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Internet of Things (IoT)
Secretariat: KATS (Korea, Republic of)

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Status:	ITU-T JCA-IoT invites ISO/IEC JTC 1/SWG 5: – to appoint a liaison officer to JCA-IoT – to provide a feedback on the IoT standards roadmap – to note the appointment of Mr Jun Seob LEE, ETRI (juns@etri.re.kr), as liaison officer from JCA-IoT to ISO/IEC JTC 1/SWG 5
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STUDY PERIOD 2009-2012

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Geneva, 7 March 2013

LIAISON STATEMENT

Source: ITU-T/JCA-IoT

Title: Request to appoint a liaison officer from ISO/IEC JTC 1/SWG 5 to ITU-T JCA-IoT

LIAISON STATEMENT

For action to: ISO/IEC JTC 1/SWG 5

For comment to:

For information to:

Approval: JCA-IoT meeting, Geneva, 26 February 2013

Deadline: 15 June 2013

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ITU-T Joint Coordination Activity on Internet of Things (JCA-IoT) was established by ITU-T TSAG in February 2011.

The scope of the JCA-IoT is to coordinate the ITU-T work on the "Internet of Things" including networks aspects of identification of things, and ubiquitous sensor network (USN). One of the competences of JCA-IoT is to carry out an external collaboration role with other relevant recognized standards development organizations (SDOs) and to invite their representatives.

In addition to all ITU-T and ITU-R Study Groups active in the field, the JCA-IoT includes representatives of most of the international players active in the field, including: ITU FG M2M; ISO TC 122/104 JWG; ISO TC 204; ISO/IEC JTC1 SC 6; ISO/IEC JTC1 SC 31; ISO/IEC JTC 1 WG7 on Sensor Networks; GS1/EPC Global; European Commission; EC/IERC; ETSI; ETSI TC M2M; CEN; OMA; YRP Ubiquitous Networking Laboratory; ECMA; GISFI; TIA; GSC M2M Standardization Task Force (GSC MSTF); Open Geospatial Consortium (OGC); ISO/IEC JTC 1/SC 29/WG11 (MPEG 2); Augmented Reality (AR) Standards.

JCA-IoT is developing a global standards roadmap on Internet of Things. This document contains a collection of Standards/ITU-T Recommendations that fit into the IoT scope from the point of view of various SDOs. This roadmap is considered as a very useful tool to coordinate the IoT standardization work worldwide.

ISO/IEC JTC 1/SWG 5 is invited to look at the list of standards (approved and under development) currently included in the IoT standards roadmap and provide any feedback to JCA-IoT. This list is

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updated at every JCA-IoT meeting upon feedback from relevant SDOs. The IoT Roadmap is freely downloadable from JCA-IoT home page at (http://itu.int/itu-t/jca/iot); direct access: http://www.itu.int/en/ITU-T/jca/iot/Documents/deliverables/JCAIoT-D-2r5_IoT_roadmap-20130226.doc.

We would invite ISO/IEC JTC 1/SWG 5:

– to appoint a liaison officer that could regularly attend JCA-IoT meetings and report on ISO/IEC JTC 1/SWG 5 advancements to foster coordination and collaboration internationally. Avoiding duplication of efforts and reducing proliferation of fragmented standardization in this field is of utmost importance.

– to provide a feedback on the IoT standards roadmap

– to note the appointment of Mr Jun Seob LEE, ETRI (juns@etri.re.kr), as liaison officer from JCA-IoT to ISO/IEC JTC 1/SWG 5

The next JCA-IoT meeting is planned in Geneva, Switzerland, on 21 June 2013. The JCA-IoT meeting always allows remote participation.

For more information on JCA-IoT and future meetings see http://itu.int/ITU-T/jca/iot/ or contact JCA-IoT Secretariat (tsbjcaiot@itu.int).

INTERNATIONAL TELECOMMUNICATION UNION

TELECOMMUNICATION STANDARDIZATION SECTOR

STUDY PERIOD 2013-2016

JOINT COORDINATION ACTIVITY ON INTERNET OF THINGS

JCA-IoT-D-2 Rev.54

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Deliverable

Source: Editor of IoT Standards Roadmap

Title: IoT Standards Roadmap

This document represents the second deliverable of JCA-IoT. It was updated by the roadmap editor after the seventh JCA-IoT meeting (Geneva, 26 February 2013), as agreed by the meeting.

This document contains a collection of Standards/ITU-T Recommendations that fit into the scope of JCA-IoT. It includes Standards/ITU-T Recommendations related to network aspects of identification systems, including RFID (NID) and ubiquitous sensor networks (USN).

JCA-IoT participants are invited to review it and provide updated information to the editor of this document, Mr Jun Seob Lee (juns@etri.re.kr) or to the JCA-IoT secretariat (tsbjcaiot@itu.int).

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Activity domain	Entity	Title of deliverable	Scope of deliverable	Current status	Starting date	Target date
General	ITU-T SG2 Q1 (2009 ~ 2012)	**ITU-T E.101**, Definitions of terms used for identifiers (names, numbers, addresses and other identifiers) for public telecommunication services and networks in the E-series Recommendations	This Recommendation provides terms and definitions for use in the field of identifiers (e.g., names, numbers, addresses and other identifiers (IDs)) for public telecommunication services and networks.	Recommendation		2009-11-24
NID	ITU-T SG13 Q2 (2009 ~ 2012)	**ITU-T Y.2213**, NGN service requirements and capabilities for network aspects of applications and services using tag-based identification	This Recommendation covers: - description and scope of tag-based identification applications and services with some example scenarios; - high-level service requirements of tag-based identification applications and services; and - extended or new NGN capabilities based on the high-level service requirements. Functional requirements and related NGN architecture extensions for support of the described capabilities are out of scope of this Recommendation.	Recommendation		2008-09-12
USN	ITU-T SG13 Q3 (2009 ~ 2012)	**ITU-T Y.2221**, Requirements for support of Ubiquitous Sensor Network (USN) applications and services in NGN environment	The scope of this Recommendation includes: - Description and general characteristics of USN and USN applications and services; - Service requirements to support USN applications and services; - Requirements of extended or new NGN capabilities based on the service requirements.	Recommendation		2010-01-13

NID	ITU-T SG13 Q5 (2009 ~ 2012)	**ITU-T Y.2016**, Functional requirements and architecture of the NGN for applications and services using tag-based identification	This Recommendation describes functional requirements, functional architecture and functional entities in order to support the NGN service requirements and capabilities defined in [ITU-T Y.2213]. This Recommendation covers: - Support of capabilities defined in [ITU-T Y.2213] from an architectural viewpoint; - Functional requirements of the NGN architecture to support applications and services using tag-based identification; - Functional architecture and entities extensions for applications and services using tag-based identification in NGN.	Recommendation		2009-08-22
NID	ITU-T SG16 Q22 (2009 ~ 2012)	**ITU-T H.621**, Architecture of a system for multimedia information access triggered by tag-based identification	This Recommendation defines the following issues to cover multimedia information access services triggered by tag-based identification as defined in [ITU-T F.771]: - a functional architecture reference model with descriptions of corresponding elements; - interface protocols between communication elements; and - a generic work flow to support multimedia information access triggered by tag-based identification. Moreover, this Recommendation describes implementation examples with work flows.	Recommendation		2008-08-06
NID	ITU-T SG16 Q22 (2009 ~ 2012)	**ITU-T F.771**, Service description and requirements for multimedia information access triggered by tag-based identification	This Recommendation specifies the service description and the requirements for multimedia information access triggered by tag-based identification. This service enables users to access multimedia information through users' electronic devices equipped with ID tag readers and communication functions.	Recommendation		2008-08-06

NID	ITU-T SG16 Q25 (2009 ~ 2012)	**ITU-T H.642.1**, Identification scheme for multimedia information access triggered by tag-based identification – Part 1: Identification scheme"	This Recommendation defines an Identifier (ID) scheme for the multimedia information access triggered by tag-based identification. This ID scheme is mainly used in the multimedia information system architecture defined in ITU-T H.621. It also satisfies the requirements defined in ITU-T F.771. This Recommendation does not define encoding rules to store the identifier value into data carriers such as barcode tags and RFID tags.	Recommendation		2012-06
NID	ITU-T SG16 Q25 (2009 ~ 2012)	**ITU-T H.642.2**, Identification scheme for multimedia information access triggered by tag-based identification – Part 2: Registration procedure	This Recommendation defines registration procedures of identification scheme defined by ITU-T Recommendation H.IDscheme. The identification scheme consists of High Level Code (HLC), Top Level Code (TLC), Class and elements such as Second Level Organization Code (SLOC), and Serial Code (SC). TLC is allocated by RA and then SLOC is allocated by the registrant of TLC which is called second level RA. The mechanism is meant for distributed RA hierarchy.	Recommendation		2012-07
MIIM	ISO/IEC JTC 1/SC 31/WG 6 (2009 ~ 2012)	**ISO/IEC 29174-1**, Information technology -- UII scheme and encoding format for Mobile AIDC services -- Part 1: Identifier scheme for multimedia information access triggered by tag-based identification	ISO/IEC 29174-1 defines an identifier scheme for Mobile AIDC services and Registration Authority (RA) and registration procedures of the ID that was developed to support service requirements of an identifier scheme for Mobile AIDC services. This standard consists of two parts. Part 1 (ISO/IEC 29174-1) defines requirements, structure and encoding formats of the ID.	DIS posted 31n3564 2011-08-26 to 2012-02-24	2011-01-24, registered as single part standard on 2008-11-05	2012-07-01
MIIM	ISO/IEC JTC 1/SC 31/WG 6 (2009 ~ 2012)	**ISO/IEC 29174-2**, Information technology -- UII scheme and encoding format for Mobile AIDC services --	ISO/IEC 29174-2 defines an identifier scheme for Mobile AIDC services and Registration Authority (RA) and registration procedures of the ID that was developed to support service requirements of an identifier scheme for Mobile AIDC services. This standard consists of two parts. Part 2 (ISO/IEC	DIS ballot passed DoC meeting 2012-03-12	2011-01-24, registered as single part	2012-07-01

		Part 2: Registration procedures	29174-2) defines procedures of ID scheme, obligations and requirements of Registration Authority (RA) as managing the ID.		standard on 2008-11-05	
NID/ MIIM	ITU-T SG16 Q22 | ISO/IEC JTC 1/SC 31/WG 6 (2009 ~ 2012)	**ITU-T H.642.3 | ISO/IEC 29177**, Information technology – Automatic identification and data capture technique – Identifier resolution protocol for multimedia information access triggered by tag-based identification	This Recommendation | International Standard defines the identifier (ID) resolution protocol for multimedia information access triggered by tag-based identification which is described in ITU-T Recommendations F.771 and H.621.	Recommendation | FDIS to ISO/CS (2012-01-17)	2008-11-05	2012-06
USN	ITU-T SG16 Q25 (2009 ~ 2012)	**ITU-T F.744**, Service description and requirements for ubiquitous sensor network middleware	This Recommendation describes USN services and requirements for ubiquitous sensor network (USN) middleware. This Recommendation covers: - description of the USN services; - description of the USN middleware; - use cases of USN services that use USN middleware; - functional model of USN middleware; - – requirements for USN middleware to support functions commonly required by USN services.	Recommendation		2009-12-14
USN	ITU-T SG16 Q25 (2009 ~ 2012)	**ITU-T H.641**, SNMP-based sensor network management framework	This Recommendation provides an SNMP-based sensor network management framework. The primary purpose of this Recommendation is to describe the framework of integrated sensor network management which can be used to manage heterogeneous sensor networks. The scope of this Recommendation includes: - Overall architecture of framework	Recommendation		2012-02

			- Functional entities of framework - Object identifier allocation for MIB - Object identifier translation between SNMP and sensor network management protocol			
General	ITU-T SG17 Q10 | ISO/IEC JTC 1/SC 6/WG 9 (2009 ~ 2012)	**ITU-T X.660 | ISO/IEC 9834-1**, Information technology – Procedures for the operation of Object Identifier Registration Authorities: General procedures and top arcs of the International Object Identifier tree	This Recommendation | International Standard: - specifies a tree structure for allocations made by a hierarchical structure of Registration Authorities, called the international OID tree, which supports the ASN.1 OBJECT IDENTIFIER type and the ASN.1 OID IRI type (see Rec. ITU-T X.680 | ISO/IEC 8824-1); - registers top-level arcs of the international object identifier tree; - specifies procedures which are generally applicable to registration at any level of the international OID tree; - provides guidelines for the establishment and operation of International Registration Authorities for use, when needed, by other ITU-T Recommendations and/or International Standards; - provides guidelines for additional ITU-T Recommendations and/or International Standards which choose to reference the procedures in this Recommendation | International Standard; - provides a recommended fee structure for lower-level Registration Authorities.	Recommendation | International Standard		2011-07-29
NID	ITU-T SG17 Q12 | ISO/IEC JTC 1 SC 6/WG 9 (2009 ~	**ITU-T X.668 | ISO/IEC 9834-9**, Information technology – Open Systems Interconnection – Procedures for the operation of OSI	This Recommendation | International Standard specifies the procedures for operating the Registration Authority for object identifiers under the arc {joint-iso-itu-t(2) tag-based(27)}, that supports tag-based applications and services.	Recommendation | International Standard		2008-05-29

	2012)	Registration Authorities: Registration of object identifier arcs for applications and services using tag-based identification				
RFID	ITU-T SG17 Q10 (2009 ~ 2012)	**ITU-T X.1275**, Guidelines on protection of personally identifiable information in the application of RFID technology	This Recommendation provides guidance to radio frequency identification (RFID) users and vendors (including RFID service providers and manufacturers) in protecting personally identifiable information for the privacy of individuals in the context of RFID technology. These guidelines can be applied to cases wherein the RFID system may be used to invade individual privacy; e.g., personally identifiable information is recorded in an RFID tag and subsequently collected, or the object information collected by means of RFID is linked to personally identifiable information. However, it does not apply to such cases where the object information is collected and used without any risk of disclosure of personally identifiable information and invasion of privacy. These guidelines seek to protect personally identifiable information for the privacy of individuals potentially affected by an RFID system and to promote a safe environment for RFID use. These guidelines are intended to provide the basic rules for the RFID service provider and guidance to the RFID service provider, manufacturers and user with regard to privacy in RFID and are subject to local and national laws.	Recommendation		2010-12-17
NID	ITU-T SG17 Q6 (2009 ~ 2012)	**ITU-T X.1171**, Threats and requirements for protection of personally identifiable information in applications using tag-based identification	The scope of this Recommendation covers the following objectives including threats and requirements for protection of personally identifiable information (PII) in applications using tag based identification as described below: - To describe PII threats in a business-to-customer (B2C)-based environment of applications using tag based	Recommendation		2009-02-20

			identification; - To identify requirements for PII protection in a B2C-based environment of applications using tag based identification.			
USN	ITU-T SG17 Q6 | ISO/IEC JTC 1/SC 6 (2009 ~ 2012)	**ITU-T X.1311 | ISO/IC 29180**, Security framework for ubiquitous sensor network	This draft Recommendation describes the security threats to and security requirements of the Ubiquitous Sensor Network. In addition, this draft Recommendation categorizes the security technologies according to the security functions that satisfy said security requirements and by the place to which the security technologies are applied in the security model of USN. Finally, the security requirements and security technologies for USN are presented.	Recommendation | International Standard		2011-02-13
USN	ITU-T SG17 Q6 (2009 ~ 2012)	**ITU-T X.1312**, Ubiquitous sensor networks (USN) middleware security guidelines	This Recommendation provides guidelines for USN middleware security and also covers the following: - overview of USN middleware security; - the functional model of USN middleware; - security threats on USN middleware; - security requirements for USN middleware; - guidelines for USN middleware security.	Recommendation		2011-02-13
USN	ITU-T SG17 Q6 (2009 ~ 2012)	**ITU-T X.~~usnsec-3~~1313**, Security requirements for wireless sensor network routing	This Recommendation provides security requirements for wireless sensor network routing and also covers as follow; - Overview of USN architecture - General network topologies and routing protocols for WSN - Security threats of WSN routing - Security requirements for WSN routing	~~Draft~~ Recommendation		~~Expected date of approval Feb.~~ 2012-10-14
	ITU-T SG17 Q6 (2009 ~	**ITU-T X.~~unsec-1~~1311**, Security requirements and framework of	This Recommendation describes security threats and security requirements to the Ubiquitous Sensor Network. In addition, this Recommendation categorizes security technologies by	~~Draft~~ Recommendation		2011-02-13

	2012)	ubiquitous networking	security functions that satisfy above security requirements and by the place to which the security technologies are applied in the security model of the Ubiquitous Sensor Network. Finally, the security function requirements for each entity in the network and possible implementation layer for security function are presented.			
NID	ITU-T SG17 Q2 (2009 ~ 2012)	**ITU-T X.520 AMD 3**, Information technology – Open Systems Interconnection – The Directory: Selected attribute types	X.520 defines attribute types for Directory Services. The amendment 3 to X.520 will extend it to support identification management in Directory Services	Draft Recommendation		
NID	ITU-T SG17 Q12 | ISO/IEC JTC 1/SC 6 (2009 ~ 2012)	**ITU-T X.672 | ISO/IEC 29168-1**, Information technology – Open systems interconnection – Object identifier resolution system (ORS)	This Recommendation | International Standard specifies the OID resolution system, including the overall architecture and a DNS-based resolution mechanism. It specifies the means for inserting any application-defined information associated with an OID node into the DNS and the means of retrieval of that information using the ORS. It does not restrict the number of applications it can support. It specifies the required operation of an ORS client, including the mapping of an OID-IRI value by the ORS client into a DNS name to produce a DNS query for the specified application information and the processing of any returned information. The ORS has no role in the allocation or registration of OID nodes. The required behavior of an ORS client is specified, but the interfaces to it are specified only in terms of the semantics of the interaction. A bit-level application program interface is platform and software dependent, and is not in the scope of this Recommendation | International Standard. It does not include a tutorial or complete specification on the management of DNS zone files (for that, see IETF RFC 1035	Recommendation | International Standard		2010-08-29 | 2011-09-12

			and IETF RFC 3403); it specifies (only) the DNS resource records that need to be inserted in the zone files in order to support ORS access to the information associated with an OID node. This Recommendation | International Standard specifies required DNS zone file resource records, and prohibits the use of other resource records of a similar form but with different semantics (in DNS zone files in the .oid-res.org domain). It does not otherwise restrict the general use of DNS zone files.			
NID	ISO/IEC JTC 1/SC 6	ISO/IEC 29168-2, Information technology – Open Systems Interconnection – Procedures for the Object Identifier Resolution System Operational Agency	This International Standard specifies the mechanisms and criteria that shall be applied for the selection and approval of the operational agency, and includes procedures that the operational agency shall follow. It also addresses any future modification of the procedures, and the procedures for any change of the operational agency. It lists the OID nodes for which the operational agency is required to provide ORS support. It gives the required level of support for these nodes. It gives the procedures by which lower level nodes can apply for ORS support (class A, class B, or class C), and the role of the operational agency in providing these levels of support. It determines the basis for charges that might be levied for these levels of support.	International Standard		2011-09-12
AIDC	ISO TC 104/SC 4	ISO 6346, Freight containers – Coding, identification and marking	Provides a system for general application for the identification and presentation of information about freight containers. Specifies an identification system with mandatory marks for visual interpretation and optional features for automatic identification and electronic data interchange and a coding system for data on container size and type. Replaces the second edition, which has been technically revised.	International Standard		1998-01-22
RFID	ISO TC	ISO 10374, Freight	Specifies all necessary user requirements. Includes: a container	International Standard		2007-02-24

	104/SC 4	containers – Automatic identification	identification system, data coding systems, description of data, performance criteria and security features.			
RFID	ISO TC 104/SC 4	ISO/TS 10891, Freight containers – Radio frequency identification (RFID) – Licence plate tag	ISO/TS 10891:2009 establishes: - a set of requirements for container tags, which allow the transfer of information from a container to automatic processing systems by electronic means; - a data coding system for container identification and permanent related information which resides within a container tag; - a data coding system for the electronic transfer of both container identification and permanent related information from container tags to automatic data processing systems; - the description of data to be included in container tags for transmission to automatic data processing systems; - performance criteria necessary to ensure consistent and reliable operation of container tags within the international transportation community; - the physical location of container tags on containers; - features to inhibit malicious or unintentional alteration and/or deletion of the information content of container tags when installed on a freight container. It is intended to be applicable to freight containers as defined in ISO 668 as well as to other containers not defined in ISO 668 and container ancillary equipment such as road and terminal chassis, generator sets and power packs . The use of container tags and the equipping of containers for automatic identification are optional. The purpose of ISO/TS 10891:2009 is to optimise the efficiency of equipment control systems and to assist in container security initiatives and	International Standard		2009-01-30

			programs, including the optional usage of electronic seals in accordance with ISO 18185, and any subsequent International Standard. For this reason, any container tag system used for identifying containers shall be non-proprietary and conform to and be compatible with ISO/TS 10891:2009.			
RFID	ISO TC 104/SC 4	ISO 18185-1, Freight containers – Electronic seals – Part 1: Communication protocol	SO 18185-1:2007 provides a system for the identification and presentation of information about freight container electronic seals. The identification system provides an unambiguous and unique identification of the container seal, its status and related information. The presentation of this information is provided through a radio-communications interface providing seal identification and a method for determining whether a freight container's seal has been opened. ISO 18185-1:2007 specifies a read-only, non-reusable freight container seal identification system, with an associated system for verifying the accuracy of use, having - a seal status identification system, - a battery status indicator, - a unique seal identifier including the identification of the manufacturer, - seal (tag) type. ISO 18185-1:2007 is used in conjunction with the other parts of ISO 18185. It applies to all electronic seals used on freight containers covered by ISO 668, ISO 1496-1 to ISO 1496-5, and ISO 8323. Wherever appropriate and practicable, it also applies to freight containers other than those covered by these International Standards.	International Standard		2011-05-13
RFID	ISO TC	ISO 18185-2, Freight	ISO 18185-2:2007 specifies a freight container seal	International Standard		2011-01-20

	104/SC 4	containers – Electronic seals – Part 2: Application requirements	identification system, with an associated system for verifying the accuracy of use, having: - a seal status identification system; - a battery status indicator; - a unique seal identifier including the identification of the manufacturer; - a seal (tag) type. ISO 18185-2:2007 is used in conjunction with the other parts of ISO 18185.			
RFID	ISO TC 104/SC 4	ISO 18185-3, Freight containers – Electronic seals – Part 3: Environmental characteristics	ISO 18185-3:2006 specifies the minimum environmental characteristics for electronic seals. ISO 18185-3:2006 describes the environmental requirements for the ISO 18185 series, for ISO 10374 (Freight containers -- RF automatic identification) and for ISO 17363 (Supply chain applications of RFID -- Freight containers), since it is expected that the implementation of these International Standards will face the same environmental conditions. However, each of these International Standards has its own unique requirements other than environmental conditions.	International Standard		2009-09-18
RFID	ISO TC 104/SC 4	ISO 18185-4, Freight containers – Electronic seals – Part 4: Data protection	ISO 18185-4:2007 specifies requirements for the data protection, device authentication and conformance capabilities of electronic seals for communication to and from a seal and its associated reader. These capabilities include the accessibility, confidentiality, data integrity, authentication and non-repudiation of stored data.	International Standard		2011-05-13
RFID	ISO TC 104/SC 4	ISO 18185-5, Freight containers – Electronic seals – Part 5: Physical layer	ISO 18185-5:2007 specifies the air interface between electronic container seals and Reader/Interrogators of those seals. It is to be used in conjunction with the other parts of ISO 18185. ISO 18185-5:2007 describes the physical layer for supply chain	International Standard		2011-05-13

			applications of RFID for freight containers in accordance with the ISO 18185 series and ISO 17363, since it is expected that the implementation of these standards will face the same international conditions. However, each of these standards has its own unique requirements other than the physical layer. It is expected that RFID Freight Container Identification (as specified in ISO 10374 and ISO 17363), and electronic seals (as specified in the ISO 18185 series) will be able to use the same infrastructure, while recognizing that that there may be requirements for different frequencies for passive devices as opposed to the active devices identified in ISO 18185-5:2007.			
MIIM	ISO/IEC JTC 1/SC 31/WG 6	ISO/IEC TR 29172, Information technology – Mobile item identification and management – Reference architecture for Mobile AIDC services	ISO/IEC 29172 defines an overall service architecture to provide Mobile AIDC services. It describes various architectural configurations enabled by a set of Mobile AIDC-relevant standards such as ISO/IEC 18004, 15424, 16480, 29143, 18000-3 Mode 3, 18000-6, 29173, 29174, 29175, 29176, 29177, 29178, 29179, 29168, and 9834-9, in terms of relevant standards and their roles and positions in various implementations. The overall service architecture deals with all of the relevant standards, their interface relationships and how to incorporate them to develop Mobile AIDC services based on resulting Mobile AIDC technologies.	International Standard	2008-11-05	2011-11-08
MIIM	ISO/IEC JTC 1/SC 31/WG 6	ISO/IEC 29173-1, Information technology – Mobile item identification and management – Part 1: Mobile RFID interrogator device protocol for ISO/IEC 18000-6 Type C	ISO/IEC 29173-1 defines an interface protocol between a device driver of a mobile AIDC application platform and a mobile RFID interrogator within a mobile AIDC terminal. In accordance to the ISO/IEC 18000-6 type C and ISO/IEC 29143 RFID air interface standard, this standard will include: types of command / response / notification protocol messages and their usages; protocol message format; and protocol message exchange procedures, as the communication protocol between an interrogator and phone.	~~FDIS to ISO/CS (2102-01-17)ballot 2011-10-17 (wg6n0472)~~International Standards	2008-11-05	2012-11-30
MIIM	ISO/IEC JTC 1/SC 31/WG 6	ISO/IEC 29175, Information technology – Mobile item	ISO/IEC 29175 defines user data for the purpose of encoding and identifying user data in Mobile AIDC services using ISO/IEC 29143 RF tags, ISO/IEC 18000-6, REV1 Type C RF	International Standard	2008-11-05	2012-03

		identification and management – User data for Mobile AIDC services	tags, and ISO/IEC 15434-applied ORM such as linear bar codes and two-dimensional symbols. Identifiers for user data follow ASC MH10 Data Identifiers, which are given in ANSI MH10.8.2, hereafter referred to as the "ASC MH10 Data Identifiers", are standardized in ANSI MH10.8.2 and ISO/IEC 15418.			
MIIM	ISO/IEC JTC 1/SC 31/WG 6	ISO/IEC 29176, Information technology – Mobile item identification and management – Consumer privacy-protection protocol for Mobile RFID services	ISO/IEC 29176 defines a privacy protocol between a Mobile RFID interrogator and a Mobile RFID tag. This international standard does not deal with security issues such as mutual authentication method, data encryption method, and cipher algorithm suite. This international standard does cover the operation procedure of the interrogator for the protection of the consumer's privacy. This international standard can be applied to tags and interrogators conforming to ISO/IEC 18000-6 Type C and ISO/IEC 18000-3 MODE 3 RFID air interfaces without any modification of hardware and additional commands.	International Standards	2008-11-05	2012-10-06
MIIM	ISO/IEC JTC 1/SC 31/WG 6	ISO/IEC 29178, Information technology – Mobile item identification and management – Service broker for Mobile AIDC services	ISO/IEC 29178 defines the functions of a service broker supporting service control, MII recognition and MII resolution related functions in Mobile AIDC service architecture, which uses MII (ISO/IEC 29174) as an identifier. For the use of a service broker by a Mobile AIDC terminal, definition is required of the interface between a terminal and a service broker. This standard describes that interface.	International Standard	2008-11-05	2012-03
MIIM	ISO/IEC JTC 1/SC 31/WG 6	ISO/IEC 29179, Information technology – Mobile item identification and management – Mobile AIDC application programming interface	ISO/IEC 29179 defines the Mobile AIDC application programming interface to give a standardized functional view over different Mobile AIDC application platforms. In addition, ISO/IEC 29179 provides a description of Mobile AIDC applications and specifies the functional requirements of Mobile AIDC application interfaces.	International Standard	2008-11-05	2012-01-20
Sensor and actuator	ISO/IEC JTC 1/SC	ISO/IEC/IEEE 21450 - Information technology	ISO/IEC/IEEE 21450:2010 provides a common basis for members of the ISO/IEC/IEEE 21451 series of International	Published by ISO/IEC/IEEE	N/A	2011-12-15

	31/WG 6	– Smart Transducer Interface for Sensors and Actuators – Common Functions, Communication Protocols, and Transducer Electronic Data Sheet (TEDS) Formats	Standards to be interoperable. It defines the functions that are to be performed by a transducer interface module (TIM) and the common characteristics for all devices that implement the TIM. It specifies the formats for Transducer Electronic Data Sheets (TEDS). It defines a set of commands to facilitate the setup and control of the TIM as well as reading and writing the data used by the system. Application programming interfaces (APIs) are defined to facilitate communications with the TIM and with applications.			
Sensor and actuator	ISO/IEC JTC 1/SC 31/WG 6	ISO/IEC/IEEE 21451-1 - Information technology – Smart Transducer Interface for Sensors and Actuators – Network Capable Application Processor (NCAP) Information Model	ISO/IEC/IEEE 21451-1:2010 defines an object model with a network-neutral interface for connecting processors to communication networks, sensors, and actuators. The object model contains blocks, services, and components; it specifies interactions with sensors and actuators and forms the basis for implementing application code executing in the processor.	PSDO Standard published ~~2010-05-20~~	N/A	2010-05-20
Sensor and actuator	ISO/IEC JTC 1/SC 31/WG 6	ISO/IEC/IEEE 21451-2 - Information technology – Smart Transducer Interface for Sensors and Actuators – Transducer to Microprocessor Communication Protocols and Transducer Electronic Data Sheet (TEDS) Formats	ISO/IEC/IEEE 21451-2:2010 defines a digital interface for connecting transducers to microprocessors. It describes a Transducer Electronic Data Sheet (TEDS) and its data formats. It defines an electrical interface, read and write logic functions to access the TEDS, and a wide variety of transducers. ISO/IEC/IEEE 21451-2:2010 does not specify signal conditioning, signal conversion, or how the TEDS data is used in applications.	PSDO Standard published ~~2010-05-20~~	N/A	2010-05-20
Sensor and actuator	ISO/IEC JTC 1/SC 31/WG 6	ISO/IEC/IEEE 21451-4 - Information technology – Smart Transducer Interface for Sensors and Actuators – Mixed-Mode Communication	ISO/IEC/IEEE 21451-4:2010 defines the protocol and interface that allows analog transducers to communicate digital information with an ISO/IEC/IEEE 21451 object. It also defines the format of the Transducer Electronic Data Sheet (TEDS), which is based on the ISO/IEC/IEEE 21451-2 TEDS. It does not specify the transducer design, signal conditioning, or	PSDO Standard published ~~2010-05-20~~	N/A	2010-05-20

		Protocols and Transducer Electronic Data Sheet (TEDS) Formats	the specific use of the TEDS.			
Sensor and actuator	ISO/IEC JTC 1/SC 31/WG 6	ISO/IEC/IEEE 21451-5 - Information technology – Smart Transducer Interface for Sensors and Actuators – Wireless Communication Protocols and Transducer Electronic Data Sheet (TEDS) Formats	ISO/IEC/IEEE 21451-5 defines a wireless interface for sensors. It specifies radio-specific protocols for this wireless interface. It defines communication modules that connect the wireless transducer interface module (WTIM) and the network capable applications processor (NCAP) using the radio-specific protocols. It also defines the transducer electronic data sheets (TEDS) for the radio-specific protocols.	2011-10-03 Corrigendum to IEEE Standard 1451.5-2007 PAR approved 17-Jun-2010. In final approval "pre-ballot" Once approved to WG 6 FDIS ballot	2010-06-17	B4 2014-12-31
Sensor and actuator	ISO/IEC JTC 1/SC 31/WG 6	ISO/IEC/IEEE 21451-7 - Information technology – Standard for a Smart Transducer Interface for Sensors and Actuators - Transducers to Radio Frequency Identification (RFID) Systems Communication Protocols and Transducer Electronic Data Sheet Formats	ISO/IEC/IEEE 21451-7 defines data formats to facilitate communications between radio frequency identification (RFID) systems and smart RFID tags with integral transducers (sensors and actuators). The standard defines new transducer electronic data sheet (TEDS) formats based on the ISO/IEC/IEEE 21451 family of standards. This standard also defines a command structure and specifies the communication methods with which the command structure is designed to be compatible.	PSDO Standard published 2010-05-20	N/A	2010-05-20

Sensor and actuator	ISO/IEC JTC 1/SC 31/WG 6	ISO/IEC/IEEE 8802-15-4 - Information technology – Telecommunications and information exchange between systems – Local and metropolitan area networks – Specific requirements – Part 15-4: Wireless medium access control (MAC) and physical layer (PHY) specifications for low-rate wireless personal area networks (WPANs)	ISO/IEC/IEEE 8802-15-4 defines the protocol and compatible interconnection for data communication devices using low-data-rate, low-power, and low-complexity short-range radio frequency (RF) transmissions in a wireless personal area network (WPAN).	PSDO Standard published 2010-10-13	N/A	2010-10-13
Sensor networks~~WSN~~	ISO/IEC JTC 1/WG 7	ISO/IEC 29182-1, Reference architecture for sensor network applications and services	General overview and the requirements identified for the reference architecture	DIS	2010-03	2015-09
Sensor networks~~WSN~~	ISO/IEC JTC 1/WG 7	ISO/IEC 29182-2, Reference architecture for sensor network applications and services – Part 2: Vocabulary/Terminology	Definitions of all the terminology and vocabulary used in the sensor network reference architecture	DIS	2010-03	2015-09
Sensor networks~~WSN~~	ISO/IEC JTC 1/WG 7	ISO/IEC 29182-3, Reference architecture for sensor network applications and services – Part 3: Reference architecture views	Reference architecture from various viewpoints, such as business, operational, system, technical, functional, and logical views	DIS~~CD~~	2010-03	2015-09
Sensor	ISO/IEC	ISO/IEC 29182-4,	Categorizes entities comprising a sensor network into two	DIS~~CD~~	2010-03	

networksWSN	JTC 1/WG 7	Reference architecture for sensor network applications and services – Part 4: Entity models	categories of physical and functional entities and presents models for all such entities			
Sensor networksWSN	ISO/IEC JTC 1/WG 7	ISO/IEC 29182-5, Reference architecture for sensor network applications and services – Part 5: Interface definitions	Detailed information on the interfaces among various entities in the reference architecture	DISCD	2010-03	2015-09
Sensor networksWSN	ISO/IEC JTC 1/WG 7	ISO/IEC 29182-6, Reference architecture for sensor network applications and services – Part 6: Application Profiles	Application profiles that are derived from studies of use cases, scenarios, etc., for sensor network-based applications and services	WD	2010-03	2015-09
Sensor networksWSN	ISO/IEC JTC 1/WG 7	ISO/IEC 29182-7, Reference architecture for sensor network applications and services – Part 7: Interoperability guidelines	Design principles for the reference architecture that take the interoperability requirements into account	CD	2010-03	2015-09
Sensor networksWSN	ISO/IEC JTC 1/WG 7	ISO/IEC 20005, Services and Interfaces Supporting Collaborative Information Processing in Intelligent Sensor Networks	Services and interfaces supporting collaborative information processing (CIP) in intelligent sensor networks	DIS	2010-04	2013-10
Sensor networksWSN	ISO/IEC JTC 1/WG 7	ISO/IEC 30101, Sensor Network and its Interface for Smart Grid System	Interfaces between the sensor networks and other networks for smart grid system applications, Sensor network architecture to support smart grid systems, Interface between sensor networks with smart grid systems	WD	2010-08	2016-02

Sensor networks	ISO/IEC JTC 1/WG 7	ISO/IEC 30128, Generic Sensor Network Application Interface	This international standard specifies generic (specific application neutral and specific sensor network protocol neutral) sensor network application interface which is used between any sensor network client (application, or sensor network integration platform) and any sensor network gateway. The scope of this interface is entitled as Protocol A of Interface 3 in Clause 7.4 of ISO/IEC 29182 Part 5. This international standard covers: - Overview of sensor network applications - Overview of sensor network capabilities - Generic sensor network application interface specification	WD	2012	2015
AIDC	ISO/IEC JTC 1/SC 31	ISO/IEC 19762-1, Information technology – Automatic identification and data capture (AIDC) techniques – Harmonized vocabulary – Part 1: General terms relating to AIDC	ISO/IEC 19762-1:2008 provides general terms and definitions in the area of automatic identification and data capture techniques on which are based further specialized sections in various technical fields, as well as the essential terms to be used by non-specialist users in communication with specialists in automatic identification and data capture techniques.	International Standard NP for a single part document & translation to French, German, and Russian		2008-06-11
AIDC	ISO/IEC JTC 1/SC 31	ISO/IEC 19762-2, Information technology – Automatic identification and data capture (AIDC) techniques – Harmonized vocabulary – Part 2: Optically readable media (ORM)	ISO/IEC 19762-2:2008 provides terms and definitions unique to optically readable media (ORM) in the area of automatic identification and data capture techniques. This glossary of terms enables the communication between non-specialist users and specialists in ORM through a common understanding of basic and advanced concepts.	International Standard NP for a single part document & translation to French, German, and Russian		2008-06-11
AIDC	ISO/IEC JTC 1/SC	ISO/IEC 19762-3, Information technology -	ISO/IEC 19762-3:2008 provides terms and definitions unique to radio frequency identification (RFID) in the area of	International Standard NP for a single part		2008-06-11

	31	- Automatic identification and data capture (AIDC) techniques – Harmonized vocabulary – Part 3: Radio frequency identification (RFID)	automatic identification and data capture techniques. This glossary of terms enables the communication between non-specialist users and specialists in RFID through a common understanding of basic and advanced concepts.	document & translation to French, German, and Russian		
AIDC	ISO/IEC JTC 1/SC 31	ISO/IEC 19762-4, Information technology – Automatic identification and data capture (AIDC) techniques – Harmonized vocabulary – Part 4: General terms relating to radio communications	ISO/IEC 19762-4:2008 provides general terms and definitions relating to radio communications in the area of automatic identification and data capture techniques. This glossary of terms enables the communication between non-specialist users and specialists in radio communications through a common understanding of basic and advanced concepts.	International Standard NP for a single part document & translation to French, German, and Russian		2008-06-11
AIDC	ISO/IEC JTC 1/SC 31	ISO/IEC 19762-5, Information technology – Automatic identification and data capture (AIDC) techniques – Harmonized vocabulary – Part 5: Locating systems	ISO/IEC 19762-5:2008 provides terms and definitions unique to locating systems in the area of automatic identification and data capture techniques. This glossary of terms enables the communication between non-specialist users and specialists in locating systems through a common understanding of basic and advanced concepts.	International Standard NP for a single part document & translation to French, German, and Russian		2008-06-11
AIDC	ISO/IEC JTC 1/SC 31	ISO/IEC 15459-1, Information technology – Automatic identification and data capture techniques – Unique identification – Part 1: Individual	This standard provides unique identification at the transport unit level. This standard serves as the basis for identification in ISO 15394 (for bar codes) and ISO 17365 (for RFID)	FDIS		

		transport units				
AIDC	ISO/IEC JTC 1/SC 31	ISO/IEC 15459-2, Information technology – Automatic identification and data capture techniques – Unique identification – Part 2: Registration procedures	Unique identification can occur at many different levels in the supply chain, at the transport unit, at the item level, and elsewhere. Such distinct entities are often handled by several parties: the sender, the receiver, one or more carriers, customs authorities, etc. Each of these parties must be able to identify and trace the item so that reference can be made to associated information such as address, order number, contents of the item, weight, sender, batch or lot number, etc. There are considerable benefits if the identity of the item is common between all the relevant parties. ISO/IEC 15459-2:2006 specifies the procedural requirements to maintain a non-significant, unique identifier for item management applications, and outlines the obligations of the Registration Authority and Issuing Agencies. ISO/IEC 15459-2:2006 excludes those items where ISO has designated Maintenance Agencies or Registration Authorities to provide identification schemes. It does not apply to - freight containers, because their unique coding is specified in ISO 6346, Freight containers -- Coding, identification and marking; - vehicles, because their unique identification is specified in ISO 3779, Road vehicles -- Vehicle identification number (VIN) -- Content and structure; - car radios, because their unique identification is specified in ISO 10486, Passenger cars -- Car radio identification number (CRIN). The exclusion also applies to ISO 2108, Information and documentation -- International standard book number (ISBN) and ISO 3297, Information and documentation -- International	International Standard		2009-06-29

			standard serial number (ISSN).			
AIDC	ISO/IEC JTC 1/SC 31	ISO/IEC 15459-3, Information technology – Automatic identification and data capture techniques – Unique identification – Part 3: Common rules for unique	Unique identification can occur at many different levels in the supply chain, at the transport unit, at the item level, and elsewhere. Such distinct entities are often handled by several parties - the sender, the receiver, one or more carriers, customs authorities, etc. Each of these parties must be able to identify and trace the item so that reference can be made to associated information such as configuration, maintenance history, address, order number, contents of the item, weight, sender, batch or lot number, etc. The information is often held on computer systems, and may be exchanged between parties involved via EDI (Electronic Data Interchange) and XML (eXtensible Markup Language) messages. There are considerable benefits if the identity of the item is represented in bar code format, or other AIDC (Automatic Identification and Data Capture) media and attached to or made a constituent part of that which is being uniquely identified so that - it can be read electronically, thus minimising errors; - one identity can be used by all parties; - each party can use the identity to look up its computer files to find the data associated with the item; - the identifier is unique within the class and cannot appear on any other item of the class during the lifetime of the item. ISO/IEC 15459-3:2006 specifies the common rules that apply for unique identifiers for item management that are required to ensure full compatibility across classes of unique identifiers.	International Standard		2009-06-29
AIDC	ISO/IEC JTC 1/SC	ISO/IEC 15459-4, Information technology	Unique identification can occur at many different levels in the supply chain, at the transport unit, at the item level, and	International Standard		2009-06-29

	31	– Automatic identification and data capture techniques – Unique identification – Part 4: Individual items	elsewhere. Such distinct entities are often handled by several parties: the sender, the receiver, one or more carriers, customs authorities, etc. Each of these parties must be able to identify and trace the item so that reference can be made to associated information such as configuration, maintenance history, address, order number, contents of the item, weight, sender, batch or lot number, etc. The information is often held on computer systems, and may be exchanged between parties involved via EDI (Electronic Data Interchange) and XML (eXtensible Markup Language) messages. There are considerable benefits if the identity of the item is represented in bar code format, or other AIDC (Automatic Identification and Data Capture) media and attached to or made a constituent part of that which is being uniquely identified so that - it can be read electronically, thus minimising errors; - one identity can be used by all parties; - each party can use the identity to look up its computer files to find the data associated with the item; - the identifier is unique within the class and cannot appear on any other item of the class during the lifetime of the item. The unique identifier for individual items defined in ISO/IEC 15459-4:2008 and represented in a bar code label, two-dimensional symbol, radio-frequency identification tag, or other AIDC media attached to the item meets these needs. All AIDC technologies have the potential to encode a unique identifier. It is expected that application standards for items, using various automatic identification technologies, will be developed based upon the unique identifier as a prime key.			

			These application standards may be made available from the Issuing Agency. ISO/IEC 15459-4:2008 specifies a unique, non-significant string of characters for the unique identifier for individual items. The character string is intended to be represented in a bar code label or other AIDC media attached to the item to meet supply chain needs. To address management needs, different classes of items are recognized in the various parts of ISO/IEC 15459, which allows different requirements to be met by the unique identifiers associated with each class. The rules are defined for the individual items to identify the unique occurrence of an item, understood to mean the layers zero and one as will be defined in two future International Standards (ISO 17367 and ISO 17366, respectively).			
AIDC	ISO/IEC JTC 1/SC 31	ISO/IEC 15459-5, Information technology – Automatic identification and data capture techniques – Unique identification – Part 5: Unique identifier for returnable transport items (RTIs)	ISO/IEC 15459-5:2007 specifies a unique, non-significant string of characters for the unique identification of returnable transport items (RTIs). The character string is intended to be represented in a radio frequency identification (RFID) transponder, bar code label or other automatic identification and data capture (AIDC) media attached to the item to meet supply chain management needs. To address management needs different classes of RTI are recognised in the various parts of ISO/IEC 15459, which allows different requirements to be met by the unique identifiers associated with each class. The rules for the unique identifier for RTIs, to identify the unique occurrence of an item, with the identity being relevant for the complete life cycle of the item, are defined and supported by an example.	International Standard		2009-06-29
AIDC	ISO/IEC JTC 1/SC 31	ISO/IEC 15459-6, Information technology – Automatic identification and data capture techniques – Unique identification –	ISO/IEC 15459-6:2007 specifies a unique, non-significant string of characters for the unique identifier of product groupings. The character string is intended to be represented in linear bar code and two-dimensional symbols, radio frequency identification (RFID) transponder or other automatic identification and data capture (AIDC) media attached to the	International Standard		2009-06-29

		Part 1: Individual transport units	product and/or material to meet the management needs in a batch or lot unit. To address management needs, different classes of item are recognised in the various parts of ISO/IEC 15459. This allows different requirements to be met by the unique identifiers of each class. The unique identifier for product grouping enables a product grouping defined by a batch or lot number to be uniquely identified from all other lots and batches compliant with ISO/IEC 15459-6:2007. Encoding this unique identifier in a data carrier enables information about the quality of product and end-of-life processing to be clearly identified. The rules for the unique identifier for product grouping, to identify the unique occurrence of that quality, are defined and supported by an example.			
AIDC	ISO/IEC JTC 1/SC 31	ISO/IEC 15459-8, Information technology – Automatic identification and data capture techniques – Unique identification – Part 8: Grouping of transport units	ISO/IEC 15459-8:2009 specifies a unique, non-significant, string of characters for the unique identifier for grouping of transport units. The character string might be represented in a bar code label or other AIDC media associated with the items that make up the grouping to meet supply chain needs and regulatory needs (e.g. customs clearance). An individual instance of an entity is aptly identified by a unique identifier defined in other parts of ISO/IEC 15459. This relationship has to be communicated to the business partners according to the business need and the unique identifier for the grouping might be used as a reference number only or marked in addition to the existing identifier. To address management needs, different classes of items are recognized in the various parts of ISO/IEC 15459, which allows different requirements to be met by the unique identifiers associated with each class. ISO/IEC 15459-8:2009 defines the rules for the grouping of transport units to identify the multiple physical units that make up a single shipment from a consignor and are treated as a single logical grouping for customs and other shipping requirements.	International Standard		2009-08-31

RFID	ISO/IEC JTC 1/SC 31	ISO/IEC 18000-3, Information technology – Radio frequency identification for item management – Part 3: Parameters for air interface communications at 13,56 MHz	ISO/IEC 18000 has been developed in order to: - provide a framework to define common communications protocols for Internationally useable frequencies for radio frequency identification (RFID), and, where possible, to determine the use of the same protocols for all frequencies such that the problems of migrating from one to another are diminished; - minimize software and implementation costs; - enable system management and control and information exchange to be common as far as is possible. ISO/IEC 18000-1 provides explanation of the concepts behind ISO/IEC 18000-3:2010. ISO/IEC 18000-3:2010 has 3 MODES of operation, intended to address different applications. The detailed technical differences between the modes are shown in parameter tables. ISO/IEC 18000-3:2010 provides physical layer, collision management system and protocol values for RFID systems for item identification operating at 13,56 MHz in accordance with the requirements of ISO/IEC 18000-1. It provides definitions for systems for each MODE determined in ISO/IEC 18000-3:2010. It defines three non-interfering MODES. - The MODES are not interoperable. - The MODES, whilst not interoperable, are non-interfering.	International Standard		2010-11-04
RFID	ISO/IEC JTC 1/SC 31	ISO/IEC 18000-63, Information technology – Radio frequency identification for item management – Part 63:	ISO/IEC 18000-6:2010 defines the air interface for radio frequency identification (RFID) devices operating in the 860 MHz to 960 MHz Industrial, Scientific, and Medical (ISM) band used in item management applications. It provides a common technical specification for RFID devices that can be	~~DIS ends on 2012-02-24~~International Standard		2013-01-16

		Parameters for air interface communications at 860 MHz to 960 MHz	used by ISO committees developing RFID application standards. ISO/IEC 18000-6:2010 is intended to allow for compatibility and to encourage inter-operability of products for the growing RFID market in the international marketplace. It defines the forward and return link parameters for technical attributes including, but not limited to, operating frequency, operating channel accuracy, occupied channel bandwidth, maximum effective isotropic radiated power (EIRP), spurious emissions, modulation, duty cycle, data coding, bit rate, bit rate accuracy, bit transmission order, and, where appropriate, operating channels, frequency hop rate, hop sequence, spreading sequence, and chip rate. It further defines the communications protocol used in the air interface. ISO/IEC 18000-6:2010 specifies the physical and logical requirements for a passive-backscatter, Interrogator-Talks-First (ITF) or tag-talks-only-after-listening (TOTAL) RFID system. The system comprises Interrogators, and tags, also known as labels. An Interrogator receives information from a tag by transmitting a continuous-wave (CW) RF signal to the tag; the tag responds by modulating the reflection coefficient of its antenna, thereby backscattering an information signal to the Interrogator. The system is ITF, meaning that a tag modulates its antenna reflection coefficient with an information signal only after being directed to do so by an Interrogator, or TOTAL, meaning that a tag modulates its antenna reflection coefficient with an information signal upon entering an Interrogator's field after first listening for Interrogator modulation in order to determine if the system is ITF or not. In detail, ISO/IEC 18000-6:2010 contains one mode with four types. The detailed technical differences between the four types are shown in the associated parameter tables. Types A, B and C are ITF. Type A uses Pulse-Interval Encoding (PIE) in the forward link and an adaptive ALOHA collision-arbitration algorithm. Type B uses Manchester in the			

			forward link and an adaptive binary-tree collision-arbitration algorithm. Type C uses PIE in the forward link and a random slotted collision-arbitration algorithm. Type D is TOTAL based on Pulse Position Encoding or Miller M=2 encoded subcarrier. ISO/IEC 18000-6:2010 specifies - physical interactions (the signalling layer of the communication link) between Interrogators and tags, - Interrogator and tag operating procedures and commands, - the collision arbitration scheme used to identify a specific tag in a multiple-tag environment.			
RFID	ISO/IEC JTC 1/SC 31	ISO/IEC 18000-7, Information technology – Radio frequency identification for item management – Part 7: Parameters for active air interface communications at 433 MHz	ISO/IEC 18000-7:2009 defines the air interface for radio frequency identification (RFID) devices operating as an active RF tag in the 433 MHz band used in item management applications. It provides a common technical specification for RFID devices that can be used by ISO technical committees developing RFID application standards. ISO/IEC 18000-7:2009 is intended to allow for compatibility and to encourage inter-operability of products for the growing RFID market in the international marketplace. ISO/IEC 18000-7:2009 defines the forward and return link parameters for technical attributes including, but not limited to, operating frequency, operating channel accuracy, occupied channel bandwidth, maximum power, spurious emissions, modulation, duty cycle, data coding, bit rate, bit rate accuracy, bit transmission order, and, where appropriate, operating channels, frequency hop rate, hop sequence, spreading sequence, and chip rate. ISO/IEC 18000-7:2009 further defines the communications protocol used in the air interface.	International Standard to be revised~~CD~~		
RFID	ISO/IEC JTC 1/SC 31	ISO/IEC 15963, Information technology – Radio frequency	ISO/IEC 15963:2009 describes numbering systems that are available for the identification of RF tags.	International Standard		2009-08-31

		identification for item management – Unique identification for RF tags	The unique ID can be used - for the traceability of the integrated circuit itself for quality control in its manufacturing process, - for the traceability of the RF tag during its manufacturing process and along its lifetime, - for the completion of the reading in a multi-antenna configuration, - by the anti-collision mechanism to inventory multiple tags in the reader's field of view, and - for the traceability of the Item to which the RF tag is attached.			
MIIM	ISO/IEC JTC 1/SC 31	ISO/IEC 29143, Information technology – Automatic identification and data capture techniques – Air interface specification for Mobile RFID interrogators	ISO/IEC 29143:2011 specifies - Mobile RFID interrogator media access control, - interrogator to interrogator and multiple interrogator to tag collision arbitration scheme including interrogator requirements, - interrogator to interrogator and multiple interrogator to tag collision avoidance scheme, and - tag memory use for Mobile RFID applications. ISO/IEC 29143:2011 does not specify - physical interactions (the signaling layer of the communication link) between interrogators and tags, - interrogator and tag operating procedures and commands, and - the collision arbitration algorithm used to singulate (separate to the current response slot) a specific tag in a multiple-tag environment.	International Standard		2011-01-31
AIDC	ISO/IEC	ISO/IEC 29161,	This International Standard establishes a scheme of unique	~~NP end on 2012-02-~~		

	JTC 1/SC 31	Automatic identification and data capture techniques – Unique identification	digital identification for products, product packages, transport units, assets, and other items. This International Standard specifies the common rules applicable for unique digital identification that are required to ensure full compatibility across different identities. The unique digital identification is a universal binary identifier for any physical object. It is used in information systems that need to track or otherwise refer to physical objects. It is intended for use within any AIDC media capable of encoding binary structures.	~~29~~WD		
RFID	ISO TC 122	ISO 17363, Supply chain applications of RFID – Freight containers	ISO 17363:2013 defines the usage of read/write radio-frequency identification technology (RFID) cargo shipment-specific tags associated with containerized freight for supply chain management purposes (“manifest tags”). This International Standard, through reference to other standards within ISO TC 122, ISO TC 104, and ISO/IEC JTC 1/SC 31, defines the air interface communications, a common set of required data structures, and a commonly organized, through common syntax and semantics, set of optional data requirements. This International Standard - Makes recommendations about a second generation supply chain tag intended to monitor the condition and security of the freight resident within a freight container. - Specifies the implementation of sensors for freight resident in a freight container. - Makes specific recommendations about mandatory non-reprogrammable information on the shipment tag. - Makes specific recommendations about optional, re-programmable information on the shipment tag. - Makes specific recommends about the data link interface for GPS or GLS services.	2nd Ed Approved 2012-12-07, awaiting publication ~~2nd Edition FDIS~~		

				- Specifies the reuse and recyclability of the RF tag. - Specifies the means by which the data in a compliant RF tag is "backed-up" by bar codes and two-dimensional symbols, as well as human-readable information.ISO 17363:2007 defines the usage of read/write radio-frequency identification technology (RFID) cargo-shipment-specific tags on freight containers for supply-chain management purposes (shipment tags). It defines the air-interface communications, a common set of required data structures, and a commonly organized set of optional data requirements (through common syntax and semantics). - It contains recommendations about a containerized cargo-supply chain RFID system, based on shipment tags; specific recommendations about mandatory non-reprogrammable information on the shipment tag; and specific recommendations about optional, re-programmable information on the shipment tag. - Identified within ISO 17363:2007 are the air-interface and communication parameters for active radio-frequency identification communications using ISO/IEC 18000-7. - ISO 17363:2007 is applicable to freight containers as defined in ISO 668 and to freight containers that are not defined by other ISO standards. It complements ISO 10374 for permanent container license-plate tags. - It fully describes cargo shipment-specific tags. - It does not address smart container technologies affixed to, or inside, freight containers (e.g. sensors) for supply-chain management purposes.			
RFID		ISO TC 122	ISO 17364, Supply chain applications of RFID –	ISO 17364:2013 defines the basic features of RFID for the use in the supply chain when applied to returnable transport items. In particular it	2nd Ed Approved 2012-12-07, awaiting		

			Returnable transport items (RTIs)	- provides specifications for the identification of the RTI and RPI, - makes recommendations about additional information on the RF tag, - specifies the semantics and data syntax to be used, - specifies the data protocol to be used to interface with business applications and the RFID system, - specifies the minimum performance requirements, - specifies the air interface standards between the RF interrogator and RF tag, and specifies the reuse and recyclability of the RF tag.~~ISO 17364:2009 defines the basic features of RFID for the use in the supply chain when applied to returnable transport items. In particular it:~~ ~~- provides specifications for the identification of the RTI,~~ ~~- makes recommendations about additional information on the RF tag,~~ ~~- specifies the semantics and data syntax to be used,~~ ~~- specifies the data protocol to be used to interface with business applications and the RFID system,~~ ~~- specifies the minimum performance requirements,~~ ~~- specifies the air interface standards between the RF interrogator and RF tag, and~~ - ~~specifies the reuse and recyclability of the RF tag.~~	publication ~~2nd Edition FDIS~~		
RFID		ISO TC 122	ISO 17365, Supply chain applications of RFID – Transport units	ISO 17365:2013 defines the basic features of RFID for the use in the supply chain when applied to transport units. In particular it - provides specifications for the identification of the	2nd Ed Approved 2012-12-07, awaiting publication~~2nd Edition FDIS~~		

				transport unit, - makes recommendations about additional information on the RF tag, - specifies the semantics and data syntax to be used, - specifies the data protocol to be used to interface with business applications and the RFID system, - specifies the minimum performance requirements, - specifies the air interface standards between the RF interrogator and RF tag, and - specifies the reuse and recyclability of the RF tag specifies the reuse and recyclability of the RF tag~~ISO 17365:2009 defines the basic features of RFID for the use in the supply chain when applied to transport units. In particular it:~~ ~~- provides specifications for the identification of the transport unit,~~ ~~- makes recommendations about additional information on the RF tag,~~ ~~- specifies the semantics and data syntax to be used,~~ ~~- specifies the data protocol to be used to interface with business applications and the RFID system,~~ ~~- specifies the minimum performance requirements,~~ ~~- specifies the air interface standards between the RF interrogator and RF tag, and~~ - ~~specifies the reuse and recyclability of the RF tag.~~			
RFID		ISO TC 122	ISO 17366, Supply chain applications of RFID – Product packaging	ISO 17366:2013 defines the usage of RFID technology for product packaging i defines the basic features of RFID for the use in the supply chain when applied to product packaging. In particular it	2nd Ed Approved 2012-12-07, awaiting publication ~~2nd Edition~~		

				- provides specifications for the identification of the product packaging, - makes recommendations about additional information on the RF tag, - specifies the semantics and data syntax to be used, - specifies the data protocol to be used to interface with business applications and the RFID system, - specifies the minimum performance requirements, - specifies the air interface standards between the RF interrogator and RF tag, and - specifies the reuse and recyclability of the RF tagISO 17366 defines the usage of RFID technology for product packaging in supply chain management applications. It defines the air-interface communications, a common set of required data structures, and a commonly organized set of optional data requirements (through common syntax and semantics). - ISO 17366 identifies the air-interface and communication parameters for passive radio-frequency identification communications using ISO/IEC 18000-6C or alternately ISO/IEC 18000-3m3.	FDIS		
RFID		ISO TC 122	ISO 17367, Supply chain applications of RFID – Returnable transport items (RTIs)	ISO 17367:2013 defines the basic features of RFID for the use in the supply chain when applied to product tagging. In particular it - provides specific recommendations about the encoded identification of the product, - makes recommendations about additional information about the product on the RF tag, - makes recommendations about the semantics and data syntax to be used,	2nd Ed Approved 2012-12-07, awaiting publication 2nd Edition FDIS		

				- makes recommendations about the data protocol to be used to interface with business applications and the RFID system, and - makes recommendations about the air interface standards between the RF interrogator and RF tag. ~~—~~This International Standard only addresses product tagging and does not address product packaging.~~ISO 17367:2009 defines the basic features of RFID for the use in the supply chain when applied to product tagging. In particular it~~ ~~— provides specific recommendations about the encoded identification of the product,~~ ~~— makes recommendations about additional information about the product on the RF tag,~~ ~~— makes recommendations about the semantics and data syntax to be used,~~ ~~— makes recommendations about the data protocol to be used to interface with business applications and the RFID system, and~~ ~~— makes recommendations about the air interface standards between the RF interrogator and RF tag.~~ ~~It only addresses product tagging and does not address product packaging.~~			
	IoT	ISO TC 122	ISO 18577, Internet of Things (IoT) in the supply chain — Transport units	ISO 18577 This International Standard specifies the component pieces necessary for the effective implementation of Internet of Things applications for transport units. This International Standard specifies the necessary forms of identification, communications, types of devices, sensors, actuators, means of localization and tracking, appropriate security, methods of storage, and processing of IoT data.	New Work Item Proposal Approved 2013-01-12		

IoT	ISO TC 122	ISO 18576, Internet of Things (IoT) in the supply chain — Returnable transport items (RTIs)	ISO 18576 specifies the component pieces necessary for the effective implementation of Internet of Things applications for returnable transport items. This International Standard specifies the necessary forms of identification, communications, types of devices, sensors, actuators, means of localization and tracking, appropriate security, methods of storage, and processing of IoT data.	New Work Item Proposal Approved 2013-01-12		
IoT	ISO TC 122	ISO 18575, Internet of Things (IoT) in the supply chain — Products & product packages	ISO 18575 specifies the component pieces necessary for the effective implementation of Internet of Things applications for products and product packaging. This International Standard specifies the necessary forms of identification, communications, types of devices, sensors, actuators, means of localization and tracking, appropriate security, methods of storage, and processing of IoT data.	New Work Item Proposal Approved 2013-01-12		
IoT	ISO TC 122	ISO 18574, Internet of Things (IoT) in the supply chain — Containerized cargo	ISO 18574 specifies the component pieces necessary for the effective implementation of Internet of Things applications for containerized cargo. This International Standard specifies the necessary forms of identification, communications, types of devices, sensors, actuators, means of localization and tracking, appropriate security, methods of storage, and processing of IoT data.	New Work Item Proposal Approved 2013-01-12		
Identity management	OMA	OMA Web Services Network Identity	The 'OMA Web Services Enabler (OWSER): Network Identity Specifications' provides the specifications of the components needed to provide aspects of the Network Identity related capabilities of the OWSER.	Approved Enabler		2006-03-28
Identity management	OMA	OMA Identity Management Framework Requirements	The intention of this Requirements Document is to tie together all existing efforts relating to Identity within the OMA in order to create a single Identity Management (IdM) enabler to be used by all OMA enablers. This document sets requirements for all technical working groups of OMA, and all Identity Management related functions should be satisfied according to the resulting enabler.	Candidate Enabler		2005-02-02

Identity management	OMA	OMA Global Permissions Management	The GPM enabler consists of the Permission Checking and Management component, which provides the following main functions: - The Permissions Checking function which processes Permissions Rules, and is exposed by a derivative of the PEM-1 interface. - The Permissions Rules management function for creating, reading, deleting, modifying of Permissions Rules, which is exposed by a derivative of the PEM-2 interface. - Consent interaction function, which uses the Interfaces to other resources to asks Ask Targets for consent on Permissions Checking decisions (e.g. send Ask Request to Ask Target). This may be performed during processing of Permissions Rules.	Candidate Enabler		2009-07-10
~~NID~~	~~ITU-T SG17 Q11~~	~~F.5xx, Directory Service - Support of Tag-based Identification Services~~	~~The scope of this Recommendation is to provide sufficient information for the use of directories for supporting tag-based identification applications without having to study the details of the many specifications for tag-based identification. It describes how this support may be provided using systems supporting the ITU-T X.500 Series of Recommendations | ISO/IEC 9594-All Parts. The capabilities required are primarily limited to those capabilities that are also supported by the LDAP specifications.~~ ~~NOTE 1 – Use of LDAP based systems provides low-cost solutions.~~ ~~For more complex environments this Recommendation also provides guidance on how directory responsibilities may be split between a general service provider and the information owners.~~ ~~This Recommendation is only concerned with tag-based identification as related to Automatic Identification and Data Capture (AIDC) media as specified in numerous ISO/IEC and~~	~~Draft Recommendation~~		

			~~ISO International Standards and in GS1 specifications. This Recommendation is further limited to the following types of AIDC media:~~ ~~- The 18000-6C tag type as defined in [ISO/IEC 18000-6]. This tag type is identical to the GS1 EPCglobal Class 1 Gen 2 tag type.~~ ~~- The 18000-3 Mode 3 tag type as defined in [ISO/IEC 18000-3].~~			
NID	ITU-T SG11 Q12 (2009 ~ 2012)	Q.3950, Testing and model network architecture for tag-based identification systems and functions	A set of standards and relevant implementations are necessary to enable tag-based identification applications and services over the NGN and other communication networks. The implementations are recommended to be verified according to given standards to evaluate their conformance and interoperability. This Recommendation specifies a testing and model network architecture that describes target systems, target functions and system configurations in terms of model network, general procedures and testing requirements	Recommendation	January 2010	2011-11
FN	ITU-T SG13 Q21 (2009 ~ 2012)	Y.3001 (Future Networks: Objectives and Design Goals)	This Recommendation describes objectives and design goals for Future Networks. The scope of this Recommendation covers: - Fundamental issues to which not enough attention was paid in designing current networks, and which are recommended to be the objective of Future Networks - High-level capabilities and characteristics that are recommended to be supported by Future Networks - Target timeframe for Future Networks Ideas and research topics of Future Networks that are important and may be relevant to future ITU-T standardization are included in the Appendix of this Recommendation.	Recommendation	January 2009	2011-05

FN	ITU-T SG13 Q21 (2009 ~ 2012)	Y.~~FNid~~ 3031, ~~(Framework of identifiers~~ Identification framework in future networks~~)~~	The scope of this Recommendation includes the following items: - Specification of important objects requiring new identifiers in future networks (FNs); - Analysis of the identifiers being used in existing networks and FNs projects; Framework and generic requirements for identifiers in FNs.	~~Under study~~Recommendation	January 2011	~~February 2012~~2012-05-07
Geospatial Information	OGC	OGC Abstract Specification, Topic 2: Spatial Referencing by Coordinates Version 4.0, OGC Document 08-015r2 Also published as ISO 19111:2007	This Abstract Specification defines the conceptual schema for the description of spatial referencing by coordinates, optionally extended to spatio-temporal referencing. It describes the minimum data required to define one-, two- and three-dimensional spatial coordinate reference systems with an extension to merged spatial-temporal reference systems. It allows additional descriptive information to be provided. It also describes the information required to change coordinates from one coordinate reference system to another. http://www.opengeospatial.org/standards/as	Abstract Specification.		2010-04-27
Geospatial Information	ISO	ISO 19112:2003 Geographic information – Spatial referencing by geographic identifiers	ISO 19912:2003 defines the conceptual schema for spatial references based on geographic identifiers. It establishes a general model for spatial referencing using geographic identifiers, defines the components of a spatial reference system and defines the essential components of a gazetteer. Spatial referencing by coordinates is not addressed in this document; however, a mechanism for recording complementary coordinate references is included. http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=26017	International Standard		2003
Geospatial Information	OGC	KML OGC Document 07-	KML is an XML language focused on geographic visualization, including annotation of maps and images. Geographic	Implementation Standard		2008-04-14

		147r2	visualization includes not only the presentation of graphical data on the globe, but also the control of the user's navigation in the sense of where to go and where to look. http://www.opengeospatial.org/standards/kml			
Geospatial Information	OGC	Web Map Service (WMS) OGC Document 06-042 Also published as ISO 19128	The Web Map Service Interface Standard provides a simple HTTP interface for requesting geo-registered map images from one or more distributed geospatial databases. A WMS request defines the geographic layer(s) and area of interest to be processed. The response to the request is one or more geo-registered map images (returned as JPEG, PNG, etc) that can be displayed in a browser application. http://www.opengeospatial.org/standards/wms	Implementation Standard		2006-03-15
Geospatial Information	OGC	Geography Markup Language (GML) Encoding Standard Version 3.2.1 Document 07-036 Also published as ISO 19136	GML is an XML grammar for expressing geographical features. GML serves as a modeling language for geographic systems as well as an open interchange format for geographic transactions on the Internet. As with most XML based grammars, there are two parts to the grammar – the schema that describes the document and the instance document that contains the actual data. A GML document is described using a GML Schema. This allows users and developers to describe generic geographic data sets that contain points, lines and polygons. However, the developers of GML envision communities working to define community-specific application schemas that are specialized extensions of GML. Using application schemas, users can refer to roads, highways, and bridges instead of points, lines and polygons. http://www.opengeospatial.org/standards/gml	Implementation Standard		2007-12-28
Geospatial Information	OGC	City Geography Markup Language (CityGML) Encoding Standard	This document is an OpenGIS® Encoding Standard for the representation, storage and exchange of virtual 3D city and landscape models. CityGML is implemented as an application schema of the Geography Markup Language version 3.1.1	Implementation Standard		2008-08-20

		OGC Document 08-007r1	(GML3). CityGML models both complex and georeferenced 3D vector data along with the semantics associated with the data. In contrast to other 3D vector formats, CityGML is based on a rich, general purpose information model in addition to geometry and appearance information. For specific domain areas, CityGML also provides an extension mechanism to enrich the data with identifiable features under preservation of semantic interoperability. http://www.opengeospatial.org/standards/citygml			
Geospatial Information	OGC	Web Feature Service OGC Document 09-025r1 also ISO 19142	This International Standard specifies the behaviour of a service that provides transactions on and access to geographic features in a manner independent of the underlying data store. It specifies discovery operations, query operations, locking operations, transaction operations and operations to manage stored parameterized query expressions. http://www.opengeospatial.org/standards/wfs	Implementation Standard		2010-11-02
Geospatial Information	OGC	OGC Filter Encoding Encoding Standard Version 2.0 Document 09-026r1 Also published as ISO 19143	This International Standard describes an XML and KVP encoding of a system neutral syntax for expressing projections, selection and sorting clauses collectively called a query expression. These components are modular and intended to be used together or individually by other standards which reference this International Standard. http://www.opengeospatial.org/standards/filter	Implementation Standard		2010-11-22
SWE	OGC	Sensor Web Enablement Architecture OGC Document 06-021r4	This document describes the architecture implemented by OGC's Sensor Web Enablement (SWE). In much the same way that HTML and HTTP standards enabled the exchange of any type of information on the Web, the SWE initiative is focused on developing standards to enable the discovery of sensors and corresponding observations, exchange, and processing of sensor observations, as well as the tasking of sensors and sensor systems.	Best Practice		2008-08-20

			http://portal.opengeospatial.org/files/?artifact_id=29405			
SWE	OGC	OGC Abstract Specification, Topic 20: Observations and Measurements Version 2.0 Document 10-004r3 Also published as ISO 19156:2010	This International Standard defines a conceptual schema for observations, and for features involved in sampling when making observations. These provide models for the exchange of information describing observation acts and their results, both within and between different scientific and technical communities. http://www.opengeospatial.org/standards/as	Approved Abstract Specification		2010-11-10
SWE	OGC	Observations and Measurements - XML Implementation OGC Document 10-025r1	This standard specifies an XML implementation for the OGC and ISO Observations and Measurements (O&M) conceptual model (OGC Observations and Measurements v2.0 also published as ISO/DIS 19156), including a schema for Sampling Features. This encoding is an essential dependency for the OGC Sensor Observation Service (SOS) Interface Standard. More specifically, this standard defines XML schemas for observations, and for features involved in sampling when making observations. These provide document models for the exchange of information describing observation acts and their results, both within and between different scientific and technical communities. http://www.opengeospatial.org/standards/om	Implementation Standard		2011-03-22
SWE	OGC	Sensor Model Language (SensorML) OGC Document 07-000	The Sensor Model Language Encoding Standard (SensorML) specifies models and XML encoding that provide a framework within which the geometric, dynamic, and observational characteristics of sensors and sensor systems can be defined. There are many different sensor types, from simple visual thermometers to complex electron microscopes and earth observing satellites. These can all be supported through the definition of atomic process models and process chains. http://www.opengeospatial.org/standards/sensorml	Implementation Standard		2007-07-17

SWE	OGC	Sensor Observation Service OGD Document 06-009r6	The Sensor Observation Service Interface Standard (SOS) provides an API for managing deployed sensors and retrieving sensor data and specifically "observation" data. Whether from in-situ sensors (e.g., water monitoring) or dynamic sensors (e.g., satellite imaging), measurements made from sensor systems contribute most of the geospatial data by volume used in geospatial systems today. http://www.opengeospatial.org/standards/sos	Implementation Standard		2007-10-26
SWE	OGC	Sensor Planning Service OGC Document 09-000	The Sensor Planning Service Interface Standard (SPS) defines interfaces for queries that provide information about the capabilities of a sensor and how to task the sensor. The standard is designed to support queries that have the following purposes: to determine the feasibility of a sensor planning request; to submit and reserve/commit such a request; to inquire about the status of such a request; to update or cancel such a request; and to request information about other OGC Web services that provide access to the data collected by the requested task. http://www.opengeospatial.org/standards/sps	Implementation Standard		2011-03-28
LBS	OGC	OpenGIS Location Service (OpenLS) Implementation Specification: Core Services OGC Document 07-074	The five Core OpenLS services are defined in a single document: 1. Directory Service. Provides access to an online directory enabling an application to find the location of a specific or nearest place, product, or service. 2. Gateway Service. Retrieves the position of a known Mobile Terminal from the network. This interface is modelled after the LIF/OMA Mobile Location Protocol (MLP), Standard Location Immediate Service, specified in Open Mobile Alliance MLP. 3. Location Utility Service (Geocoder/Reverse Geocoder) Geocoding converts a text description of a location, such as a place name, street address, or postal code to a position structured as Point geometry. Reverse Geocoding converts a position into a feature (Address with Point), where the address may be a street address, intersection address, place name, or	Implementation Standard		9 September 2008

			postal code. 4. Presentation Service. Creates maps and other graphic depictions of selected geospatial data, with a set of ADTs as logical layers. 5. Route Service. Determines travel routes and navigation information between two or more points http://www.opengeospatial.org/standards/ols			
LBS	OGC	OpenLS: Part 6-Navigation Service Implementation Standard OGC Document 08-028r7	The OpenLS: Part 6-Navigation Service Implementation Standard is an enhanced version of the Route Service, that determines travel routes and navigation information between two or more points. http://www.opengeospatial.org/standards/ols	Implementation Standard		2008
LBS	OGC	OpenLS Tracking Service Interface Standard OGC Document 06-024r4	The OpenLS Tracking Service Interface Standard supports a very simple functionality allowing a collection of movable objects to be tracked as they move and change orientation. http://www.opengeospatial.org/standards/ols	Implementation Standard		2008
LBS	OGC	Open GeoSMS	The OpenGIS Open GeoSMS standard defines an encoding for location enabling the Short Message Service. SMS is a communication service for phone, web or mobile communication systems, that provides exchange of short text messages between fixed line or mobile phone devices. The OGC Open GeoSMS encoding standard facilitates communication of location content using the extended SMS devices or applications for achieving interoperable communications while still maintaining human readability of the content. http://www.opengeospatial.org/projects/groups/opengeosmsswg	Standards Working Group	2010/01/05	2011
AIDC	EN 841:1995	Bar coding - Symbology specifications - Format Description	This standard - specifies the format for bar code symbology specifications.	Published		

			- specifies the characteristics of the symbology which need to be defined. The standard is applicable as the basis for European Standards for bar code symbologies.			
AIDC	EN 1573:1996	Bar coding - Multi-industry transport label	This European Standard - specifies the general requirements for the design of bar coded transport labels for use by a wide range of industries; - provides for traceability of transported units by automatic access via a 'license plate' printed in bar code and supplemented where necessary by other identified data presented both in bar code and human readable form. - provides a choice of bar code symbologies; - specifies quality requirements, classes of bar code density; - gives recommendations as to label material, size and the inclusion of free text and any appropriate graphics.	Published		Revision started 11-2011
AIDC	EN 1556:1998	Bar coding - Terminology	This European Standard defines a number of technical and other terms applicable to bar code technology, which are used in the standards produced by CEN TC225 and may be encountered elsewhere in bar coding standards produced by other organisations. Definitions given are in the context of bar coding and the terms so defined may customarily have a wider meaning than that shown in this Standard. Translations of the terms defined into the t w o other official languages of CEN are also shown to facilitate cross-reference.	Published		
AIDC	EN 606:2004	Bar coding - Transport and handling labels for steel products	This document specifies the requirements for labels containing human readable and bar coded information for fixing to steel products for the purpose of despatch, transport, and reception in accordance with the requirements of ISO 15394. Data elements are specified together with their status, location on the label, the appropriate data identifier and choice of bar code symbology.	Published		

AIDC	EN 1649:2004	AIDC technologies - Operational aspects affecting the reading of bar code symbols	This document specifies the operational aspects affecting the reading of bar code symbols which must be considered in the preparation of application standards. It defines the subjects which must be addressed by application standards if they are to provide practical guidance to the user industries for whose use they are developed.	Published		
AIDC	EN 12323:2005	AIDC technologies - Symbology specifications - Code 16K	This document: - specifies the requirements for the multi row bar code symbology known as "Code 16K"; - specifies "Code 16K" symbology characteristics, data character encodation, dimensions, tolerances, decoding algorithms and user-defined application parameters; - describes a subset of "Code 16K" assigned to EAN International.	Published		
WASN	ITU-R SG 5 WP 5A Q.250/5	ITU-R M.~~-~~2001, Objectives, characteristics and functional requirements of wide-area sensor and/or actuator network (WASN) systems	This Recommendation provides the objectives, system characteristics, functional requirements, service applications and fundamental network functionalities for mobile wireless access systems providing communications to a large number of ubiquitous sensors and/or actuators scattered over wide areas in the land mobile service. The key objective of WASN systems is to support machine-to-machine service applications irrespective of machine locations.	Draft new Recommendation	May 2009	2012-03
WASN	ITU-R SG 5 WP 5A Q.250/5	System design guidelines for wide area sensor and/or actuator network (WASN) systems	This report provides detailed information for service applications, network architecture, system design guidelines, wireless applications and examples of wide area sensors and/or actuators network (WASN) systems.	Draft new Report	May 2009	November 2011
Supply chain	GS1	GS1 System Landscape	This document provides a comprehensive inventory of the GS1 standards and catalogues and classifies them into topic areas.	Published		February 2011
M2M	ITU-T SG9 Q5	J.295, ~~"~~Functional Requirements for	This Recommendation defines functional requirements for the advanced cable set-top box to enable cable television operators	~~Approved on January~~		~~Consented on~~

	(2009 ~ 2012)	Advanced Cable Set-Top Box~~"~~	to provide advanced services to their subscribers. The advanced cable set-top box is intended to apply to cable television operators' service provision, where many types of access network technologies have been recently introduced, e.g. HFC, PON, RFoG. Cable television operators have a capability of providing both broadcasting and interactivity over its own network originally intended to distribute broadcasting television programs, and the advanced cable set-top box is a core device for the delivery of attractive advanced services.	~~2012~~Recommendation		~~11-2011~~2012-01-30
USN	ITU-T SG9 Q8 (2009 ~ 2012)	ITU-T J.700, ~~"~~IPTV service requirements and framework for secondary distribution~~"~~	This Recommendation describes the service requirements and functional framework architecture for support of IPTV services to provide enhanced broadcasting, where broadcasting programs are delivered over existing cable-based secondary distribution networks composed of HFC or FTTx with some enhancements by applications and/or services provided over IP-enabled networks. It addresses the service requirements, use cases and functional components required to support these requirements. Where possible, this Recommendation utilizes the material already developed, or under development, in ITU-T Recommendations related to video service delivery over secondary networks.	~~Approved on December 2008~~Recommendation		2009-12-14
USN	ITU-T SG9 Q8 (2009 ~ 2012)	~~[~~ITU-T J.360,~~]~~ ~~"~~IPCablecom2 architecture framework~~"~~	The initial release of IPCablecom [ITU-T J.160-J.178] provides for telephony. IPCablecom multimedia [ITU-T J.179] creates a bridge that allows for the expansion of IPCablecom into a full range of multimedia services. This Recommendation provides the architectural framework, technical background and project organization for the second release of the IPCablecom family of Recommendations providing for the extension into the multimedia domain.	~~Approved on November 2006~~Recommendation		2008-06-13
M2M	ITU-T SG9 Q8	~~[~~ITU-T J.366.0,~~]~~	This Recommendation is an overview document introducing the family of IMS delta Recommendations that adapt the	~~Approved on November 2006~~Recommendation		2006-11-29

	(2009 ~ 2012)	IPCablecom2 IP Multimedia Subsystem (IMS): Delta Recommendations overview	wireless industries IMS initiative to the needs of the cable industry. A delta Recommendation references another document and then shows only the changes necessary to adapt the other document to the current needs. It is an important objective of this work that interoperability between IPCablecom 2.0 and 3GPP IMS is provided. IPCablecom 2.0 is based upon 3GPP IMS, but includes additional functionality necessary to meet the requirements of cable operators. Recognizing developing converged solutions for wireless, wireline, and cable, it is expected that further development of IPCablecom 2.0 will continue to monitor and contribute to IMS developments in 3GPP, with the aim of alignment of 3GPP IMS and IPCablecom 2.0.			
USN	ITU-T SG9 Q9 (2009 ~ 2012)	~~Draft new~~ ITU-T ~~Rec.~~ J.lasdp-req, ~~"~~Functional and Application Programming Interface Requirements for Local Application and Service Delivery Platform for Cable Home Networks~~"~~	This draft new Recommendation defines functional requirements for the local application and service delivery platform (LASDP) in the cable home network environment. The local application service delivery platform is a conceptual platform which resides within the home network to provide programming interfaces and functionalities to enable the cable service provider and third party entities to deliver advanced and innovative applications and services to cable subscribers in the home network. The LASDP can communicate and interwork with network service delivery platforms to create more value for customers and the service provider.	Draft Recommendation		~~Expected for approval on May 2012~~ ~~Ref. TD 284 (GEN 9)~~
IoT	ITU-T SG13 Q3 (2009 ~ 2012)	Y.2060, Overview of Internet of Things	This Recommendation provides an overview of the Internet of Things (IoT) with the main objectives to introduce to this important area for future standardization. More specifically, this Recommendation covers the following: - IoT related terms and definitions; - concept and scope of IoT; - characteristics of IoT; - high level requirements of IoT;	Recommendation	2011-05	2012-06

			- IoT reference models. IoT ecosystem and business models related information is provided in Appendix I.			
MOC	ITU-T SG13 Q3 (2009 ~ 2012)	**Y.2061**, Requirements for support of machine oriented communication applications in the NGN environment	This Recommendation covers extensions and additions to NGN capabilities [ITU-T Y.2201] and MOC device domain capabilities in order to support machine oriented communication (MOC) applications in the NGN environment. Although this Recommendation deals with support of MOC applications in the NGN environment, these capabilities can conceptually be applicable to other networks. The scope of this Recommendation includes: - Service overview, description of MOC ecosystem and key supporting features of MOC applications; - Service requirements to support MOC applications; - Requirements of extended or new NGN capabilities based on the MOC service requirements; - Requirements of MOC device domain capabilities (for supporting MOC applications over NGN) - Reference framework for MOC capabilities.	Recommendation		
		ITU-T SG13 Q3 (2009 ~ 2012)	**Y.SCN**, ~~Applications of~~ Sensor Control Networks and their applications over NGN	This Recommendation provides a description and general characteristics of sensor control networks (SCN) applications. This Recommendation describes objectives and fundamental characteristics of SCNs and identifies capabilities required for the support of SCN applications in NGN.	Draft Recommendation		
		ITU-T SG13 Q3 (2009 ~ 2012)	**Y.EHM-Reqts**, Requirements and Capabilities for E-health Monitoring Applications	This Recommendation describes requirements for supporting e-Health monitoring services, and specifies corresponding network capabilities. The scope of this Recommendation includes: - Classification of scenarios for E-Health monitoring	Draft Recommendation		

			services; - Description of features of E-Health monitoring services from network perspective; - Requirements for supporting E-Health monitoring services from network perspective; - Capabilities for supporting E-Health monitoring services from network perspective.			
	ITU-T SG13 Q12 (2009 ~ 2012)	**Y.2062**, Framework of object-to-object communication for ubiquitous networking in NGN	This draft Recommendation describes concept and high-level architectural model of object-to-object communication for ubiquitous networking in NGN and presents several requirements and mechanism for identification of all objects and providing connectivity to them. For this, this draft Recommendation covers the followings: - General overview of ubiquitous networking in NGN in the end-user perspective; - Basic concept and high-level architectural model for object to object communication with NGN; - Requirements and technical considerations of object-to-object communication for ubiquitous networking; - A mechanism for object to object communication.	Recommendation		2012-03
	ITU-T SG13 Q12 (2009 ~ 2012)	**Y.2063**, Framework of Web of Things	The scope of this Recommendation is to addresses Web of Things to realize the ubiquitous networking [ITU-T Y.2002]. The draft Recommendation covers: - Requirement analysis of Web of Things - Deployment model of Web of Things - Identify the capabilities for Web of Things - Functional architecture for Web of Things	Recommendation		2012-07
	ITU-T	**Y.energy-hn**, Energy	This draft Recommendation describes requirements and			

	SG13 Q12 (2009 ~ 2012)	saving using smart objects in next generation home network	capabilities for energy saving using smart objects in next generation home network (NG-HN) and present several mechanisms for energy saving of constraint smart objects. For this, this draft Recommendation covers the following: - General overview of energy saving using smart objects in NG-HN; - Requirements for energy saving using smart objects in NG-HN; - Functional model for energy saving using smart objects in NG-HN; - Mechanisms for energy saving of constraint smart objects in NG-HN. Basically, this draft Recommendation consider fixed smart environment like home/building and mobile smart environment like networked vehicle which support ubiquitous networking among objects.			
IoT	ITU-T SG13 Q3 (2009 ~ 2012)	**Y.gw-IoT-Reqts**, Common requirements and capabilities of gateways for IoT applications	This Recommendation studies the common requirements and capabilities of gateway for IoT applications. The scope of this Recommendation includes: - Relevant use cases of gateway for IoT applications. - General features of gateway of IoT applications - Common requirements of gateway for IoT applications - Technical framework of gateway for IoT applications - Common capabilities for gateway for IoT applications	Draft Recommendation	2012-05	2013-02
IoT	ITU-T SG13 Q3 (2009 ~ 2012)	**Y.IoT-common-reqts**, Common requirements of Internet of Things	This Recommendation provides the common requirements of Internet of Things (IoT) based on abstracted use cases and cross-domain use cases of IoT. The abstracted use cases are derived from application use cases, or derived from the definition and characteristics of the IoT regarded as general abstract use cases. The cross-domain use cases refer to use	Draft Recommendation	2012-05	2013-12

				cases that cover multiple application domains (e.g. e-Health, ITS, Smart Home, etc.). This Recommendation builds on the overview of IoT [ITU-T Y.2060], developing the common requirements based on the IoT reference model. The scope of this Recommendation includes: - Abstracted use cases - Cross-domain use cases - Key areas of consideration from a requirements perspective - Common requirements of IoT Appendix I provides typical application use cases.			
		ITU-T SG13 Q3 (2009 ~ 2012)	**Supplement to Y.2704 (formerly Y.NGN Certificate Management)**, Certificate Management				
		ITU-T SG13 Q3 (2009 ~ 2012)	**Supplement NGN Security Planning and Operations Guidelines**, Draft Supplement NGN Security Planning and Operations Guidelines				
		ITU-T SG13 Q25 (2009 ~ 2012)	**Y.2069**, Terms and definition for Internet of Things	This Recommendation specifies terms and definitions related to Internet of Things from an ITU-T perspective.	Recommendation		2012-07
USN		ITU-T SG16 Q25 (2009 ~	F.747.2, Deployment guidelines for ubiquitous sensor network (USN)	This Recommendation describes deployment guideline of Ubiquitous Sensor Network (USN) applications and services for mitigating the climate change. The scope of this	Recommendation	2009-10	2012-06

	2012)	applications and services for mitigating the climate change	Recommendation includes: - Analysis of environmental impact by USN applications and services; Deployment guideline of USN applications and services for mitigating the climate change.			
USN	ITU-T SG16 Q25 (2009 ~ 2012)	F.USN-NRP, Requirements of USN application and services for network robot platform	This Recommendation covers the following: - Overview of network robot platform in terms of USN applications and services; - Use cases of USN applications and services for network robot platform; USN service requirements for network robot platform.	Draft Recommendation	2010-03	2012
USN	ITU-T SG16 Q25 (2009 ~ 2012)	F.747.1, Capabilities of ubiquitous sensor network (USN) for supporting requirements of smart metering systems	The main purpose of this Recommendation is to identify capabilities of ubiquitous sensor network which supports requirements of smart metering services. The scope of this Recommendation covers the following: - Overview of smart metering; - Smart metering scenarios; - Requirements of smart metering services; USN capabilities for supporting requirements of smart metering services.	Recommendation	2010-07	2012-06
USN	ITU-T SG16 Q25 (2009 ~ 2012)	F.OpenUSN, Requirements and reference architecture for open USN service framework	The objective of this Recommendation is to define an open USN service framework, and provide requirements, and reference architecture of open USN service framework. The use of standard interfaces of open USN service framework will ensure USN service reusability, portability across several USN services, as well as accessibility and interoperability by USN application providers and/or developers. This Recommendation describes requirements and reference architecture for open USN service framework. The scope of this	Draft Recommendation	2011-11	2013

			Recommendation includes: - Concept of open USN service framework - Requirements of open USN service framework - Reference architecture of open USN service framework Functional entities of open USN service framework			
USN	ITU-T SG16 Q25 (2009 ~ 2012)	F.USN-ALI, Requirements and reference structure of automatic location identification capability for USN applications and services	Automatic Location Identification capability enables a device to discover its own location. Within USN scheme, ALI locates between the application and service layers. The ALI can be deployed with the network equipment, or independently integrated by end-node devices. It can be used in various networks such as hybrid mobile networks, internet, low power wireless network (smart gird), and other USN communication systems. The scope of this recommendation includes: - The specific scenario of ALI for USN; - The requirements of ALI for USN; The reference structure of ALI system within USN scheme.	Draft Recommendation	2011-11	2013
IoT	ITU-T SG16 Q25 (2009 ~ 2012)	H.IoT-reqs, Common Service Requirements for Internet of Things (IoT) applications and services	This draft Recommendation defines the common services requirements for Internet of Things applications and services based on [ITU-T Y.IoT-overview]. This Recommendation covers the following from the service point of view: - General overview of Internet of Things applications and services, and; - Characteristics of Internet of Things applications and services, and; - Common services requirements for Internet of Things	Draft Recommendation	2012-05	2013

			applications and services NOTE: This draft Recommendation mainly focuses on the view point of applications and services. Network layer aspect of Internet of Things is out of scope of this draft Recommendation.			
IoT	ITU-T SG16 Q25 (2009 ~ 2012)	H.IoT-ID, Requirements and Common Characteristics of IoT Identifier for IoT Service	The objective of this Recommendation is to analyse identifiers in existing technologies and networks for IoT service, and describe the requirements of IoT identifier, common characteristics of IoT identifier, and the general architecture of IoT identifier. This Recommendation describes the requirements and common characteristics of IoT identifier for IoT service. The scope of this Recommendation includes: - Analysis of identifiers in existing technologies and networks - Describe requirements of IoT identifier - Describe common characteristics of IoT identifier - Describe the general architecture of IoT identifier	Draft Recommendation	2012-05	2013
USN	ITU-T SG16 Q25 (2009 ~ 2012)	H.USN-WQA, Requirements of water quality assessment services in USN	This Recommendation identifies USN requirements and scenarios of water quality assessment services. The scope covers the following: - Overview of water quality assessment; - Water quality assessment scenarios; - Requirements of water quality assessment services; - USN capabilities for supporting the requirements of water quality assessment services;	Draft Recommendation	2012-05	2013
	ITU-T SG16 Q25	H.WoT-SA, Web of Things service	The objective of this Recommendation is to define the reference architecture of Web of things for its deployment.	Draft Recommendation	2012-05	2013

	(2009 ~ 2012)	architecture	The scope of this Recommendation covers the followings: - Overview of WoT Service Architecture; - WoT accessibility; - WoT findability; - WoT sharing; - WoT composition; - WoT interface.			
e-Health Application	ITU-T SG16 Q28 (2009 ~ 2012)	HSTP.-EHMSI, Multimedia Service and Interfaces for e-health	This Technical Paper describes requirements and use cases of multimedia services for e-health and their interfaces.	Draft Technical Paper	2009	~~2012~~
IoT	ITU-T SG13 Q2	Y.DM-IoT-Reqts,	This Recommendation studies the requirements and capabilities of device management in IoT. The scope of this Recommendation includes: - the requirements of device management in IoT; - the reference technical framework of device management in IoT; - the capabilities of device management in IoT.	Draft Recommendation	2013-02	
IoT	ITU-T SG13 Q2	Y.IoT-app-models, IoT application support models	This Recommendation studies application support models of Internet of Things (IoT). The basis of the study of application support models of IoT includes IoT applications classification, application-oriented services, and application adaptable capabilities. The Recommendation intends to show the applicability of application support models to the IoT requirements specified in [ITU-T Y.IoT-common-reqts]. The Recommendations also provides security considerations for IoT application support models.	Draft Recommendation	2013-02	

	IoT	ITU-T SG13 Q2	Y.IoT-funct-framework	This Recommendation provides the functional framework and associated capabilities of Internet of Things (IoT), in particular components of the functional framework, their capabilities, and the relationships among these components. The Recommendation also describes the relationships between the IoT requirements specified in [ITU-T Y.IoT-common-reqts] and the capabilities specified in this Recommendation. Finally, the Recommendation provides security considerations for the IoT functional framework.	Draft Recommendation	2013-02	
	IoT	ITU-T SG13 Q3	Y.gw-IoT-arch, Functional architecture of gateway for IoT applications	This Recommendation studies the functional architecture of gateway for IoT application. The scope of this Recommendation includes: - The functional architecture of gateway for IoT applications. - The functional entities of gateway for IoT applications - The internal/external interface of gateway for IoT applications	Draft Recommendation	2013-02	
	IoT	ITU-T SG16 Q27	F.VGP-REQ, Service and functional requirements of vehicle gateway platforms	This Recommendation provides the service description, application scenarios and requirements for Vehicle Gateway Platforms. A series of Recommendations for Vehicle Gateway Platforms is currently opened in ITU- T SG 16. This Recommendation is part of that series and gives the service description, application scenarios and requirements.	Draft Recommendation		
	IoT	ITU-T SG16 Q27	H.VGP-FAM, Functional architecture model of vehicle gateway platforms	N/A	Draft Recommendation		
	IoT	ITU-T SG16 Q27	G.SAM, Mechanisms for managing the situational	N/A	Draft Recommendation	2013-01	

			awareness of drivers				
IoT		ITU-T SG16 Q27	G.V2A, Communications interface between external applications and a Vehicle Gateway Platform	N/A	Draft Recommendation	2013-01	
M2M		3GPP	Release 10 features for Machine Type Communication	Section 4.2 of Release 10 document in the following link: http://www.3gpp.org/ftp/Information/WORK_PLAN/Description_Releases/	Completed		
M2M		3GPP	Release 11 features for Machine Type Communication	Section 4.2 of Release 11 document in the following link: http://www.3gpp.org/ftp/Information/WORK_PLAN/Description_Releases/	Completed		
M2M		3GPP	Release 12 features for Machine Type Communication	Work currently in Progress	In progress		

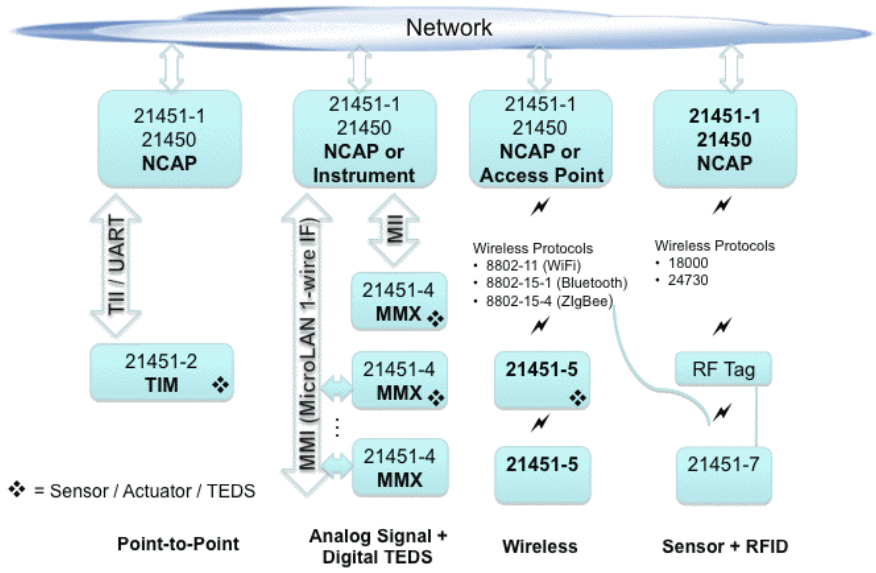
Annex A
Activity domain

A.1 Sensor and actuator

A.1.1 Summary of the activity domain

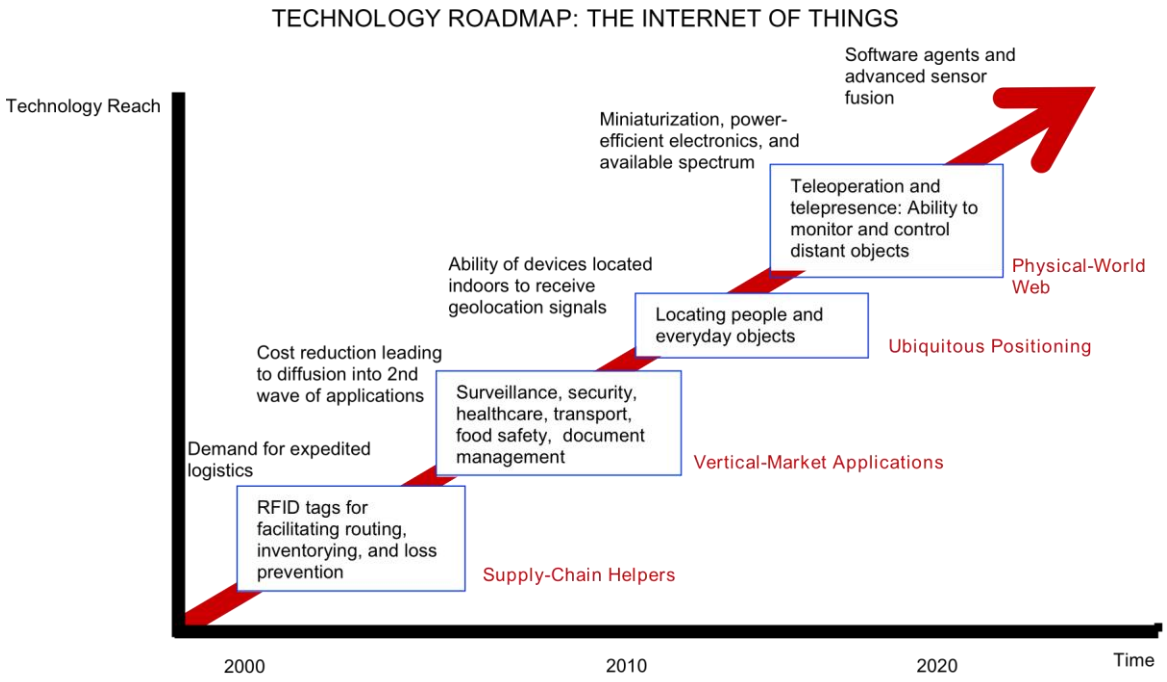
Embrace the terms and definitions of JTC 1/WG 7, facilitate the ISO / JTC 1 adoption of IEEE standards (IEEE 1451-series), collaborate with IEEE in the improvement of existing sensor and actuator standards and co-develop sensor and actuator standards to support supply chain standards.

A.1.2 High level overview diagram



A.1.3 Relation with IoT

Definitions here become important. In April 2008, SRI and National Intelligence Council published a public domain work entitled Disruptive Technologies Global Trends 2025, wherein is found the following Roadmap for IoT.



During that same period, a European Union Framework 7 Project entitled CASAGRAS provided the following definition for IoT in their final report

> *A global network infrastructure, linking physical and virtual objects through the exploitation of data capture and communication capabilities. This infrastructure includes existing and evolving Internet and network developments. It will offer specific object-identification, sensor and connection capability as the basis for the development of independent cooperative services and applications. These will be characterised by a high degree of autonomous data capture, event transfer, network connectivity and interoperability.*

While, admittedly, the term IoT was first coined by the Auto-ID Center in 1999, it was suggested as a concept that required unique addressability of all objects, which the founders were quite willing to provide through a device called the Electronic Product Code (EPC). Soon GS1 realized that such an addressability structure would directly compete with their Universal Product Code (U.P.C. and EAN). This caused GS1 to acquire EPC. Schemes were then developed to convert GS1 coding structures to EPC, while ignoring other extant coding structures used in the supply chain and in networking. A case-in-point is Internet Protocol Version 4 (IPv4) and IPv6. The former is a 32-bit structure having a capacity of 4.3 billion addresses, with most of these addresses having already been assigned. Its successor, IPv6, is a 128-bit structure having a capacity of 340 trillion trillion trillion (34 duodecillion) addresses. A second case-in-point is the supply chain standards having their roots in products other than grocery (the

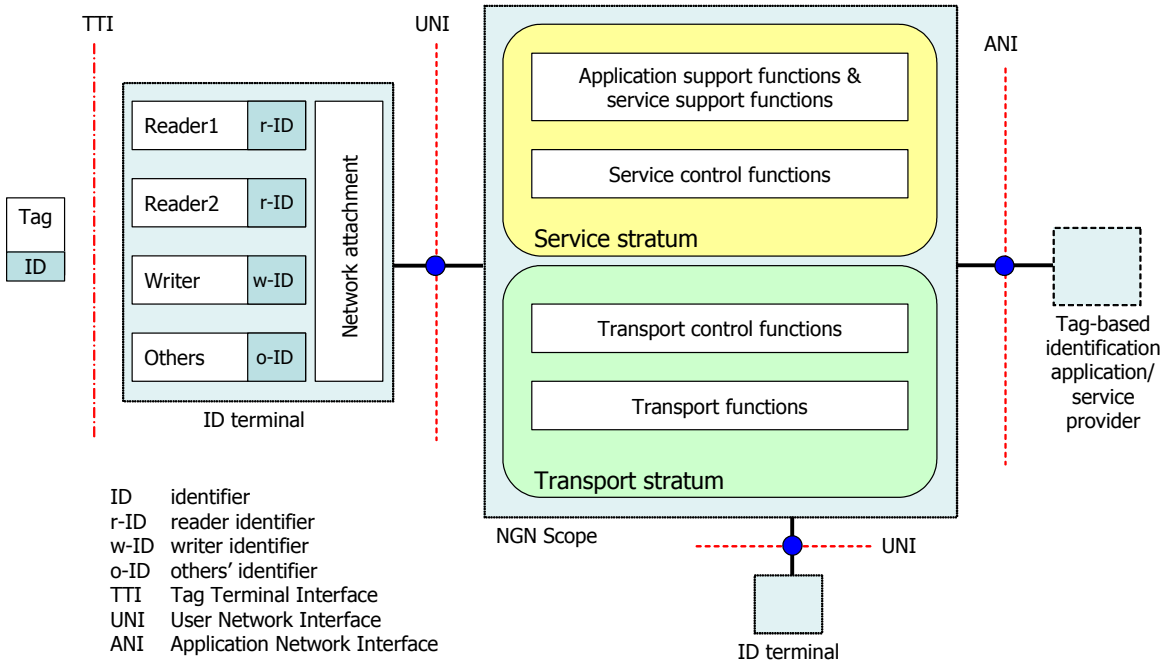
genesis of GS1), for example those embraced by ISO/IEC 15459, Unique identification. And yet a third case in point is the scheme employed for MAC addresses and other network addressing for IEEE & JTC 1 8802 (802) series standards and those employed for sensors, i.e. IEEE EUI-48 and EUI-64.

A.2 NID (= tag-based identification)

A.2.1 Summary of the activity domain

NID deals with network aspects of tag-based identification functionalities where the tag-based identification is defined as the process of specifically identifying a physical or logical object from other physical or logical objects by using identifiers stored on an identification tag such as barcode label, RFID tag, and smart card.

A.2.2 High level overview diagram



A.2.3 Relation with IoT

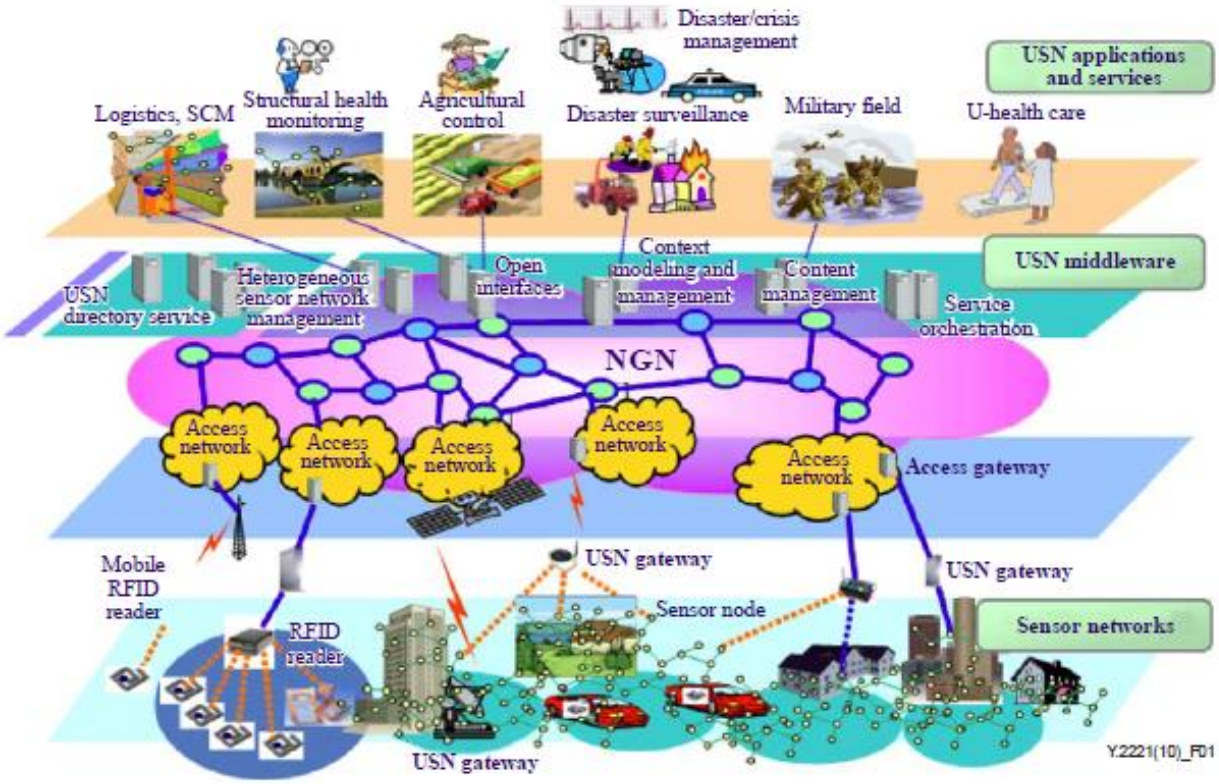
NID is an enabler for the IoT. The “Things” of “Internet of Things” are everything physical such as cars, flowers, trees, doors, televisions, refrigerators, and desks. Moreover everything virtual such as movie contents, on-line lectures and news could be the “Things” through a proxy. For example, a television could be a proxy for broadcasting news and a computer monitor could be a proxy for on-line lecture content. All such things are standalone and should communicate among themselves for object-to-object communication, or with human beings for human-to-object communication. Enablers that breathe life into the things are barcode, RFID, sensor, smartcard, etc.

A.3 USN

A.3.1 Summary of the activity domain

USN is defined by ITU-T Y.2221 as a conceptual network built over existing physical networks which makes use of sensed data and provides knowledge services to anyone, anywhere and at anytime, and where the information is generated by using context awareness.

A.3.2 High level overview diagram



A.3.3 Relation with IoT

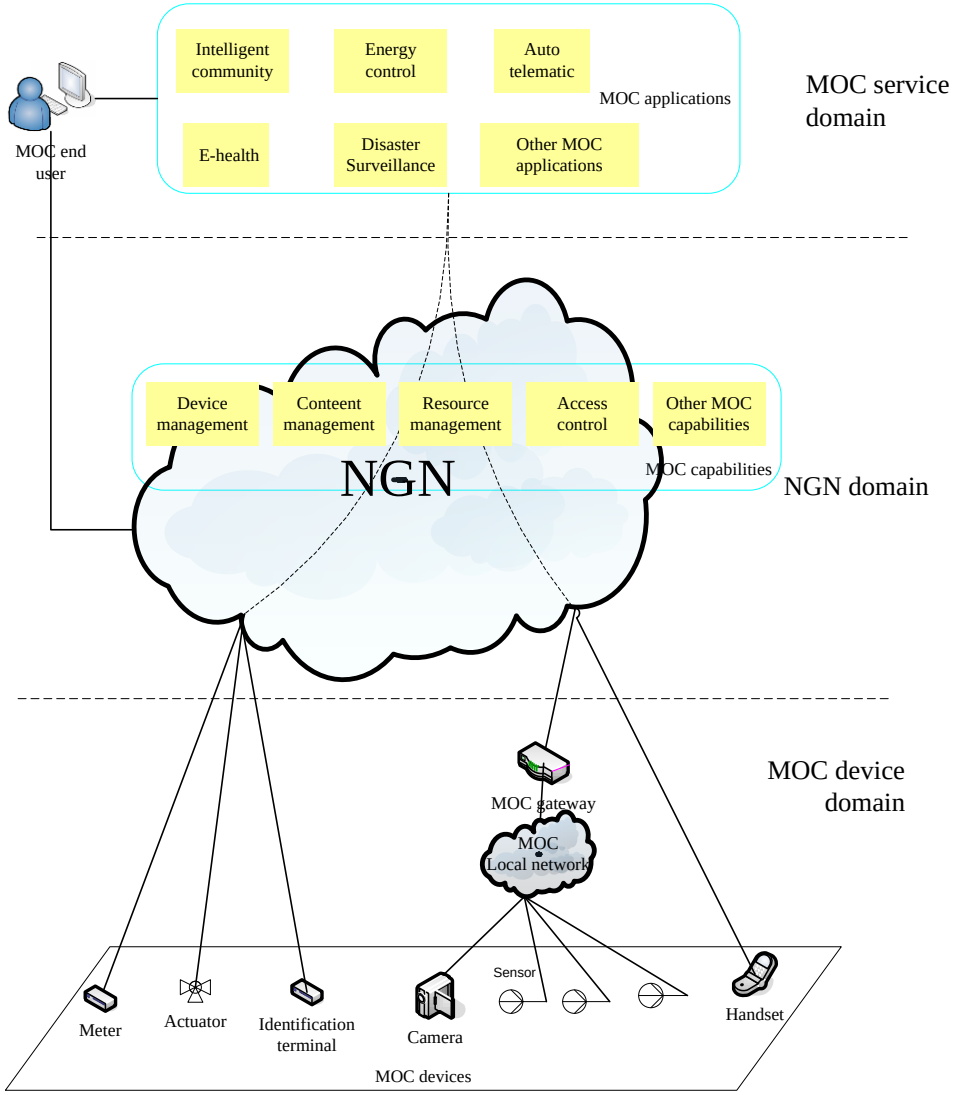
USN is enabled by physical sensor networks and various information processing features. A sensor network consists of sensors and communication units to send sensed and measured data to a local or remote node(s). It embeds applications and services that use the measured data. The sensor network is one of key enablers of the IoT because monitoring and sensing of physical conditions and phenomena are a vital requirement to enable the concept of the IoT. Things equipped with a sensor can talk about what they sense for themselves and relevant sensor networks transport their sensor data to users.

A.4 MOC

A.4.1 Summary of the activity domain

MOC is defined by ITU-T Y.MOC-reqts as a form of data communication between two or more entities in which at least one entity does not necessarily require human interaction or intervention in the process of communication.

A.4.2 High level overview diagram



A.4.3 Relation with IoT

Machine oriented communications (MOC) refer to communications between two or more entities that need limited or even no direct human intervention. Machine-oriented communications include communications with remote devices for monitoring, management and other functions. MOC applications intend to automate decision and communication processes. MOC works as an enabler for the IoT.

A.5 Future Network

A.5.1 Summary of the activity domain

Future Network is a network able to provide services, capabilities, and facilities difficult to provide using existing network technologies. We expect trial services and phased deployment of them is estimated to fall approximately between 2015 and 2020. Details are shown in ITU-T Recommendation Y.3001.

A.5.2 High level overview diagram

Please see the figure 1 of ITU-T Recommendation Y.3001.

A.5.3 Relation with IoT

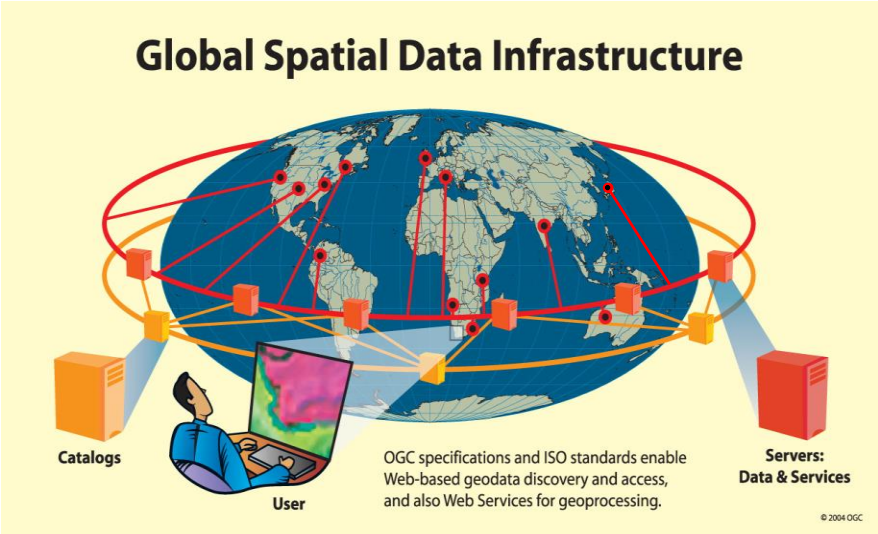
We believe Future Networks will be the foundation of IoT in the future.

A.6 Geospatial Information

A.6.1 Summary of the activity domain

Geospatial information is a ubiquitous element of almost all data. Whether represented as a map or an image, encoded as an address, zip code, or phone number, described in a text passage as a landmark or event, or any of the many other ways of representing Earth features and their properties; location is pervasive. Geospatial location and time are integral to all aspects of the work in the OGC and OGC standards. Geography is a foundational property for modeling the world in a coherent, intuitive way. Location and time can be exploited as a unifying theme to better understand the context of most real and abstract phenomena. OGC has established a set of standards for the GeoWeb and works with many other standards organizations to increase the accuracy of handling location and geospatial information in all domains.

A.6.2 High level overview diagram



A.6.3 Relation with IoT

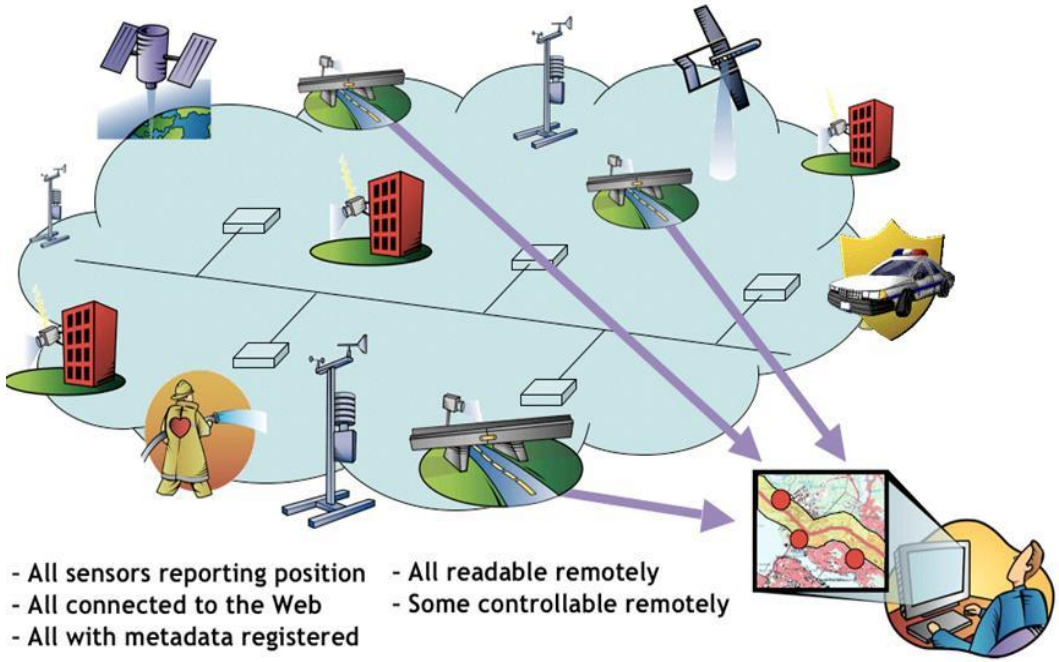
Information about location is fundamental to nearly all aspects of IoT. “Everything is somewhere”

A.7 Sensor Web Enablement (SWE)

A.7.1 Summary of the activity domain

OGC has established a set of Sensor Web Enablement standards for interfaces and metadata encodings that enable real time integration of heterogeneous sensor webs into information infrastructures. Developers use these specifications in creating applications, platforms, and products involving Web-connected devices such as flood gauges, air pollution monitors, stress gauges on bridges, mobile heart monitors, Webcams, and robots as well as space and airborne earth imaging devices.

A.7.2 High level overview diagram



A.7.3 Relation with IoT

Many of the nodes in the Internet of Things will include sensors. While there are many standards aimed at providing network access to the sensors, OGC's SWE standards focus on the content of sensor information and making the sensor observations useful to end user applications. SWE standards allow users to assessment the fitness for use of observations and to allow accurate processing on the sensed information to create derived information suitable to the users needs.

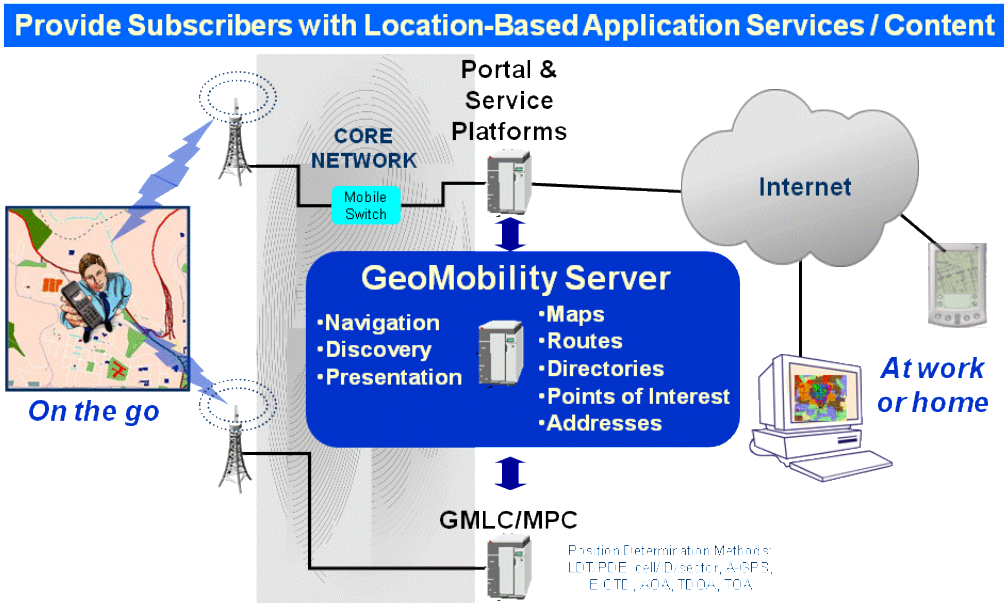
A.8 Location Based Services

A.2.1 Summary of the activity domain

The OpenLS standards define an open platform for position access and location-based applications targeting Mobile Terminals. OpenLS specifies interfaces that enable companies in the Location Based Services (LBS) value chain to "hook up" and provide their pieces of applications such as emergency response (E-911, for example), personal navigator, traffic information service, proximity service, location recall, mobile field service, travel

directions, restaurant finder, corporate asset locator, concierge, routing, vector map portrayal and interaction, friend finder, and geography voice-graphics. These applications are enabled by interfaces that implement OpenLS services such as a Directory Service, Gateway Service, Geocoder Service, Presentation (Map Portrayal) Service and others.

A.8.2 High level overview diagram



A.8.3 Relation with IoT

Many IoT services will be on mobile devices and involve location based services. OGC's OpenLS standards were developed in conjunction with the mobile industry, i.e., OMA, and has been deployed widely in the backside mobile networks.

A.9 AIDC

A.9.1 Summary of the activity domain

AIDC technologies permit the identification, location, and status/condition monitoring of any type of object with minimal human intervention and with minimal delay.

AIDC technologies provide the environmental sensors required to enable the future Internet of Things and the Internet of Services.

AIDC is used in all sectors of society. Technical innovation, driven by the needs of a wide range of applications, has resulted in multiple techniques, each with its own functional deliverables.

Optical Readable Media (ORM) (Bar code, OCR) and RFID (including environmental sensors) are the most implemented and well known forms of AIDC.

A.9.2 High level overview diagram

N/A

A.9.3 Relation with IoT

There is a relation / interface between the edge technologies like barcode, RFID and associated sensors and the IoT.

A.10 Wide area sensor and/or actuator network (WASN) systems

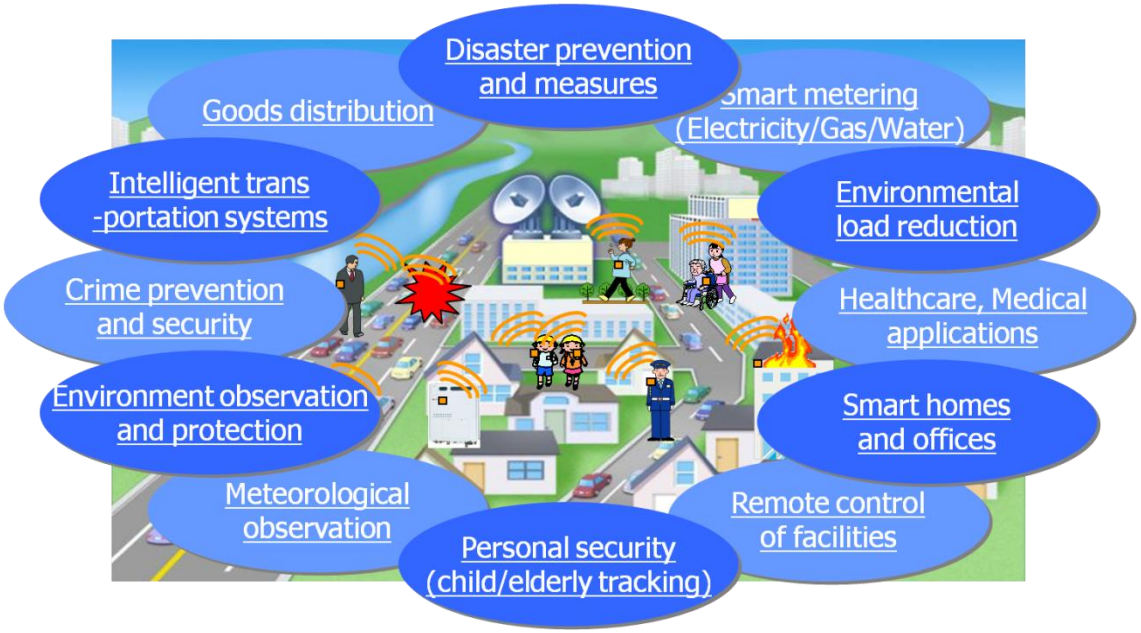
A.10.1 Summary of the activity domain

WASN systems provide a large number of sensors and/or actuators with M2M (Machine-to-Machine) service applications. As shown in Fig. 1, key characteristics of the systems are the following:

– They will accommodate extremely high density of WT (Wireless Terminal) such as in urban areas as well as low density of WT such as in rural areas.

– They typically operate at low transmission rates which will facilitate the deployment of large cells and allow low-density areas to be supported cost-effectively.

A.10.2 High level overview diagram



A.10.3 Relation with IoT

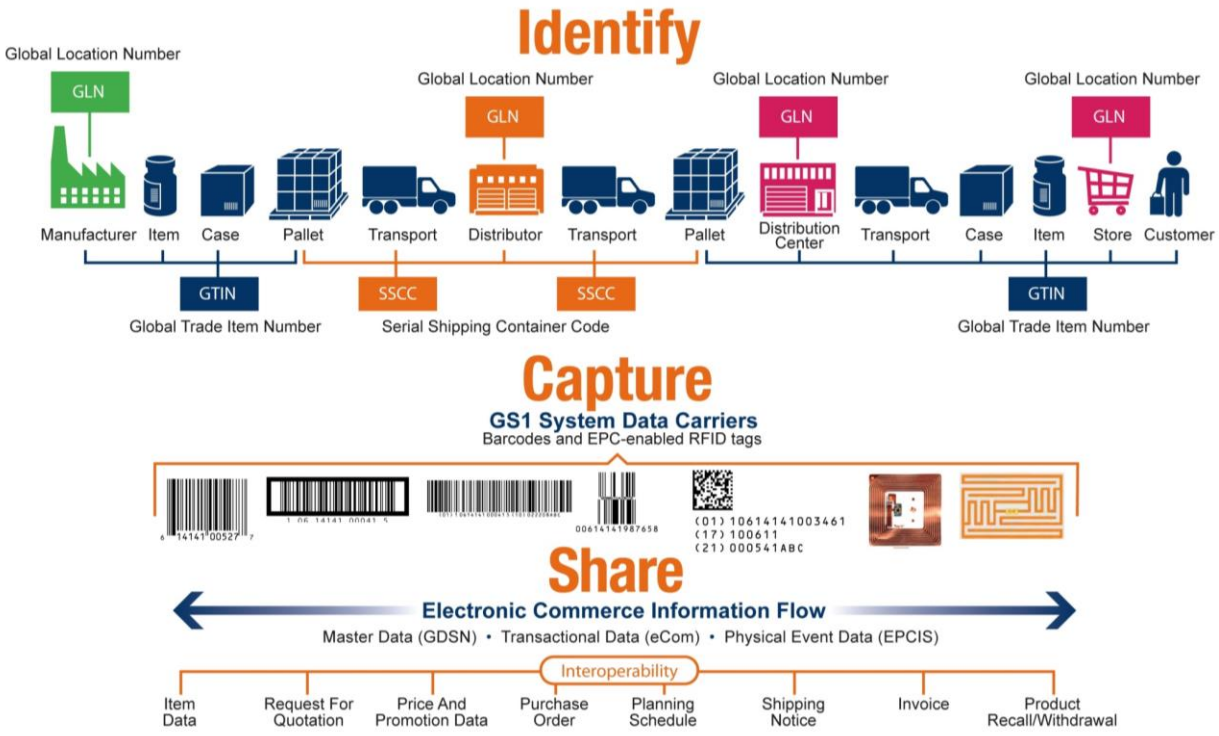
WASN systems are wireless applications that provide ICT services such as environment monitoring, stolen goods tracing, monitoring of gas, water and electricity use for reducing environmental loads, personal security and health care, etc.

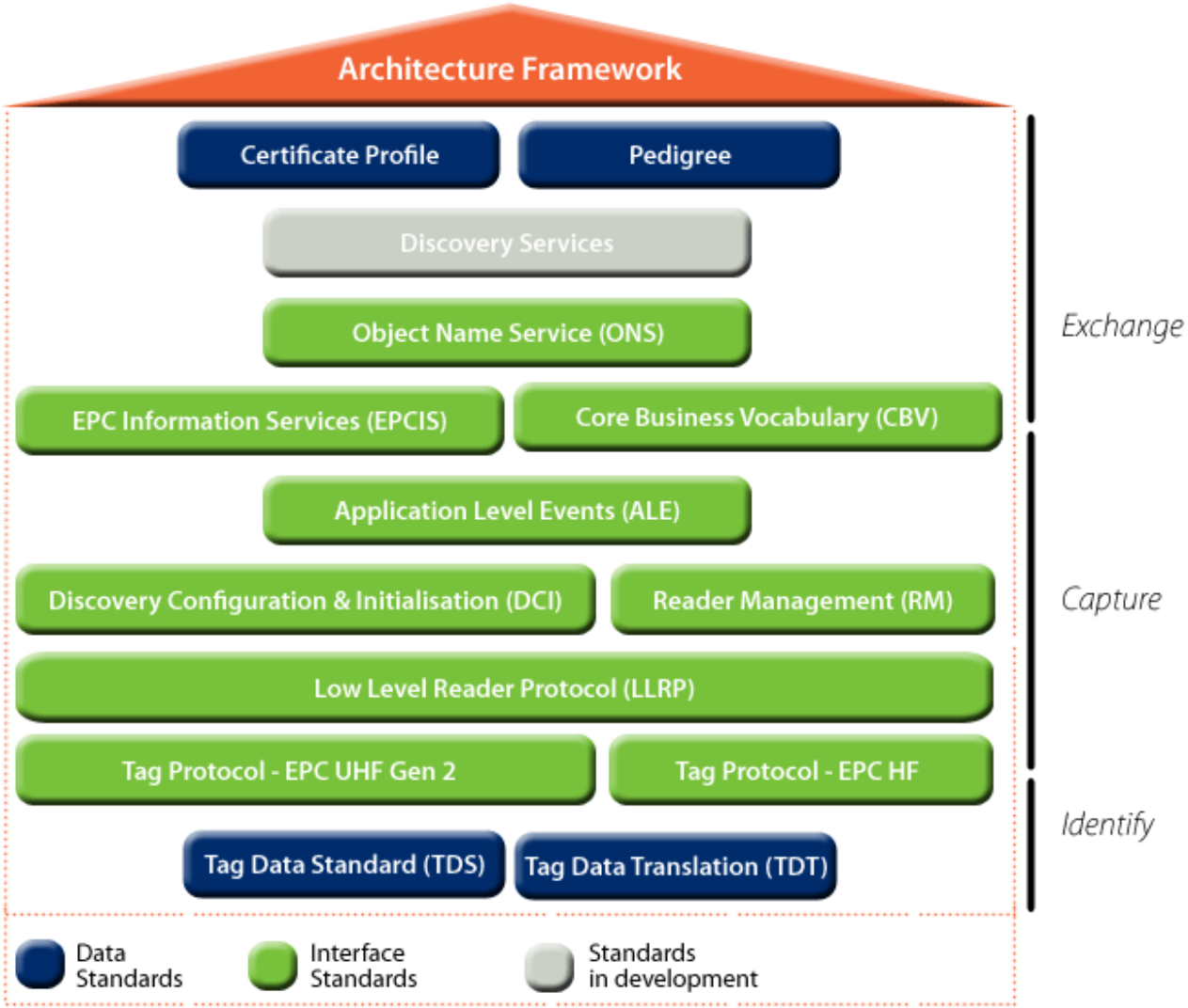
A.11 Supply chain

A.2.1 Summary of the activity domain

Design and implementation of global standards and solutions to improve the efficiency and visibility of supply and demand chains globally and across sectors.

A.2.2 High level overview diagram




Architecture Framework
Certificate Profile
Pedigree
Discovery Services
Object Name Service (ONS)
EPC Information Services (EPCIS)
Core Business Vocabulary (CBV)
Application Level Events (ALE)
Discovery Configuration & Initialisation (DCI)
Reader Management (RM)
Low Level Reader Protocol (LLRP)
Tag Protocol - EPC UHF Gen 2
Tag Protocol - EPC HF
Tag Data Standard (TDS)
Tag Data Translation (TDT)
Exchange
Capture
Identify
Data Standards
Interface Standards
Standards in development

A.2.3 Relation with IoT

The GS1 System provides a way to relate physical objects and their movements in supply chains with static and dynamic information related to the objects. In this sense, it seems appropriate to state that it fits within the IoT vision.