-1 on Service Management in 2005
- ISO/IEC 20000-2 on the application of service management systems in 2012
- The last core part of ISO/IEC 15504 about Process assessment in 2006
- A harmonized edition of ISO/IEC 12207 and ISO/IEC 15288 about Software and, respectively, System life cycle processes in 2008
- ISO/IEC 38500 on Corporate governance of information technology in 2008

7.1.7.ISO/IEC JTC1/SC17

General information			
Committee	**ISO/IEC JTC1/SC17**	**Title**	**Cards and personal identification**
Creation date	1969	**MEMBERS** 	**Participating Countries (34):** United Kingdom, Armenia, Australia, Austria, Belgium, Canada, China, Czech Republic, Denmark, Finland, 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, USA **Observing Countries (15):** Bosnia and Herzegovina, Estonia, 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		
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: a) Identification and related documents, b) Cards and devices associated with their use in inter-industry applications and International interchange.		
Structure	JTC1/SC17/WG1 Physical characteristics and test methods for ID-cards JTC1/SC17/WG3 Identification cards - Machine readable travel documents JTC1/SC17/WG4 Integrated circuit card with contacts JTC1/SC17/WG5 Registration Management Group (RMG) JTC1/SC17/WG8 Integrated circuit cards without contacts JTC1/SC17/WG9 Optical memory cards and devices JTC1/SC17/WG10 Motor vehicle driver license and related documents JTC1/SC17/WG11 Application of biometrics to cards and personal identification		
Standardization work			
Published standards	Number of published ISO standards under the direct responsibility of JTC1/SC17 (number includes updates): 103		
Standards under development	42		
Comments			
ISO/IEC JTC1 subcommittee SC17, 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.

7.1.8.ISO/IEC JTC1/SC22

General information			
Committee	**ISO/IEC JTC1/SC22**	**Title**	**Programming languages, their environments and system software interfaces**
Creation date	1985	**MEMBERS** 	**Participating Countries (20):** USA, Austria, Canada, China, Denmark, Finland, France, Germany, Ireland, Italy, Japan, Kazakhstan, Republic of Korea, Netherlands, Romania, Russian Federation, Spain, Switzerland, Ukraine, United Kingdom **Observing Countries (26):** 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, Portugal, 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	ACM SIGAda, Ada-Europe, Ecma International, GSE, OMG, The Open Group, W3C		
Web site	http://www.iso.org/iso/standards_development/technical_committees/list_of_iso_technical_committees/iso_technical_committee.htm?commid=45202		
Scope	SC22 is responsible for the standardization of programming languages (such as Cobol, Fortran, Ada, C, C++, Lisp and Prolog) and their environments (such as POSIX). SC22 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. The most recently created WG has a project to document the vulnerabilities of various programming languages.Program portability between different implementations of the same language is a key goal.		
Structure	JTC1/SC22/WG4 COBOL JTC1/SC22/WG5 Fortran JTC1/SC22/WG9 Ada JTC1/SC22/WG14 C JTC1/SC22/WG17 Prolog JTC1/SC22/WG21 C++ JTC1/SC22/WG23 Programming Language Vulnerabilities		
Standardization work			
Published standards	Number of published ISO standards under the direct responsibility of JTC1/SC22 (number includes updates): 95		
Standards under development	4		
Comments			
Created in 1985, SC22 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 SC22 are:

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

7.1.9.ISO/IEC JTC1/SC23

General information			
Committee	**ISO/IEC JTC1/SC23**	Title	**Digitally Recorded Media for Information Interchange and Storage**
Creation date	1987	**MEMBERS** 	**Participating Countries (8):** Japan, China, India, Republic of Korea, Netherlands, Russian Federation, Switzerland, USA **Observing Countries (19):** Argentina, Belgium, Bosnia and Herzegovina, Bulgaria, Cuba, Czech Republic, Finland, France, Ghana, Hungary, Iceland, 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 : - 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	JTC1/SC23/WG6 iVDR Cartridge JTC1/SC23/WG7 Joint between ISO/IEC JTC1/SC23, ISO/TC 42, and ISO/TC 171/SC1		
Standardization work			
Published standards	Number of published ISO standards under the direct responsibility of JTC1/SC23 (number includes updates): 137		
Standards under development	6		
Comments			
Examples of standards developed by ISO/IEC JTC1/SC23 are: - ISO/IEC DIS 10995 (Information technology -- Digitally recorded media for information interchange and storage -- Test method for the estimation of the archival lifetime of optical media) - ISO/IEC DIS 12862 (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))			

7.1.10. ISO/IEC JTC1/SC24

General information			
Committee	**ISO/IEC JTC1/SC24**	**Title**	**Computer graphics, image processing and environmental data representation**
Creation date	1987	**MEMBERS** 	**Participating Countries (10):** United Kingdom, Australia, China, Egypt, France, Japan, Republic of Korea, Portugal, Russian Federation, USA **Observing Countries (24):** 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, Singapore, 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	CGM Open, DGIWG, IHO, INRIA, ISMC, OGC, OMG, SEDRIS Organization, SISO, USA, WIPO, Web3D		
Web site	http://www.iso.org/iso/standards_development/technical_committees/list_of_iso_technical_committees/iso_technical_committee.htm?commid=45252		
Scope	Standardization of interfaces for information technology based applications relating to: - computer graphics, - image processing, - environmental data representation, - support for the augmented reality continuum (ARC), and - interaction with, and visual presentation of, information Included are the following related areas: 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. Excluded: 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 TC211 work on geographic information and geomatics; and software environments as described by ISO/IEC JTC 1 SC22.		
Structure	JTC1/SC24/WG6 Augmented reality continuum presentation and interchange JTC1/SC24/WG7 Image processing and interchange JTC1/SC24/WG8 Environmental representation JTC1/SC24/WG9 Augmented reality continuum concepts and reference model		
Standardization work			
Published standards	Number of published ISO standards under the direct responsibility of JTC1/SC24 (number includes updates): 80		
Standards under development	10		

Comments
Examples of standards developed by ISO/IEC JTC1/SC23 are: - 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)

7.1.11. ISO/IEC JTC1/SC25

General information			
Committee	**ISO/IEC JTC1/SC25**	**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, USA, United Kingdom **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	Standardization of microprocessor systems; and of interfaces, protocols and associated interconnecting media for information technology equipment, generally for commercial and residential environments, for embedded and distributed computing environments, storage systems, and other input/output components. Development of standards for telecommunication networks and interfaces to telecommunication networks is excluded.		
Structure	JTC1/SC25/TG 1 Project Team: Taxonomy and Terminology (PTTT) JTC1/SC25/WG1 Home electronic systems JTC1/SC25/WG3 Customer premises cabling JTC1/SC25/WG4 Interconnection of computer systems and attached equipment		
Standardization work			
Published standards	Number of published ISO standards under the direct responsibility of JTC1/SC25 (number includes updates): 259		
Standards under development	38		
Comments			
Some standards in development or developed, that are representative of the work of ISO/IEC SC25 are: - ISO/IEC DTR 29108 (Information technology - Terminology for intelligent homes) - ISO/IEC 29341-1:2011 (Information technology -- UPnP Device Architecture -- Part 1: UPnP Device Architecture Version 1.0) - ISO/IEC NP 14165-416 (Information technology -- Fibre Channel -- Part 416: Generic services - 6 (FC-GS-6))		

7.1.12. ISO/IEC JTC1/SC27

<table>
<tr><th colspan="4">General information</th></tr>
<tr><td>Committee</td><td>ISO/IEC JTC1/SC27</td><td>Title</td><td>IT Security techniques</td></tr>
<tr><td>Creation date</td><td>1990</td><td rowspan="6">MEMBERS
  </td><td rowspan="6">Participating Countries (49):
Germany, Algeria, Australia, Austria, Belgium, Brazil, Canada, China, Cyprus, Czech Republic, Côte d'Ivoire, Denmark, Estonia, Finland, France, India, Ireland, Israel, Italy, 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, USA, Ukraine, United Arab Emirates, United Kingdom, Uruguay

Observing Countries (17):
Argentina, 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</td></tr>
<tr><td>Secretariat</td><td>DIN (Germany)</td></tr>
<tr><td>Secretary</td><td>Mrs. Krystyna Passia</td></tr>
<tr><td>Chairperson</td><td>Dr. Walter Fumy</td></tr>
<tr><td>Involvement of Luxembourg</td><td>13 delegates</td></tr>
<tr><td>Organizations in liaison</td><td>CCDB, CCETT, Cloud security alliance, ECBS, ENISA, EPC, ETSI, Ecma International, ISACA/ITGI, ISSEA, ITU, MasterCard, Visa</td></tr>
<tr><td>Web site</td><td colspan="3">http://www.iso.org/iso/standards_development/technical_committees/list_of_iso_technical_committees/iso_technical_committee.htm?commid=45306</td></tr>
<tr><td>Scope</td><td colspan="3">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:
- 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.

SC27 engages in active liaison and collaboration with appropriate bodies to ensure the proper development and application of SC27 standards and technical reports in relevant areas.</td></tr>
<tr><td>Structure</td><td colspan="3">JTC1/SC27/WG1 Information security management systems
JTC1/SC27/WG2 Cryptography and security mechanisms
JTC1/SC27/WG3 Security evaluation testing and specification
JTC1/SC27/WG4 Security controls and services
JTC1/SC27/WG5 Identity management and privacy technologies</td></tr>
</table>

Standardization work	
Published standards	Number of published ISO standards under the direct responsibility of JTC1/SC27 (number includes updates): 117
Standards under development	70

Comments

ISO/IEC JTC1/SC27, IT Security techniques, is responsible for helping in the fight against the growing problems of cybersecurity attacks, online fraud, and information and identity theft. It provides organizations with solutions to protect their sensitive and critical information, as well as personal data, regardless of business sector and organizational structure.

Information security standards deal with the handling of incidents, including disaster recovery scenarios, system failures, business disruptions and malicious software attacks such as those caused by viruses, worms and Trojan horses. They also underpin the security features used in various software products, technologies and applications, including online business transactions. The information security standards market changed significantly when businesses around the world were introduced to the concept of an Information Security Management System (ISMS). ISO/IEC 27001:2005 (Information technology – Security techniques – Information security management systems – Requirements) provides an effective management framework for information security. It meets all types of organizational security needs and business requirements. Additionally, it is capable of evolving and improving the level of protection commensurate with changes in the cyber-threat environment. Many programs designed to tackle the cyber-war issue reference ISO/IEC 27001 and its supporting code of practice ISO/IEC 27002:2005 (Information technology – Security techniques – Code of practice for information security management).

7.1.13. ISO/IEC JTC1/SC28

General information			
Committee	**ISO/IEC JTC1/SC28**	**Title**	**Office equipment**
Creation date	1989	**MEMBERS** 	**Participating Countries (13):** Japan, Austria, China, Germany, India, Italy, Republic of Korea, Netherlands, Philippines, Russian Federation, Thailand, USA, United Kingdom **Observing Countries (19):** Argentina, Belgium, Bosnia and Herzegovina, Czech Republic, Finland, France, Ghana, Hungary, Indonesia, Islamic Republic of Iran, Kazakhstan, Kenya, Malaysia, Poland, Romania, Saudi Arabia, Serbia, South Africa, Uruguay
Secretariat	JISC (Japan)		
Secretary	Mr. Motokuni Sugiyama		
Chairperson	Mr. Akira Saito		
Involvement of Luxembourg	**NO (no registered delegate)**		
Organizations in liaison	CIE, Ecma International, 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	JTC1/SC28/WG1 Advisory WG JTC1/SC28/WG2 Consumables JTC1/SC28/WG3 Productivity JTC1/SC28/WG4 Image quality assessment JTC1/SC28/WG5 Office Colour		
Standardization work			
Published standards	Number of published ISO standards under the direct responsibility of JTC1/SC28 (number includes updates): 45		
Standards under development	8		
Comments			
ISO/IEC JTC1/SC28 is primarily a printer and copier oriented subcommittee whose scope remains unchanged since its inception which reads as follows. *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 Equipment, Digital scanners, Facsimile equipment and systems composed of combinations of office equipment.* Inventory of published ISO/IEC JTC1/SC28 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 JTC1/SC28 is contiguous with scopes of ISO/TC42, TC 130 and TC 171 necessitates tight liaisons with those technical committees among others. Also, ISO/IEC JTC1/SC28 has always been an active member of the ISO Steering Committee on Image Technology (SCIT).			

7.1.14. ISO/IEC JTC1/SC29

General information			
Committee	**ISO/IEC JTC1/SC29**	**Title**	**Coding of audio, picture, multimedia and hypermedia information**
Creation date	1991	**MEMBERS** 	**Participating Countries (25):** Japan, Australia, Belgium, Canada, China, Denmark, Finland, France, Germany, India, Israel, Italy, Republic of Korea, Netherlands, Norway, Poland, Portugal, Russian Federation, Singapore, Spain, Sweden, Switzerland, USA, Ukraine, United Kingdom **Observing Countries (16):** Austria, Bosnia and Herzegovina, Czech Republic, Greece, Hong Kong, Hungary, Indonesia, Islamic Republic of Iran, Ireland, Malaysia, Morocco, Romania, Serbia, Slovakia, South Africa, Turkey
Secretariat	JISC (Japan)		
Secretary	Ms. Yukiko Ogura		
Chairperson	Mr. Kohtaro Asai		
Involvement of Luxembourg	**NO (no registered delegate)**		
Organizations in liaison	3GPP, ABU, AES, AGICOA, ATIS, ATSC, CCSDS, CEA, CIE, CISAC, DAISY, DAVIC, DVB, EBU, EDItEUR, ETSI, FIAPF, FLO Forum, I3A, IDF, IEEE-CS, IFPI, IMTC, IOC, IPTC, ISMA, ISOC, ITU, MMA, OASIS RLTC, OCLC, OMG, OeBF/EBX, SMPTE, TVA, UHAPI, UMTSF ICTG, WIPO, cIDF		
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: - 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	JTC1/SC29/WG1 Coding of still pictures JTC1/SC29/WG11 Coding of moving pictures and audio		
Standardization work			
Published standards	Number of published ISO standards under the direct responsibility of JTC1/SC29 (number includes updates): 459		
Standards under development	75		

Comments

Examples of standards developed by ISO/IEC JTC1/SC29 are:

- ISO/IEC 10918-1:1994 (Information technology -- Digital compression and coding of continuous-tone still images: Requirements and guidelines)
- 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 1-3)
- ISO/IEC 15444-1:2000 (Information technology -- JPEG 2000 image coding system -- Part 1: Core coding system)

7.1.15. ISO/IEC JTC1/SC31

General information			
Committee	**ISO/IEC JTC1/SC31**	**Title**	**Automatic identification and data capture techniques**
Creation date	1996	**MEMBERS** 	**Participating Countries (32):** USA, Australia, Austria, Belgium, Brazil, Canada, China, Colombia, Czech Republic, Denmark, Finland, 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, Ghana, Hong Kong, Hungary, Indonesia, Islamic Republic of Iran, Kazakhstan, New Zealand, Norway, Serbia, Thailand
Secretariat	ANSI (USA)		
Secretary	Mr. Frank M. Sharkey		
Chairperson	Mr. Charles Biss		
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.		
Structure	JTC1/SC31/WG1 Data carrier JTC1/SC31/WG2 Data structure JTC1/SC31/WG4 Radio frequency identification for item management JTC1/SC31/WG5 Real time locating systems JTC1/SC31/WG6 Mobile Item Identification and Management (MIIM) JTC1/SC31/WG7 Security for item management		
Standardization work			
Published standards	Number of published ISO standards under the direct responsibility of JTC1/SC31 (number includes updates): 99		
Standards under development	41		
Comments			
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. 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. ISO/IEC JTC1/SC31, 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 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).		

7.1.16. ISO/IEC JTC1/SC32

General information			
Committee	**ISO/IEC JTC1/SC32**	**Title**	**Data management and interchange**
Creation date	1997	**MEMBERS** 	**Participating Countries (14):** USA, Canada, China, Czech Republic, Egypt, Finland, Germany, India, Japan, Republic of Korea, Portugal, Russian Federation, Sweden, United Kingdom **Observing Countries (17):** Austria, Belgium, Bosnia and Herzegovina, France, Ghana, Hungary, Indonesia, Islamic Republic of Iran, Italy, Kazakhstan, Netherlands, Norway, Poland, Romania, Serbia, Spain, Switzerland
Secretariat	ANSI (USA)		
Secretary	Dr. Timothy D. Schoechle		
Chairperson	Mr. Jim Melton		
Involvement of Luxembourg	**NO (no registered delegate)**		
Organizations in liaison	CISAC, EUROSTAT, IEEE-CS, ITSO, ITU, Infoterm, OECD, OGC, OMG, SWIFT, UNECE, W3C, 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 data management facilities across sector-specific areas. Specifically, SC32 standards include: 1. reference models and frameworks for the coordination of existing and emerging standards; 2. definition of data domains, data types and data structures, and their associated semantics; 3. languages, services and protocols for persistent storage, concurrent access, concurrent update and interchange of data; 4. methods, languages, services, and protocols to structure, organize, and register metadata and other information resources associated with sharing and interoperability, including electronic commerce.		
Structure	JTC1/SC32/WG1 eBusiness JTC1/SC32/WG2 MetaData JTC1/SC32/WG3 Database language JTC1/SC32/WG4 SQL/Multimedia and application packages		
Standardization work			
Published standards	Number of published ISO standards under the direct responsibility of JTC1/SC32 (number includes updates): 61		
Standards under development	31		

Comments
ISO/IEC JTC1/SC32 is especially in charge of standardizing the SQL language and developing XML-related standards. Examples of standards developed by ISO/IEC JTC1/SC32 are: - ISO/IEC 9075-1:2008 (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)

7.1.17. ISO/IEC JTC1/SC34

General information			
Committee	**ISO/IEC JTC1/SC34**	**Title**	**Document description and processing languages**
Creation date	1998	**MEMBERS** 	**Participating Countries (33):** Japan, Armenia, Brazil, Bulgaria, Canada, Chile, China, Czech Republic, Côte d'Ivoire, Denmark, Egypt, Finland, France, Germany, India, Italy, Republic of Korea, Lebanon, Malaysia, Malta, Netherlands, Norway, Pakistan, Poland, Romania, Russian Federation, Slovakia, South Africa, Sri Lanka, Sweden, Switzerland, Thailand, USA, United Kingdom **Observing Countries (23):** Australia, Austria, Belgium, Bosnia and Herzegovina, Croatia, Cyprus, Greece, Hong Kong, Hungary, Indonesia, Islamic Republic of Iran, Ireland, Israel, Kazakhstan, Kenya, Lithuania, Mexico, Portugal, Serbia, Spain, 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, W3C		
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: - 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	JTC1/SC34/WG1 Information description JTC1/SC34/WG2 Information presentation JTC1/SC34/WG3 Information association JTC1/SC34/WG4 Office Open XML JTC1/SC34/WG5 Document Interoperability JTC1/SC34/WG6 OpenDocument Format		
Standardization work			
Published standards	Number of published ISO standards under the direct responsibility of JTC1/SC34 (number includes updates): 65		
Standards under development	6		

Comments
ISO/IEC JTC1/SC34 has inherited from its predecessors (ISO TC 97/SC18/WG8 and ISO/IEC JTC1/SC18/WG8) 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 JTC1/SC34, as well as continuing to influence the work of other bodies such as OASIS and W3C.

7.1.18. ISO/IEC JTC1/SC35

General information			
Committee	**ISO/IEC JTC1/SC35**	**Title**	**User interfaces**
Creation date	1998	**MEMBERS** 	**Participating Countries (18):** France, Canada, China, Denmark, Finland, Germany, Greece, India, Italy, Japan, Republic of Korea, Russian Federation, Spain, Sweden, Switzerland, USA, Ukraine, United Kingdom **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			
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 JTC1 requirements for cultural and linguistic adaptability. This includes: - 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	JTC1/SC35/WG1 Keyboards and input interfaces JTC1/SC35/WG2 Graphical user interface and interaction JTC1/SC35/WG4 User interfaces for mobile devices JTC1/SC35/WG5 Cultural and linguistic adaptability JTC1/SC35/WG6 User interfaces accessibility JTC1/SC35/WG7 User interfaces object, actions and attributes JTC1/SC35/WG8 User interfaces for remote interactions		
Standardization work			
Published standards	Number of published ISO standards under the direct responsibility of JTC1/SC35 (number includes updates): 47		
Standards under development	22		

Comments
Examples of standards developed by ISO/IEC JTC1/SC35 are: - ISO/IEC 9995-1:2009 (Information technology -- Keyboard layouts for text and office systems -- Part 1: General principles governing keyboard layouts) - ISO/IEC 11581-1:2000 (Information technology -- User system interfaces and symbols -- Icon symbols and functions -- Part 1: Icons – General) - ISO/IEC 18036:2003 (Information technology -- Icon symbols and functions for World Wide Web browser toolbars)

7.1.19. ISO/IEC JTC1/SC36

<table>
<tr><th colspan="4">General information</th></tr>
<tr><td>Committee</td><td>ISO/IEC JTC1/SC36</td><td>Title</td><td>Information technology for learning, education, and training</td></tr>
<tr><td>Creation date</td><td>1999</td><td rowspan="5">MEMBERS
  </td><td rowspan="5">Participating Countries (22):
Republic of Korea, Algeria, Australia, Canada, China, Denmark, France, Germany, India, Italy, Japan, Kenya, Luxembourg, Netherlands, Norway, Russian Federation, Slovakia, South Africa, Spain, Tunisia, Ukraine, United Kingdom

Observing Countries (23):
Belgium, Bosnia and Herzegovina, Colombia, Czech Republic, Finland, Ghana, Hong Kong, Hungary, Indonesia, Islamic Republic of Iran, Ireland, Kazakhstan, Malaysia, New Zealand, Portugal, Romania, Saudi Arabia, Serbia, Singapore, Sweden, Switzerland, Turkey, USA</td></tr>
<tr><td>Secretariat</td><td>KATS (Republic of Korea)</td></tr>
<tr><td>Secretary</td><td>Ms Eunsook Kim</td></tr>
<tr><td>Chairperson</td><td>Mr. Erlend Øverby</td></tr>
<tr><td>Involvement of Luxembourg</td><td>4 delegates</td></tr>
<tr><td>Organizations in liaison</td><td>ADL, AICC, AUF, IMS Global, Infoterm, LETSI, LTSC</td><td></td><td></td></tr>
<tr><td>Web site</td><td colspan="3">http://www.iso.org/iso/standards_development/technical_committees/list_of_iso_technical_committees/iso_technical_committee.htm?commid=45392</td></tr>
<tr><td>Scope</td><td colspan="3">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.
Excluded: The SC shall not create standards or technical reports that define educational standards, cultural conventions, learning objectives, or specific learning content. 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.</td></tr>
<tr><td>Structure</td><td colspan="3">JTC1/SC36/AG 1 Business planning and communications
JTC1/SC36/WG1 Vocabulary
JTC1/SC36/WG2 Collaborative technology
JTC1/SC36/WG3 Learner information
JTC1/SC36/WG4 Management and delivery of learning, education and training
JTC1/SC36/WG5 Quality assurance and descriptive frameworks
JTC1/SC36/WG6 Platform, Services, and specification integration
JTC1/SC36/WG7 ITLET - Culture, language and individual needs</td></tr>
<tr><th colspan="4">Standardization work</th></tr>
<tr><td>Published standards</td><td colspan="3">Number of published ISO standards under the direct responsibility of JTC1/SC36 (number includes updates): 30</td></tr>
<tr><td>Standards under development</td><td colspan="3">32</td></tr>
</table>

Comments

ISO/IEC JTC1/SC36 was formed by ISO/IEC JTC1 at the 1999 JTC1 Plenary held in Seoul, Korea. The first ISO/IEC JTC1/SC36 plenary meeting was held in March 2000 in London, United Kingdom. Since then, ISO/IEC JTC1/SC36 has held 22 plenary meetings in over 13 countries.

Since its inception, ISO/IEC JTC1/SC36 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 JTC1/SC36, 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 1) Facilitate global trade, 2) Improve quality, security, and consumer protection, and 3) Global dissemination of technologies and good practices, all of which contribute to economic and social progress.

7.1.20. ISO/IEC JTC1/SC37

General information			
Committee	**ISO/IEC JTC1/SC37**	**Title**	**Biometrics**
Creation date	2002	**MEMBERS** 	**Participating Countries (28):** USA, 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	Mr. Fernando Podio		
Involvement of Luxembourg	**NO (no registered delegate)**		
Organizations in liaison	BioAPI Consortium, 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	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. Excluded is the work in ISO/IEC JTC1/SC17 to apply biometric technologies to cards and personal identification. Excluded is the work in ISO/IEC JTC1/SC27 for biometric data protections techniques, biometric security testing, evaluations, and evaluations methodologies.		
Structure	JTC1/SC37/WG1 Harmonized biometric vocabulary JTC1/SC37/WG2 Biometric technical interfaces JTC1/SC37/WG3 Biometric data interchange formats JTC1/SC37/WG4 Biometric functional architecture and related profiles JTC1/SC37/WG5 Biometric testing and reporting JTC1/SC37/WG6 Cross-Jurisdictional and Societal Aspects of Biometrics		
Standardization work			
Published standards	Number of published ISO standards under the direct responsibility of JTC1/SC37 (number includes updates): 79		
Standards under development	61		
Comments			
The goal of ISO/IEC JTC1/SC37 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 JTC1/SC37, 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. A harmonized biometric vocabulary that will serve the standards community as well as other customers is also in development.

7.1.21. ISO/IEC JTC1/SC38

General information			
Committee	**ISO/IEC JTC1/SC38**	Title	**Distributed application platforms and services (DAPS)**
Creation date	2009	MEMBERS 	**Participating Countries (23):** USA, Australia, Brazil, Canada, China, Denmark, Finland, France, Germany, India, Ireland, Italy, Japan, Republic of Korea, **Luxembourg**, Netherlands, Poland, Russian Federation, Singapore, Spain, Sweden, Switzerland, United Kingdom **Observing Countries (9):** Austria, 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	**1 delegate**		
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: - Web Services, - Service Oriented Architecture (SOA), and - Cloud Computing.		
Structure	JTC1/SC38/WG1 Web services JTC1/SC38/WG2 Service Oriented Architecture (SOA) JTC1/SC38/WG3 Cloud computing		
Standardization work			
Published standards	Number of published ISO standards under the direct responsibility of JTC1/SC38 (number includes updates): 5		
Standards under development	4		
Comments			
Established by ISO/IEC JTC1 at its 2009 Plenary meeting in Tel Aviv (Israel), SC38 on Distributed Application Platforms & Services works in three related technology areas: Web Services, Service Oriented Architecture (SOA), and Cloud Computing. 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). ISO/IEC JTC1/SC38, 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 JTC1 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 computing. By initiating standardization activities only after first identifying cloud computing standardization requirements, ISO/IEC JTC1/SC38 will address the public and private sector needs for standards that address end-user requirements and facilitate the rapid deployment of cloud computing.		

7.1.22. ISO/IEC JTC1/SC39

General information			
Committee	**ISO/IEC JTC1/SC39**	Title	**Sustainability for and by Information Technology**
Creation date	2012	MEMBERS 	**Participating Countries (13):** USA, Belgium, Canada, China, Finland, France, Germany, Italy, Japan, Republic of Korea, Netherlands, Norway, Singapore **Observing Countries (6):** Australia, Denmark, Ireland, Spain, Switzerland, United Kingdom
Secretariat	ANSI (USA)		
Secretary	Ms. Sally Seitz		
Chairperson	Mr. Jay Taylor		
Involvement of Luxembourg	**NO (no registered delegate)**		
Organizations in liaison			
Web site	http://www.iso.org/iso/standards_development/technical_committees/list_of_iso_technical_committees/iso_technical_committee.htm?commid=654019		
Scope	Standardization related to the intersection of resource efficiency and IT which supports sustainable development, application, operation, and management aspects.		
Structure	JTC1/SC39/WG1 Resource Efficient Data Centres JTC1/SC39/WG2 Green ICT		
Standardization work			
Published standards	Number of published ISO standards under the direct responsibility of JTC1/SC39 (number includes updates): 0		
Standards under development	2		

Comments

The creation of ISO/IEC JTC1/SC39 was officially decided on during the 2011 JTC1 Plenary meeting held in San Diego, California.

ISO/IEC JTC1/SC39 will establish its own substructure and discuss and possibly propose improvements to its title and Terms of Reference at its first meeting. Based on discussions at the JTC1 Plenary, it is anticipated that ISO/IEC JTC1/SC39 will initially establish a group as follows:

A Working Group on Energy Efficient Data Centres (contingent upon approval of an NP). The draft Terms of Reference is:

a) development of a data center energy efficiency taxonomy and vocabulary
b) development of a holistic suite of metrics supporting universally accepted standardized Key Performance indicators
c) development of best practices for energy efficient data centers
d) development of an energy management system standard specifically tailored for data centers

Between now and the 2012 JTC1 Plenary meeting, ISO/IEC JTC1/SC39 should survey ongoing and new activities in JTC1, identify overlaps with respect to their scope and make recommendations to the 2012 Plenary on how such overlaps should be addressed.

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. 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. Lescribaa		
Involvement of Luxembourg	**1 delegate**		
Organizations in liaison	ANEC, EPC, ERTICO ITS, EuroCommerce, GlobalPlatform, Mastercard Europe, UIC, VISA EU		
Web site	http://www.cen.eu/cen/Sectors/TechnicalCommitteesWorkshops/CENTechnicalCommittees/Pages/default.aspx?param=6205&title=CEN/TC%20224		
Scope	The development of inter-industry standards for: - Cards and related interfaces - Personal identification including authentication, confidentiality - Electronic signature - Card life management		
Structure	CEN/TC 224/WG5 / CEN/TC 224/WG6 User Interface CEN/TC 224/WG9 Telecommunication applications CEN/TC 224/WG11 Transport applications CEN/TC 224/WG15 European citizen card CEN/TC 224/WG16 Application Interface for smart cards used as Secure Signature Creation Devices CEN/TC 224/WG17 Protection Profiles in the context of SSCD CEN/TC 224/WG18 Interoperability of biometric recorded data		
Standardization work			
Published standards	39		
Standards under development	26		
Comments			
As a matter of principle, CEN/TC 224 does not duplicate the work of ISO/IEC JTC1/SC17, 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	**MEMBERS** 	33 members of CEN/CENELEC
Secretariat	NEN (Pays-Bas)		
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://www.cen.eu/cen/Sectors/TechnicalCommitteesWorkshops/CENTechnicalCommittees/Pages/default.aspx?param=6206&title=CEN/TC%20225		
Scope	Standardization of data carriers for automatic identification and data capture, of the data element architecture therefore, of the necessary test specifications and of technical features for the harmonization of cross-sector applications. Establishment of an appropriate system of registration authorities, and of means to ensure the necessary maintenance of standards.		
Structure	CEN/TC 225/WG1 Optical Readable Media CEN/TC 225/WG3 Security and data structure CEN/TC 225/WG4 Automatic ID applications CEN/TC 225/WG5 RFID, RTLS and on board sensors CEN/TC 225/WG6 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 JTC1/SC31 (Automatic Identification and Data Capture (AIDC) techniques) and ISO/IEC JTC1/SC27 (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 JTC1/SC31
- 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	**MEMBERS** 	33 members of CEN/CENELEC
Secretariat	SNV (Suisse)		
Secretary	Dipl.-Ing. M. Schumacher		
Chairperson	Mr. R. Ullmann		
Involvement of Luxembourg	**NO (no registered delegate)**		
Organizations in liaison	NORMAPME		
Web site	http://www.cen.eu/cen/Sectors/TechnicalCommitteesWorkshops/CENTechnicalCommittees/Pages/default.aspx?param=6228&title=CEN/TC247		
Scope	Standardisation of building automation, controls and building management systems and services 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. The primary integration measures include application interfaces, systems, and services to ensure an efficient technical building management in cooperation with commercial and infrastructural building management. Excluded from this scope are areas of building automation which are under the responsibility of other CEN/CENELEC TCs.		
Structure	CEN/TC 247/WG3 CEN/TC 247/WG4 CEN/TC 247/WG6	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	24		
Standards under development	10		
Comments			

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 (BAC) and Building Management (BM) including Building Communication Networks (BCN).

At the international level, the standard series EN ISO 16484 is carried out by CEN/TC 247 and ISO/TC 205 Building environment design and ISO/TC205/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 is taken by CEN.

For standardizing in the field of Home Automation, CEN/TC247 has an efficient liaison with CENELEC/TC205 "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 BAC and HBE will be prepared by the Joint Working Group "General Technical Requirements" of CEN/TC247 and CENELEC /TC 205.

The CEN/TC 247 standardization activities, reflecting the requirements and test set ups especially for energy efficient products and systems, support 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 will be made 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. Therefore, CEN/TC 247 participates in BT (Technical Board)/WG173 "Energy Performance of Buildings Project Group".

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 (Pays-Bas)		
Secretary	Mrs. S. Golyardi		
Chairperson	Mr. R. Stegwee		
Involvement of Luxembourg	**NO (no registered delegate)**		
Organizations in liaison	ATS, COCIR, EFMI, EFPIA, GS1, IMIA, WHO		
Web site	http://www.cen.eu/cen/Sectors/TechnicalCommitteesWorkshops/CENTechnicalCommittees/Pages/default.aspx?param=6232&title=CEN/TC251		
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/WG1 Information models CEN/TC 251/WG2 Terminology and knowledge representation CEN/TC 251/WG4 Technology for interoperability		
Standardization work			
Published standards	76		
Standards under development	35		
Comments			

CEN/TC 251 will seek to remain engaged with other standards development organizations, *consortia,* and *fora* 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.

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.

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.

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 (Pays-Bas)		
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://www.cen.eu/cen/Sectors/TechnicalCommitteesWorkshops/CENTechnicalCommittees/Pages/default.aspx?param=6259&title=Road%20transport%20and%20traffic%20telematics		
Scope	Standardization in the field of telematics to be applied to road traffic and transport, including those elements that need technical harmonization for intermodal operation in the case of other means of transport. It shall support, among others: - vehicle, container, swap body and goods wagon identification; - communication between vehicles and road infrastructure; - communication between vehicles; - vehicle man machine interfacing as far as telematics is concerned; - traffic and parking management; - user fee collection; - public transport management; - user information.		
Structure	CEN/TC 278/WG1 Electronic fee collection and access control (EFC) CEN/TC 278/WG2 Freight, Logistics and Commercial Vehicle Operations CEN/TC 278/WG3 Public transport (PT) CEN/TC 278/WG8 Road traffic data (RTD) CEN/TC 278/WG9 Dedicated Short Range Communication (DSRC) CEN/TC 278/WG10 Man-machine interfaces (MMI) CEN/TC 278/WG12 Automatic Vehicle Identification and Automatic Equipment Identification (AVI/AEI) CEN/TC 278/WG13 Architecture and terminology CEN/TC 278/WG14 After theft systems for the recovery of stolen vehicles CEN/TC 278/WG15 eSafety CEN/TC 278/WG16 Co-operative systems		
Standardization work			
Published standards	116		
Standards under development	48		

Comments
The original program of work of CEN/TC 278 was based on the recommendations from the CEN/CENELEC/ETSI expert team on Road Transport Informatics (RTI). This group, referred to as Transport Expert Team (TET), reported in 1992. Since then, obviously the markets and technology involved have undergone a rapid evolution, although perhaps not quite as rapid as might have been thought. In 1998, mandate M/270 was issued with the general aim of reviewing the Road transport and traffic telematics (RTTT) standardization program. In response to the recommendations from the M/270 report, the ICT standards board (ICTSB) set up a strategy group, the ITS SG (Intelligent Transport Systems Study Group), to define an overall strategy for European RTTT standardization, with complementary programs for ETSI, CEN, and CENELEC. The current mandate M/338, albeit restricted to supporting the European Electronic Tolling System (EETS), is a major driver for the work of the TC. CEN/TC 278 will ensure coordination with relevant activities in ISO, CEN, CENELEC, ETSI, and JTC 1. Many work items are already carried out in parallel with ISO/TC 22 and ISO/TC 204 under the Vienna Agreement. ISO/TC 278 has also established efficient liaisons with *consortia* and *fora*, while at the same time ensuring that the actual standardization process remains open and transparent.

7.2.6.CEN/TC 287

General information			
Committee	**CEN/TC 287**	**Title**	**Geographic Information**
Creation date	1991	**MEMBERS** 	33 members of CEN/CENELEC
Secretariat	BSI (Royaume-Uni)		
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://www.cen.eu/cen/Sectors/TechnicalCommitteesWorkshops/CENTechnicalCommittees/Pages/default.aspx?param=6268&title=Geographic%20Information		
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/WG5 Spatial Data Infrastructure		
Standardization work			
Published standards	48		
Standards under development	13		
Comments			
The main objective is to facilitate the development and usage of geographical information in Europe by: - 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

<table>
<tr><th colspan="4">General information</th></tr>
<tr><td>Committee</td><td>CEN/TC 294</td><td>Title</td><td>Communication systems for meters and remote reading of meters</td></tr>
<tr><td>Creation date</td><td>1991</td><td rowspan="6">MEMBERS
  </td><td rowspan="6">33 members of CEN/CENELEC</td></tr>
<tr><td>Secretariat</td><td>DIN (Allemagne)</td></tr>
<tr><td>Secretary</td><td>Mr. B. Hein</td></tr>
<tr><td>Chairperson</td><td>Mr. O. Pfaff</td></tr>
<tr><td>Involvement of Luxembourg</td><td>NO (no registered delegate)</td></tr>
<tr><td>Organizations in liaison</td><td>AQUA, DLMS User Association, E.V.V.E., ECOS, ETSI, EUREAU, European Smart Metering Industry Group, FARECOGAZ, KNX Association, ZigBee Alliance</td></tr>
<tr><td>Web site</td><td colspan="3">http://www.cen.eu/cen/Sectors/TechnicalCommitteesWorkshops/CENTechnicalCommittees/Pages/default.aspx?param=6275&title=Communication%20systems%20for%20meters%20and%20remote%20reading%20of%20meters</td></tr>
<tr><td>Scope</td><td colspan="3">Standardization of communication interfaces for systems with meters and remote reading of meters for all kind of fluids and energies distributed by network. Secure communication covering data privacy as an inherent property, providing a scalable mechanism for security services, data integrity, authentication and confidentiality. Cooperation with CENELEC and ETSI for consistent interface definitions as essential condition for achieving interoperability between entities in systems.</td></tr>
<tr><td>Structure</td><td colspan="3">CEN/TC 294/WG2 Application layer for communication systems for and remote reading of all meters within the scope
CEN/TC 294/WG4 Data exchange for meters on bus-systems and interface
CEN/TC 294/WG5 Radio meter data exchange</td></tr>
<tr><th colspan="4">Standardization work</th></tr>
<tr><td>Published standards</td><td colspan="3">7</td></tr>
<tr><td>Standards under development</td><td colspan="3">4</td></tr>
<tr><th colspan="4">Comments</th></tr>
<tr><td colspan="4">CEN/TC 294 had EN 13757 Parts 1 to 6 approved in the period from 2002 to 2008.
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. CEN/TC 294 is currently working on the revision of
- EN 13757-1, Communication system for and remote reading of meters - Part 1: Data exchange
- EN 13757-3, Communication systems for and remote reading of meters - Part 3: Dedicated application layer
- EN 13757-4, Communication systems for meters and remote reading of meters - Wireless meter (Radio meter reading for operation in SRD bands)
- EN 13757-5, Communication systems for meters and remote reading of meters - Part 5: Wireless relaying</td></tr>
</table>

7.2.8.CEN/TC 304

General information			
Committee	**CEN/TC 304**	**Title**	**Information and Communication Technologies - European Localization Requirements**
Creation date	1992	**MEMBERS** 	33 members of CEN/CENELEC
Secretariat	DIN (Allemagne)		
Secretary	Mr. R. Grahle		
Chairperson	Mr. M. Küster		
Involvement of Luxembourg	**NO (no registered delegate)**		
Organizations in liaison			
Web site	http://www.cen.eu/cen/Sectors/TechnicalCommitteesWorkshops/CENTechnicalCommittees/Pages/default.aspx?param=6285&title=Information%20and%20communications%20technologies%20-%20European%20localization%20requirements		
Scope	Standardization in the field of Information and Communications Technologies, to ensure that European localization requirements can be satisfied. Localization in this context means the provision of software and hardware support adapted to local linguistic and cultural needs in Europe.		
Structure	/		
Standardization work			
Published standards	8		
Standards under development	/		
Comments			
This TC is still under construction.			

7.2.9.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 (Royaume-Uni)		
Secretary	Dr. M. J. Leggett		
Chairperson	Mr. H. G. Mason		
Involvement of Luxembourg	**1 delegate**		
Organizations in liaison	/		
Web site	http://www.cen.eu/cen/Sectors/TechnicalCommitteesWorkshops/CENTechnicalCommittees/Pages/default.aspx?param=6291&title=Advanced%20automation%20technologies%20and%20their%20applications		
Scope	Standardization activities in the field of Advanced Manufacturing Technologies to ensure the availability of the standards required by industry, for the integration of elements of AMT systems. Standards are required in areas such as Enterprise modelling and system architecture, Communication, Data, Information processing, Control equipment, Human aspects, Mechanical aspects and System operational aspects.		
Structure	CEN/TC 310/WG1 Systems architecture		
Standardization work			
Published standards	10		
Standards under development	1		
Comments			

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.

The specific objectives of ISO/TC 310 are to:

- 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.

7.2.10. 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 (Italie)		
Secretary	Mr. M. Actis Dato		
Chairperson	Mr. C. Stracke		
Involvement of Luxembourg	**1 delegate**		
Organizations in liaison	NORMAPME		
Web site	http://www.cen.eu/cen/Sectors/TechnicalCommitteesWorkshops/CENTechnicalCommittees/Pages/default.aspx?param=580446&title=Information%20and%20Communication%20Technologies%20for%20Learning,%20Education%20and%20Training		
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: - 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 Interoperability CEN/TC 353/WG 2 Business Planning, Communications & Prospectives (BPCP)		
Standardization work			
Published standards	4		
Standards under development	4		
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:

- 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.
- Vocabularies and frameworks: Development of European learning, education and training vocabularies and frameworks around which software vendors, tool producers and content authors may work in order to provide a greater level of interoperability and application of tools.

Moreover, a link can be established between the scope of this TC and the one of ISO/IEC JTC1/SC36.

7.2.11. CEN/TC Project Committee 365

<table>
<tr><th colspan="4">General information</th></tr>
<tr><td>Committee</td><td>CEN/TC Project Committee 365</td><td>Title</td><td>Internet Filtering</td></tr>
<tr><td>Creation date</td><td>2007</td><td rowspan="6">MEMBERS
  </td><td rowspan="6">33 members of CEN/CENELEC</td></tr>
<tr><td>Secretariat</td><td>AENOR (Spain)</td></tr>
<tr><td>Secretary</td><td>Ms. P. Garcia Lopez</td></tr>
<tr><td>Chairperson</td><td>/</td></tr>
<tr><td>Involvement of Luxembourg</td><td>NO (no registered delegate)</td></tr>
<tr><td>Organizations in liaison</td><td>-</td></tr>
<tr><td>Web site</td><td colspan="3">http://www.cen.eu/cen/Sectors/TechnicalCommitteesWorkshops/CENTechnicalCommittees/Pages/default.aspx?param=625771&title=Project%20Committee%20-%20Internet%20Filtering</td></tr>
<tr><td>Scope</td><td colspan="3">This Project Committee is currently developing standards on Internet Content and Communications Filtering Software and Services.</td></tr>
<tr><td>Structure</td><td colspan="3">/</td></tr>
<tr><th colspan="4">Standardization work</th></tr>
<tr><td>Published standards</td><td colspan="3">0</td></tr>
<tr><td>Standards under development</td><td colspan="3">1</td></tr>
<tr><th colspan="4">Comments</th></tr>
<tr><td colspan="4">This TC is still under construction. The only standard under development is:
- prCEN/TS 16080, Internet Content and communications filtering software and services.</td></tr>
</table>

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, ISO/TC 46 has also been selected as part of the ICT standards watch and is surveyed in this section.

<table>
<tr><th colspan="4">General information</th></tr>
<tr><td>Committee</td><td>ISO/TC 46</td><td>Title</td><td>Information and documentation</td></tr>
<tr><td>Creation date</td><td>1947</td><td rowspan="6">MEMBERS
  </td><td rowspan="6">Participating Countries (35):
France, Armenia, Australia, Austria, Bulgaria, Canada, China, Czech Republic, Denmark, Egypt, Estonia, Finland, Germany, Islamic Republic of Iran, Ireland, Italy, Japan, Kenya, Democratic People's Republic Korea, Republic of Korea, Morocco, Netherlands, Norway, Portugal, Russian Federation, South Africa, Spain, Sri Lanka, Sweden, Switzerland, Thailand, The former Yugoslav Republic of Macedonia, USA, Ukraine, United Kingdom

Observing Countries (37):
Argentina, Belarus, Belgium, Bosnia and Herzegovina, Colombia, Croatia, Cuba, Ecuador, Ethiopia, Greece, Hong Kong, Hungary, Iceland, India, Indonesia, Israel, Jamaica, Kazakhstan, Lithuania, Luxembourg, Malaysia, Republic of Moldova, Mongolia, New Zealand, Pakistan, Poland, Romania, Saudi Arabia, Serbia, Singapore, Slovakia, Slovenia, Sudan, Syrian Arab Republic, United Republic of Tanzania, Tunisia, Turkey</td></tr>
<tr><td>Secretariat</td><td>AFNOR (France)</td></tr>
<tr><td>Secretary</td><td>Mrs. Sabine Donnard Cusse</td></tr>
<tr><td>Chairperson</td><td>Mrs. Françoise Pellé</td></tr>
<tr><td>Involvement of Luxembourg</td><td>7 delegates</td></tr>
<tr><td>Organizations in liaison</td><td>CIDOC, CISAC, DOI, EC, IAEA, ICA, IFLA, IIF, ISAN, ISOC, ISSN International Center, ITU, UN, UNCTAD, UNECE, UNESCO, UPU, WIPO</td></tr>
<tr><td>Web site</td><td colspan="3">http://www.iso.org/iso/home/standards_development/list_of_iso_technical_committees/iso_technical_committee.htm?commid=48750</td></tr>
<tr><td>Scope</td><td colspan="3">Standardization of practices relating to libraries, documentation and information centers, publishing, archives, records management, museum documentation, indexing and abstracting services, and information science.</td></tr>
<tr><td>Structure</td><td colspan="3">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 6 Storage for archive materials
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 11 Archives/records management</td></tr>
<tr><th colspan="4">Standardization work</th></tr>
<tr><td>Published standards</td><td colspan="3">Total number of published ISO standards related to the TC and its SCs (number includes updates): 113

Number of published ISO standards under the direct responsibility of TC 46 (number includes updates): 42</td></tr>
</table>

Standards under development	16

Comments
Examples of standards developed by ISO/TC 46 are: - ISO 5127:2001, Information and documentation – Vocabulary - ISO 15489-1:2001, Information and documentation -- Records management -- Part 1: General - ISO/TR 15489-2:2001, Information and documentation -- Records management -- Part 2: Guidelines - ISO 30301:2011, Information and documentation -- Management systems for records – Requirements

7.4. 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 800 ETSI member organizations drawn from 64 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. Two other ID-Cards are provided for the technical committees "TC CLOUD" and "TC ESI" because both are relevant and related to the following (respective) subsectors: "cloud computing" and "electronic signature".

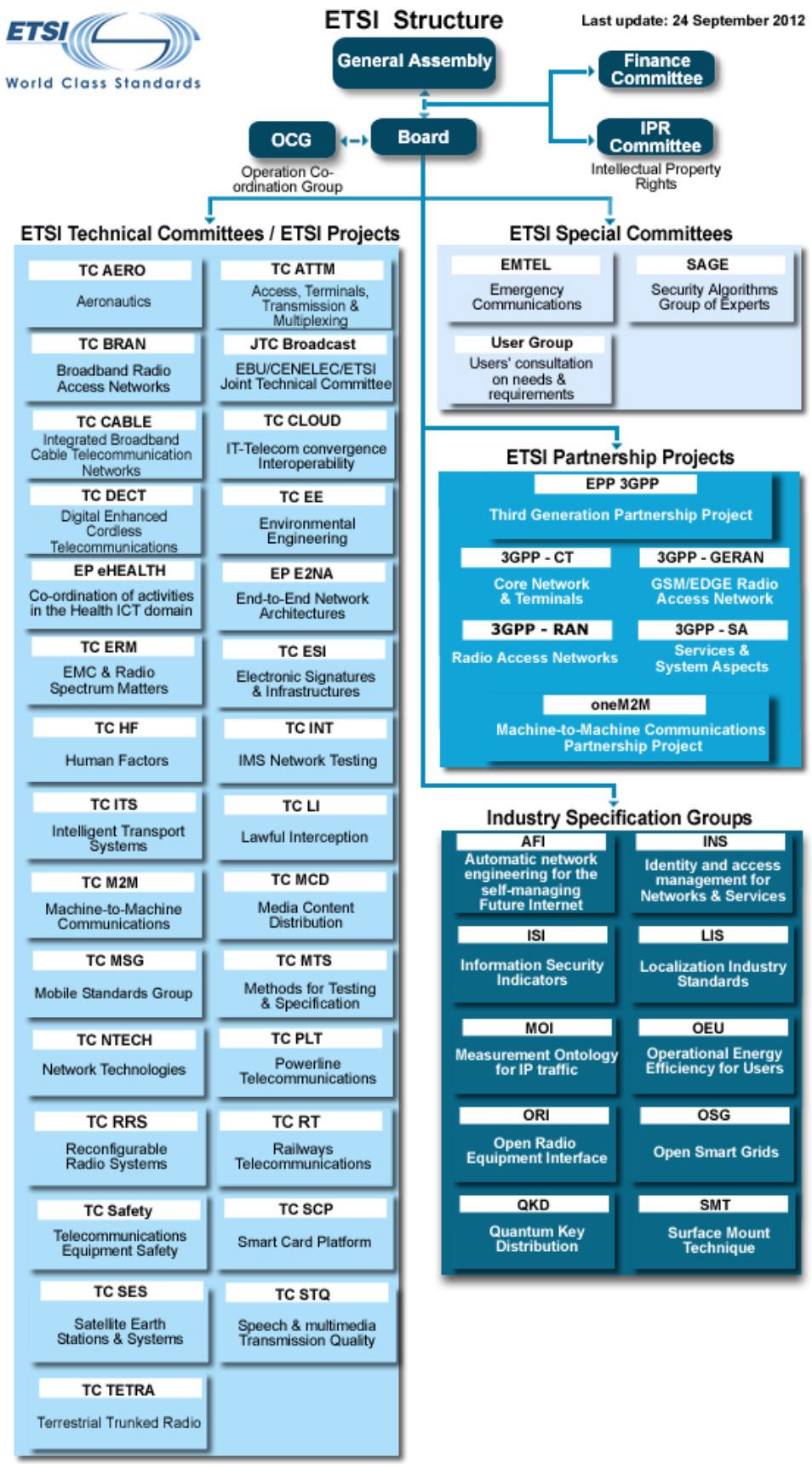
7.4.1.ETSI – European Telecommunications Standards Institute

<table>
<tr><th colspan="4">General information</th></tr>
<tr><td>Standard body</td><td>ETSI</td><td>Title</td><td>European Telecommunications Standards Institute</td></tr>
<tr><td>Creation date</td><td>1988</td><td rowspan="3">MEMBERS
  </td><td rowspan="3">More than 800 ETSI member organizations drawn from 64 countries across 5 continents worldwide</td></tr>
<tr><td>Chairperson</td><td>Luis Jorge Romero Saro</td></tr>
<tr><td>Involvement of Luxembourg</td><td>5 members (Ministère des communications, ILNAS, FBConsulting, eWitness, P&T)</td></tr>
<tr><td>Web site</td><td colspan="3">http://www.etsi.org/website/homepage.aspx</td></tr>
<tr><td>Scope</td><td colspan="3">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.</td></tr>
<tr><td>Executive summary</td><td colspan="3">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.

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.

The following ETSI standards are used in Luxembourg by ILNAS to supervise/accredit Certification Service Providers:
- 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"</td></tr>
</table>

Structure


ETSI
World Class Standards
ETSI Structure
Last update: 24 September 2012
General Assembly
Finance Committee
IPR Committee
Intellectual Property Rights
OCG
Operation Co-ordination Group
Board
ETSI Technical Committees / ETSI Projects
TC AERO
Aeronautics
TC ATTM
Access, Terminals, Transmission & Multiplexing
TC BRAN
Broadband Radio Access Networks
JTC Broadcast
EBU/CENELEC/ETSI Joint Technical Committee
TC CABLE
Integrated Broadband Cable Telecommunication Networks
TC CLOUD
IT-Telecom convergence Interoperability
TC DECT
Digital Enhanced Cordless Telecommunications
TC EE
Environmental Engineering
EP eHEALTH
Co-ordination of activities in the Health ICT domain
EP E2NA
End-to-End Network Architectures
TC ERM
EMC & Radio Spectrum Matters
TC ESI
Electronic Signatures & Infrastructures
TC HF
Human Factors
TC INT
IMS Network Testing
TC ITS
Intelligent Transport Systems
TC LI
Lawful Interception
TC M2M
Machine-to-Machine Communications
TC MCD
Media Content Distribution
TC MSG
Mobile Standards Group
TC MTS
Methods for Testing & Specification
TC NTECH
Network Technologies
TC PLT
Powerline Telecommunications
TC RRS
Reconfigurable Radio Systems
TC RT
Railways Telecommunications
TC Safety
Telecommunications Equipment Safety
TC SCP
Smart Card Platform
TC SES
Satellite Earth Stations & Systems
TC STQ
Speech & multimedia Transmission Quality
TC TETRA
Terrestrial Trunked Radio
ETSI Special Committees
EMTEL
Emergency Communications
SAGE
Security Algorithms Group of Experts
User Group
Users' consultation on needs & requirements
ETSI Partnership Projects
EPP 3GPP
Third Generation Partnership Project
3GPP - CT
Core Network & Terminals
3GPP - GERAN
GSM/EDGE Radio Access Network
3GPP - RAN
Radio Access Networks
3GPP - SA
Services & System Aspects
oneM2M
Machine-to-Machine Communications Partnership Project
Industry Specification Groups
AFI
Automatic network engineering for the self-managing Future Internet
INS
Identity and access management for Networks & Services
ISI
Information Security Indicators
LIS
Localization Industry Standards
MOI
Measurement Ontology for IP traffic
OEU
Operational Energy Efficiency for Users
ORI
Open Radio Equipment Interface
OSG
Open Smart Grids
QKD
Quantum Key Distribution
SMT
Surface Mount Technique

Standardization work	
Published standards	Over 23000 standards and reports
Standards under development	/

7.4.2.ETSI/TC CLOUD

General information			
Committee	**TC CLOUD**	**Title**	**Technical Committee (TC) on Cloud Computing**
Creation date	/	**MEMBERS** 	/
Chairperson	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	TC CLOUD will address interoperability aspects of end-to-end applications and develop formal test specifications to support them. The technical scope of TC CLOUD is broad. It includes: - resource and service access - protocols and middleware - security		
Executive summary	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. 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. 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 telecommunications 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.		
Structure	/		
Standardization work			
Published standards	14		
Standards under development	3		

7.4.3.ETSI/TC ESI

General information			
Committee	**TC ESI**	**Title**	**Technical Committee (TC) on Electronic Signatures and Infrastructures**
Creation date	/	**MEMBERS** 	/
Chairperson	Riccardo Genghini		
Involvement of Luxembourg	/		
Organizations in liaison	CAB Forum, ENISA, ISO, ISOC/IETF, OASIS, 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 1) 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 2) Liaising with other ETSI bodies in relation to electronic signatures and related trust infrastructures 3) Liaising with bodies external to ETSI in relation to electronic signatures and related trust infrastructures 4) Establishing a continuing work plan in relation to electronic signatures and related trust infrastructures		
Executive summary	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. 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. The ETSI strategy is in line with, and endorsed by the initiative of the EU Commission to establish a harmonized infrastructure for electronic signatures.		
Structure	/		
Standardization work			
Published standards	115		
Standards under development	66		

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 ISO[42]. 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 11.3) 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 JTC1. The work quality of these organizations is recognized by ISO/IEC JTC1, and they are approved to submit PAS as drafts for review and approval as International ISO/IEC JTC1 standards[43]. Moreover, we have also included ITU-T in this chapter. Although it is not recognized as a *forum* or *consortium*, but as an "intergovernmental public-private partnership organization", an ID-Card for the whole organization, aligned with what has been done for the *fora/consortia*, has been developed.

[42] http://www.cen.eu/cen/Sectors/Sectors/ISSS/Consortia/Pages/default.aspx
[43] The force multiplier for ICT innovation, ISO/IEC joint technical committee 1 – JTC 1, Information technology standards, 2011.

8.1. ITU-T — International Telecommunication Union - Telecommunication Standardization

General information			
Forum / Consortium	**ITU-T**	**Title**	**ITU Telecommunication Standardization**
Creation date	1865	**MEMBERS** 	193 national members
Chairperson	Malcolm Johnson		
Involvement of Luxembourg	**3 members (Service des médias et des Communications, ILR, P&T)**		
Web site	http://www.itu.int/ITU-T/index.hltm		
Scope	Telecommunication Standardization		
Executive summary	ITU's role as creator of the world's most universally-recognized infocommunications standards dates back as far as the organization itself. Since its inception in 1865, the Union has been brokering industry consensus on the technologies and services that form the backbone of the world's largest, most interconnected man-made system. In 2007 alone, ITU's Telecommunication Standardization Sector (ITU-T) produced over 160 new and revised standards (ITU-T Recommendations), covering everything from core network functionality and broadband to next-generation services like IPTV. ITU-T Recommendations are defining elements in Information and Communication Technologies (ICTs) infrastructure. Whether we exchange voice, data or video messages, communications cannot take place without standards linking the sender and the receiver. Today's work extends well beyond the traditional areas of telephony to encompass a far wider range of information and communications technologies. Today, priority work areas include ensuring the needs of developing countries are taken into account in the development of global ICTs; accessibility; adopting International standards to ensure seamless global communications and interoperability for next generation networks (NGN); building confidence and security in the use of ICTs; emergency communications to develop early warning systems and to provide access to communications during and after disasters and the reduction of the impact of ICTs on climate change as well as create better understanding of how ICTs can mitigate its effects.		
Structure	**Study Groups** SG2: Operational aspects of service provision and telecommunications management SG3: Tariff and accounting principles including related telecommunication economic and policy issues SG5: Environment and climate change SG9: Television and sound transmission and integrated broadband cable networks SG11: Signalling requirements, protocols and test specifications SG12: Performance, QoS and QoE SG13: Future networks including mobile and NGN SG15: Optical transport networks and access network infrastructures SG16: Multimedia coding, systems and applications SG17: Security TSAG: Telecommunication Standardization Advisory Group **Focus Groups** Focus Group on Audiovisual Media Accessibility (FG AVA) Focus Group on Driver Distraction (FG Distraction) Focus Group on Car Communication (FG CarCOM) Focus Group on Disaster Relief Systems, Network Resilience and Recovery (FG-DR&NRR) Focus Group on M2M Service Layer (FG M2M)		

	Joint Coordination Activities 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) Joint Coordination Activity on Child Online Protection (JCA-COP) Joint Coordination Activity on Smart Grid and Home Networking (JCA-SG&HN) Joint Coordination Activity for Cloud Computing (JCA-Cloud) **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 3000 ITU-T Recommendations
Standards under development	/

8.2. IETF — Internet Engineering Task Force

General information			
Forum / Consortium	**IETF**	**Title**	**Internet Engineering Task Force**
Creation date	1986	**MEMBERS** 	No membership
Chairperson	Russ Housley		
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	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. 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. 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.		
Structure	**Areas :** Applications Area (app) General Area (gen) Internet Area (int) Operations and Management Area (ops) Real-time Applications and Infrastructure Area (rai) Routing Area (rtg) Security Area (sec) Transport Area (tsv)		
Standardization work			
Published standards	Approximately 6500 RFC		
Standards under development	/		

8.3. W3C — World Wide Web Consortium

<table>
<tr><th colspan="4">General information</th></tr>
<tr><td>Forum / Consortium</td><td>W3C</td><td>Title</td><td>World Wide Web Consortium</td></tr>
<tr><td>Creation date</td><td>1994</td><td rowspan="3">MEMBERS
  </td><td rowspan="3">336 members</td></tr>
<tr><td>Director</td><td>Tim Berners-Lee</td></tr>
<tr><td>Involvement of Luxembourg</td><td>/</td></tr>
<tr><td>Web site</td><td colspan="3">http://www.w3.org/</td></tr>
<tr><td>Scope</td><td colspan="3">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</td></tr>
<tr><td>Executive summary</td><td colspan="3">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.</td></tr>
<tr><td>Structure</td><td colspan="3"><u>Working Groups:</u>
Audio Working Group
Authoring Tool Accessibility Guidelines Working Group
Browser Testing and Tools Working Group
Cascading Style Sheets (CSS) Working Group
Device APIs Working Group
Education and Outreach Working Group
Efficient XML Interchange Working Group
Evaluation and Repair Tools Working Group
Forms Working Group
Geolocation Working Group
Government Linked Data Working Group
HTML Working Group
Independent User Interface (Indie UI) Working Group
Internationalization Working Group
Linked Data Platform (LDP) Working Group
Math Working Group
Media Annotations Working Group
Media Fragments Working Group
Model-Based User Interfaces Working Group
MultilingualWeb-LT Working Group
Multimodal Interaction Working Group
Near Field Communications Working Group
OWL Working Group
Protocols and Formats Working Group
RDF Working Group
RDFa Working Group
Research and Development Working Group
Rule Interchange Format Working Group
SOAP-JMS Binding Working Group
SPARQL Working Group
SVG Working Group
System Applications Working GroupTimed Text Working Group</td></tr>
</table>

	Tracking Protection Working Group User Agent Accessibility Guidelines Working Group Voice Browser Working Group Web Application Security Working Group Web Applications Working Group Web Content Accessibility Guidelines Working Group Web Cryptography Working Group Web Events Working Group Web Notification Working Group Web Performance Working Group Web Real-Time Communications Working Group Web Services Policy Working Group Web Services Resource Access Working Group WebFonts Working Group XML Core Working Group XML Print and Page Layout Working Group XML Processing Model Working Group XML Query Working Group XML Schema Working Group XML Security Working Group XSLT Working Group **Interest Groups :** HTML5 Chinese Interest Group HTML5 Japanese Interest Group HTML5 Korean Interest Group Internationalization (I18n) Interest Group Internationalization Tag Set (ITS) Interest Group Mobile Web For Social Development (MW4D) Interest Group Patents and Standards Interest Group Privacy Interest Group Semantic Web Health Care and Life Sciences Interest Group Semantic Web Interest Group WAI Interest Group Web Security Interest Group Web Testing Interest Group Web and TV Interest Group eGovernment Interest Group **Coordination Groups :** Hypertext Coordination Group Semantic Web Coordination Group WAI Coordination Group Web Services Coordination Group XML Coordination Group **Permanent Groups :** Technical Architecture Group (TAG) Advisory Board (AB)
Standardization work	
Published standards	/
Standards under development	/

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

<table>
<tr><th colspan="4">General information</th></tr>
<tr><td>Forum / Consortium</td><td>IEEE-SA</td><td>Title</td><td>Institute of Electrical and Electronics Engineers Standards Association</td></tr>
<tr><td>Creation date</td><td>1963</td><td rowspan="3">MEMBERS
  </td><td rowspan="3">Over 400 000 members (individuals)</td></tr>
<tr><td>President</td><td>Steve Mills</td></tr>
<tr><td>Involvement of Luxembourg</td><td>/</td></tr>
<tr><td>Web site</td><td colspan="3">http://standards.ieee.org/</td></tr>
<tr><td>Scope</td><td colspan="3">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.</td></tr>
<tr><td>Executive summary</td><td colspan="3">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.
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..</td></tr>
<tr><td>Structure</td><td colspan="3"><u>Topics:</u>
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</td></tr>
</table>

Standardization work	
Published standards	2718
Standards under development	595

8.5. DMTF — Distributed Management Task Force

General information			
Forum / Consortium	**DMTF**	**Title**	**Distributed Management Task Force**
Creation date	1992	**MEMBERS** 	More than 3500 participants
Chairperson	Mike Baskey		
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	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. DMTF standards encompass the Common Information Model (CIM) and the Open Virtualization Format (OVF).		
Structure	Common Diagnostic Model (CDM) Desktop and Mobile Architecture for System Hardware (DASH) Systems Management Architecture for Server Hardware (SMASH) Storage Management Initiative (SMI-S) Virtualization Management (VMAN) Cloud Management (CLOUD) Common Information Model (CIM) Configuration Management Database Federation (CMDBf) Platform Management Components Intercommunication (PMCI) System Management BIOS (SMBIOS) Web-Based Enterprise Management (WBEM) Web Services Management (WS-MAN) Alert Standard Format (ASF) Desktop Management Interface (DMI)		
Standardization work			
Published standards	/		
Standards under development	17		

8.6. Ecma International (previously called ECMA)

General information			
Forum / Consortium	**Ecma International**	**Title**	**Ecma International**
Creation date	1961	**MEMBERS** 	71 member organizations
Chairperson	Ms Josée Auber		
Involvement of Luxembourg	/		
Web site	http://www.ecma-international.org/		
Scope	Standardization of Information and Communication Technology (ICT) and Consumer Electronics (CE)		
Executive summary	The aims of Ecma are: - 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. 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 JTC1.		
Structure	TC12 Safety TC20 (EMC and EMF) TC26 Acoustics TC31 Information Storage TC32 Business Communications TC38 Product-related environmental attributes TC39 ECMAScript TC43 Universal 3D (U3D) TC45 Office Open XML Formats TC46 Open XML Paper Specification (OpenXPS) TC47 Near Field Communications TC48 High Rate Wireless Communications TC49 Programming Languages TC50 Close Proximity Electric Induction Data Transfer		
Standardization work			
Published standards	About 500		
Standards under development	/		

8.7. OASIS — Organization for the Advancement of Structured Information Standards

<table>
<tr><th colspan="4">General information</th></tr>
<tr><td>Forum / Consortium</td><td>OASIS</td><td>Title</td><td>Organization for the Advancement of Structured Information Standards</td></tr>
<tr><td>Creation date</td><td>1993</td><td rowspan="3">MEMBERS
  </td><td rowspan="3">More than 5000 participants representing over 600 organizations and individual members in 100 countries</td></tr>
<tr><td>Chairperson</td><td>/</td></tr>
<tr><td>Involvement of Luxembourg</td><td>/</td></tr>
<tr><td>Web site</td><td colspan="3">http://www.oasis-open.org/</td></tr>
<tr><td>Scope</td><td colspan="3">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.</td></tr>
<tr><td>Executive summary</td><td colspan="3">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.
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.
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.</td></tr>
<tr><td>Structure</td><td colspan="3"><u>OASIS Committee Categories:</u>
Cloud
Conformance
Content Technologies
e-Commerce
Emergency Management
Government/Legal
Healthcare
Localization
Privacy/Identity
Security
Smart Grid
SOA
Standards Adoption
Supply Chain
Web Services</td></tr>
<tr><th colspan="4">Standardization work</th></tr>
<tr><td>Published standards</td><td colspan="3">93</td></tr>
<tr><td>Standards under development</td><td colspan="3">/</td></tr>
</table>

8.8. OMG — Object Management Group

General information			
Forum / Consortium	**OMG**	Title	**Object Management Group**
Creation date	1989	MEMBERS 	316 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	Domain Technology Committee 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 Manufacturing Technology and Industrial Systems DTF Robotics DTF Space DTF Mathematical Formalism SIG Regulatory Compliance DSIG Super Distributed Objects DSIG Systems Engineering DSIG Platform Technology Committee 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 Telecommunications PSIG		

Standardization work	
Published standards	/
Standards under development	/

8.9. OGF — Open Grid Forum

<table>
<tr><th colspan="4">General information</th></tr>
<tr><td>Forum / Consortium</td><td>OGF</td><td>Title</td><td>Open Grid Forum</td></tr>
<tr><td>Creation date</td><td>2006</td><td rowspan="3">MEMBERS
  </td><td rowspan="3">Over 400 organizations in more than 50 countries</td></tr>
<tr><td>Chairperson</td><td>Steven Newhouse</td></tr>
<tr><td>Involvement of Luxembourg</td><td>/</td></tr>
<tr><td>Web site</td><td colspan="3">http://www.ogf.org/</td></tr>
<tr><td>Scope</td><td colspan="3">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.

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.

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.</td></tr>
<tr><td>Executive summary</td><td colspan="3">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.

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.</td></tr>
<tr><td>Structure</td><td colspan="3"><table>
<tr><td>Architecture</td><td>OGSA Naming Working Group (ogsa-naming-wg)
Open Grid Services Architecture WG (ogsa-wg)
Production Grid Infrastructure WG(pgi-wg)
Reference Model Working Group (rm-wg)</td></tr>
<tr><td>Compute</td><td>Grid Resource Allocation Agreement Protocol WG(graap-wg)
Grid Scheduling Architecture RG (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)</td></tr>
<tr><td>Data</td><td>Data Format Description Language WG(dfdl-wg)
Database Access and Integration Services WG(dais-wg)
Digital Repositories Research Group (dr-rg)
Grid File System Working Group (gfs-wg)
Grid Storage Management WG(gsm-wg)</td></tr>
</table></td></tr>
</table>

		GridFTP WG(gridftp-wg) Info Dissemination WG(infod-wg) OGSA ByteIO Working Group (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 Research Group (ISOD-RG) Network Mark-up Language Working Group (nml-wg) Network Measurement and Control WG(nmc-wg) Network Measurements Working Group (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 â¬ Working Group (ari-wg) Distributed Computing Infrastructure Federation Working Group (dcifed-wg) GLUE Working Group (glue) Usage Record WG(ur-wg)
	Security	Certificate Authority Operations WG(caops-wg)
Standardization work		
Published standards	49	
Standards under development	5	

8.10. TOG — The Open Group

<table>
<tr><th colspan="4">General information</th></tr>
<tr><td>Forum / Consortium</td><td>TOG</td><td>Title</td><td>The Open Group</td></tr>
<tr><td>Creation date</td><td>1996</td><td rowspan="3">MEMBERS
  </td><td rowspan="3">407 members</td></tr>
<tr><td>President</td><td>Allen Brown</td></tr>
<tr><td>Involvement of Luxembourg</td><td>1 member
(CRP Henri Tudor)</td></tr>
<tr><td>Web site</td><td colspan="3">http://www.opengroup.org/</td></tr>
<tr><td>Scope</td><td colspan="3">The Open Group works with customers and suppliers of IT products and services as well as with consortia 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.</td></tr>
<tr><td>Executive summary</td><td colspan="3">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:
- 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 consortia
- Operate the industry's premier certification service

The Open Group has especially developed standards on the following topics: Single UNIX Specification, LDAP, and CORBA implementations.</td></tr>
<tr><td>Structure</td><td colspan="3"><u>Topic:</u>

Enterprise Architecture
Enterprise Management
Managed Consortia
Platform
Security
Service-Oriented Architecture</td></tr>
<tr><th colspan="4">Standardization work</th></tr>
<tr><td>Published standards</td><td colspan="3">About 250</td></tr>
<tr><td>Standards under development</td><td colspan="3">/</td></tr>
</table>

8.11. 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	The SNIA connects the IT industry with end-to-end storage and information management solutions		
Executive summary	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. 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.		
Structure	SNIA is composed of the following Technical Work Groups (TWG): - Cloud Storage TWG - Common RAID Disk Data Format 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 - Multipath Management API TWG - NDMP Software TWG - NVM Programming TWG - Security TWG - SMI-S Core TWG - Solid State Storage TWG - Storage Media Library TWG - XAM Software Development Kit (SDK) TWG		
Standardization work			
Published standards	/		
Standards under development	/		

8.12. TCG — Trusted Computing Group

General information			
Forum / Consortium	**TCG**	**Title**	**Trusted Computing Group**
Creation date	2003	**MEMBERS** 	111 member organizations
President	Dr. Joerg Borchert		
Involvement of Luxembourg	/		
Web site	http://www.trustedcomputinggroup.org/		
Scope	Trusted Computing is a category of technology developed and promoted by the Trusted Computing Group. The term is taken from the field of trusted systems. Trusted Computing is the industry's answer to growing security problems in the enterprise and is based in a hardware root of trust. From this, enterprise systems, applications and networks can be made more secure. With Trusted Computing, the computer or system will consistently behave in specific ways, and those behaviors will be enforced by hardware and software when the owner of those systems enables these technologies. Trusted Computing technology will make computers safer, less prone to viruses and malware, and thus more reliable. In addition, Trusted Computing will allow computers systems to offer improved security and efficiency.		
Executive summary	The TCG publicizes the specifications and uses membership implementations as examples of the use of TCG Technology. The TCG is organized into a work group model whereby experts from each technology category can work together to develop specifications. This fosters a neutral environment wherein competitors and collaborators can develop industry best capabilities that are vendor neutral and interoperable.		
Structure	TCG is composed of the following Workgroups: - Infrastructure - Mobile Platform - PC Client - Server Specific - Storage - Trusted Multi-tenant Infrastructure - Trusted Network Connect - Trusted Platform Module - TCG Software Stack - Virtualized Platform		
Standardization work			
Published standards	/		
Standards under development	/		

8.13. UPnP Forum

General information			
Forum / Consortium	**UPnP Forum**	**Title**	**Universal Plug and Play Forum**
Creation date	1999	MEMBERS 	More than 986 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	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. 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.		
Structure	The following committees are actively working on new and updated UPnP standards: - Audio / Video Working Committee (AV) - E-Health & Sensors Working Committee (EHS) - Friendly Devices Working Committee (FRIENDLYDEVICES) - Home Energy Management and Smart Grid (HEMS) - Telephony Working Committee (PHONE)		
Standardization work			
Published standards	About 1200		
Standards under development	/		

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, 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. Section 9.1 to 9.3 present sectors already analyzed by ILNAS through the sector-based standards analysis, as defined by ILNAS in the national standardization strategy 2010-2020, or carefully studied by the Digital Trust department of ILNAS (archiving sector). Then, Section 9.4 is about other sectors not currently covered by the sector-based standards analysis. These sectors are potential sectors to be analyzed through the sector-based 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 information[44]. 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 April 12, 2012, a document entitled "Technical regulation requirements and measures for accrediting Digitization and/or Archiving Service Providers (PSDC)". This document aims at providing requirements and measures for companies wanting to be recognized as:

- PSDC (DC) – Digitization and archiving service provider.
- 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.

[44] 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

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 economy[45]. In this context, five subsectors have been defined in the frame of the standards watch of the energy sector in order to survey it:

- Energy management and energy efficiency
- Fuel
- Power engineering
- Renewable energies
- 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 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 ECalso wants to encourage greater regional cooperation and European integration, particularly through the European Network of Transmission System Operators for Electricity (ENTSO-E).

Thus, the revision of Directive 2006/32/EC on energy end-use efficiency and energy services will take into account these aspects and will set minimum requirements for the presentation and content of information to be furnished by customers, and on the access to information services and demand-side management.

[45] http://www.ilnas.public.lu/fr/publications/normalisation/etudes-nationales/rapport-de-veille-normative-secteur-energie-septembre-2011.pdf

9.2.2. Technical Committees related to ICT in the energy sector

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

International Level

ISO/IEC JTC1 Special Working Group on Smart Grid (SWG-Smart Grid)

European Level

Technical Committees
CEN/CENELEC/ETSI JWG Smart Grids
IEC SG 3 – Strategic Group on Smart Grid

Other Initiatives
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 the energy sector, specifically Sensor network-based smart grid systems and automated meter reading.

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: while dentistry activities continue to be included, veterinary activities have been excluded. Finally, the biomedical technologies sector, as defined in its standards analysis, 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".

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."

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."

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)

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

Other International Initiatives
ITU-T Study Group 16 – e-health and standardization
NEMA / DICOM – Digital imaging and communication in medicine

Health Level Seven International / HL7
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
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.

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)

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.

9.4. OTHER SECTORS WHERE ICT ACTS A SUPPORTING SECTOR

ICT is a supporting sector for other sectors not currently covered by the sector-based standards analysis, as defined by ILNAS in the national standardization strategy 2010-2020. 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
  - ISO/TC 68 – Financial services
  - CEN/TC 263 – Secure storage of cash, valuables and data media
  - ISO/IEC JTC 1/WG 7 – Sensor Networks (Automation of facilities management and security)

- Automotive sector
  - ISO/TC 184 - Automation systems and integration
  - ISO/TC 22 – Road vehicles
  - ISO/TC 204 - Intelligent transport systems
  - ISO/TC 23 – Tractors and machinery for agriculture and forestry
  - CEN/TC 278 – Road transport and traffic telematics
  - CEN/TC 337 – Winter maintenance and road service area maintenance equipment
  - ISO/IEC JTC 1/WG 7 – Sensor Networks (Intelligent transportation and traffic)

- Railway sector
  - CLC/TC 9X – Electrical and electronic applications for railways
  - 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
  - ISO/TC 36 - Cinematography
  - ISO/TC 42 - Photography
  - ISO/TC 130 - Graphic technology
  - IEC/TC 100 – Audio, video and multimedia systems and equipment
  - CLC/SR 100 – Audio, video and multimedia systems and equipment
  - CLC/TC 100X – Audio, video and multimedia systems and equipment and related sub-systems

- Geographic information/Geomatics sector
  - ISO/TC 211 - Geographic information/Geomatics
  - CEN/TC 287 – Geographic Information

- Ergonomics sector
  - ISO/TC 159 – Ergonomics
  - CEN/TC 122 – Ergonomics

- Processes, data elements and documents in commerce, industry and administration sector
  - ISO/TC 154 - Processes, data elements and documents in commerce, industry and administration
  - ISO/IEC JTC 1/WG 7 – Sensor Networks (Automation, monitoring, and control of industrial production processes)

- Computer-aided design (CAD) sector
  - ISO/TC 10 - Technical product documentation
  - CEN/SS F01 – Technical drawings

- Maritime sector

    - ISO/TC 8 - Ships and marine technology
    - 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
    - ISO/TC 29 - Small tools
    - IEC/TC 65 – Industrial-process measurement, control and automation
    - IEC/TC 22 – Power electronic systems and equipment
    - CEN/TC 310 – Advanced Automation Technologies and their Applications
    - CLC/SR 65 – Industrial-process measurement, control and automation
    - CLC/TC 65X – Industrial-process measurement, control and automation
    - CLC/TC 215 – Electrotechnical aspects of telecommunication equipment
    - 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
    - IEC/TC 108 – Safety of electronic equipment within the field of audio/video, information technology and communication technology
    - CLC/TC 108X – Safety of electronic equipment within the fields of Audio/Video, Information Technology and Communication Technology
    - ISO/IEC JTC 1/WG 7 – Sensor Networks (Environment observation, forecasting, and protection)

- Building sector
    - CEN/TC 247 – Building Automation, Controls and Building Management
    - ISO/IEC JTC 1/WG 7 – Sensor Networks (Remote habitat monitoring and automation; Smart homes)

- Public sector
    - ISO/IEC JTC 1/WG 7 – Sensor Networks (Homeland security; Civil protection and public safety)

- Agriculture sector
    - ISO/IEC JTC 1/WG 7 – Sensor Networks (Automation and control of agriculture processes)

- Research, Development and Innovation sector
    - ISO/IEC JTC 1/WG 7 – Sensor Networks

10. 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, 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 best 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 2010-2020[46], ICT was the first economic sector selected by the Minister of the Economy and Foreign Trade to be followed at the standards level by ILNAS. 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 in the field of ICT. Thus, ICT is still currently carefully followed at the standards level.

The purpose of this standards analysis is to inform the national stakeholders of the ICT sector about the main standards activities and to offer them guidance for a future potential involvement in the standardization process. This document is based on several years of experience of 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. The two main innovations in this analysis are the focus on ICT *fora* and *consortia* (Chapter 8), developing *de facto* standards, and the highlight of ICT as a sector supporting other economic sectors at the standards level (Chapter 9).

Finally, this analysis highlights the potential interest for the national stakeholders and 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 position themselves with regards to participation in standardization activities within one or more technical committees at the European or International level, following the guiding principle of the national standardization strategy 2010-2020: "Setting standards means setting the market".

[46] http://www.ilnas.public.lu/fr/publications/normalisation/etudes-nationales/ilnas-strategie-normalisation-2010-2020.pdf

11. APPENDIX

11.1. LIST OF ACRONYMS

ACRONYM	TITLE
ANEC	Agence pour la Normalisation et l'Economie de la Connaissance
CAB	Conformity Assessment Body
CAD	Computer-Aided Design
CEN	European Committee for Standardization
CENELEC	European Committee for Electrotechnical Standardization
CLUSIL	CLUb de la Sécurité de l'Information – Luxembourg
CNPD	Commission Nationale pour la Protection des Données
CSSF	Commission de Surveillance du Secteur Financier
CWA	CEN Workshop Agreement
DICOM	Digital Imaging and Communication in Medicine
DMTF	Distributed Management Task Force
EFTA	European Free Trade Association
EIG	Economic Interest Grouping
ENTSO-E	European Network of Transmission System Operators for Electricity
ESO	European Standards Organizations
ETSI	European Telecommunications Standards Institute
EC	European Commission
EU	European Union
FedISA	Fédération de l'ILM (Information Lifecycle Management), du Stockage et de l'Archivage
FNR	National Research Fund
GDP	Gross Domestic Product
HIMSS	Healthcare Information and Management Systems Society
HL7	Health Level Seven International
ICS	International Classification for Standards

ACRONYM	TITLE
ICT	Information and Communication Technology
ID-Cards	Identification Cards
IEC	International Electrotechnical Commission
IEEE-SA	Institute of Electrical and Electronics Engineers Standards Association
IETF	Internet Engineering Task Force
ILNAS	Institut Luxembourgeois de la Normalisation, de l'Accréditation, de la Sécurité et qualité des produits et services
ILR	Institut Luxembourgeois de Régulation
ISO	International Organization for Standardization
IT	Information Technology
ITU	International Telecommunication Union
JMIR	Journal of Medical Internet Research
JTC	Joint Technical Committee
JWG	Joint Working Group
NIST	National Institute of Standards and Technology
NFC	Near field communication
OASIS	Organization for the Advancement of Structured Information Standards
OGF	Open Grid Forum
OLAS	Office Luxembourgeois d'Accréditation et de Surveillance
OMG	Object Management Group
OSI	Open systems interconnection
PDA	Personal Digital Assistant
PKI	Public Key Infrastructures
PSC	Prestataire de Services de Certification
PSDC	Prestataire de Services de Dématérialisation et/ou de Conservation
PSF	Prestataire de Services Financiers
RFID	Radio-frequency identification

ACRONYM	TITLE
R&D	Research and Development
SC	Subcommittee
SG	Strategic Group
SDO	Standards Developing Organizations
SMILE	Security made in Lëtzebuerg
SNCH	Société Nationale de Certification et d'Homologation
SNIA	Storage Networking Industry Association
SWG	Special Working Group
TC	Technical Committee
TCG	Trusted Computing Group
TOG	The Open Group
UPnP	Universal Plug and Play
W3C	World Wide Web Consortium
WG	Working Group
WHO	World Health Organization

11.2. PARTICIPATION IN THE STANDARDIZATION PROCESS

To participate in standardization activities at the national, European or International level, each interested person has to become registered with Luxembourg's national standards body, ILNAS. A specific department, the "*Organisme Luxembourgeois de Normalisation*" (OLN), fulfills the ILNAS mission as a national standardization organization.

Indeed, in the framework of the standardization process, a national standards body recognized at national level is eligible to be a national member of corresponding International and European standards organizations. In addition, 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.

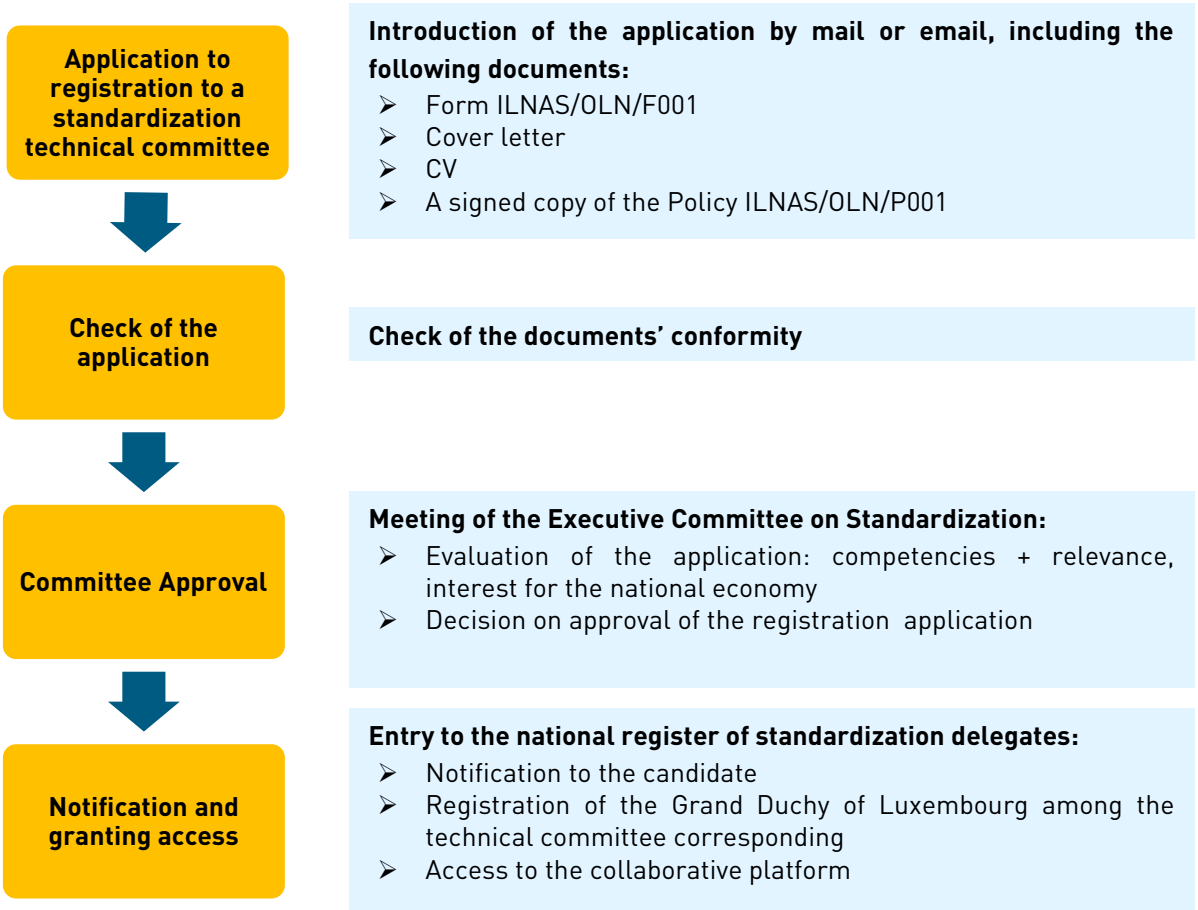
In order to provide all national socio-economic stakeholders access to standardization processes, the registration as national delegate is entirely free of charge in Luxembourg.

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 5 summarizes the process for registering as a national delegate to a standardization technical committee.

Figure 5: 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.

The OLN represents Luxembourg's interests in the European standardization organizations as CEN, CENELEC and ETSI, as well as the international standardization organizations ISO and the IEC. Thus, each delegate has to specify the name of the European/International technical committee, but also sub-committee and working group, in which he or she wants to participate.

❖ National register of standardization delegates registered for standardization technical committees

The national register of the standardization delegates participating in standardization technical committees is updated regularly. 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 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 feedbacks to the OLN, if necessary, on malfunctions;
- use the logo "Member of ILNAS Network" in technical contributions.

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

- the respect of the standardization policy of the OLN and the terms and conditions of use of the logo "Member of the ILNAS Network" (ILNAS/OLN/A003);
- the commitment of nondisclosure of the technical committee's documents to third parties;
- active participation in the standardization process is required when registered in a national standardization study committee;
- providing a periodic review 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 policies). After the approval of your application, ILNAS will grant you full access to standardization works and you will become a full member of the standards network.

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

11.3. LIST OF ALL IDENTIFIED STANDARDS RELATED FORA AND CONSORTIA FOR THE ICT SECTOR

Source: **List of standards-related *Fora* and *Consortia* established by CEN** (Edition 17 - August 2012)
http://www.cen.eu/cen/Sectors/Sectors/ISSS/Consortia/Pages/default.aspx

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
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
Energistics
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
OIPF - 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

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