



EUOS

EU Observatory for
ICT Standardisation

Report of TWG Smart Cities: Landscape of Smart Cities Standards

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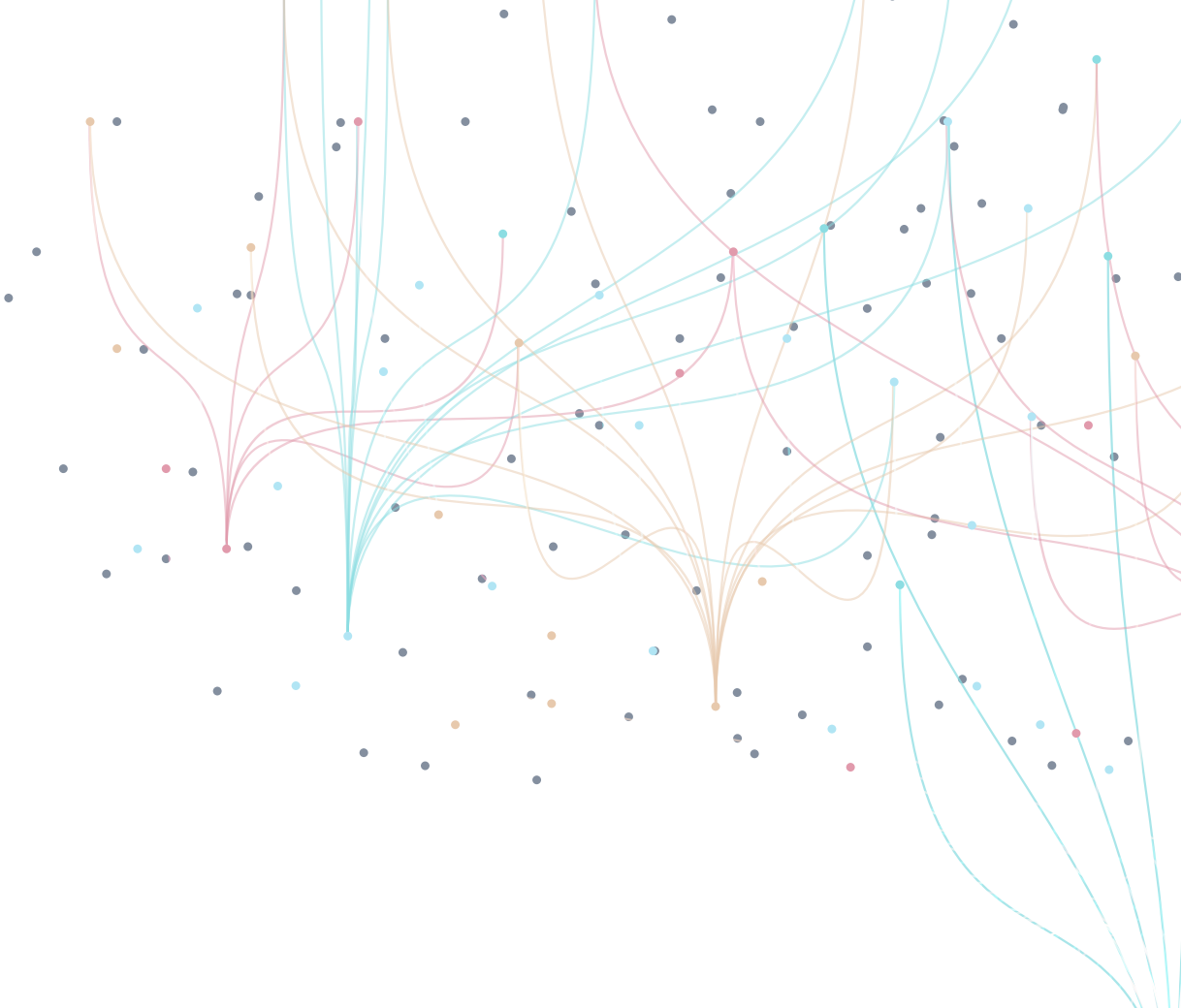
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ICT STANDARDISATION OBSERVATORY AND SUPPORT FACILITY IN EUROPE



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About StandICT.eu

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1 Foreword

As the urbanisation trend continues to grow throughout Europe and worldwide, considerable effort is underway to encourage the use of digital technologies to facilitate and ease the transformation to smart sustainable cities and communities. Today, the consensus is that IoT-based city platforms, built on increasingly decentralised European federated cloud-edge computing continuum and feeding into the Common European Data Spaces, constitute the main technological element to articulate an evolution towards smart and sustainable cities. These cities work towards achieving Sustainable Development Goal (SDG) 11 to make cities and human settlements inclusive, safe, resilient and sustainable.



We welcome the StandICT.eu Landscape report on Smart Cities which maps international standards efforts in this domain that can help the dedicated Technical Working Group (TWG) comprising a group of selected and renowned experts that will describe an architecture framework model, data information models, context information management on a set of specifications based on open international standards and existing solutions. It will be developed in accordance to the architecture design principles of Minimum Interoperability Mechanisms (MIMs) with a special interest in interoperability and how emerging new technologies can be articulated in this architecture from a city governance point of view.



In this respect, as part of EU policy effort and legislation, the European Innovation Partnership on Smart Cities and Communities (EIP SCC) in its Integrated Infrastructures and Processes action cluster has created a reference architecture and design principles for an open urban platform, which became a standard of DIN and is moving towards a standard in the international SDOs.

With the support of the European Commission, the stakeholder community launched at a Finnish EU presidency event the Living-in EU declaration and initiative, within which the Technical Sub-Group drafted a consolidated report setting a technical common ground of specifications. This is referred to as MIM Plus, which consolidates in one achievement plus the work of relevant standard initiatives for a holistic interoperability reference for smart cities and communities, recently launched as the MIMs Plus v4, Living-in.EU Technical Specifications, with the Minimal Interoperability Mechanisms at the core.

We look forward to welcoming continued thought leadership on core Smart Cities through standardised efforts and continuing a structured dialogue between the EC, Member States and Standardisation organisations to stay at the forefront of smart sustainable cities through the EU's twin green and digital objectives in adopting a European approach to excellence in Smart Cities and Communities and the approach to introducing Green Deal innovations through these efforts.

Eddy Hartog

Head of unit C3 in Smart Cities & Communities
DG Connect European Commission

Max Lemke

Head of unit Internet of Things (IoT)
DG Connect European Commission

■ 2 Using this document

The StandICT.eu project, a H2020 Coordination & Support Action (CSA) funded under EC Grant 951972 [Sep 2020-Aug 2023], is dedicated to promoting standardisation within the EU and globally.

This document is part of a growing series designed to (a) create a dynamic overview of documents and activities relevant to standardisation, (b) identify gaps in the standardisation where additional activity would greatly aid deployment of technologies and interoperability within the EU and globally.

This document considers the standardisation landscape for the technology areas applicable to Smart Cities. Companion documents for Blockchain, Big Data, and other themes are under development. The companion document for AI has already been published¹.

This overview or landscape document is a static “snapshot” of a dynamically updated database compiled within StandICT.eu. The database is inclusive (from many different SDOs and organizations), re-useable (available for liaison to other organisations), filterable (to choose a subset of documents and organisations appropriate to a particular use), and easily exportable (CSV, Word, ODT, Mind-map). All of the document titles and document abstracts included here are copied or directly derived from publicly available materials, however copyright of those original materials is retained by the respective owners. Errors or omissions in this report will be corrected in the database, to allow release of an updated document. It is intended to release updates of this landscape document as required and as more specifications are discovered or written.

This overview provides an easy “look up” regarding what Smart Cities standardisation is happening in various organizations, terms and definitions, rankings and use cases, as well as brief information on the organizations. There is no attempt to say here which documents are more fit-for-purpose than others: that will be considered in the next step, in a Smart Cities Gaps Analysis Report.

The “CATEGORY” that is assigned to each reference is intended as a broad guide. The database allows assigning multiple categories for different segmentation of the topics.

For this report, the following broad categories were assigned:

- 🔖 Buildings
- 🔖 Case Studies and Rankings
- 🔖 Connectivity
- 🔖 Data and Architecture
- 🔖 Education, Training and Learning
- 🔖 Energy
- 🔖 Ethics
- 🔖 Health
- 🔖 Information Processing
- 🔖 Mobility
- 🔖 Privacy and Security
- 🔖 Safety and Emergencies
- 🔖 Social Community and Well-being
- 🔖 Strategies, Policies and Planning
- 🔖 Sustainability and Resilience
- 🔖 Water

Organisations are invited to create different or more detailed classifications, and to share them.

Errors, omissions and suggestions for improvement should be reported to contact@standict.eu

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1 https://zenodo.org/record/5011179#_YYzU5k6ZM2x

■ 3 Acknowledgements

StandICT.eu gratefully acknowledges the following individuals, who have contributed the present report:

Joel Myers in his coordination role of Chair of TWG-Cities; and Mohamed Essaaidi and Victor Larios in their roles as co-editors.

The EUOS Expert Advisory Group, the EUOS Technical Working Group (TWG-CITIES) and other individuals who gave extensive advice during many meetings and had significant influence on the breadth and depth and format of this report: Srikanth Chandrasekaran, Lindsay Frost, Ray Walshe and Martin Brynskov.

Thanks to the European Commission for their continued guidance and support: Thomas Reibe, Emilio Davila-Gonzales, Antonio Conte, Salvatore Scalzo, Filipe Jones- Mourao, Eddy Hartog, Max Lemke and Olavi Luotonen.

■ 4 Introduction to this report

In a moment in time where the world has been hit by the COVID-19 pandemic and where the digital divide has widened considerably, we look to our cities for guaranteeing sustainability and resilience in how we live, work and access education, facilitated through technology and data. There has never been a more important time for publishing a report on global standardization on Smart Cities. For the first time, representatives from many different SDOs, government, academic institutions, and industry have created an open-access database of specifications, reports, guidelines, databases, recommended practices, frameworks and landscapes for a particular theme (Smart Cities) in a way that encourages future extensions, re-use, cross-comparisons and re-classification according to disparate needs.



Practitioners know very well that each specifications developing organization has a long legacy of how to approach problems, as well as an institutional knowledge of which problems are inside or outside their remit, so that sharing of approaches is never easy. By collecting disparate outcomes, from across the global community, and making them readily accessible, the team members who have collated this report and have developed the processes to make extensions dynamic have created a new problem-solving tool. This is the first version of the tool and the database needs more work, but it is very promising.

However, we recognise that this report is only the first step. This database already indicates important gaps in areas where standards need to be developed further, such as in Ethics, Sustainability, Environment and so on. The report seeks to initiate that gap analysis and provide an ongoing process of keeping pace with new standards required for the technologies that are continuously being designed, developed, piloted, and deployed in our cities. Standards need to encompass the constantly changing definition of “smart” in “smart cities”, where the needs and the expectations of city stakeholders and their populations, and where success and issues in smart city projects, are remapping the best routes forward in achieving greater sustainability and resilience.

The first use by StandICT.eu of the processes and expertise which compiled this report will be to carry out that gap analysis and share the knowledge contained in this database of standards, terms and definitions, use cases and rankings, with governments and city stakeholders, not only as a tool for understanding and access to standards within smart cities, but also as a means for collaboration.

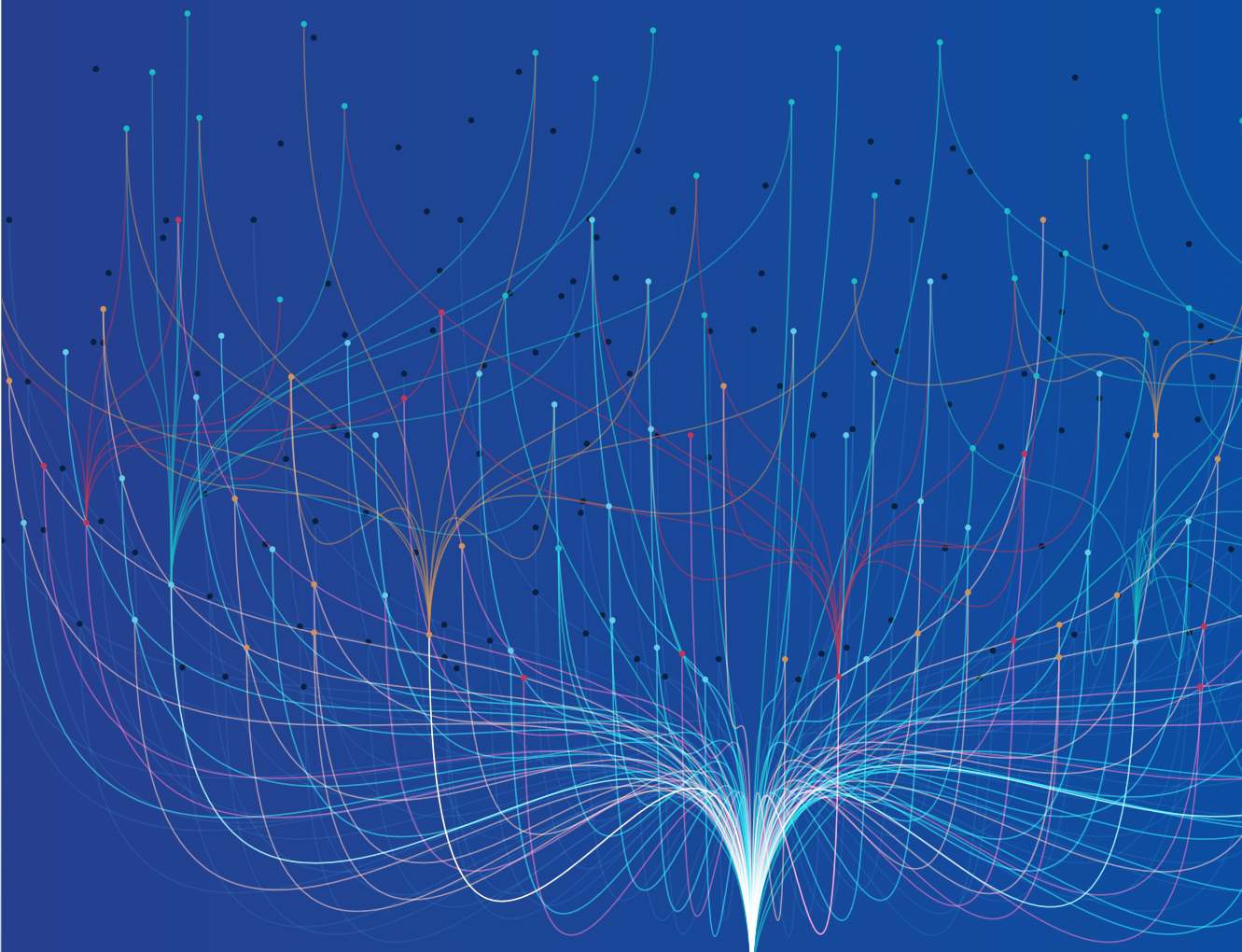
Smart Cities is an evolving and highly complex area, where multidisciplinary expertise is required to reflect the underlying heterogenous mechanisms at play, which differ socially, culturally, politically, and economically from city to city across the world. We welcome this global view and multidisciplinary process, where the scientists and standardisation experts in the European Union can help ensure the success of our society and the well-being of citizens by prioritizing the work to fill the gaps most important in the EU.

StandICT.eu and the team of TWG Cities thanks the European Commission for supporting this work and invites experts and concerned citizens to join us in expanding the coverage of the database behind this report, and in using it to compare standards, improve them, and make your work more effective.

By the chair, **Joel Myers**

5 Landscape of Standards

Standardisation Documents



■ Europe

■ CEN

CEN Building construction - Organization of information about construction works - Part 3: Framework for object-oriented information (ISO 12006-3:2007)

 https://standards.cen.eu/dyn/www/f?p=204:110:0:::FSP_PROJECT:62046&cs=1102A598E88C2278A2FFA63784A5EE755

ISO 12006-3 2007 specifies a language-independent information model which can be used for the development of dictionaries used to store or provide information about construction works. It enables classification systems, information models, object models and process models to be referenced from within a common framework.

 CATEGORY Buildings

 PUBLISHED 19/10/2016

CEN EN ISO 29481-2:2016 Building information models - Information delivery manual - Part 2: Interaction framework (ISO 29481-2:2012)

 https://standards.cen.eu/dyn/www/f?p=204:110:0:::FSP_PROJECT:62043&cs=1BB9990EC11C268B4FF15E089E24BA6E2

ISO 29481-2 2012 specifies a methodology and format for describing coordination acts' between actors in a building construction project during all life cycle stages. It therefore specifies a methodology that describes an interaction framework, an appropriate way to map responsibilities and interactions that provides a process context for information flow, a format in which the interaction framework should be specified. ISO 29481-2 2012 is intended to facilitate interoperability between software applications used in the construction process, to promote digital collaboration between actors in the building construction process, and to provide a basis for accurate, reliable, repeatable, and high-quality information exchange.

 CATEGORY Buildings

 PUBLISHED 19/10/2016

CEN EN 17210 Accessibility and usability of the built environment - Functional requirements

 https://standards.cen.eu/dyn/www/f?p=204:110:0:::FSP_PROJECT:65077&cs=1A6586A527F39633C2093573B08986567

This document describes basic, minimum functional requirements and recommendations for an accessible and usable built environment, following Design for All/Universal Design principles which will facilitate equitable and safe use for a wide range of users, including persons with disabilities. The requirements and recommendations given in this document are applicable across the full spectrum of the built environment. These functional accessibility and usability requirements and recommendations are relevant to the design, construction, refurbishment or adaptation, and

maintenance of built environments including outdoor pedestrian and urban areas.

📁 CATEGORY Social Community and Well-being

📅 PUBLISHED 13/1/2021

■ CITYkeys

CITYkeys CITYkeys D3.3 - Recommendations for the Smart City Index

🔗 <http://www.citykeys-project.eu/citykeys/resources/general/download/CITYkeys-D3-3-Recommendations-for-the-Smart-City-Index-WSWE-AJENM8>

The CITYkeys project has resulted in a set of indicators for assessing the success of smart city projects, which is linked to a set of indicators for smart cities. Since the 1990s various city sustainability indices have been developed that aim to provide a ranking of cities. More recently organisations supplying green certification schemes for buildings have moved into green certification of neighbourhoods, districts and in an extreme case even cities. Both developments provide inputs on indicators selection, aggregation methods, weighting of variables into the discussion on a possible aggregation of the CITYkeys indicators into, eventually, a smart city index.

📁 CATEGORY Case Studies and Rankings

📅 PUBLISHED 24/6/2016

■ EC

EC Ecodesign requirements for energy related products Directive (ErP - 2009/125/EC)

🔗 <https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:285:0010:0035:en:PDF>

Directive 2009/125/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for the setting of ecodesign requirements for energy-related products.

📁 CATEGORY Energy

📅 PUBLISHED 21/10/2009

EC Directive (EU) 2019/882 of the European Parliament and of the Council of 17 April 2019 on the accessibility requirements for products and services (PE/81/2018/REV/1)

🔗 https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2019.151.01.0070.01.ENG&toc=OJ:L:2019:151:TOC

This Directive should make functional accessibility requirements compulsory and they should be formulated in terms of general objectives. Those requirements should be precise enough to create legally binding obligations and sufficiently detailed so as to make it possible to assess conformity in order to ensure the good functioning of the internal market for the products and services covered by this Directive, as well as leave a certain degree of flexibility in order to allow for innovation.

📁 CATEGORY Social Community and Well-being

📅 PUBLISHED 17/4/2019

EC EC Directorate-General for Internal Market, Industry, Entrepreneurship and SMES, GROW/F3 - Rolling Plan for ICT Standardisation

<https://joinup.ec.europa.eu/collection/rolling-plan-ict-standardisation/rolling-plan-2021>

The Rolling Plan for ICT Standardisation provides a unique bridge between EU policies and standardisation activities in the field of information and communication technologies (ICT). This allows for increased convergence of standardisation makers' efforts towards achieving EU policy goals. This document is the result of an annual dialogue involving a wide-range of interested parties as represented by the European multi-stakeholder platform on ICT standardisation (MSP). The Rolling Plan focuses on actions that can support EU policies and does not claim to be as complete as the work programmes of the various standardisation bodies. Standardisation actions identified in this document to support EU policies are complementary to other instruments, in particular the Annual Union Work Programme (AUWP). The Rolling Plan attempts to list all known areas where ICT standardisation could support EU policy objectives. It also details the requirements for ICT standardisation, translates them into actions and provides a follow-up mechanism for the actions. The Rolling Plan 2021 identifies around 180 actions grouped into 37 technological or application domains under four thematic areas key enablers and security, societal challenges, innovation for the single market and sustainable growth.

📁 CATEGORY Strategies, Policies and Planning

📅 PUBLISHED 1/4/2021

EC Smart City Guidance Package (SCGP)

<https://smart-cities-marketplace.ec.europa.eu/insights/solutions/smart-cities-guidance-package-full-document>

The Smart City Guidance Package (SCGP) helps to plan and implement smart city and low energy district projects in an integrated way by describing common situations and giving real-life examples. It bundles the generously shared experiences and expertise of cities, businesses, citizens, research institutes and Non-Governmental Organisations (NGOs) that work together in the European Innovation Partnership Smart Cities and Communities (EIP-SCC).

📁 CATEGORY Strategies, Policies and Planning

📅 PUBLISHED 27/5/2019

EC Smart City Terminology

<https://termcoord.eu/2019/08/smart-city-terminology/>


In this Guideline, offered by TermCoord at the DG Trade of the European Parliament, the you can find a good overview of terms related to Smart Cities.

📁 CATEGORY Terms and Definitions


📅 PUBLISHED 7/8/2019

■ EIP-SCC

EIP-SCC EIP Integrated Infrastructure Urban Platform

 https://docbox.etsi.org/Workshop/2016/201611_M2MIoTWS/00_WORKSHOP/S03_SMARTCITIES_INITIATIVES/EIP_DELATHOUWER.pdf

Urban Platforms form a core building block by which cities better manage the current explosion in volumes of city data and more easily share this data between city services in order to improve outcomes for society. Few cities in Europe have implemented such solutions. The Urban Platform sits within the European Innovation Partnership (EIP) and seeks to accelerate the adoption of urban platforms across EU cities. Specifically that by 2025 300 million EU citizens are served by platforms within their cities. This presentation seeks to provide a summary briefing for all parties, and further details are available from the EIP Marketplace.

 CATEGORY Information Processing

 PUBLISHED 1/7/2016

■ ESPRESSO

ESPRESSO ESPRESSO - systEmic standardisation apPRoach to Empower Smart citieS and cOmmunities

 <http://espresso.espresso-project.eu/>

A Smart City integrates physical, digital and human systems to deliver a sustainable, prosperous and inclusive future for its citizens. Many of these innovative solutions will be based on sophisticated information and communication technologies. However, technological complexity, as well as the complexity of the various sectorial services involved within a Smart City, require a system approach to standardisation. Such an approach must promote the greatest possible reuse of existing open standards to accelerate Smart City deployment. In an effort to leverage the promise of a system approach, ESPRESSO (Espresso - systEmic standardisation apPRoach to Empower Smart citieS and cOmmunities) will focus on the development of a conceptual Smart City Information Framework based on open standards. This framework will consist of a Smart City platform (the Smart City enterprise application) and a number of data provision and processing services to integrate relevant data, workflows, and processes. The project will build this framework by identifying relevant open standards, technologies, and information models that are currently in use or in development in various sectors.

 CATEGORY Social Community and Well-being

 PUBLISHED 30/11/2017

■ ETSI

ETSI (ATTM); Sustainable Digital Multiservice Cities; Broadband Deployment and Energy Management; Part 2: Multiservice Networking Infrastructure and Associated Street Furniture; Sub-part 1: General requirements

http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=51282

The goal is to detail measures which may be taken to ease the deployment of smart new services and their multiservice street furnitures of digital multiservice city within the IP network of a single city or an association of cities administratively clustered. Furthermore, the suggested measures will enable to engineer a reliable common networking infrastructure which can improve the Total Cost of Ownership (TCO) for the public administration while improving the energy efficiency of the overall deployment.

📁 CATEGORY Buildings

📅 PUBLISHED 1/11/2018

ETSI (ATTM); Sustainable Digital Multiservice Cities; Broadband Deployment and Energy Management; Part 2: Multiservice Networking Infrastructure and Associated Street Furniture; Sub-part 2: The use of lamp-posts for hosting sensing devices and 5G networking

http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=54714

The present document addresses the opportunities and challenges offered by the use of lamp-posts to provide facilities supporting services required by sustainable digital multiservice cities and communities.

The replacement of existing luminaires by LED light sources offers an opportunity to increase the functionality provided by the lamp-posts - beginning with improved operational control of the lighting provided.

However, additional functionality is supported by simultaneous installation of an electronics package to enable the lamp-post to host sensing devices. The present document describes the functions to be supported by this package together with consideration of power supply to any hosted sensing devices.

A more comprehensive replacement approach includes the incorporation of 5G services by the separate installation of small (micro- or femto-cell) network components acting as a Remote Radio Unit (RRU). The present document describes the technical challenges associated with the physical installation, provision of power, cabling and other infrastructures necessary to meet the necessary level of availability for these services.

📁 CATEGORY Buildings

📅 PUBLISHED 1/6/2019

ETSI SmartM2M; Extension to SAREF; Part 3: Building Domain

http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=59271

This work will extend the Smart Appliances reference ontology as defined in TS 103 264. The objective is to include input from the Building Domain actors. This specification is defined as an extension of TS 103 264.

Note DTS/SmartM2M-103271SAREF-EXT-EXT (TS 103 410) work item was split as follows

📄 TS 103 410-1 on SAREF for Energy

- 🔗 TS 103 410-2 on SAREF for Environment
 - 🔗 TS 103 410-3 on SAREF for Building
 - 🔗 and a contribution to TS 103 264 (V2.1.1) on oneM2M mapping
- 📁 CATEGORY Buildings
-
- 📅 PUBLISHED 1/5/2020
-

ETSI SmartM2M; Smart Lifts IoT System

🔗 http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=63409

Standardize the IoT system for Smart Lifts. It includes

- 🔗 The identification of the relevant roles;
- 🔗 The Information models in the Smart Lift system, including signals, alarms and commands; -the mapping to Semantic model of oneM2M (SDT) and ETSI SAREF;
- 🔗 The communication system.

📁 CATEGORY Buildings

📅 PUBLISHED 1/7/2021

ETSI (ATTM); Broadband Deployment and Energy Management; Part 7: Digital multiservice cities; Sub-part 1: Multiservice Street Furnitures

🔗 http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=46659

The standard details processes which may be taken into account to improve energy efficiency, common infrastructure and ease deployment of smart new services as IP network.

📁 CATEGORY Connectivity

📅 PUBLISHED 1/6/2017

ETSI (ATTM); Ethernet and power over cables; Part 2: Ethernet and power over coaxial cables for IP video surveillance

🔗 http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=56880

The present document describes the technology which enables Efficient IP Video Surveillance Systems over new and legacy Coaxial Infrastructures. The technology enables the transmission of both Ethernet data and power over a single coaxial cable.

📁 CATEGORY Connectivity

📅 PUBLISHED 1/6/2019

ETSI Context Information Management (CIM); Information Model (MOD0)

🔗 http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=51351

The purpose of this Group Specification is to define or identify a cross-domain data model compatible with the CIM API defined in WI API0, for use in testing that preliminary API specification. The preliminary cross-cutting data model shall be applied using two or more of the use case domains in WI UC. It is not essential that the data model be in any sense comprehensive, but it should allow

testing of all functions of CIM API0. It is expected that recent work within ETSI SmartM2M and within oneM2M will strongly influence this preliminary specification.

📁 CATEGORY Data and Architecture

📅 PUBLISHED 1/7/2019

ETSI Context Information Management (CIM); NGSI-LD API

🔗 http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=62573

This Group Specification provides additions and corrections to the GS-009 NGSI-LD API specification, based on feedback received from developers in the linked-data, internet-of-things, mobile-apps and smart-applications communities, as well as from end users and stakeholders.

📁 CATEGORY Data and Architecture

📅 PUBLISHED 1/4/2021

ETSI Context Information Management (CIM); Use Cases (UC)

🔗 http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=51347

The purpose of this Group Report is to collect and analyse use cases and requirements for management of information coming from many different sources (not only IoT) and data models to allow applications to perform updates on context, register context providers, query information on current and historic context information and subscribe for receiving notifications on context changes. Where ever possible, material shall be collected (by reference) from prior art and existing standards and specifications in this area.

Collection of use cases There shall be no restrictions on inclusion of use cases due to inability to be supported by a particular (popular) data exchange architecture. Use cases may be excluded based on incompatibility with the ToR of the ISG CIM, ethical or policy frameworks of ETSI or the EU, etc. Each use case should be accompanied in the published report by a list of requirements (possibly chosen from an extensible checklist). The format for describing use cases should follow an agreed template to allow better comparison (and elimination of duplicates), preferably based on a format which has already demonstrated usefulness (e.g. in oneM2M, SmartM2M, or some major group).

Analysis of use cases Not every use case will be achievable using every possible architecture so part of the analysis should indicate such restrictions. In particular, use case compatibility with the architecture(s) discussed in Work Item GAP should be identified.

Prioritization Since the needs of various smart cities at various times will be diverse, prioritization of use cases may not be possible, however a decision matrix based on a list of weighted criteria, including illustration of cross-domain aspects, should be created. The chosen subset of use cases will be used to guide later requirements for the Architecture and for the API specification(s). A comprehensive global set of use cases is not required, just a set to define the problem space.

📁 CATEGORY Data and Architecture

📅 PUBLISHED 1/9/2018

ETSI Key Performance Indicators for Sustainable Digital Multiservice Cities

🔗 http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=50113

This document describes the selection of indicators for assessing indicators on city level. Starting from the definition of a smart city, indicators have been selected that can function as Key Performance Indicators for tracking the progress towards city objectives. The indicators for smart cities focus on monitoring the evolution of a city towards an even smarter city. The time component development over the years, is an important feature. The city indicators may be used to show to what extent overall

policy goals have been reached, or are within reach. With a starting point in the smart city definition, and taking into account the wishes of cities and citizens with regard to smart city indicators, the indicators are arranged in an extended triple bottom line sustainability framework, including the themes people, planet, prosperity, governance and propagation, and completed with specific smart city indicators. Under the main themes sub-themes conforming to major policy ambitions have been identified. Under these sub-themes in total 73 city indicators have been selected. The selection has been based on an inventory of 43 existing indicator frameworks for cities indicators. The majority of the indicators in the ICT users selection have been derived from existing indicator frameworks. New indicators have been suggested to fill gaps in existing frameworks. Annex A of this document presents the selection of indicators for ICT users.

📁 CATEGORY Data and Architecture

📅 PUBLISHED 20/7/2017

ETSI Operational energy Efficiency for Users (OEU); KPIs for Smart Cities

🔗 http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=49519

This document describes the selection of indicators for assessing indicators on city level. Starting from the definition of a smart city, indicators have been selected that can function as Key Performance Indicators for tracking the progress towards city objectives. The indicators for smart cities focus on monitoring the evolution of a city towards an even smarter city. The time component development over the years, is an important feature. The city indicators may be used to show to what extent overall policy goals have been reached, or are within reach. With a starting point in the smart city definition, and taking into account the wishes of cities and citizens with regard to smart city indicators, the indicators are arranged in an extended triple bottom line sustainability framework, including the themes people, planet, prosperity, governance and propagation, and completed with specific smart city indicators. Under the main themes sub-themes conforming to major policy ambitions have been identified. Under these sub-themes in total 73 city indicators have been selected. The selection has been based on an inventory of 43 existing indicator frameworks for cities indicators. The majority of the indicators in the ICT users selection have been derived from existing indicator frameworks. New indicators have been suggested to fill gaps in existing frameworks.

CATEGORY Data and Architecture

PUBLISHED 25/8/2017

ETSI ATTM; Broadband Deployment and Energy Management; Part 7: Digital multiservice cities; Sub-part 1: Multiservice Street Furnitures

🔗 http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=46659

This document details measures which may be taken to ease the deployment of smart new services and their multi-service street furnitures of digital multi-service city within the IP network of a single city or an association of cities administratively clustered. Furthermore, the suggested measures will enable to engineer a reliable common networking infrastructure which can improve the Total Cost of Ownership (TCO) for the public administration while improving the energy efficiency of the overall deployment. The document also lists the requirements which have led to this common architecture. This will enable the proper introduction and implementation of a new service, application or content within the city digital portfolio on a unified energy efficient network, though it is not the goal of this document to provide detailed standardized solutions for network architecture.

📁 CATEGORY Energy

📅 PUBLISHED 20/6/2017

ETSI Electromagnetic compatibility and Radio spectrum Matters (ERM); System Reference document (SRdoc): Spectrum Requirements for Short Range Device, Metropolitan Mesh Machine Networks (M3N) and Smart Metering (SM) applications

http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=34078

System Reference document to describe expected functionalities, benefits and service and facilities (including brief Layer 1, Layer 2, Layer3) for Metropolitan Mesh Machine Network (M3N) and Smart Metering (SM).

Spectrum Requirements and preliminary sharing feasibility for M3N and SM applications will also be outlined in the System reference document.

CATEGORY Energy

PUBLISHED 1/9/2011

ETSI Machine-to-Machine communications (M2M); Smart Metering Use Cases

http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=30460

This document collects the Use Cases which have been identified for the Smart Metering M2M application. These Use Cases will identify actors and information flows, and will form the basis of future requirements work at TC M2M on Smart Metering. Several parts of the present document have been taken from Smart Metering Functionality Use Cases [i.4], in particular the subclauses General Use Case Description; Scenario; and Information Exchanges, of clause 5.2.

CATEGORY Energy

PUBLISHED 18/5/2010

ETSI Open Smart Grid Protocol (OSGP); Smart Metering/Smart Grid Communication Protocol

http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=50572

The objective of this scope of work is to provide an update of an existing section of ETSI GS OSG 001 (section 7) on security. This GS was originally created under the ISG OSG. This ISG is now closed and no longer active and its scope now falls under the TC PLT. The security in GS OSG 001 has become obsolete and there is an urgent need to update it to ensure continued protection and security of utility and end user customer information within the use of this protocol.

CATEGORY Energy

PUBLISHED 1/12/2016

ETSI Open Smart Grid Protocol (OSGP); Smart Metering/Smart Grid Communication Protocol

http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=56288

This Technical Specification (TS) has been produced by ETSI Technical Committee Access, Terminals, Transmission and Multiplexing (ATTM). With more than 5 million OSGP compatible smart meters and other devices already installed in Europe and around the world, OSGP has become a defacto standard for smart meters and smart grid infrastructure communications in Europe. In addition, over 30 million more electricity meters already installed in Europe are using the same power line communications technology as used by OSGP.

CATEGORY Energy

PUBLISHED 1/1/2019

ETSI SmartM2M; Extension to SAREF; Part 1: Energy Domain

http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=59273

This work will extend the Smart Appliances reference ontology as defined in TS 103 264. The objective is to include input from the Energy Domain actors. This specification is defined as an extension of TS 103 264.

Note DTS/SmartM2M-103271SAREF-EXT-EXT (TS 103 410) work item was split as follows

- TS 103 410-1 on SAREF for Energy
- TS 103 410-2 on SAREF for Environment
- TS 103 410-3 on SAREF for Building
- and a contribution to TS 103 264 (V2.1.1) on oneM2M mapping

📁 CATEGORY Energy

📅 PUBLISHED 1/5/2020

ETSI ETSI GR SAI 004 - Securing Artificial Intelligence (SAI); Problem Statement

https://www.etsi.org/deliver/etsi_gr/SAI/001_099/004/01.01.01_60/gr_SAI004v010101p.pdf

The Report describes the problem of securing AI-based systems and solutions, with a focus on machine learning, and the challenges relating to confidentiality, integrity and availability at each stage of the machine learning lifecycle. It also points out some of the broader challenges of AI systems including bias, ethics and ability to be explained. A number of different attack vectors are outlined, as well as several cases of real-world use and attacks.

📁 CATEGORY Ethics

📅 PUBLISHED 1/12/2020

ETSI SmartM2M; Asynchronous Contact Tracing System; Fighting pandemic disease with Internet of Things (IoT)

http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=62484

Asynchronous Contact Tracing (ACT) traces the IoT connected object that may have been infected by the Covid-19 virus (or future pandemic viruses).

This shifts the paradigm, from searching for a person in the process of infecting another to the tracing of both potential contamination and infections, and leveraging on the combination of the two information.

The scope of this WI is to standardize the full support of Asynchronous Contact Tracing (ACT) by means of

1. Providing some examples of use and deployment of ACT by means of a few explanatory use cases.
2. Specifying the ACT method and its interaction with deployed contact tracing applications for human and systems. This includes the interaction with the different technologies used by non ACT contact tracing solutions.
3. Specifying the ACT system including application protocols and API.

The new ACT method will require the use of existing ready-to-market IoT-based technology and well-established wireless network techniques, in particular the ones specified in the ETSI standards ecosystem.

Moreover, it will preserve the user's privacy in accordance with GDPR and/or other regional requirements not requiring the transmission of any personal information by the user.

📁 CATEGORY Health

📅 PUBLISHED 1/8/2021

ETSI SmartM2M; Extension to SAREF; Part 8: eHealth/Ageing-well Domain

http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=51404

Specify an initial extension to SAREF to include the semantic model for eHealth/Ageing-well.

This initial extension will be based on a limited set of use cases and available existing data models identified in the corresponding requirement TR.

This work is expected to be developed in close collaboration with AIOTI, the H2020 Large Scale Pilots, ETSI (in particular EP eHealth and TC smartBAN) and oneM2M.

Further extensions are envisaged in the future to cover entirely the eHealth/Ageing-well domain.

📁 CATEGORY Health

📅 PUBLISHED 1/7/2020

ETSI SmartM2M; Extension to SAREF; Part 9: Wearables Domain

http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=51406

Specify an initial extension to SAREF to include the semantic model for Wearables.

This initial extension will be based on a limited set of use cases and available existing data models identified in the corresponding requirement TR.

This work is expected to be developed in close collaboration with AIOTI, the H2020 Large Scale Pilots, ETSI (in particular TC SmartBAN) and oneM2M.

Further extensions are envisaged in the future to cover entirely the Wearables domain.

📁 CATEGORY Health

📅 PUBLISHED 1/7/2020

ETSI SR 002 564 V2.0.0 Applicability of existing ETSI and ETSI/3GPP deliverables to eHealth

https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKI_ID=26302

eHealth related work has been done in several ETSI Technical Bodies however, there is currently no specific committee structure for eHealth standardization work. It is felt that the importance of the subject matter could justify the creation of a new ETSI Technical Body, but before taking this step, it is necessary to further analyse the work to be performed. This document provides the results of an analysis of the applicability of existing ETSI and ETSI/3GPP deliverables for eHealth matters, and specifies the need for further work in this area.

📁 CATEGORY Health

📅 PUBLISHED 22/5/2007

ETSI Whitepaper 29: The argument in favour of eHealth standardization in ETSI

https://www.etsi.org/images/files/ETSIWhitePapers/etsi_wp29_ehealth_standardization_FINAL.pdf

The intent of this paper is thus to highlight the role of standards in eHealth technology today and their ability to serve the global population in the management of health. The main body of this paper illustrates that the core competences of ETSI's membership are well matched to development of the eHealth digital infrastructure in extending and evolving the networks and systems already standardized with a view to supporting eHealth.

📁 CATEGORY Health

📅 PUBLISHED 6/9/2018

ETSI Intelligent Transport System (ITS); Vulnerable Road Users (VRU) awareness; Part 2: Functional Architecture and Requirements definition; Release 2: VRU Architecture

http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=53493

This document analyses the impact of use cases described in ETSI TR 103 300-1 [i.1] and specifies the VRU related requirements, as well as the functional architecture of the VRU system that will prevent collisions with other road users. In addition, it provides the impact of the specified requirements and functional architecture on relevant C-ITS standards, identifying which messages are needed to support the use cases described in ETSI TR 103 300-1 [i.1].

📁 CATEGORY Mobility

📅 PUBLISHED 7/5/2020

ETSI Intelligent Transport Systems (ITS); Framework for Public Mobile Networks in Cooperative ITS (C-ITS)

https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKI_ID=37107

The scope of the work item is to analyse cooperative ITS services using public mobile cellular networks for communications between ITS stations in order to identify related functional requirements on the ITS architecture; identify required amendments/modifications of existing standards on cooperative ITS in order to enable usage of public mobile cellular networks; identify functionality to be specified in new ITS standards to be developed under M/453.

📁 CATEGORY Mobility

📅 PUBLISHED 24/2/2012

ETSI Intelligent Transport Systems (ITS); Infrastructure to Vehicle Communication; Electric Vehicle Charging Spot Notification Specification

[https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKI_ID=35131&curlItemN\[...\]NonActiveTB=FALSE&includeSubProjectCode=&qREPORT_TYPE=SUMMARY](https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKI_ID=35131&curlItemN[...]NonActiveTB=FALSE&includeSubProjectCode=&qREPORT_TYPE=SUMMARY)

This document specifies the application responsible for the broadcasting of dynamic information from a roadside ITS station, or any other appropriate node (e.g. EV charging spot) in possession of this information and compliant to the ITS specifications, to Electric Vehicle ITS Stations (EV) related to the availability and characteristics of the EV Charging Spot(s) in the vicinity and/or surrounding areas of the vehicle. The roadside ITS station can be the EV charging spot itself. Broadcasting is defined as a communication configuration attribute which denotes a point-to-

multipoint mode of transmission, i.e. unidirectional distribution to all ITS Stations connected to the network and tuned for receiving.

📁 CATEGORY Mobility

📅 PUBLISHED 20/7/2012

ETSI Multi-access Edge Computing (MEC); Study on MEC Support for V2X Use Cases

🔗 http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=52949

This work item focuses on identifying the necessary support provided by Multi-access Edge Computing for V2X applications. The work will be a study with the intent to collect and analyse the relevant V2X use cases (including the findings from external organisations), evaluate the gaps from the defined MEC features and functions, and identify the new requirements including new features and functions. When necessary, this may include identifying new multi-access edge services or interfaces, as well as changes to existing multi-access edge services or interfaces, data models, application rules and requirements. The work item will recommend the necessary normative work to close these gaps if identified.

📁 CATEGORY Mobility

📅 PUBLISHED 1/9/2018

ETSI SmartM2M; Extension to SAREF; Part 7: Automotive Domain

🔗 http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=51402

Specify an initial extension to SAREF to include the semantic model for Automotive.

This initial extension will be based on a limited set of use cases and available existing data models identified in the corresponding requirement TR.

This work is expected to be developed in close collaboration with AIOTI, the H2020 Large Scale Pilots, ETSI and oneM2M.

Further extensions are envisaged in the future to cover entirely the Automotive domain.

📁 CATEGORY Mobility

📅 PUBLISHED 1/7/2020

ETSI SmartM2M; Guidelines for Security, Privacy and Interoperability in IoT System Definition; A Concrete Approach

🔗 http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=57974

Providing guidelines for Security, Privacy and Interoperability in IoT System Definition based on the analysis of representative use cases.

📁 CATEGORY Privacy and Security

📅 PUBLISHED 1/3/2020

ETSI User Group; User Centric Approach: Guidance for users; Best practices to interact in the Digital Ecosystem

http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=52879

This work item will define guidance to the user in order to build his/her own service composition with the expected and relevant quality of experience (QoE) and to ensure his/her data privacy.

📁 CATEGORY Privacy and Security

📅 PUBLISHED 1/4/2019

ETSI Emergency Communications (EMTEL); Guidelines for alert message content accessibility

http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=45969

Alert messages need to be presented to users affected by possible alerts in a way that they can be readily understood and required actions can be taken. It is obvious that the presentation of these alert messages needs to be fully accessible for the largest possible user community, including people with specific requirements and elderly people with multiple impairments. The proposed Technical Report will summarize guidelines and good practice proposals to the design process of the user interface for the presentation of alert message on a wide range of end user devices in a fully accessible manner. SC EMTEL and TC HF will work in close cooperation to produce this TR.

📁 CATEGORY Safety and Emergencies

📅 PUBLISHED 1/4/2017

ETSI Emergency Communications (EMTEL); Requirements for communications from authorities/organizations to individuals, groups or the general public during emergencies; authorities to citizens

https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKI_ID=31391

The document gives an overview of the requirements for communication from authorities/organizations to citizens in all types of emergencies. It collects operational and organizational requirements as a basis for a common notification service, including targeting of the area to be notified. This Work-item will revise the current TS to add parameterisation of the requirements and any additional requirements discovered.

📁 CATEGORY Safety and Emergencies

📅 PUBLISHED 7/7/2010

ETSI Emergency Communications (EMTEL); Total Conversation Access to Emergency Services

https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKI_ID=39305

Total Conversation, as defined in ITU-T F.703, is a combination of three media in a conversational call video, real-time text and audio. Total conversation services and terminals are deployed in the Internet in a number of countries in Europe, and adopted by people with disabilities who, for example, need video for sign language or real-time text for a text based conversation or as complement to a voice conversation. The objective of this Work Item is to define requirements, based on the background described in TR 103 170, for using Total Conversation for emergency services and make access of emergency services possible to people with disabilities. The Work Item will mainly address the PSAP organisations and potential impact on overall organisations of emergency services. For example it

should address functional requirements regarding the interface to the PSAP, the connection to external supporting services, the transferring and sharing of the call between call handling organisations, the call logging and call recording, call back aspects and specific call routing and location information provision aspects for these calls. Due consideration of present ongoing standardisation work (e.g. 3GPP) and appropriate liaisons with relevant groups (e.g. EGEA) will be organised as required during the progress of this Work Item.

📁 CATEGORY Safety and Emergencies

📅 PUBLISHED 21/11/2013

ETSI EMTEL; Study of use cases and communications involving IoT devices in provision of emergency situations

🔗 http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=53371

The purpose of this work item is to prepare the requirements for communications involving IoT devices in all types of emergency situations (e.g. communications of individuals with authorities/organisations, between authorities/organisations, from authorities/organisations to the individuals, amongst individuals). The work will start with a study of the state of the art across the IoT domain scope. It will include an analysis of use cases for emergency services, taking into account the work already done in other projects, such as oneM2M and 3GPP. It will conclude with an analysis of the impacts of these use cases on the existing specifications and of what needs to be standardized.

📁 CATEGORY Safety and Emergencies

📅 PUBLISHED 1/7/2019

ETSI ETSI TC HF EN 301 549 Accessibility Requirements

🔗 http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=50127

The EN will contain normative specifications related to the accessibility of websites and mobile applications and their compliance with the essential requirements of perceivability, operability, understandability and robustness defined in the Web and Mobile Accessibility Directive.

📁 CATEGORY Social Community and Well-being

📅 PUBLISHED 1/8/2018

ETSI Human Factors (HF); A study of user context dependent multilingual communications for interactive applications

🔗 https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKI_ID=34721

The goal of this work item is to study the issues relevant for the localization of multilingual applications, regarded from all relevant stakeholders' perspectives. Based on the studies performed, this Technical Report will provide conclusions, recommendations and guidance addressing the issues related to the localization of user context dependent multilingual communications for interactive applications. The aim of the work will be on ensuring the accuracy of the texts generated by the applications, therewith simplifying the work of developers, publishers, translators and interaction designers.

📁 CATEGORY Social Community and Well-being

📅 PUBLISHED 3/2/2012

ETSI Human Factors (HF); An annotated bibliography of documents dealing with Human Factors and disability

http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=35706

This document provides a listing of standardization documents relevant to ICT on the subjects of Human Factors and accessibility and gives a brief outline of the content of the listed documents that are published and provides some comments on their applicability.

🔗 CATEGORY Social Community and Well-being

📅 PUBLISHED 28/8/2013

ETSI Human Factors (HF); Guidelines for the design of mobile ICT devices and their related applications for people with cognitive disabilities

https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKI_ID=37153

The preparation of a set of recommendations for the design and development of devices and applications such as mobile phones, smartphones, touchpads, tablet computers and their related applications in order people with learning disabilities (including elderly) to exploit the new services emerging from the rapidly evolving mobile ICT technology.

🔗 CATEGORY Social Community and Well-being

📅 PUBLISHED 16/11/2016

ETSI Human Factors (HF); Guidelines to identify Design-for-All aspects in ETSI deliverables

https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKI_ID=35796

This document contains a Design for All (DfA) checklist to be used by ETSI groups to identify potential Design for All implications to be considered in the context of new ETSI work items. Annex D contains references to guidelines related to the Design for All issues identified in applying the checklist.

🔗 CATEGORY Social Community and Well-being

📅 PUBLISHED 9/9/2014

ETSI Human Factors (HF); Smart cities and communities standardization for citizens and consumers

http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=50103

This document assesses the different citizen-related issues that smart city-related standardization in the ICT domain needs to address. These include fundamental aspects such as accessibility, usability, interoperability, personal data protection and security, and how services to citizens are to be designed to maximize benefits to the community. For each of these issues, the document provides a short statement of the subject area; makes a short statement of the key citizen concerns (for example accessibility or privacy) related to the subject; lists relevant current standards and ongoing relevant standards activities; assesses whether it appears the activities are in practice taking reasonable account of the smart city/community dimension from the perspective of citizen welfare, and if not, what might be needed to rectify the position; and identifies any further general legal and ethical issues that require attention outside the standardization domain, or other issues not covered.

🔗 CATEGORY Social Community and Well-being

📅 PUBLISHED 23/9/2020

ETSI Human Factors (HF); User-centred terminology for existing and upcoming ICT devices, services and applications Device and service terminology

 https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKI_ID=35174

The EG will update the terminology list of EG 202 132 to include relevant terms for upcoming device and service features and will extend the list to include the 5 most frequently spoken languages in the EU and EFTA (English, French, German, Italian, Spanish). The scope of the EG will be limited to general and generic terms and will not, in any way, prevent manufacturers and service operators to introduce specific and/or proprietary terms for special or unique features that they wish to offer.

 CATEGORY Social Community and Well-being

 PUBLISHED 1/8/2019

ETSI Universal Communications Identifier (UCI); Improving communications for disabled, young and elderly people

 https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKI_ID=15616

The production of a taxonomy of all disability, ageing and youth issues that could be addressed by UCI based systems and relating these to requirements for elements in the UCI additional information field and to PUA functionality. The work will include liaison with groups representing young, elderly and disabled people and with the eEurope Smartcard initiative.

 CATEGORY Social Community and Well-being

 PUBLISHED 14/11/2003

ETSI User Centric Approach: Guidance for users; Best practices to interact in the Digital Ecosystem User Centric-User

 http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=52879

This document defines guidance to the user in order to build its own service composition with the expected and relevant Quality of Experience (QoE) and to ensure their data privacy. It focuses on analysis of functionalities and information from the user point of view. It provides recommendations from functional and informational elements. The document defines the intersection of the User Centric and the User Interface which contains the different profiles of the user and equipment to adapt to user's new needs. Thus according to the possibilities offered by the equipment, the networks and the software platforms, a personalization is possible. It includes the results of an additional survey that complete the results obtained in the initial survey, defined in ETSI TR 103 438 [i.1].


 CATEGORY Social Community and Well-being


 PUBLISHED 11/4/2019

ETSI User Group; Collection of user requirements from visually impaired people for e-accessibility to ICT products and services

 https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKI_ID=41273

Identification of use cases for visually impaired people for e-access to ICT products and services but also use cases to allow users to interact with machines or equipment (e.g. users terminal, user interface) via dedicated devices (M2M communications) in order to define appropriate protocols (NFC or similar). The intention is not to define technical solutions but to forward the requirements to the appropriate TBs.


 CATEGORY Social Community and Well-being

 PUBLISHED 18/8/2015

ETSI User Group; User centric approach in Digital Ecosystem

 http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=47208

The goal of this TR is to consider Digital Ecosystem through user's point of view under the following two directions

 Identification of user's needs such as QoS, security, usability, flexibility, Service Level Objectives (SLO)

 Study impact of technical implementations related to user's requirements/concerns

 CATEGORY Social Community and Well-being

 PUBLISHED 1/2/2019

ETSI User Group; User Centric Approach; Guidance for providers and standardization makers

 http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=52880

This work item will define guidance to the providers and standard makers to ensure that each service component is provided with the information needed by the user to make an informed choice.

 CATEGORY Social Community and Well-being

 PUBLISHED 1/3/2019

ETSI User Group; User Centric Approach; Guidance for providers and standardization makers. User Centric-Providers


 http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=52880

This document defines guidance to the providers and standard makers to ensure that each service component is provided with the information needed by the user to make an informed choice. It addresses all the dimensions of ACIFO to the supplier, in order to produce the APIs according to the user expectations and whatever the number and types of additional suppliers. It is designed in conjunction with the user guide, ETSI EG 203 602 [i.2]. Each recommendation which has been identified as important for the user finds its parallel for the supplier offer, as defined in the document. For each need and expectation, by user categories, the document recommends relevant service information and functions. This is to facilitate, on the one hand, easy access for the user and on other hand, consistently create manageable services that are easily incorporated into a service definition that can support Service Level Agreement (SLA). The recommendations are intended for the user to be able to compose own services according to the needs, the location and activities. The concept of this new vision is detailed in ETSI TR 103 438 [i.1].


 CATEGORY Social Community and Well-being

 PUBLISHED 1/3/2019

ETSI User Group; User centric approach; Qualification of the interaction with the digital ecosystem

 http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=52881

This work item will define the qualifications of the interaction of the user with the digital ecosystem (e.g. authentication, security, privacy, single sign on, service composition, presentation, etc.)

 CATEGORY Social Community and Well-being

 PUBLISHED 1/4/2019

ETSI (ATTM); Sustainable Digital Multiservice Cities (SDMC); Broadband Deployment and Energy Management; Part 1: Overview, common and generic aspects of societal and technical pillars for sustainability

http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=51275

The goal is to introduce the common and generic aspects of the societal and technical pillars to achieve sustainability objectives behind the deployment of smart new services within the IP network of a single city or an association of cities administratively clustered.

➤ CATEGORY Strategies, Policies and Planning

📅 PUBLISHED 1/12/2018

ETSI SmartM2M; Extension to SAREF; Part 4: Smart Cities Domain

http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=59270

Specify an initial extension to SAREF to include the semantic model for Smart Cities. This initial extension will be based on a limited set of use cases and available existing data model identified in the corresponding requirement TR.

This work is expected to be developed in close collaboration with AIOTI, the H2020 Large Scale Pilots and with ETSI activities in the Smart Cities, primarily ISG CIM. Use cases and related semantic model are expected to be aligned with corresponding work in CIM.

Further extensions are envisaged in future to cover entirely the Smart Cities domain.

➤ CATEGORY Strategies, Policies and Planning

📅 PUBLISHED 1/5/2020

ETSI SmartM2M; Extension to SAREF; Part 5: Industry and Manufacturing Domains

http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=59269

Specify an initial extension to SAREF to include the semantic model for extension to industry and manufacturing domains, including deployment and related services aspects. This initial extension will be based on a limited set of use cases and available existing data model identified in the corresponding requirement TR. This work is expected to be developed in close collaboration with AIOTI, the H2020 Large Scale Pilots and with ETSI activities in these domains. Further extensions are envisaged in the future to cover entirely these domains.

➤ CATEGORY Strategies, Policies and Planning

📅 PUBLISHED 1/5/2020

ETSI SmartM2M; Extension to SAREF; Part 6: Smart Agriculture and Food Chain Domain

http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=59268

Specify an initial extension to SAREF to include the semantic model for smart agriculture and food chain domain.

This initial extension will be based on a limited set of use cases and available existing data model identified in the corresponding requirement TR.

This work is expected to be developed in close collaboration with AIOTI, the H2020 Large Scale Pilots and with ETSI activities in the smart agriculture and food chain domain.

Further extensions are envisaged in future to cover entirely the smart agriculture and food chain domain.

🔗 CATEGORY Strategies, Policies and Planning

📅 PUBLISHED 1/5/2020

ETSI SmartM2M; SAREF extension investigation; Requirements for Smart Cities

🔗 http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=51396

Determine an initial semantic model for Smart Cities based on a limited set of use cases and from available existing data model.

This work is expected to be developed in close collaboration with AIOTI, the H2020 Large Scale Pilots and with ETSI activities in the Smart Cities, primarily ISG CIM. Use cases and related semantic model are expected to be aligned with corresponding work in CIM.

Further extensions are envisaged in future to cover entirely the Smart Cities domain.

🔗 CATEGORY Strategies, Policies and Planning

📅 PUBLISHED 1/9/2018

ETSI ATTM; Broadband Deployment and Lifecycle Resource Management; Part 5: Customer network infrastructures; Sub-part 1: Homes (single-tenant)

🔗 http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=49991

This document specifies the general engineering of various broadband infrastructures to enable the most effective energy management (and management of other resources) and the appropriate measures for EoL treatment of ICT equipment. This document specifies the requirements for resource management of customer network infrastructures within homes (single-tenant), as recipients of broadband services, as a combination of 1) Energy management while maintaining or even improving the level of service is supported by requirements for a) in new, refurbished and existing buildings the selection of customer premises equipment and associated power supplies which meet specific energy consumption and energy efficiency requirements (by means of external references); b) in new or refurbished buildings the provision of appropriate spaces and pathways to accommodate cabling infrastructure. 2) EoL of ICT equipment by reference to ETSI EN 305 174-8 [7].

🔗 CATEGORY Sustainability and Resilience

📅 PUBLISHED 1/7/2018

ETSI Energy Efficient IP Video Surveillance Systems over Coaxial Cables; Energy Efficient IP Video Surveillance Systems over Coaxial Cables

🔗 https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKI_ID=56848

This document describes the motivations for the standardization of technology which enables Energy Efficient IP Video Surveillance Systems over new and legacy Coaxial Infrastructures. The technology enables the transmission of both IP data and power over a single coaxial cable, and is based as much as possible on existing standards. The standardization of this technology is needed for the deployment of sustainable Video Surveillance Systems using interoperable products from different manufacturers.


🔗 CATEGORY Sustainability and Resilience

📅 PUBLISHED 18/1/2019

ETSI Environmental Engineering (EE); Assessment of mobile network energy efficiency

 http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=41179

Define the topology and level of analysis to assess the energy efficiency of mobile network (scope that could include radio base stations, backhauling systems, radio controllers, other infrastructure radio site equipment). The covered technology will be GSM, UMTS, LTE. Define metrics for radio access network EE. Define methods for assessing (measuring) EE in operational networks. Starting point for this WI is the TR developed DTR/EE-EEPS004.

 CATEGORY Sustainability and Resilience

 PUBLISHED 1/4/2015

ETSI Environmental Engineering (EE); Best practice to assess energy performance of future Radio Access Network (RAN) deployment

 http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=47216

Many companies are running studies on estimating energy performance of future radio access networks (RAN) deployment. In this work item we want to find methods and best practice to assess energy performance (Energy Consumption, Energy Efficiency) of a future RAN deployment. The work will start with collecting important preconditions as traffic aspects (growth, new traffic classes, potential disruption), collection of energy efficiency/saving solutions and strategies and energy issues in current networks. Network energy performance will be assessed based on set of scenarios including different solutions. The time period is 2020, optionally beyond and 5G impact. Energy consumption and efficiency definitions from ES 202706 and ES 203228 are preferred.

 CATEGORY Sustainability and Resilience

 PUBLISHED 1/5/2018

ETSI Environmental Engineering (EE); Measurement method for energy efficiency of Network Functions Virtualisation (NFV) in laboratory environment

 http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=47210

Establish a new energy efficiency measurement methods and metrics to support NFV scenarios, such as IMS and EPC, to define measurement methods for 1) VNF, 2) Server, 3) NFVI (NFV Infrastructure) including HW and hypervisor. A similar work item will be also proposed inITU-T SG5 for having common deliverables.

 CATEGORY Sustainability and Resilience

 PUBLISHED 1/3/2019

ETSI Environmental Engineering (EE); Measurement method for power consumption and energy efficiency of wireless access network equipment

http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=41181

Energy efficiency is one of the critical factors of the modern telecommunication systems. The energy consumption of the access network is the dominating part of the wireless telecom network energy consumption. The scope of this document is to define methods for evaluation of power consumption and energy efficiency of base station in static and dynamic mode respectively.

🔗 CATEGORY Sustainability and Resilience

📅 PUBLISHED 1/12/2014

ETSI Environmental Engineering (EE); Mobile Network (MN) Energy Consumption (EC) estimation method; Energy estimation method based on statistical approach

http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=50597

This document is aimed to define an estimation method for anticipating the total energy consumption of a radio access network based on measuring energy consumption of a few randomly chosen sites, and to be used when measuring energy consumption of the whole network is either impossible or costly to an operator. Two different methods have been presented in this document one based on Basic Estimation Method; and another based on stratified Estimation Method. The document deals with any type of radio access network such as homogeneous and heterogeneous network and technologies such as GSM, UMTS and LTE.

🔗 CATEGORY Sustainability and Resilience

📅 PUBLISHED 27/4/2018

ETSI Environmental Engineering (EE); Standardization terms and trends in energy efficiency

http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=44554

This document specifies terminology, principles and concepts for Energy efficiency and energy management; establishes common understanding on measurement methodology used to determine the energy efficiency of a good, service and network; and serves as a framework for other ETSI standards and other Standard Development Organization SDO document for Energy efficiency thematic.

🔗 CATEGORY Sustainability and Resilience

📅 PUBLISHED 1/11/2017

ETSI Environmental Engineering (EE); Study on methods and metrics to evaluate energy efficiency for future 5G systems

http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=50092

This TR is an initial study about metrics and methods of measurements for the energy efficiency of 5G products and networks. This WI will prepare a TR to be considered as a basis for a future specification and not for evaluation of 5G technology.

🔗 CATEGORY Sustainability and Resilience

📅 PUBLISHED 1/6/2018

ETSI Environmental Engineering (EE); Testing methodology for equipment able of dynamic performances adaptation

http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=43756

Energy Aware Networking adapt performances and power consumption according to traffic load. Actual energy efficiency measurement procedures are unsuitable to determines the equipment's ability to adapt performances and power consumption to traffic load needs, hence a novel measurement method is required.

📁 CATEGORY Sustainability and Resilience

📅 PUBLISHED 1/2/2016

ETSI Integrated broadband cable telecommunication networks (CABLE); Energy management; Operational infrastructures; Global KPIs; Part 4: Design assessments; Sub-part 4: Cable Access Networks

http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=47544

This document specifies the requirements for a Global KPI for energy management (designated KPI-EP) and its underpinning Objective KPI for energy consumption addressing the following objectives for the cable operator access networks of broadband deployment energy consumption; renewable energy. The requirements are mapped to the concepts of ETSI EN 305 200-1 [i.5]. Energy management of cable access networks comprises a number of independent layers. This document addresses performance of infrastructures that supports the normal function of hosted ICT equipment within the cable access network (e.g. power distribution, environmental control, security and safety).

📁 CATEGORY Sustainability and Resilience

📅 PUBLISHED 1/4/2018

ETSI Operational energy Efficiency for Users (OEU); Energy Consumption Measurement of Operational Information Technology Servers

http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=41200

Information and communication technology (ICT) sites constitute one of the most important areas of the worldwide growing energy consumption. They are responsible for at least 2 of the worldwide greenhouse gas emissions, still growing. Energy management performance of ICT sites is an important matter. It is now essential if not vital to implement commitments in order to reduce the energy consumption by ICT sites. Further to the 1997 Kyoto protocol, the European Commission has issued, and will issue, Directives in order to improve energy management of networks, sites included, of whole industry sectors. Therefore suppliers and users of ICT equipment are obliged to implement Green tools (indicators, recognized Green levels) to monitor the efficiency of their greener networks. Consequently, ISG OEU has developed this document in order to define this operational measurement method. This document defines requirements for operational measurement of energy consumption by ICT equipment as well as requirements for technical KPIs allowing selection of energy efficient equipment for specific uses.

📁 CATEGORY Sustainability and Resilience

📅 PUBLISHED 1/9/2016

ETSI Operational energy Efficiency for Users (OEU); Energy Consumption Measurement of Operational Technical Equipment of Copper and Optical Fixed Access

 http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=43806

This document proposes Key Performance Indicators (KPI) applicable by vendors in laboratories or by operators in operational situations. The scope of the document is exclusively dealing with the Multi-Service Access Node MSAN, configured for both Fiber to the Home (FTTH) and Digital subscriber line (DSL) usages. Considering the foreseen implementation of energy consumption meters embedded in the MSAN allowing real time knowledge of energy consumption, clause 4 proposes the operational KPIs which should be managed by the Network Management System (NMS). This document proposes engineering KPIs to evaluate and to model on-field energy consumption, structured in three clauses 1) Listing the key parameters which have most impact on the power consumption; 2) Defining a MSAN power consumption model when it is used as a digital subscriber line access multiplexer (DSLAM) to obtain a green Operational KPI, according to the key parameters; and 3) Defining the methodology for an optical line termination (OLT).

 CATEGORY Sustainability and Resilience

 PUBLISHED 1/6/2015

ETSI Operational energy Efficiency for Users (OEU); Global KPIs for ICT Sites

 http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=45996

This document defines the current position of the ISG OEU members in relation to the so-called Global Key Performance Indicators (Global KPIs) enabling the monitoring of data centre (DC) energy management. The document defines Global Key Performance Indicators in relation to energy management for ICT sites including, but not limited to operator data centres (ODC), operator sites (OS) and customer data centres (CDC). It addresses the following objectives energy consumption; task efficiency; energy reuse; renewable energy. This document defines four KPIs addressing these objectives (Objective KPIs); one Global KPI which combines the four Objective KPIs. The Objective and Global KPIs defined here apply to ICT sites of any size from initial operation to end of life.

 CATEGORY Sustainability and Resilience

 PUBLISHED 1/12/2014

ETSI Operational energy Efficiency for Users (OEU); Referential specification to define sustainable levels of Fixed Broadband access networks

 http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=46572

This document defines the current position of the ISG OEU members in relation to the Referential Specification to define sustainable levels of Fixed Broadband access networks as defined in European Commission mandate M/462.

 CATEGORY Sustainability and Resilience

 PUBLISHED 1/10/2015

ETSI Operational energy Efficiency for Users (OEU); Referential specification to define sustainable levels of ICT Sites

http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=41205

This document defines the current position of the ISG OEU members in relation to the Referential Specification to define sustainable levels of ICT sites including operator sites, operator data centres and corporate data centres as defined in European Commission mandate M/462.

📁 CATEGORY Sustainability and Resilience

📅 PUBLISHED 1/6/2015

ETSI Operational energy Efficiency for Users (OEU); Technical Global KPIs for Fixed Access Networks

http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=43807

The document defines Global Key Performance Indicators for energy management in ICT sites including, but not limited to operator data centres (ODC), operator sites (OS) and customer data centres (CDC). It addresses energy consumption; task efficiency; energy reuse; and renewable energy. It defines four KPIs addressing these objectives (Objective KPIs); and one Global KPI which combines the four Objective KPIs. The Objective and Global KPIs defined may be applied to ICT sites of any size and from initial operation to end of life.

📁 CATEGORY Sustainability and Resilience

📅 PUBLISHED 1/10/2015

ETSI Operational energy Efficiency for Users (OEU); Waste management of ICT equipment

http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=46573

This document defines the current position of the ISG OEU members in relation to management of ICT equipment as WEEE, and has been developed by ISG OEU members (ICT world Users) in order to define the most efficient tools, recommendations and best practices to help ICT sector to manage the e-waste. It includes also some reminders of the regulatory frame in European Union regarding e-waste collection and treatment. It presents the waste processing in a simple format. It is expected that the document will influence the development of a new ETSI standard under the responsibility of ETSI Technical Committee Access, Terminals, Transmission and Multiplexing (ATTM) and ETSI Technical Committee Environmental Engineering (EE).

📁 CATEGORY Sustainability and Resilience

📅 PUBLISHED 1/1/2016

ETSI SmartM2M; Extension to SAREF; Part 2: Environment Domain

http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=59272

This work will extend the Smart Appliances reference ontology as defined in TS 103 264. The objective is to include input from the Environment Domain actors. This specification is defined as an extension of TS 103 264.

Note DTS/SmartM2M-103271SAREF-EXT-EXT (TS 103 410) work item was split as follows

- 📄 TS 103 410-1 on SAREF for Energy
- 📄 TS 103 410-2 on SAREF for Environment
- 📄 TS 103 410-3 on SAREF for Building

and a contribution to TS 103 264 (V2.1.1) on oneM2M mapping

CATEGORY Sustainability and Resilience

PUBLISHED 1/5/2020

ETSI User Group; User centric approach in Digital Ecosystem

https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKL_ID=47208

The goal of this TR is to consider Digital Ecosystem through user's point of view under the following two directions identification of user's needs such as QoS, security, usability, flexibility, Service Level Objectives (SLO); and study impact of technical implementations related to user's requirements/concerns.

CATEGORY Sustainability and Resilience

PUBLISHED 13/2/2019

ETSI SAREF: the Smart Applications REference ontology

<https://saref.etsi.org/>

The SAREF ontology is the foundation for a number of ETSI standards. The Smart Applications REference (SAREF) ontology is a shared model of consensus that facilitates the matching of existing assets in the smart applications domain. SAREF provides building blocks that allow separation and recombination of different parts of the ontology depending on specific needs. SAREF explicitly specifies recurring core concepts in the smart applications domain, the main relationships between these concepts, and axioms to constrain the usage of these concepts and relationships. SAREF has been created based on the following fundamental principles Reuse and alignment of concepts and relationships that are defined in existing assets; Modularity to allow separation and recombination of different parts of the ontology depending on specific needs; Extensibility to allow further growth of the ontology; and Maintainability to facilitate the process of identifying and correcting defects, accommodate new requirements, and cope with changes in (parts of) SAREF.

CATEGORY Terms and Definitions

PUBLISHED 11/2/2020

ETSI SmartM2M; Extension to SAREF; Part 10: Water Domain

http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKL_ID=53015

Specify an initial extension to SAREF to include the semantic model for the Water domain. This initial extension will be based on a limited set of use cases and available existing data models identified in the corresponding requirements TR and based upon the results of the ICT4WATER cluster.

CATEGORY Water

PUBLISHED 1/7/2020

■ HLEG-AI

HLEG-AI EC HLEG - Ethics Guidelines for Trustworthy AI

[🔗 https://ec.europa.eu/digital-single-market/en/news/ethics-guidelines-trustworthy-ai](https://ec.europa.eu/digital-single-market/en/news/ethics-guidelines-trustworthy-ai)

The Guidelines put forward a set of 7 key requirements that AI systems should meet in order to be deemed trustworthy. A specific assessment list aims to help verify the application of each of the key requirements human agency and oversight; Technical Robustness and safety; Privacy and data governance; Transparency; Diversity, non-discrimination and fairness; Societal and environmental well-being; and Accountability. The AI HLEG has also prepared a document which elaborates on a Definition of Artificial Intelligence used for the purpose of the Guidelines.

📁 CATEGORY Ethics

📅 PUBLISHED 8/4/2019

■ MobileData

MobileData GTFS: Making Public Transit Data Universally Accessible

[🔗 https://gtfs.org](https://gtfs.org)

TriMet in Portland, Oregon, along with Google, was one of the first public agencies to try and tackle the problem of online transit trip planners through the use of open datasets that are shared with the general public. TriMet worked with Google to format their transit data into an easily maintainable and consumable format that could be imported into Google Maps. This transit data format was originally known as the Google Transit Feed Specification (GTFS). As a result of developer innovation, GTFS data is now being used by a variety of third-party software applications for many different purposes, including trip planning, timetable creation, mobile data, data visualization, accessibility, analysis tools for planning, and real-time information systems. Among public transportation data formats, GTFS stands out because it was conceived to meet specific, practical needs in communicating service information to passengers, not as an exhaustive vocabulary for managing operational details. It is designed to be relatively simple to create and read for both people and machines. Even organizations that work with highly detailed data internally using standards like NeTEx find GTFS useful as a way to publish data for wider consumption in consumer applications.

📁 CATEGORY Mobility

📅 PUBLISHED 7/12/2005

■ Global

■ BSI

BSI BSI PAS 181 Smart city framework

 <https://www.bsigroup.com/en-GB/smart-cities/Smart-Cities-Standards-and-Publication/PAS-181-smart-cities-framework/>

This PAS establishes a good practice framework for city leaders to develop, agree and deliver smart city strategies that can help transform their city's ability to meet its future challenges and deliver its future aspirations. The smart city framework (SCF) distils current good practices into a set of consistent and repeatable patterns that city leaders can use to help develop and deliver their own smart city strategies. PAS 181 Smart city framework. Guide to establishing strategies for smart cities and communities does not intend to describe a one-size-fits-all model for the future of UK cities. Instead it focuses on the enabling processes by which the innovative use of technology and data, together with organizational change, can help deliver the diverse visions for future UK cities in more efficient, effective and sustainable ways. Although many of the principles and methodologies recommended by the SCF are relevant within specific vertical sectors of cities, the focus is very much on the issues and challenges involved in joining all of these up into a whole-city approach. Central to the SCF is a strong emphasis on leadership and governance, culture, business model innovation, and the active role played by all stakeholders in the creation, delivery and use of city spaces and services.

 CATEGORY Strategies, Policies and Planning

 PUBLISHED 28/2/2014

BSI BSI PD 8100 Smart cities overview

 <https://www.bsigroup.com/en-GB/smart-cities/Smart-Cities-Standards-and-Publication/PD-8100-smart-cities-overview/>

The role of smart city standards is to support the widespread adoption of common approaches to the implementation of smart city products and services in order to facilitate the rapid development of an effective smart city market. In order to support this work, BSI is developing the Smart City Overview which will provide a simple and easy to read guide for smart city practitioners. It will help them find the standards that are relevant to what they are doing and will include illustrations to help with the readability and impact of the text. However it will also be rigorous enough to be used by standards professionals in providing a high level draft of a reference architecture for smart cities. By providing this as a Published Document, this high level draft can be widely tested for usefulness, so that it can provide a firm foundation for its further development in the longer term into a systematic and detailed technical reference architecture for smart cities.

 CATEGORY Strategies, Policies and Planning

PUBLISHED 27/2/2015

BSI BSI PD 8101 Smart city planning guidelines

<https://www.bsigroup.com/en-GB/smart-cities/Smart-Cities-Standards-and-Publication/PD-8101-smart-cities-planning-guidelines/>

During major new infrastructure development, it's more cost-effective to install new infrastructure or the appropriate software at build stage than having to retrofit later. The challenge is that few cities have clear ideas as to their precise future smart city requirements at this present time and there are few models of what should be specified in order to cost effectively meet potential future requirements. By providing local authorities with models of good practice, new developments will be built in a way that will support smart city aspirations at minimal cost. This document gives guidance on what is needed to plan for any new development to support the smart city plans for a given area. It provides an overview of the key issues to be considered, as well as more detailed guidance on issues identified as priorities. PD 8101 Smart cities. Guide to the role of the planning and development process is for use by local authority planning and regeneration officers to identify good practice in a UK context, and what tools they could use to implement this good practice.

📁 CATEGORY Strategies, Policies and Planning

📅 PUBLISHED 31/10/2014

1.1.1 BSI PAS 183:2017 Smart cities. Guide to establishing a decision-making framework for sharing data and information services

<https://shop.bsigroup.com/products/smart-cities-guide-to-establishing-a-decision-making-framework-for-sharing-data-and-information-services>

It gives guidance on establishing a decision-making framework for sharing data and information services in smart cities. It is also one of a suite of BSI publications related to smart cities which is providing guidance for city leaders on strategic smart city issues at a global level. It is for decision-makers in smart cities from the public, private and third sectors. It will also be of interest to any city organizations wishing to share data. It is important because the data sharing framework it sets out can help ensure that a smart city has the best overall data on which to base sound decisions. Also because data sharing will likely provide the basis for new commercial models in the smart city.

📁 CATEGORY Strategies, Policies and Planning

📅 PUBLISHED 31/3/2017

BSI PAS 184:2017 Smart Cities. Developing project proposals for delivering smart city solutions. Guide.

<https://shop.bsigroup.com/products/smart-cities-developing-project-proposals-for-delivering-smart-city-solutions-guide>

This PAS provides practical, how-to advice, reflecting current good practice as identified by a broad range of public, private and voluntary sector practitioners engaged in developing smart city solutions. The advice is structured into three main components

- 📄 Component A - Smart thinking how to better frame opportunities to challenge traditional ways of doing things within the city, identifying where solutions could deliver transformational change in a particular area of city activity;
- 📄 Component B - Smart practices how to develop a project in a way that
 - 📄 Delivers a smart city solution successfully in practice;
 - 📄 Is consistent with effective and appropriate security needs and minimizes risks to achieving the full desired impacts of the solution; and
 - 📄 Optimizes its contribution towards broader city goals for the future; and

- Component C - Smart measurement how to build measurement and evaluation into the project throughout its lifecycle in ways that
 - Support successful delivery of the solution;
 - Enable effective communication to city stakeholders of the solutions impact; and
 - Provide actionable learning for future projects in the city.

📁 CATEGORY Strategies, Policies and Planning

📅 PUBLISHED 31/3/2017

BSI PAS 185:2017 Smart Cities. Specification for establishing and implementing a security-minded approach

🔗 <https://shop.bsigroup.com/products/smart-cities-specification-for-establishing-and-implementing-a-security-minded-approach>

The underlying premise of smart cities is that with more data and information, services and provision for citizens can be enhanced. At the same time, though, the increased use of and dependence on information technologies creates significant vulnerabilities and security issues. It means a new security minded approach needs to be developed. This PAS has been created to answer that need. This PAS is for decision-makers in smart cities from the public, private and third sectors, smart city data officers and anyone with an interest in utilizing data and information to effectively deliver smart city objectives. This PAS supplies a framework that enables the development of an overall security strategy for the handling, management and sharing of data and information. This framework can be used to inform and guide the development and delivery of smart city projects and the subsequent operation, delivery, evolution and disposal of assets and services. The security-minded approach specified in this PAS covers all aspects of security relating to smart cities. It covers aspects of the environment of the smart city, including scale, organizational complexity, complex service delivery and ownership of smart city infrastructure, response to incidents, events, changing risk levels and extent of autonomy. It covers technological aspects relating to the secure delivery of services, including safety, authenticity, availability (including reliability), confidentiality, integrity, possession, resilience and utility. This framework can be used to create and cultivate an appropriate, risk-based safety and security mindset and culture across the many organizations, services and individuals which use shared, disclosed and derived data, and includes the need to monitor and audit compliance.

📁 CATEGORY Strategies, Policies and Planning

📅 PUBLISHED 31/5/2018

BSI PAS 186:2020 Smart cities. Supplying data products and services for smart communities. Code of practice

🔗 <https://shop.bsigroup.com/products/smart-cities-supplying-data-products-and-services-for-smart-communities-code-of-practice>

PAS 186 2020 sets out recommendations for suppliers of data products and services to smart cities and communities. It is for organizations that supply smart and connected services to cities and local authorities regardless of sector, including Engineering, architecture and infrastructure consultancies and suppliers, Facilities management companies and organizations that provide back-end/outsourced services to cities and local authorities. In addition, stakeholders responsible for procuring, contracting or commissioning services might also benefit from this PAS by referencing it when detailing requirements for data products and data services within smart cities and/or smart communities.

📁 CATEGORY Strategies, Policies and Planning

📅 PUBLISHED 31/12/2020

BSI BS 8001 Framework for implementing the principles of the circular economy in organizations

<https://www.bsigroup.com/en-GB/standards/benefits-of-using-standards/becoming-more-sustainable-with-standards/BS8001-Circular-Economy/>

Published in May 2017, BS 8001 is the first practical framework and guidance of its kind for organizations to implement the principles of the circular economy and has been written in way so that it can be used wherever they are in the world. It is intended to apply to any organization, regardless of location, size, sector and type. It will be useful to those with varying levels of knowledge and understanding of the circular economy. It provides practical ways to secure smaller quick-wins, right through to helping organizations re-think holistically how their resources are managed to enhance financial, environmental and social benefits.

📁 CATEGORY Sustainability and Resilience

📅 PUBLISHED 1/5/2017

BSI BIS PAS 180 Smart cities. Vocabulary

<https://www.bsigroup.com/en-GB/smart-cities/Smart-Cities-Standards-and-Publication/PAS-180-smart-cities-terminology/>

Help build a strong foundation for future standardization and good practices, PAS 180 provides industry-agreed understanding of smart city terms and definitions to be used in the UK. PAS 180 Smart cities. Vocabulary will help to improve communication and understanding of smart cities by providing a common language for developers, designers, manufacturers and clients. This will help industry to work more efficiently and effectively, as well as help reduce the chances of confusion in the supply chain. The PAS defines terms for smart cities, including smart city concepts across different infrastructure and systems' elements and used across all service delivery channels. It covers materials, processes, methodologies and applications. The PAS is intended for city authorities and planners, buyers of smart city services and solutions, as well as product and service providers.

📁 CATEGORY Terms and Definitions

📅 PUBLISHED 28/2/2014

DATEX2

DATEX2 DATEX Traffic Information Exchange

<http://www.datex2.eu>

DATEX II is a multi-part Standard, maintained by CEN Technical Committee 278, Road Transport and Traffic Telematics. CEN - the European Standardization Organisation - is the leading standards development organisation in Europe (see www.cen.eu). CEN Technical Committee 278 addresses Intelligent Transport Systems (ITS), and is responsible for the standardisation of the DATEX II data model. CEN/TC278, through National Standards Bodies' consultation and balloting, adopts new DATEX II standards or modifies existing standards. The DATEX II data content standards are defined in the multi-part CEN specification number 16157 Part 1 Context and framework; Part 2 Location referencing; Part 3 Situation publication; Part 4 Variable Message Sign (VMS) publications; Part 5 Measured and elaborated data publications; Part 6 Parking publications; Part 7 Common data elements; Part 8 Traffic management publications and urban extensions; Part 9 Traffic signal management publications. Parts 1, 2, 3, 5 and 7 were approved as European Standards in 2018-2020, shortly to be joined by Part 4. These define the various aspects of version 3 of the DATEX II content specifications. Parts 6, 8 and 9 have been published as CEN Technical Specifications.

 CATEGORY Mobility

PUBLISHED 1/3/2018

Eden Strategy Institute

Eden Strategy Institute Top 50 Smart City Governments

https://static1.squarespace.com/static/5b3c517fec4eb767a04e73ff/t/5b513c57aa4a99f62d168e60/1532050650562/Eden-OXD_Top+50+Smart+City+Governments.pdf

Beyond a set of rankings, this collection of the Top 50 Smart City Governments therefore details the development of smart cities from a city government's perspective. It identifies a suite of 10 key tools that mayors have found effective to develop smart cities, details our reflections on how these tools were applied differently to achieve a range of outcomes, and highlights the achievements of 50 leading governments that have steered their smart cities forward.

 CATEGORY Case Studies and Rankings

 PUBLISHED 18/7/2018

EIP-SCC

EIP-SCC Trends for smart city strategies in Emerging Asia

<https://www.oecd-ilibrary.org/docserver/4fcef080-en.pdf?expires=1621414411&id=id&ccname=guest&checksum=772B9E5DF8C0EE2D4B346220F2ADC54D>

This working paper examines current policy trends at the national and subnational levels in the aim of offering key takeaways for policy makers and includes three parts. After the introduction, it presents the analytical framework needed to design and implement smart city strategies (promoting a territorial approach). Then, the working paper presents the results of the assessment, focusing on the six countries (China, India, Indonesia, Malaysia, Singapore and Thailand) that have already developed dedicated smart city strategies at the national level. Where possible, the working paper also presents subnational smart city. In the context of this paper, Southeast Asia refers to the countries comprising

ASEAN Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, the Philippines, Singapore, Thailand and Viet Nam. Given the complexity of smart cities and the current urban policy and governance contexts in Emerging Asia, sharing global best practices and learning from the experience of peers is undoubtedly useful to policy makers.

🔗 CATEGORY Strategies, Policies and Planning

📅 PUBLISHED 1/1/2019

■ ICLEI

ICLEI ICLEI Resilient Cities Report 2018

🔗 https://resilientcities2018.iclei.org/wp-content/uploads/RC2018_Report.pdf

Resilient Cities is the annual global forum on urban resilience and adaptation convened in Bonn, Germany. The congress series provides an international platform to share the latest knowledge, good practices, challenges, and innovations for creating more resilient cities. It also serves as an annual meeting point to track local progress on the resilience targets of Sustainable Development Goal 11 to make cities inclusive, safe, resilient, and sustainable. The congress outcomes present a snapshot of the state of urban resilience, building on discussions and developments from previous years. This report reflects the outcomes of the Resilient Cities 2018 congress and global developments in the field of urban resilience and climate change adaptation. The following pages highlight specific tools, initiatives, case studies, and solutions presented from local governments and practitioners around the world. The findings are cross-referenced to additional resources.

🔗 CATEGORY Sustainability and Resilience

📅 PUBLISHED 26/4/2018

■ IEC

IEC IEC 62325-451-10:2020 ED1 Framework for energy market communications - Part 451-10: Profiles for Energy Consumption Data (My Energy Data)

🔗 https://www.iec.ch/dyn/www/f?p=103:38:0:::FSP_ORG_ID,FSP_APEX_PAGE,FSP_PROJECT_ID:1273,109,101123#

IEC 62325-451-10 2020 specifies a UML package for the Energy Consumption Data business process and its associated document contextual model, assembly model and XML schema for use within the European style electricity markets. The relevant aggregate core components (ACCs) defined in IEC 62325-351 have been contextualised into aggregated business information entities (ABIEs) to satisfy the requirements of the European style market Energy Consumption Data business process. The contextualised ABIEs have been assembled into the Energy Consumption Data document contextual model. A related assembly model and an XML schema for the exchange of Energy Consumption information between market participants is automatically generated from the assembled document contextual model. The XML schema follows IEC Code Components management and copyright licensing.

🔗 CATEGORY Energy

📅 PUBLISHED 1/12/2020

IEC SRD 63235:2021 Smart city system - Methodology for concepts building

<https://webstore.iec.ch/publication/63690>

IEC SRD 63235 2021 provides a holistic system of systems approach to provide views, methodology framework, principles, processes, rules, and evaluation criteria for smart city system concepts building. While it does not specify the definitions of a smart city system, it provides a methodology based on system approaches for coordination, cooperation and connectivity of the terminology sources including IEC, ISO and ITU. The methodology fosters a multi-dimensional system of systems view on smart city systems across dimensions, domains and layers along the lifecycle of a smart city system, scenarios and use cases, supporting the sustainable development of smart city system arrangements, activities and artefacts, convergence of people, process and productivity globally.

📁 CATEGORY Strategies, Policies and Planning

📅 PUBLISHED 19/3/2020

IEC 63152:2020 Smart cities - City service continuity against disasters - The role of the electrical supply

<https://webstore.iec.ch/publication/60486>

IEC 63152 2020 establishes concepts and gives guidelines to help sustain a variety of city services on the occasion of a disaster from the perspective of providing electricity. It outlines the basic concepts on how multiple city services can cooperate and continue by electricity continuity plan(s) and electricity continuity system(s). It also specifies methods and means to establish these. The users of this document are assumed to be city developers, city operators, equipment manufacturers, essential service providers and disaster management personnel.

📁 CATEGORY Sustainability and Resilience

📅 PUBLISHED 13/7/2020

IEEE

IEEE 1905.1-2013 - Standard for a Convergent Digital Home Network for Heterogeneous Technologies

https://standards.ieee.org/standard/1905_1-2013.html

An abstraction layer for multiple home networking technologies that provides a common interface to widely deployed home networking technologies is defined in this standard IEEE 1901 over power lines, IEEE 802.11 for wireless, Ethernet over twisted pair cable, and MoCA 1.1 over coax. Connectivity selection for transmission of packets arriving from any interface or application is supported by the 1905.1 abstraction layer. Modification to the underlying home networking technologies is not required by the 1905.1 layer, and hence it does not change the behavior or implementation of existing home networking technologies. Introduced by the 1905.1 specification is a layer between layers 2 and 3 that abstracts the individual details of each interface, aggregates available bandwidth, and facilitates seamless integration. The 1905.1 also facilitates end-to-end quality of service (QoS) while simplifying the introduction of new devices to the network, establishing secure connections, extending network coverage, and facilitating advanced network management features including discovery, path selection, autoconfiguration, and quality of service (QoS) negotiation.

📁 CATEGORY Buildings

📅 PUBLISHED 12/4/2013

IEEE 1900.1-2019 - Standard for Definitions and Concepts for Dynamic Spectrum Access: Terminology Relating to Emerging Wireless Networks, System Functionality, and Spectrum Management

 https://standards.ieee.org/standard/1900_1-2019.html

Definitions and explanations of key concepts in the fields of spectrum management, spectrum trading, cognitive radio, dynamic spectrum access, policy-based radio systems, software defined radio, and related advanced radio system technologies are provided. Beyond simple, short definitions, amplifying text explaining these terms in the context of the technologies that use them is provided. Also described is how these technologies interrelate and create new capabilities while at the same time providing mechanisms supportive of new spectrum management paradigms.

 CATEGORY Connectivity

 PUBLISHED 23/4/2019

IEEE 1900.4.1-2013 - Standard for Interfaces and Protocols Enabling Distributed Decision Making for Optimized Radio Resource Usage in Heterogeneous Wireless Networks

 https://standards.ieee.org/standard/1900_4_1-2013.html

This standard provides a detailed description of interfaces and service access points defined in the baseline, IEEE 1900.4TM, enabling distributed decision making in heterogeneous wireless networks and obtaining context information for this decision making. It facilitates innovative, cost-effective, and multi-vendor production of network side and terminal side components of an IEEE 1900.4TM system and accelerates commercialization of this system to improve capacity and quality of service in heterogeneous wireless networks.

 CATEGORY Connectivity

 PUBLISHED 24/6/2013

IEEE 1900.4a-2011 - Standard for Architectural Building Blocks Enabling Network-Device Distributed Decision Making for Optimized Radio Resource Usage in Heterogeneous Wireless Access Networks Amendment 1: Architecture and Interfaces for Dynamic Spectrum Access Networks in White Space Frequency Bands

 https://standards.ieee.org/standard/1900_4a-2011.html

Additional components of the IEEE 1900.4 system are defined in this amendment to enable mobile wireless access service in white space frequency bands without any limitation on used radio interface (physical and media access control layers, carrier frequency, etc.).

 CATEGORY Connectivity

 PUBLISHED 16/9/2011

IEEE 1900.5.1-2020 - Standard for Policy Language for Dynamic Spectrum Access Systems

https://standards.ieee.org/standard/1900_5_1-2020.html

A vendor-independent policy language for managing the functionality and behavior of dynamic spectrum access networks based on the language requirements defined in IEEE 1900.5(TM), IEEE Standard Policy Language Requirements and System Architectures for Dynamic Spectrum Access Systems, is defined in this standard.

📁 CATEGORY Connectivity

📅 PUBLISHED 22/6/2021

IEEE 1900.5.2-2017 - Standard for Method for Modeling Spectrum Consumption

https://standards.ieee.org/standard/1900_5_2-2017.html

A vendor-independent generalized method for modeling spectrum consumption of any type of use of radio frequency spectrum and the attendant computations for arbitrating the compatibility among models are defined in this standard. The methods of modeling are chosen to support the development of tractable algorithms for determining the compatibility between models and for performing various spectrum management tasks that operate on a plurality of models. The modeling methods are exclusively focused on capturing spectrum use but are defined in a schema that can be joined with other schemata related to spectrum management.

📁 CATEGORY Connectivity

📅 PUBLISHED 26/6/2018

IEEE 1900.5-2011 - Standard for Policy Language Requirements and System Architectures for Dynamic Spectrum Access Systems

https://standards.ieee.org/standard/1900_5-2011.html

This standard defines a vendor-independent set of policy-based control architectures and corresponding policy language requirements for managing the functionality and behavior of Dynamic Spectrum Access networks. The purpose of this standard is to define policy language requirements and associated architecture requirements for interoperable, vendor-independent control of Dynamic Spectrum Access functionality and behavior in radio systems and wireless networks. This standard will also define the relationship of policy language and architecture to the needs of at least the following constituencies the regulator, the operator, the user, and the network equipment manufacturer.

📁 CATEGORY Connectivity

📅 PUBLISHED 13/1/2012

IEEE 1900.6-2011 - Standard for Spectrum Sensing Interfaces and Data Structures for Dynamic Spectrum Access and other Advanced Radio Communication Systems

https://standards.ieee.org/standard/1900_6-2011.html

The interfaces and data structures required to exchange sensing-related information in order to increase interoperability between sensors and their clients developed by different manufacturers are defined in this standard. The logical interface and supporting data structures are defined abstractly without constraining the sensing technology, client design, or data link between sensor and client. The entities involved and parameters exchanged in this process. It further elaborates on the service

access points, service primitives, as well as generic procedures used to realize this information exchange, are defined by this standard.

🔗 CATEGORY Connectivity

📅 PUBLISHED 22/4/2011

IEEE 1900.6a-2014 - Standard for Spectrum Sensing Interfaces and Data Structures for Dynamic Spectrum Access and Other Advanced Radio Communication Systems - Amendment 1: Procedures, Protocols, and Data Archive Enhanced Interfaces

🔗 https://standards.ieee.org/standard/1900_6a-2014.html

Included in this amendment to IEEE 1900.6(TM) are procedures, protocols, and message format specifications for the exchange of sensing related data, control data, and configuration data between spectrum sensors and their clients. In addition, specifications for the exchange of sensing related and other relevant data and related interfaces between the data archive and other data sources have been added.

🔗 CATEGORY Connectivity

📅 PUBLISHED 6/6/2014

IEEE 1900.7-2015 - Standard for Radio Interface for White Space Dynamic Spectrum Access Radio Systems Supporting Fixed and Mobile Operation

🔗 https://standards.ieee.org/standard/1900_7-2015.html

A radio interface including medium access control sublayer and physical layer of white space dynamic spectrum access radio systems supporting fixed and mobile operation in white space frequency bands, while avoiding causing harmful interference to incumbent users in these frequency bands is specified in this standard.

🔗 CATEGORY Connectivity

📅 PUBLISHED 15/2/2016

IEEE 1901.1.1-2020 - Standard Test Procedures for 1901.1(TM) for Medium Frequency (less than 15 MHz) Power Line Communications for Smart Grid Applications

🔗 https://standards.ieee.org/standard/1901_1_1-2020.html

The interoperability and compliance testing for IEEE 1901.1 products built, in which physical (PHY) and media access control (MAC) layers of the medium frequency band (less than 12 MHz) broadband power line communication technology for smart grid applications (SGPLC) based on orthogonal frequency division multiplexing (OFDM), is specified in this standard. The corresponding PLC application scenarios and test environment are introduced, and the PHY/MAC test cases and test scenarios are provided. The procedures for compliance, interoperability, and certification of IEEE 1901.1(TM) are specified in this standard.

🔗 CATEGORY Connectivity

📅 PUBLISHED 16/3/2021

IEEE 1901.1-2018 - Standard for Medium Frequency (less than 12 MHz) Power Line Communications for Smart Grid Applications

https://standards.ieee.org/standard/1901_1-2018.html

Physical (PHY) and media access control (MAC) layers of the medium frequency band (less than 12 MHz) broadband power line communication technology for smart grid applications (SGPLC) based on orthogonal frequency division multiplexing (OFDM) are specified in this standard. The necessary security requirements that assure communication privacy and allow use for mission critical and security sensitive services and applications are addressed in this standard. The coexistence with other technologies based on IEEE 1901(TM)-2010 also are addressed. The approach that is geared towards achieving an extended communication range with medium speeds in comparison with the existing power line communication technologies operating in similar frequency bands is defined in this standard.

📁 CATEGORY Connectivity

📅 PUBLISHED 14/5/2018

IEEE 1901.2-2013 - Standard for Low-Frequency (less than 500 kHz) Narrowband Power Line Communications for Smart Grid Applications

https://standards.ieee.org/standard/1901_2-2013.html

A worldwide standard for narrowband power line communications (PLC) via alternating current, direct current, and nonenergized electric power lines using frequencies below 500 kHz. Data rates of up to 500 kb/s are supported. The field of use includes Smart Grid applications. Coexistence mechanisms that can be used by other PLC technologies operating below 500 kHz are also included. These coexistence mechanisms may be used separately from the rest of the standard.

📁 CATEGORY Connectivity

📅 PUBLISHED 6/12/2013

IEEE 1901-2020 - Standard for Broadband over Power Line Networks: Medium Access Control and Physical Layer Specifications

<https://standards.ieee.org/standard/1901-2020.html>

Physical (PHY) and media access control (MAC) layers of a broadband powerline communication technology for local area networks (LANs), Smart Energy, Smart Grid, Internet of Things, transportation platforms (vehicle) applications, and other data distribution are defined in this standard. The balanced and efficient use of the power line communications channel by all classes of BPL devices is the main focus of this standard, defining detailed mechanisms for coexistence and interoperability between different BPL devices, and ensuring that desired bandwidth and quality of service may be delivered. The necessary security questions are addressed to ensure the privacy of communications between users and to allow the use of BPL for security sensitive services.

📁 CATEGORY Connectivity

📅 PUBLISHED 19/1/2021

IEEE 1903.1-2017 - Standard for Content Delivery Protocols of Next Generation Service Overlay Network

https://standards.ieee.org/standard/1903_1-2017.html

Protocols to support advanced content delivery capability in next generation service overlay networks including content delivery (CD) functional entity (FE), service routing (SR) FE, service policy decision (SPD) FE, service discovery and negotiation (SDN) FE, and context information management (CIM) FE are specified in this standard. Content discovery, content cache and storage management, content delivery control, and transport QoS control, including contextaware and dynamically adaptive content delivery operations, are supported by the content delivery capability.

🔗 CATEGORY Connectivity

📅 PUBLISHED 25/5/2018

IEEE 2700-2017 - Standard for Sensor Performance Parameter Definitions

<https://standards.ieee.org/standard/2700-2017.html>

A common framework for sensor performance specification terminology, units, conditions, and limits is provided. Specifically, the accelerometer, magnetometer, gyrometer/gyroscope, accelerometer/magnetometer/gyroscope combination sensors, barometer/pressure sensors, hygrometer/humidity sensors, temperature sensors, light sensors (ambient and RGB), and proximity sensors are discussed.

🔗 CATEGORY Connectivity

📅 PUBLISHED 31/1/2018

IEEE 802.15.4-2020 - Standard for Low-Rate Wireless Networks

https://standards.ieee.org/standard/802_15_4-2020.html

The Physical Layer (PHY) and Medium Access Control (MAC) sublayer specifications for low-data-rate wireless connectivity with fixed, portable, and moving devices with no battery or very limited battery consumption requirements are defined in this standard. In addition, the standard provides modes that allow for precision ranging. PHYs are defined for devices operating in a variety of geographic regions.

🔗 CATEGORY Connectivity

📅 PUBLISHED 23/7/2020

IEEE 802.16-2017 - Standard for Air Interface for Broadband Wireless Access Systems

https://standards.ieee.org/standard/802_16-2017.html

This standard specifies the air interface, including the medium access control layer (MAC) and physical layer (PHY), of combined fixed and mobile point-to-multipoint broadband wireless access (BWA) systems providing multiple services. The MAC is structured to support the WirelessMAN-SC, WirelessMAN-OFDM, and WirelessMAN-OFDMA PHY specifications, each suited to a particular operational environment. The standard enables rapid worldwide deployment of innovative, cost-effective, and interoperable multi-vendor broadband wireless access products, facilitates competition in broadband access by providing alternatives to wireline broadband access, encourages consistent worldwide spectrum allocation, and accelerates the commercialization of broadband wireless access systems.

🔗 CATEGORY Connectivity

📅 PUBLISHED 2/3/2018

IEEE 802.21-2017 - Standard for Local and metropolitan area networks - Part 21: Media Independent Services Framework

https://standards.ieee.org/standard/802_21-2017.html

An extensible IEEE 802(R) media access independent services framework (i.e., function and protocol) is defined that enables the optimization of services including handover and other services when performed between heterogeneous IEEE 802 networks. These services are facilitated by this standard when networking between IEEE 802 networks and cellular networks.

📁 CATEGORY Connectivity

📅 PUBLISHED 28/4/2017

IEEE 802.22-2019 - Standard - Information Technology - Telecommunications and information exchange between systems - Wireless Regional Area Networks-Specific requirements - Part 22: Cognitive Wireless RAN MAC and PHY specifications: Policies and Procedures for Operation in the Bands that Allow Spectrum Sharing where the Communications Devices May Opportunistically Operate in the Spectrum of Primary Service

https://standards.ieee.org/standard/802_22-2019.html

This standard specifies the air interface, including the cognitive medium access control layer (MAC) and physical layer (PHY), of point-to-multipoint wireless regional area networks (WRANs) comprised of a professional fixed base station (BS) with fixed and portable user terminals operating in the VHF/UHF TV broadcast bands between 54 MHz to 862 MHz, and potentially in the 1300 MHz to 1750 MHz, and 2700 MHz to 3700 MHz bands provided the regulatory regime allows it.

📁 CATEGORY Connectivity

📅 PUBLISHED 5/5/2020

IEEE 802.3-2018 - Standard for Ethernet

https://standards.ieee.org/standard/802_3-2018.html

Ethernet local area network operation is specified for selected speeds of operation from 1 Mb/s to 400 Gb/s using a common media access control (MAC) specification and management information base (MIB). The Carrier Sense Multiple Access with Collision Detection (CSMA/CD) MAC protocol specifies shared medium (half duplex) operation, as well as full duplex operation. Speed specific Media Independent Interfaces (MIIs) allow use of selected Physical Layer devices (PHY) for operation over coaxial, twisted pair or fiber optic cables, or electrical backplanes. System considerations for multisegment shared access networks describe the use of Repeaters that are defined for operational speeds up to 1000 Mb/s. Local Area Network (LAN) operation is supported at all speeds. Other specified capabilities include various PHY types for access networks, PHYs suitable for metropolitan area network applications, and the provision of power over selected twisted pair PHY types.

📁 CATEGORY Connectivity

📅 PUBLISHED 31/8/2018

IEEE P1801 - Draft Standard for Design and Verification of Low Power, Energy Aware Electronic Systems

<https://standards.ieee.org/project/1801.html>

This standard defines the syntax and semantics of a format used to express power intent in energy aware electronic system design. Power intent includes the concepts and information required for specification and validation, implementation and verification, and modelling and analysis of power managed electronic systems. This standard also defines the relationship between the power intent captured in this format and design intent captured via other formats (e.g., standard hardware description languages and cell libraries).

 CATEGORY Connectivity

 PUBLISHED 5/12/2018

IEEE P2302 - Standard for Intercloud Interoperability and Federation (SIIF)

<https://standards.ieee.org/project/2302.html>

This standard defines topology, functions, and governance for cloud-to-cloud interoperability and federation. Topological elements include clouds, roots, exchanges (which mediate governance between clouds), and gateways (which mediate data exchange between clouds). Functional elements include name spaces, presence, messaging, resource ontologies (including standardized units of measurement), and trust infrastructure. Governance elements include registration, geo-independence, trust anchor, and potentially compliance and audit.

 CATEGORY Connectivity

 PUBLISHED 18/5/2017

IEEE P802.11 - Standard for Information Technology - Telecommunications and Information Exchange Between Systems Local and Metropolitan Area Networks -- Specific Requirements - Part 11: Wireless Local Area Network (LAN) Medium Access Control (MAC) and Physical Layer (PHY) Specifications

https://standards.ieee.org/project/802_11.html

The scope of this standard is to define one Medium Access Control (MAC) and several Physical Layer (PHY) specifications for wireless connectivity for fixed, portable, and moving stations (STAs) within a local area.

 CATEGORY Connectivity

 PUBLISHED 10/2/2021

IEEE 1278.1-2012 - Standard for Distributed Interactive Simulation - Application Protocols

https://standards.ieee.org/standard/1278_1-2012.html

Data messages, known as Protocol Data Units (PDUs), that are exchanged on a network among simulation applications are defined. These PDUs are for interactions that take place within specified domains called protocol families, which include Entity Information/Interaction, Warfare, Logistics, Simulation Management, Distributed Emission Regeneration, Radio Communications, Entity Management, Minefield, Synthetic Environment, Simulation

Management with Reliability, Information Operations, Live Entity Information/Interaction, and Non-Real-Time protocol.

🔗 CATEGORY Data and Architecture

📅 PUBLISHED 19/12/2012

IEEE 2200-2012 - Standard Protocol for Stream Management in Media Client Devices

🔗 <https://standards.ieee.org/standard/2200-2012.html>

This standard will define reference architectures and interfaces for intelligently routing and replicating content over heterogeneous networks to portable devices with local storage, without disrupting content providers' direct relationship with end users. The purpose is to enable the delivery of richer media content to portable devices, in a way that is not limited by cost and bandwidth.

🔗 CATEGORY Data and Architecture

📅 PUBLISHED 8/6/2012

IEEE 2413-2019 - Standard for an Architectural Framework for the Internet of Things (IoT)

🔗 <https://standards.ieee.org/standard/2413-2019.html>

An architecture framework description for the Internet of Things (IoT) which conforms to the international standard ISO/IEC/IEEE 42010 2011 is defined. The architecture framework description is motivated by concerns commonly shared by IoT system stakeholders across multiple domains (transportation, healthcare, Smart Grid, etc.). A conceptual basis for the notion of things in the IoT is provided and the shared concerns as a collection of architecture viewpoints is elaborated to form the body of the framework description.

🔗 CATEGORY Data and Architecture

📅 PUBLISHED 10/3/2020

IEEE P1516 - Standard for Modeling and Simulation (M and S) High Level Architecture (HLA), Framework and Rules

🔗 <https://standards.ieee.org/project/1516.html>

This document provides an overview of the High Level Architecture (HLA), defines a family of related HLA documents, and defines the principles of HLA in terms of responsibilities that federates (simulations, supporting utilities, or interfaces to live systems) and federations (sets of federates working together) must uphold.

🔗 CATEGORY Data and Architecture

📅 PUBLISHED 5/2/2016

IEEE P1931.1 - Standard for an Architectural Framework for Real-time Onsite Operations Facilitation (ROOF) for the Internet of Things

https://standards.ieee.org/project/1931_1.html

This standard defines an architectural framework, protocols and Application Programming Interfaces (APIs) for providing Real-time Onsite Operations Facilitation (ROOF). ROOF computing and networking for the data and the devices include next-hop connectivity for the devices, real-time context building and decision triggers, efficient backhaul connectivity to the cloud, and security and privacy. This standard covers interoperability, collaboration and autonomous operation of an Internet of Things (IoT) system with computing required for context building, security, access control, data storage, data aggregation and ability to choose different cloud and application service providers. Furthermore, this standard defines how an end user is able to securely provision, commission and decommission the devices. This standard leverages existing applicable standards and is complimentary to architectural frameworks defined in broader IoT environments.

CATEGORY Data and Architecture

PUBLISHED 7/12/2016

IEEE 1484.11.2-2020 - Standard for Learning Technology--ECMAScript Application - Programming Interface for Content to Runtime Services Communication

https://standards.ieee.org/standard/1484_11_2-2020.html

An ECMAScript application programming interface (API) for content-to-runtime-services communication is described in this standard. It is based on a current industry practice called CMI - Computer Managed Instruction. This API enables the communication of information between content and a runtime service (RTS) typically provided by a learning management system (LMS) via common API services using the ECMAScript language. The purpose of this standard is to build consensus around, resolve ambiguities, and correct defects in existing specifications for an ECMAScript API for exchanging data between learning-related content and an LMS.

CATEGORY Education, Training and Learning

PUBLISHED 22/1/2021

IEEE 1484.12.1-2020 - Standard for Learning Object Metadata

https://standards.ieee.org/standard/1484_12_1-2020.html

A conceptual data schema that defines the structure of a metadata instance for a learning object is specified in this standard. For this standard, a learning object is defined as any entity, digital or non-digital, that is used for learning, education, or training; a metadata instance for a learning object describes relevant characteristics of the learning object to which it applies. Such characteristics can be regrouped in general, life cycle, meta-metadata, educational, technical, educational, rights, relation, annotation, and classification categories. The conceptual data schema defined in this standard specifies the data elements of which a metadata instance for a learning object is composed and allows for linguistic diversity of both learning objects and the metadata instances that describe them. It is intended that this standard will be referenced by other standards that will define the implementation descriptions of the data schema, so that a metadata instance for a learning object can be used by a learning technology system to manage, locate, evaluate, or exchange learning objects. The intent of this standard is to specify a base schema, which can be used to build on as practice develops, for instance in order to facilitate automatic, adaptive scheduling of learning objects by software agents.

CATEGORY Education, Training and Learning

PUBLISHED 4/9/2020

IEEE 1484.12.3-2020 - Standard for Learning Technology - Extensible Markup Language (XML) Schema Definition Language Binding for Learning Object Metadata

https://standards.ieee.org/standard/1484_12_3-2020.html

This Standard defines a World Wide Web Consortium (W3C) Extensible Markup Language (XML) Schema definition language binding of the learning object metadata (LOM) data model defined in IEEE 1484.12.1TM-2002. The purpose of this Standard is to allow the creation of LOM instances in XML, which allows for interoperability and the exchange of LOM XML instances between various systems. This Standard uses the W3C XML Schema definition language to define the syntax and semantics of the XML encodings.

📁 CATEGORY Education, Training and Learning

📅 PUBLISHED 7/4/2020

IEEE 1484.13.1-2012 - Standard for Learning Technology - Conceptual Model for Resource Aggregation for Learning, Education, and Training

https://standards.ieee.org/standard/1484_13_1-2012.html

A conceptual model for interpreting externalized representations of digital aggregations of resources for learning, education, and training is defined. The conceptual model is defined as an ontology. Internal compositions and uses of digital resources are not specified nor are processing methods for resource aggregations.

📁 CATEGORY Education, Training and Learning

📅 PUBLISHED 29/6/2012

IEEE 1484.13.2-2013 - Recommended Practice for Learning Technology - Metadata Encoding and Transmission Standard (METS) Mapping to the Conceptual Model for Resource Aggregation

https://standards.ieee.org/standard/1484_13_2-2013.html

This Recommended Practice specifies how the elements and attributes defined in the Metadata Encoding and Transmission Standard (METS) relate to the components of the conceptual model for resource aggregation defined in IEEE 1484.13.1-2012. The mapping specified in this recommended practice may be used with the mappings of other resource aggregation formats to achieve interoperability among the formats via the conceptual model defined in IEEE 1484.13.1-2012.

📁 CATEGORY Education, Training and Learning

📅 PUBLISHED 30/12/2013

IEEE 1484.13.3-2014 - Recommended Practice for Learning Technology - ISO 21000-2:2005 Information Technology--Multimedia Framework (MPEG-21) - Part 2: Digital Item Declaration Mapping to the Conceptual Model for Resource Aggregation

https://standards.ieee.org/standard/1484_13_3-2014.html

This Recommended Practice specifies how the elements and attributes defined in Multimedia Framework (MPEG-21) - Part 2 Digital Item Declaration relate to the components of the conceptual model for resource aggregation defined in IEEE 1484.13.1-2012.

CATEGORY Education, Training and Learning

PUBLISHED 26/6/2014

IEEE 1484.13.4-2016 - Recommended Practice for Learning Technology - IMS Content Packaging Information Model (CP) Version 1.2 - Mapping to the Conceptual Model for Resource Aggregation

https://standards.ieee.org/standard/1484_13_4-2016.html

Specified in this Recommended Practice is how the elements and attributes defined in the IMS Content Packaging Information Model (CP) Version 1.2 relate to the components of the conceptual model for resource aggregation defined in IEEE 1484.13.1(TM)-2012.

CATEGORY Education, Training and Learning

PUBLISHED 9/9/2016

IEEE 1484.13.5-2013 - Recommended Practice for Learning Technology: IETF RFC 4287 - Atom Syndication Format - Mapping to the Conceptual Model for Resource Aggregation

https://standards.ieee.org/standard/1484_13_5-2013.html

This Recommended Practice specifies how the elements and attributes defined in Atom Syndication Format (Atom) relate to the components of the conceptual model for resource aggregation defined in IEEE 1484.13.1. The mapping specified in this Recommended Practice may be used with the mappings of other resource aggregation formats to achieve interoperability among the formats via the conceptual model defined in IEEE 1484.13.1.

CATEGORY Education, Training and Learning

PUBLISHED 16/12/2013

IEEE 1484.13.6-2015 - Recommended Practice for Learning Technology - Open Archives Initiative Object Reuse and Exchange Abstract Model (OAI-ORE) - Mapping to the Conceptual Model for Resource Aggregation

https://standards.ieee.org/standard/1484_13_6-2015.html

Specified in this Recommended Practice are how the elements and attributes defined in the Open Archives Initiative Object Reuse and Exchange (OAI-ORE) Abstract Model and expressed in the OAI-ORE Resource Map Implementation in RDF/XML relate to the components of the conceptual model for resource aggregation defined in IEEE 1484.13.1(TM)-2012.

📁 CATEGORY Education, Training and Learning

📅 PUBLISHED 31/3/2015

IEEE 1589-2020 - Standard for Augmented Reality Learning Experience Model

<https://standards.ieee.org/standard/1589-2020.html>

Augmented Reality (AR) promises to provide significant boosts in operational efficiency by making information available to employees needing task support in context in real time. To support according implementations of AR training systems, this document proposes an overarching integrated conceptual model that describes interactions between the physical world, the user, and digital information, the context for AR-assisted learning and other parameters of the environment. It defines two data models and their binding to XML and JSON for representing learning activities (also known as employee tasks and procedures) and the learning environment in which these tasks are performed (also known as the workplace). The interoperability specification and standard is presented in support of an open market where interchangeable component products provide alternatives to monolithic Augmented Reality-assisted learning systems. Moreover, it facilitates the creation of experience repositories and online marketplaces for Augmented Reality-enabled learning content. Specific attention was given to reuse and repurposing of existing learning content and catering to mixed experiences combining real world learner guidance with the consumption (or production) of traditional contents such as instructional video material or learning apps and widgets.

📁 CATEGORY Education, Training and Learning

📅 PUBLISHED 17/4/2020

IEEE P1484.11.1 - Standard for Learning Technology - Data Model for Content Object Communication

https://standards.ieee.org/project/1484_11_1.html

This standard describes a data model to support the interchange of agreed upon data elements and their values between a learning-related content object and a runtime service (RTS) used to support learning management. This Standard does not specify the means of communication between a content object and an RTS nor how any component of a learning environment shall behave in response to receiving data in the form specified. This Standard is based on a related data model defined in the Computer Managed Instruction (CMI) Guidelines For Interoperability, version 3.4, defined by the Aviation Industry CBT Committee (AICC). To balance the need to support existing implementations with the need to make technical corrections and support emerging practice, this Standard selectively includes those data elements from the CMI specification that are commonly implemented; renames some data elements taken from the CMI specification to clarify their intended meaning; modifies the data types of data elements taken from the CMI specification to reflect ISO standard data types and internationalization requirements; removes some organizational structures used in the CMI specification to group data elements that are

specific to the AICC community of practice and not generally applicable; and introduces some data elements not present in the CMI specification to correct known technical defects in data elements taken from that specification.

🔗 CATEGORY Education, Training and Learning

📅 PUBLISHED 3/6/2020

IEEE P2784 - Guide for the Technology and Process Framework for Planning a Smart City

🔗 <https://standards.ieee.org/project/2784.html>

This guide will provide a framework that outlines technologies and the processes for planning the evolution of a smart city. Smart Cities and related solutions require technology standards and a cohesive process planning framework for the use of the internet of things to ensure interoperable, agile, and scalable solutions that are able to be implemented and maintained in a sustainable manner. This framework provides a methodology for municipalities and technology integrators to use as a tool to plan for innovative and technology solutions for smart cities.

🔗 CATEGORY Education, Training and Learning

📅 PUBLISHED 28/9/2017

IEEE 1402-2000 - Guide for Electric Power Substation Physical and Electronic Security

🔗 <https://standards.ieee.org/standard/1402-2000.html>

This Guide identifies and discusses security issues related to human intervention during the construction, operation, (except for natural disasters) and maintenance of electric power supply substations. It also documents methods and designs to mitigate intrusions. Access to electric supply substations by unauthorized personnel is an increasing problem for the electric industry. These intrusions may result in loss, damage, and mis-operation of equipment and facilities. This Guide will present various methods of and techniques presently being used to mitigate human intrusions as identified in an industry survey.

🔗 CATEGORY Energy

📅 PUBLISHED 4/4/2000

IEEE 1547.1-2020 - Standard Conformance Test Procedures for Equipment Interconnecting Distributed Energy Resources with Electric Power Systems and Associated Interfaces

🔗 https://standards.ieee.org/standard/1547_1-2020.html

The type, production, commissioning, and periodic tests, and evaluations that shall be performed to confirm that the interconnection and interoperation functions of equipment and systems interconnecting distributed energy resources with the electric power system conform to IEEE 1547 are specified in this standard.

🔗 CATEGORY Energy

📅 PUBLISHED 21/5/2020

IEEE 1547.4-2011 - Guide for Design, Operation, and Integration of Distributed Resource Island Systems with Electric Power Systems

https://standards.ieee.org/standard/1547_4-2011.html

Alternative approaches and good practices for the design, operation, and integration of distributed resource (DR) island systems with electric power systems (EPS) are provided. This includes the ability to separate from and reconnect to part of the area EPS while providing power to the islanded EPSs. This guide includes the DRs, interconnection systems, and participating EPSs.

📁 CATEGORY Energy

📅 PUBLISHED 20/7/2011

IEEE 1547.6-2011 - Recommended Practice for Interconnecting Distributed Resources with Electric Power Systems Distribution Secondary Networks

https://standards.ieee.org/standard/1547_6-2011.html

Recommendations and guidance for distributed resources (DR) interconnected on the distribution secondary networks, including both spot networks and grid networks, are provided. This document gives an overview of distribution secondary network systems design, components, and operation; describes considerations for interconnecting DR with networks; and provides potential solutions for the interconnection of DR on network distribution systems. IEEE 1547.6-2011 is part of the IEEE 1547(TM) series of standards. IEEE 1547-2003 provides mandatory requirements for the interconnection of DR with EPSs and focuses primarily on radial distribution circuit interconnections. For DR interconnected on networks, all of IEEE 1547-2003 needs to be satisfied. IEEE 1547.6-2011 was specifically developed to provide additional information in regard to interconnecting DR with distribution secondary networks.

📁 CATEGORY Energy

📅 PUBLISHED 12/9/2011

IEEE 1547.7-2013 - Guide for Conducting Distribution Impact Studies for Distributed Resource Interconnection

https://standards.ieee.org/standard/1547_7-2013.html

IEEE 1547.7(TM) is part of the IEEE 1547(TM) series of standards. Whereas IEEE 1547(TM)-2003 provides mandatory requirements for the interconnection of distributed resources (DR) with electric power systems (EPS), this guide does not presume the interconnection is IEEE 1547(TM) compliant. Further, this guide does not interpret IEEE 1547(TM) or other standards in the IEEE 1547(TM) series, and this guide does not provide additional requirements or recommended practices related to the other IEEE 1547(TM) documents. However, DR interconnection may contribute to resultant conditions that could exceed what was normally planned for and built into the distribution system. This guide provides alternative approaches and good practices for engineering studies of the potential impacts of a DR or aggregate DR interconnected to the electric power distribution system. This guide describes criteria, scope, and extent for those engineering studies. Study scope and extent are described as functions of identifiable characteristics of the DR, the EPS, and the interconnection. The intent includes promoting impact study consistency while helping identify only those studies that should be performed based on technically transparent criteria for the DR interconnection.

📁 CATEGORY Energy

📅 PUBLISHED 28/2/2014

IEEE 1547-2018 - Standard for Interconnection and Interoperability of Distributed Energy Resources with Associated Electric Power Systems Interfaces

 <https://standards.ieee.org/standard/1547-2018.html>

The technical specifications for, and testing of, the interconnection and interoperability between utility electric power systems (EPSs) and distributed energy resources (DERs) are the focus of this standard. It provides requirements relevant to the performance, operation, testing, safety considerations, and maintenance of the interconnection. It also includes general requirements, response to abnormal conditions, power quality, islanding, and test specifications and requirements for design, production, installation evaluation, commissioning, and periodic tests. The stated requirements are universally needed for interconnection of DER, including synchronous machines, induction machines, or power inverters/converters and will be sufficient for most installations. The criteria and requirements are applicable to all DER technologies interconnected to EPSs at typical primary and/or secondary distribution voltages. Installation of DER on radial primary and secondary distribution systems is the main emphasis of this document, although installation of DERs on primary and secondary network distribution systems is considered. This standard is written considering that the DER is a 60 Hz source.

 CATEGORY Energy

 PUBLISHED 6/4/2018

IEEE 1547a-2020 - Standard for Interconnection and Interoperability of Distributed Energy Resources with Associated Electric Power Systems Interfaces- - Amendment 1: To Provide More Flexibility for Adoption of Abnormal Operating Performance Category III

 <https://standards.ieee.org/standard/1547a-2020.html>

The performance and functional capability requirements for DER connected with the Area Electric Power Systems (Area EPS) are defined in IEEE 1547(TM). This amendment revises the ranges of allowable trip clearing time settings in Table 13 for DERs in abnormal operating performance category III to allow wider ranges that can broaden and simplify the adoption of the standard. In addition, the related informative Figure H.9 is revised accordingly.

 CATEGORY Energy

 PUBLISHED 15/4/2020

IEEE 1815-2012 - Standard for Electric Power Systems Communications - Distributed Network Protocol (DNP3)

 <https://standards.ieee.org/standard/1815-2012.html>

The DNP3 protocol structure, functions, and interoperable application options (subset levels) are specified. The simplest application level is intended for low-cost distribution feeder devices, and the most complex for full-featured systems. The appropriate level is selected to suit the functionality required in each device. The protocol is suitable for operation on a variety of communication media consistent with the makeup of most electric power communication systems.

 CATEGORY Energy

 PUBLISHED 10/10/2012

IEEE 2030-2011 - Guide for Smart Grid Interoperability of Energy Technology and Information Technology Operation with the Electric Power System (EPS), End-Use Applications, and Loads

<https://standards.ieee.org/standard/2030-2011.html>

IEEE 2030 provides alternative approaches and best practices for achieving smart grid interoperability. It is the first all-encompassing IEEE standard on smart grid interoperability providing a roadmap directed at establishing the framework in developing an IEEE national and international body of standards based on cross-cutting technical disciplines in power applications and information exchange and control through communications. IEEE 2030 establishes the smart grid interoperability reference model (SGIRM) and provides a knowledge base addressing terminology, characteristics, functional performance and evaluation criteria, and the application of engineering principles for smart grid interoperability of the electric power system with end-use applications and loads. A system of systems approach to smart grid interoperability lays the foundation on which IEEE 2030 establishes the SGIRM as a design tool that inherently allows for extensibility, scalability, and upgradeability. The IEEE 2030 SGIRM defines three integrated architectural perspectives power systems, communications technology, and information technology. Additionally, it defines design tables and the classification of data flow characteristics necessary for interoperability.

📁 CATEGORY Energy

📅 PUBLISHED 10/9/2011

IEEE C37.240-2014 - Standard Cybersecurity Requirements for Substation Automation, Protection, and Control Systems

https://standards.ieee.org/standard/C37_240-2014.html

Cybersecurity measures require that a balance be achieved between technical feasibility and economic feasibility and that this balance addresses the risks expected to be present at a substation. Further, cybersecurity measures must be designed and implemented in such a manner that access and operation to legitimate activities is not impeded, particularly during times of emergency or restoration activity. This standard presents a balance of the above factors.

📁 CATEGORY Energy

📅 PUBLISHED 30/1/2015

IEEE P1547.2 - Application Guide for 1547(TM), Standard for Interconnecting Distributed Resources with Electric Power Systems

https://standards.ieee.org/project/1547_2.html

This guide provides the technical background, rationale and guidance to support the application of the substantially revised IEEE 1547, Standard for Interconnection and interoperability of Distributed Energy Resources (DER) with Electric Power Systems (EPS) and Associated Interfaces. The document will describe how the requirements and default settings specified in 1547 have been carefully chosen to balance distribution and bulk system needs for increasing penetration of DER. It further expands IEEE 1547 by addressing certain DER integration issues that are not fully addressed by the base standard. The guide will address (1) the concept of the newly-introduced performance categories and their assignment to specific DER by an Authority Governing Interconnection Requirements (AGIR); (2) the new requirements for voltage and reactive power control, frequency control, response to abnormal conditions including ride-through; (3) the flexibility provided by the newly-introduced ranges of adjustability for control settings as well as for voltage and frequency trip settings to fully exploit the revised IEEE 1547's potential and to account for specific system characteristics; (4) the interoperability and communication interface requirements; and (5) the test and verification practices, including

design and as-built installation evaluations for utility-scale DER, that have not been included in the previous version of the standard.

📁 CATEGORY Energy

📅 PUBLISHED 28/9/2017

IEEE Standards Activities for Smart Cities

🔗 <https://standards.ieee.org/content/dam/ieee-standards/standards/web/documents/other/smartcities.pdf>

In order to meet the increased energy demands of the future, cities throughout the world will need to become smarter. To enable and facilitate this, IEEE has been working for many years on the infrastructure and networking necessary to design, generate, automate, operate, deliver, distribute, support, and connect energy to the cities, homes, and systems that demand it, both now and over the coming years. Major related standards projects are underway in the areas of Smart Grid, Cloud Computing, the Internet of Things (IoT), Intelligent Transportation, and eHealth.

📁 CATEGORY Energy

📅 PUBLISHED 9/11/2018

IEEE 7000-2021 - Standard Model Process for Addressing Ethical Concerns during System Design

🔗 <https://standards.ieee.org/standard/7000-2021.html>

A set of processes by which organizations can include consideration of ethical values throughout the stages of concept exploration and development is established by this standard. Management and engineering in transparent communication with selected stakeholders for ethical values elicitation and prioritization is supported by this standard, involving traceability of ethical values through an operational concept, value propositions, and value dispositions in the system design. Processes that provide for traceability of ethical values in the concept of operations, ethical requirements, and ethical risk-based design are described in the standard. All sizes and types of organizations using their own life cycle models are relevant to this standard.

📁 CATEGORY Ethics

📅 PUBLISHED 16/6/2021

IEEE 11073-10207-2017 - Health informatics--Point-of-care medical device communication Part 10207: Domain Information and Service Model for Service-Oriented Point-of-Care Medical Device Communication

🔗 <https://standards.ieee.org/standard/11073-10207-2017.html>

Within the context of the ISO/IEEE 11073 family of standards for point-of-care medical device communication, a Participant Model derived from the ISO/IEEE11073-10201 Domain Information Model is provided in this standard. The Participant Model specifies the structure of medical information objects. This standard also defines an abstract Communication Model to support the exchange of medical information objects. All elements of the Participant Model and Communication Model are specified using XML Schema. Core subjects of the Participant Model comprise modelling of medical device-related data, e.g., measurements and settings, alert systems, contextual information (e.g., patient demographics and location information), remote control, and archival information. Model extensibility is provided inherently through the use of XML Schema.textual information like patient demographics and location information,

remote control, and archival. Model extensibility is provided inherently through the use of XML Schema.

🔗 CATEGORY Health

📅 PUBLISHED 21/2/2018

IEEE P11073-10107 - Standard for Nomenclature for External Control of Medical Devices

🔗 <https://standards.ieee.org/project/11073-10107.html>

The base IEEE 11073-10101 nomenclature is extended by this standard to provide definitions of commands for external control. It is designed to be used in conjunction with IEEE 11073 standards, including ISO/IEEE 11073-10207, ISO/IEEE 11073-10201 and ISO/IEEE 11073-20601, and may be used with other standards or independently. The main areas addressed by this standard include commands to modify the characteristics and behavior of point-of-care (PoC) medical devices, such as modes of operation, contextual information, and settings.

🔗 CATEGORY Health

📅 PUBLISHED 21/3/2019

IEEE P11073-10700 - Standard for Common Base Requirements for Participants in a Service-Oriented Device Connectivity (SDC) System

🔗 <https://standards.ieee.org/project/11073-10700.html>

This standard defines the common base requirements for Participants in a Service-Oriented Device Connectivity (SDC) System that comprises a network of point-of-care (PoC) medical devices and medical IT systems to improve effective, safe and secure contribution to a system function such as metric provisioning.

🔗 CATEGORY Health

📅 PUBLISHED 21/3/2019

IEEE P1451-99 - Standard for Harmonization of Internet of Things (IoT) Devices and Systems

🔗 <https://standards.ieee.org/project/1451-99.html>

This standard defines a method for data sharing, interoperability, and security of messages over a network, where sensors, actuators and other devices can interoperate, regardless of underlying communication technology. The backend of such a globally scalable, secure and interoperable network would be based on the eXtensible Messaging and Presence Protocol (XMPP), and rely on infrastructural components, or bridges, with standardized interfaces that provide real-time conversion of other IoT and M2M protocols, such as those based on CoAP (Constrained Application Protocol), HTTP (Hypertext Transfer Protocol), MQTT (Message Queuing Telemetry Transport Protocol), AMQP (Advanced Message Queuing Protocol), etc., and other interoperability interfaces, such as those provided by the IEEE 1451 Smart Transducer Interface, oneM2M, OMA LWM2M (Open Mobile Alliance Lightweight M2M), OIC (Open Internet Connection), UPnP (Universal Plug and Play), IPSO (Internet Protocol for Smart Objects) Alliance, etc. The standard utilizes the advanced capabilities of the XMPP protocol, such as providing globally authenticated identities, authorization, presence, life cycle management, interoperable communication, IoT discovery and provisioning.

🔗 CATEGORY Information Processing

📅 PUBLISHED 7/12/2016

IEEE 1609.0-2019 - Guide for Wireless Access in Vehicular Environments (WAVE) Architecture

 https://standards.ieee.org/standard/1609_0-2019.html

The wireless access in vehicular environments (WAVE) architecture and services necessary for WAVE devices to communicate in a mobile vehicular environment are described in this guide. It is meant to be used in conjunction with the family of IEEE 1609 standards as of its publication date. These include IEEE 1609.2(TM), IEEE Standard Security Services for Applications and Management Messages; IEEE 1609.3(TM), Networking Services; IEEE 1609.4(TM), Multi-Channel Operation; IEEE 1609.11(TM), Over-the-Air Electronic Payment Data Exchange Protocol for Intelligent Transportation Systems (ITS); IEEE 1609.12(TM), Identifiers; and IEEE 802.11(TM) in operation outside the context of a basic service set.

 CATEGORY Mobility

 PUBLISHED 10/4/2019

IEEE 1609.12-2019 - Standard for Wireless Access in Vehicular Environments (WAVE) - Identifiers

 https://standards.ieee.org/standard/1609_12-2019.html

Wireless Access in Vehicular Environments (WAVE) is specified in the IEEE 1609 family of standards, within which certain identifiers are used. The use of these identifiers is described, and identifier values that have been allocated for use by WAVE systems are indicated.

 CATEGORY Mobility

 PUBLISHED 22/10/2019

IEEE 1609.2-2016 - Standard for Wireless Access in Vehicular Environments - Security Services for Applications and Management Messages

 https://standards.ieee.org/standard/1609_2-2016.html

This standard defines secure message formats and processing for use by Wireless Access in Vehicular Environments (WAVE) devices, including methods to secure WAVE management messages and methods to secure application messages. It also describes administrative functions necessary to support the core security functions.

 CATEGORY Mobility

 PUBLISHED 1/3/2016

IEEE 2030.1.1-2015, Standard Technical Specifications of a DC Quick Charger for Use with Electric Vehicles

 https://standards.ieee.org/standard/2030_1_1-2015.html

This standard specifies the design interface of electric vehicles and direct current (dc) quick chargers that promote rapid charging of battery electric vehicles.

 CATEGORY Mobility

 PUBLISHED 5/2/2016

IEEE P2040 - Standard for General Requirements for Fully Automated Vehicles Driving on Public Roads

<https://standards.ieee.org/project/2040.html>

This standard specifies the general requirements that a fully automated vehicle shall meet in order to drive on public roads. This standard serves as a comprehensive checklist of all the use cases, scenarios, and worst conditions that a fully automated vehicle certified by the public body shall address on public roads in order to protect the safety of the public including passengers, pedestrians, and other traffic participants.

📁 CATEGORY Mobility

📅 PUBLISHED 13/2/2020

IEEE 1619.1-2018 - Standard for Authenticated Encryption with Length Expansion for Storage Devices

https://standards.ieee.org/standard/1619_1-2018.html

Cryptographic and data authentication procedures for storage devices that support length expansion, such as tape drives, are specified. Such procedures include the following cryptographic modes of operation for the AES block cipher CCM, GCM, CBC-HMAC, and XTS-HMAC.

📁 CATEGORY Privacy and Security

📅 PUBLISHED 25/1/2019

IEEE 1619.2-2021 - Approved Draft Standard for Wide-Block Encryption for Shared Storage Media

https://standards.ieee.org/standard/1619_2-2021.html

EME2-AES and XCB-AES wide-block encryption with associated data (EAD) modes of the NIST AES block cipher, providing usage guidelines and test vectors, are described. A wide block encryption algorithm behaves as a single block cipher with a large plaintext input and ciphertext output, but uses a narrow block cipher [in this case Advanced Encryption Standard (AES)] internally. These encryption modes are oriented toward random access storage devices that do not provide authentication, but need to reduce the granularity of a potential attack.

📁 CATEGORY Privacy and Security

📅 PUBLISHED 9/5/2021

IEEE 1619-2018 - Standard for Cryptographic Protection of Data on Block-Oriented Storage Devices

<https://standards.ieee.org/standard/1619-2018.html>

Cryptographic transform for protection of data in sector-level storage devices is specified in this standard. This standard specifies the XTS cryptographic mode of operation for the Advanced Encryption Standard modes (AES) block cipher for block-oriented storage devices. The purpose of this standard is to define the XTS cryptographic mode while maintaining backward compatibility with existing implementations that are compliant with IEEE 1619(TM)-2007.

📁 CATEGORY Privacy and Security

📅 PUBLISHED 25/1/2019

IEEE 1667-2018 - Standard for Discovery, Authentication, and Authorization in Host Attachments of Storage Devices

<https://standards.ieee.org/standard/1667-2018.html>

This standard defines discovery, authentication, and authorization protocols between hosts and storage devices over multiple transports.

CATEGORY Privacy and Security

PUBLISHED 2/10/2018

IEEE 1686-2013 - Standard for Intelligent Electronic Devices Cyber Security Capabilities

<https://standards.ieee.org/standard/1686-2013.html>

The functions and features to be provided in intelligent electronic devices (IEDs) to accommodate critical infrastructure protection programs are defined in this standard. Security regarding the access, operation, configuration, firmware revision and data retrieval from an IED are addressed. Communications for the purpose of power system protection (teleprotection) are not addressed in this standard.

CATEGORY Privacy and Security

PUBLISHED 13/1/2014

IEEE 1888.3-2013 - Standard for Ubiquitous Green Community Control Network: Security

https://standards.ieee.org/standard/1888_3-2013.html

The enhanced security management function for the protocol defined in IEEE 1888(TM), Ubiquitous Green Community Control Network Protocol is described in this standard. Security requirements, system security architecture definitions, and a standardized description of authentication and authorization, along with security procedures and protocols, are specified. This standard can help avoid unintended data disclosure to the public and unauthorized access to resources, while providing enhanced integrity and confidentiality of transmitted data in the ubiquitous green community control network.

CATEGORY Privacy and Security

PUBLISHED 6/12/2013

IEEE 2030.102.1-2020 - Standard for Interoperability of Internet Protocol Security (IPsec) Utilized within Utility Control Systems

https://standards.ieee.org/standard/2030_102_1-2020.html

Specific configuration requirements within the relevant Internet Engineering Task Force (IETF) Request for Comments (RFC) for implementation of the Internet Protocol Security (IPsec) protocol suite within a utility control system are identified in this standard. It is not intended to be a comprehensive guide to implementing IPsec. Promoting interoperability between products developed by different vendors is the primary goal in developing this standard. Configuration parameters needed to support the establishment and sustained operation of an IPsec Virtual Private Network (VPN) tunnel between two devices which have implemented IPsec conforming to this standard are the focus of this standard. Minimizing configuration errors involving IPsec implementations within utility control systems is a secondary goal of this standard. Product agnosticism and applicability to any device (e.g., router, substation gateway, intelligent electronic device, etc.) is the intent of this standard, within the utility control system as the end user deems necessary for their unique system architecture.

CATEGORY Privacy and Security

PUBLISHED 3/12/2020

IEEE P1402 - Draft Guide for Physical Security of Electric Power Substations

<https://standards.ieee.org/project/1402.html>

This guide describes Recommended Practices for the physical security of electric power substations. It is designed to address a number of threats, including unauthorized access to substation facilities, theft of material, and vandalism. It describes options for positive access control, monitoring of facilities, and delay/deter features which could be employed to mitigate these threats. This guide also establishes options for different levels of physical security for electric power substations.

🔒 CATEGORY Privacy and Security

📅 PUBLISHED 10/12/2014

IEEE P1711 - Standard for a Cryptographic Protocol for Electric Power System (EPS) Communications Links

<https://standards.ieee.org/project/1711.html>

This standard defines a suite of cryptographic protocols supporting the protection of Electric Power System communications links. It does not address specific applications or hardware implementations, and is independent of the underlying communications protocol.

🔒 CATEGORY Privacy and Security

📅 PUBLISHED 5/12/2018

IEEE P1711.1 - Standard for a Cryptographic Protocol for Cyber Security of Substation Serial Links: Substation Serial Protection Protocol

https://standards.ieee.org/project/1711_1.html

This standard defines a cryptographic protocol to provide integrity, and optional confidentiality, for cybersecurity of Electrical Power System (EPS) serial links. It does not address specific applications or hardware implementations, and is independent of the underlying communications protocol.

🔒 CATEGORY Privacy and Security

📅 PUBLISHED 23/3/2017

IEEE P1912 - Standard for Privacy and Security Framework for Consumer Wireless Devices

<https://standards.ieee.org/project/1912.html>

This standard defines a privacy scale that shall be applied to data that is defined as personal identifiable information that is being collected, retained, processed or shared by or among applications implemented on networked edge, fog, or cloud computing devices. This privacy scale data provides input to assessment tools that developers or users of these applications use to develop, discover, recognize, or implement appropriate privacy settings for types or levels of personal data resident on these devices.

🔒 CATEGORY Privacy and Security

📅 PUBLISHED 5/3/2020

IEEE 1888-2014 - Standard for Ubiquitous Green Community Control Network Protocol

<https://standards.ieee.org/standard/1888-2014.html>

The standard identifies gateways for field-bus networks, data storage for archiving and developing data sharing platforms, and application units as important system components for developing digital communities, i.e., building-scale and city-wide ubiquitous facility networking infrastructure. The standard defines a data exchange protocol that generalizes and interconnects these components (gateways, storage, application units) over the IPv4/v6-based networks. This enables integration of multiple facilities, data storage, application services such as central management, energy saving, environmental monitoring, and alarm notification systems.

📁 CATEGORY Sustainability and Resilience

📅 PUBLISHED 30/5/2014

IEEE P2886 - Standard for General Requirements for Smart Residential Water Systems

<https://standards.ieee.org/project/2886.html>

This standard provides technical requirements and an architectural framework for smart residential water systems. Information modeling and interface requirements for as well as the data structure of smart residential water system applications are also defined, supporting interoperable, agile, and flexible network solutions and service delivery.

📁 CATEGORY Water

📅 PUBLISHED 3/6/2020

■ IMD

IMD Smart City Index

<https://www.imd.org/smart-city-observatory/smart-city-index/>

In 2017, our two institutions, IMD and Singapore University of Technology and Design (SUTD), decided to join forces to produce a smart city index offering a balanced focus on economic and technological aspects of smart cities on the one hand, and humane dimensions of smart cities (quality of life, environment, inclusiveness) on the other. The initial effort to produce what should become an internationally recognized global smart city index consists of two distinct phases and deliverables.

📁 CATEGORY Case Studies and Rankings

📅 PUBLISHED 1/9/2020

ISO 16739-1:2018 Industry Foundation Classes (IFC) for data sharing in the construction and facility management industries: Part 1: Data schema

 <https://www.iso.org/standard/70303.html>

The Industry Foundation Classes, IFC, are an open international standard for Building Information Model (BIM) data that are exchanged and shared among software applications used by the various participants in the construction or facility management industry sector. The standard includes definitions that cover data required for buildings over their life cycle. This release, and upcoming releases, extend the scope to include data definitions for infrastructure assets over their life cycle as well. The Industry Foundation Classes specify a data schema and an exchange file format structure. The data schema is defined in EXPRESS data specification language, defined in ISO 10303-11; XML Schema definition language (XSD), defined in XML Schema W3C Recommendation. ISO 16739-1 2017 of IFC consists of the data schemas, represented as an EXPRESS schema and an XML schema, and reference data, represented as definitions of property and quantity names, and formal and informative descriptions.

 CATEGORY Buildings

 PUBLISHED 1/11/2018

ISO 19650-1:2018 Organization and digitization of information about buildings and civil engineering works, including building information modelling (BIM): Information management using building information modelling: Part 1: Concepts and principles

 <https://www.iso.org/standard/68078.html>

This document outlines the concepts and principles for information management at a stage of maturity described as building information modelling (BIM) according to the ISO 19650 series. This document provides recommendations for a framework to manage information including exchanging, recording, versioning and organizing for all actors. This document is applicable to the whole life cycle of any built asset, including strategic planning, initial design, engineering, development, documentation and construction, day-to-day operation, maintenance, refurbishment, repair and end-of-life. This document can be adapted to assets or projects of any scale and complexity, so as not to hamper the flexibility and versatility that characterize the large range of potential procurement strategies and so as to address the cost of implementing this document.

 CATEGORY Buildings

 PUBLISHED 1/12/2018

ISO (2014) 37120: Sustainable development of communities - indicators for city services and quality of life

 <https://www.iso.org/standard/68498.html>

This document defines and establishes methodologies for a set of indicators to steer and measure the performance of city services and quality of life. It follows the principles set out in ISO 37101 and can be used in conjunction with ISO 37101 and other strategic frameworks. This document is applicable to any city, municipality or local government that undertakes to measure its performance in a comparable and verifiable manner, irrespective of size and location.

 CATEGORY Data and Architecture

 PUBLISHED 1/7/2018

ISO 37120 Sustainable development of communities - Indicators for city development and operation

 <https://www.iso.org/standard/68498.html>

This document defines and establishes methodologies for a set of indicators to steer and measure the performance of city services and quality of life. It follows the principles set out in ISO 37101 and can be used in conjunction with ISO 37101 and other strategic frameworks. This document is applicable to any city, municipality or local government that undertakes to measure its performance in a comparable and verifiable manner, irrespective of size and location.

 CATEGORY Data and Architecture

 PUBLISHED 1/7/2018

ISO 37156:2020 Smart community infrastructures Guidelines on data exchange and sharing for smart community infrastructures

 <https://www.iso.org/standard/69242.html>

This document gives guidelines on principles and the framework to use for data exchange and sharing for entities with the authority to develop and operate community infrastructure. The guidelines in this document are applicable to communities of any size that are engaged in data exchange and sharing. The specific practices of data exchange and sharing of community infrastructures will depend on the characteristics of each community.

 CATEGORY Data and Architecture

 PUBLISHED 1/2/2020

ISO 25237:2017, 3.42. Health informatics: Pseudonymization

 <https://www.iso.org/standard/63553.html>

ISO 25237 2017 contains principles and requirements for privacy protection using pseudonymization services for the protection of personal health information. This document is applicable to organizations who wish to undertake pseudonymization processes for themselves or to organizations who make a claim of trustworthiness for operations engaged in pseudonymization services. It (a) defines one basic concept for pseudonymization, (b) defines one basic methodology for pseudonymization services including organizational, as well as technical aspects, (c) specifies a policy framework and minimal requirements for controlled re-identification, (d) gives an overview of different use cases for pseudonymization that can be both reversible and irreversible, (e) gives a guide to risk assessment for re-identification, (f) provides an example of a system that uses de-identification, (g) provides informative requirements to an interoperability to pseudonymization services, and (h) specifies a policy framework and minimal requirements for trustworthy practices for the operations of a pseudonymization service.

 CATEGORY Health

 PUBLISHED 1/1/2017

ISO TR 14292:2012, 2.11.Health informatics: Personal health records - Definition, scope and contexts

<https://www.iso.org/standard/54568.html>

This Technical Report also considers the wider context of engagement of individuals in the management of their own health and healthcare, since this engagement is the primary driver for present-day growth of PHR systems and services internationally. This Technical Report includes (a) a definition of a PHR; (b) a pragmatic multidimensional classification of PHRs; (c) an overview of the possible ways in which the inclusion and engagement of individuals in managing their health and healthcare impacts on the potential roles of the PHR, including scenarios for collaborative care between individuals and healthcare organizations. The many kinds of end-user application that might be implemented and used to deliver PHR system functionality are outside the scope of this Technical Report.

📁 CATEGORY Health

📅 PUBLISHED 1/3/2012

ISO TR 18307:2001, Health informatics: Interoperability and compatibility in messaging and communication standards - Key characteristics

<https://www.iso.org/standard/33396.html>

This Technical Report describes a set of key characteristics to achieve interoperability and compatibility in trusted health information interchange between communicant application systems. The key characteristics describe inter-application interoperability needs of the healthcare community, in particular the subject of care, the healthcare professional/caregiver, the healthcare provider organization, its business units and the integrated delivery network. The key characteristics offer criteria for standards developers and implementers of standards for messaging and communications in the healthcare domain and provide a guide for software developers and vendors, healthcare providers and end users.

📁 CATEGORY Health

📅 PUBLISHED 1/12/2001

ISO TR 19669:2017, Health informatics: Re-usable component strategy for use case development

<https://www.iso.org/standard/65948.html>

ISO/TR 19669 2017 specifies a use case development methodology, facilitated by a dynamic catalogue of re-usable components. Use cases are a basic tool in describing requirements for health and healthcare settings, service provision, information technology and software products. Use case development often follows a uniform template with components such as actors, roles, scenarios, event steps, actions, data objects/ elements and requirements statements. ISO/TR 19669 2017 includes a basic use case template and the methods of component identification, capture, cataloguing and re-use. This document also includes guidance for software designed to implement the methodology in the form of a use case authoring tool.

📁 CATEGORY Health

📅 PUBLISHED 1/10/2017

ISO TS 13972:2015, Health informatics: Detailed clinical models, characteristics and processes

 <https://www.iso.org/standard/62416.html>

ISO/TS 13972 2015 (a) Describes requirements and recommended methods against which clinicians can gather, analyse and, specify the clinical context, content, and structure of Detailed Clinical Models. (b) Defines Detailed Clinical Models (DCMs) in terms of an underlying logical model. They are logical models of clinical concepts and can be used to define and to structure clinical information. (c) Describes requirements and principles for DCMs, meta-data, versioning, content and context specification, data element specification and data element relationships, and provide guidance and examples. (d) Specifies DCM governance principles to ensure conceptual integrity of all DCM attributes and logical model accuracy. (e) Describes DCM development and the methodology principles for use that will support the production of quality DCMs to minimize risk and ensure patient safety.

 CATEGORY Health

 PUBLISHED 1/10/2015

ISO TS 14265:2011, Health Informatics - Classification of purposes for processing personal health information

 <https://www.iso.org/standard/54547.html>

ISO/TS142652011 defines a set of high-level categories of purposes for which personal health information can be processed. This is in order to provide a framework for classifying the various specific purposes that can be defined and used by individual policy domains (e.g. healthcare organizations, regional health authorities, jurisdictions, countries) as an aid to the consistent management of information in the delivery of health care services and for the communication of electronic health records across organizational and jurisdictional boundaries. The scope of application of ISO/TS 14265 2011 is limited to Personal Health Information as defined in ISO 27799, information about an identifiable person that relates to the physical or mental health of the individual, or to provision of health services to the individual.

 CATEGORY Health

 PUBLISHED 1/11/2011

ISO TS 17975:2015, Health informatics: Principles and data requirements for consent in the collection, use or disclosure of personal health information

 <https://www.iso.org/standard/61186.html>

ISO/TS 17975 2015 defines the set of frameworks of consent for the Collection, Use and/or Disclosure of personal information by health care practitioners or organizations that are frequently used to obtain agreement to process the personal health information of subjects of care. This is in order to provide an Informational Consent framework which can be specified and used by individual policy domains (e.g. healthcare organizations, regional health authorities, jurisdictions, countries) as an aid to the consistent management of information in the delivery of health care services and the communication of electronic health records across organizational and jurisdictional boundaries. The scope of application of this Technical Specification is limited to Personal Health Information (PHI) as defined in ISO 27799 information about an identifiable person that relates to the physical or mental health of the individual, or to provision of health services to the individual.

 CATEGORY Health

 PUBLISHED 1/9/2015

ISO TS 21089:2018, Health informatics -Trusted end-to-end information flows

 <https://www.iso.org/standard/66936.html>

ISO/TS 21089 2018 describes trusted end-to-end flow for health information and health data/record management. Health data is originated and retained, typically as discrete record entries within a trusted electronic health record (EHR), personal health record (PHR) or other system/device. Health data can include clinical genomics information. Health record entries have a lifespan (period of time managed by one or more systems) and within that lifespan, various lifecycle events starting with 1) originate/retain. Subsequent record lifecycle events may include 2) update 3) attest 4) disclose 5) transmit 6) receive 7) access/view, and more. A record entry instance is managed over its lifespan by the source system. If record entry content is exchanged, this instance may also be managed intact by one or more downstream systems. Consistent, trusted management of record entry instances is the objective of this document, continuously and consistently whether the instance is at rest or in motion, before/during/after each lifecycle event, across one or more systems.

 CATEGORY Health

 PUBLISHED 4/1/2018

ISO 11519-1:1994, 3.9.Road vehicles - Low-speed serial data communication: Part 1: General and definitions

 <https://www.iso.org/standard/19469.html>

Specifies general definitions for low-speed serial data communication up to 125 kbit/s for road vehicle applications. The object is to define the general architecture of the communication network and the content of the data link layer and the physical layer for transmission between the different types of electronic modules on board road vehicles. Parts 2, 3 and 4 are entirely independent.

 CATEGORY Mobility

 PUBLISHED 1/6/1994

ISO 24100:2010, 3.3. Intelligent transport systems - Basic principles for personal data protection in probe vehicle information services

 <https://www.iso.org/standard/42017.html>

ISO 24100 2010 states the basic rules to be observed by service providers who handle personal data in probe vehicle information services. This International Standard is aimed at protecting the personal data as well as the intrinsic rights and interests of probe data senders, i.e., owners and drivers of vehicles fitted with in-vehicle probe systems.

 CATEGORY Mobility

 PUBLISHED 1/5/2010

ISO 37154:2017 Smart community infrastructures - Best practice guidelines for transportation

 <https://www.iso.org/standard/69965.html>

ISO 37154 2017 provides general guidance on the planning, design, development, organization, monitoring, maintenance and improvement process of smart transportation systems and infrastructures, which can help promote solutions for intra- and inter-city issues, i.e. for issues both within and outside the city that impact quality of life, the environment or any other areas of city performance. ISO 37154 2017 applies to transportation infrastructures used for the movement of

people, freight or other goods, including items transported for delivery. It is intended for use by city planners and other community decision makers, government officials, insurance providers, investment and financing organizations, transportation operators and service providers and manufacturers of transportation equipment. In particular, ISO 37154 2017 is intended to be used by those involved in making decisions about transportation modes to meet the objectives related to affordability, convenience, low environmental impact and reliability, while satisfying the needs of a diverse group of stakeholders, including city residents, visitors, government authorities, transportation operator. It addresses smart transportation by considering the factors that shape communities, such as population, demographics, locations, local culture and history. It addresses the scope of services, features and objectives to be met through smart transportation solutions. ISO 37154 2017 does not contain technical specifications for the construction of transportation assets of facilities.

📁 CATEGORY Mobility

📅 PUBLISHED 1/8/2017

ISO 37157:2018 Smart community infrastructures - Smart transportation for compact cities

🔗 <https://www.iso.org/standard/69243.html>

ISO 37157 2018 describes criteria to help plan or organize smart transportation for compact cities. It is intended to apply to cities facing a decline in population. Smart transportation can be applied to the issue of population loss as a means of attracting people back to the city.

📁 CATEGORY Mobility

📅 PUBLISHED 1/4/2018

ISO 37158:2019 Smart community infrastructures - Smart transportation using battery-powered buses for passenger services

🔗 <https://www.iso.org/standard/69244.html>

This document specifies a procedure for the introduction of smart transportation to city centres by means of battery-powered buses. This service contributes to a clean atmosphere and a relatively quiet environment while offering services that provide safe and comfortable rides for citizens.

📁 CATEGORY Mobility

📅 PUBLISHED 1/7/2019

ISO 37159:2019 Smart community infrastructures - Smart transportation for rapid transit in and between large city zones and their surrounding areas

🔗 <https://www.iso.org/standard/69245.html>

This document specifies a procedure to organize smart transportation that enables one-day trips by citizens between cities and in a large city zone, including its surrounding areas, and conveys a large number of people at a high frequency in a short time over distances of up to 1 000 km. Smart transportation aims to promote political and economic work and stimulate business activity by providing citizens with a manner of travel to complete a return trip from their home or place of work to destinations outside their cities on the same day. However, this document does not designate a procedure for constructing smart transportation facilities.

📁 CATEGORY Mobility

📅 PUBLISHED 1/5/2019

ISO 37161:2020 Smart community infrastructures - Guidance on smart transportation for energy saving in transportation services

<https://www.iso.org/standard/75472.html>

This document provides guidance on reducing the energy consumed by transportation for passengers, delivery items, freight and postal item services in cities and city zones. This document does not designate specific procedures to save energy but suggests energy-saving options to be adopted in transportation systems normally organized in different locations, on different scales and for different purposes.

CATEGORY Mobility

PUBLISHED 1/2/2020

ISO 37162:2020 Smart community infrastructures - Smart transportation for newly developing areas

<https://www.iso.org/standard/75473.html>

This document specifies a procedure to arrange smart transportation for newly developing areas, including transportation services between the area and existing city centres. This document does not designate procedures for constructing smart transportation facilities.

CATEGORY Mobility

PUBLISHED 1/2/2020

ISO 37163:2020 Smart community infrastructures - Smart transportation for parking lot allocation in cities

<https://www.iso.org/standard/69249.html>

This document specifies procedures for installing and organizing smart transportation for parking lot allocation for drivers in cities. It is intended to apply to cities, especially those having a shortage or low availability of parking lots. This smart transportation aims to provide a solution to the city issue of drivers having difficulty in quickly finding parking lots with available spaces. It also aims to address other city issues such as traffic accidents, congestion and energy consumption. This document clarifies the concept and goals of smart transportation by referring to the technical aspects suggested by ITU-T Y.4456.

CATEGORY Mobility

PUBLISHED 1/9/2020

ISO 37164:2021 Smart community infrastructures - Smart transportation using fuel cell light rail transit (FC-LRT)

<https://www.iso.org/standard/77413.html>

This document specifies a procedure to introduce smart transportation into cities by means of fuel cell light rail transit (FC-LRT). This service contributes to a cleaner atmosphere, with zero emission of greenhouse gases (GHGs) and small particles, an urban view free of catenaries and easy installation of LRT transportation operations, providing safe and comfortable rides for citizens.

CATEGORY Mobility

PUBLISHED 1/5/2021

ISO 37165:2020 Smart community infrastructures - Guidance on smart transportation with the use of digitally processed payment (d-payment)

<https://www.iso.org/standard/77414.html>

This document provides guidance on how to organize and implement smart transportation by digitally processed payment (d-payment) in order to provide a safe, convenient payment method for citizens and city visitors in transportation and its related or additional services. This will additionally benefit operators managing fee receipt in transportation services and money transfer or transactions between these business operators and banks or settlement organizations. Smart transportation by d-payment is not intended to eliminate cash payment from transportation services but is helpful in organizing inter-operator, city, regional and national common ticket networks and providing trading services independent of local currencies.

📁 CATEGORY Mobility

📅 PUBLISHED 1/9/2020

ISO 37167:2021 Smart community infrastructures - Smart transportation for energy saving operation by intentionally driving slowly

<https://www.iso.org/standard/69253.html>

This document describes how to organize smart transportation to save energy consumed in operation, by modifying speed profiles of trains, buses, trucks and ferries, which is also able to offer passenger-friendly driving of transportation vehicles.

📁 CATEGORY Mobility

📅 PUBLISHED 1/7/2021

ISO 37169:2021 Smart community infrastructures - Smart transportation by run-through train/bus operation in/between cities

<https://www.iso.org/standard/69255.html>

This document specifies a procedure for run-through train operations, identified as smart transportation. This concept provides direct, one-seat ride services in high quality corridors connecting cities and transportation hubs without forcing transfers. Improved operations planning, greater use of interchange or rental use arrangements are described so that these services can be implemented without constructing major infrastructure improvements in existing transportation corridors and right-of-way. This document also describes the application of run-through operation in bus services that are strictly licensed to bus carriers using public roads, ending the inconvenience of forcing passenger transfers between routes or service territories.

📁 CATEGORY Mobility

📅 PUBLISHED 1/8/2021

ISO 37180:2021 Smart community infrastructures - Guidance on smart transportation with QR code identification and authentication in transportation and its related or additional services

<https://www.iso.org/standard/69266.html>

This document provides guidance on transportation and its related or additional services using quick response (QR) codes for identification and authentication in data transfer, in order to make their services both convenient and advantageous for customers and service agents while protecting them from cheating and illegal action in data transfer.

📁 CATEGORY Mobility

📅 PUBLISHED 1/8/2021

ISO TR 17427-9:2015, 2.5. Intelligent transport systems: Cooperative ITS - Part 9: Compliance and enforcement aspects

<https://www.iso.org/standard/66961.html>

ISO 17427-9 2015 identifies potential critical compliance and enforcement aspects issues that C-ITS service provision may face or introduce; to consider strategies for how to identify, control, limit or mitigate such issues. The objective of this Technical Report is to raise awareness of and consideration of such issues and to give pointers, where appropriate, to standards deliverables existing that provide specifications for all or some of these aspects. This Technical Report does not provide specifications for solutions of these issues.

📁 CATEGORY Mobility

📅 PUBLISHED 1/11/2015

ISO 37123:2019 Sustainable cities and communities - Indicators for resilient cities

<https://www.iso.org/standard/70428.html>

This document defines and establishes definitions and methodologies for a set of indicators on resilience in cities. This document is applicable to any city, municipality or local government that undertakes to measure its performance in a comparable and verifiable manner, irrespective of size or location. Maintaining, enhancing and accelerating progress towards improved city services and quality of life is fundamental to the definition of a resilient city, so this document is intended to be implemented in conjunction with ISO 37120.

📁 CATEGORY Safety and Emergencies

📅 PUBLISHED 1/12/2019

ISO 37101 Management system for sustainable development.

<https://www.iso.org/standard/61885.html>

ISO 37101 2016 establishes requirements for a management system for sustainable development in communities, including cities, using a holistic approach, with a view to ensuring consistency with the sustainable development policy of communities. The intended outcomes of a management system for sustainable development in communities include (a) managing sustainability and fostering smartness and resilience in communities, while taking into account the territorial boundaries to which it applies; (b) improving the contribution of communities to sustainable development outcomes; (c) assessing the performance of communities in progressing towards sustainable development outcomes and the

level of smartness and of resilience that they have achieved; (d) fulfilling compliance obligations. ISO 37101 2016 is intended to help communities become more resilient, smart and sustainable, through the implementation of strategies, programmes, projects, plans and services, and demonstrate and communicate their achievements. ISO 37101 2016 is intended to be implemented by an organization designated by a community to establish the organizational framework and to provide the resources necessary to support the management of environmental, economic and social performance outcomes.

📁 CATEGORY Strategies, Policies and Planning

📅 PUBLISHED 1/7/2016

ISO 37104:2019 Sustainable cities and communities - Transforming our cities - Guidance for practical local implementation of ISO 37101

🔗 <https://www.iso.org/standard/69895.html>

This document provides guidance on how to implement and maintain a management system for sustainable development based on ISO 37101 principles, specifically in the context of cities, but applicable to other forms of settlement. This document provides guidance for practical implementation of a management system for sustainable development in cities and other settlements, based on ISO 37101; establishes a methodological framework for the systematic evaluation of the sustainable development schemes and achievements in the city or other settlements, based on the cross-analysis of the six purposes of sustainability and the 12 areas of action of ISO 37101; illustrates how other International Standards can be used to support successful implementation of ISO 37101, including, in particular, ISO 37120 (which recommends a suite of city indicators mapped against the six purposes of ISO 37101) and ISO 37106 (which provides practical guidance on how to implement joined-up delivery and innovation across organizational boundaries within the city or settlement).

📁 CATEGORY Strategies, Policies and Planning

📅 PUBLISHED 1/4/2019

ISO 37105:2019 Sustainable cities and communities - Descriptive framework for cities and communities

🔗 <https://www.iso.org/standard/62064.html>

This document specifies a descriptive framework for a city including an associated foundational ontology of the anatomical structure of a city or community. The descriptive framework is intended to have the following qualities timeless, i.e. compatible with any human settlement at any time in history; acultural, i.e. valid for any culture and any type of city; scalable, i.e. valid for a metropolis, a city, a small town or a village; and generic, so that everything we could define as a “human settlement”, such as a “smart city”, has a place in this structure.

📁 CATEGORY Strategies, Policies and Planning

📅 PUBLISHED 1/11/2019

ISO 37106:2021 Sustainable cities and communities - Guidance on establishing smart city operating models for sustainable communities

🔗 <https://www.iso.org/standard/82854.html>

This document gives guidance for leaders in smart cities and communities (from the public, private and voluntary sectors) on how to develop an open, collaborative, citizen-centric and digitally-enabled operating model for their city that puts its vision for a sustainable future into operation. This document does not describe a one-size-fits-all model for the future of cities. Rather, the focus is on the enabling

processes by which innovative use of technology and data, coupled with organizational change, can help each city deliver its own specific vision for a sustainable future in more efficient, effective and agile ways.

📁 CATEGORY Strategies, Policies and Planning

📅 PUBLISHED 1/10/2021

ISO 37152 Smart community infrastructures - Common framework for development and operation

🔗 <https://www.iso.org/standard/66898.html>

ISO/TR 37152 2016 outlines the basic concept of a common framework for the development and operation of smart community infrastructures. The framework describes the planning, development, operation and maintenance methodology to facilitate the harmonization of each infrastructure as a part of a smart community and ensures that the interactions between multiple infrastructures are well orchestrated. The framework is applicable to all processes of smart community infrastructures' life cycle (from conceptual design through planning, development, operation, maintenance, redevelopment and feedback). The infrastructures to be covered are energy, water, transportation, waste management, ICT and others. The framework can be adopted by all relevant stakeholders who are engaged in planning, development and operation of smart community infrastructures, including planners, developers, business operators and suppliers. The framework is intended to cover the processes in which these stakeholders are engaged, such as management, organizational structure, analyses and design methods, and documentations.

📁 CATEGORY Strategies, Policies and Planning

📅 PUBLISHED 1/8/2016

ISO 37153:2017, 3.9. Smart community infrastructures: Maturity model for assessment and improvement

🔗 <https://www.iso.org/standard/69225.html>

ISO 37153 2017 provides the basis, requirements and guidance for a maturity model for the assessment of technical performance, process and interoperability of community infrastructure(s) as well as its contribution to the community, and guidance for future improvements. This document is applicable to a) all types of community infrastructure, including, but not limited to, energy, water, transportation, waste and ICT, b) single types of community infrastructure or multiple types of community infrastructure, and c) all types of communities, regardless of geographical locations, size, economic structure, stage of economic development, and d) all applicable stages of infrastructure life cycle (e.g. planning/design, construction, operation, decommission).

📁 CATEGORY Strategies, Policies and Planning

📅 PUBLISHED 1/12/2017

ISO 37155-1:2020 Framework for integration and operation of smart community infrastructures - Part 1: Recommendations for considering opportunities and challenges from interactions in smart community infrastructures from relevant aspects through the life cycle

🔗 <https://www.iso.org/standard/69241.html>

This document describes a framework (a set of processes and methodologies) for smart community infrastructure interactions (interactions between multiple infrastructures, between infrastructures and stakeholders, and between infrastructures and the external environment) to ensure that such

interactions are well identified and managed. There are two potential use cases for this document. The first is for green field sites, where all the smart community infrastructures can be designed and developed at the same time. This is of value to planners and investors of major new infrastructure developments. The second builds on the first and will support efficient management of an existing urban area by taking into account the increasing interdependencies of the infrastructures on each other and the way they should be managed as a system of systems.

📁 CATEGORY Strategies, Policies and Planning

📅 PUBLISHED 1/1/2020

ISO 37155-2:2021 Framework for integration and operation of smart community infrastructures - Part 2: Holistic approach and the strategy for development, operation and maintenance of smart community infrastructures

🔗 <https://www.iso.org/standard/76547.html>

This document describes the interactions of smart community infrastructures (interactions between multiple infrastructures, between infrastructures and stakeholders, and between infrastructures and the external environment). It describes the framework (a set of processes and methodologies) for these interactions to ensure the consistency of smart community infrastructures is well identified and managed. There are two potential use cases for this document. The first is for the green field site, where all the smart community infrastructures can be designed and developed at the same time. This is of value to planners and investors of major new infrastructure developments. The second is for the brown field site and builds on the first and will support efficient management of an existing urban area by taking into account the increasing interdependencies of the infrastructures on each other and the way they should be managed as a system of systems. This document will also take into account accelerating technological and environmental changes.

📁 CATEGORY Strategies, Policies and Planning

📅 PUBLISHED 1/5/2021

ISO IEC 30145-1 Smart City ICT Reference Framework - Business Process Framework

🔗 <https://www.iso.org/standard/76371.html>

This document specifies a generic business process framework for a smart city focusing solely on smart city-specific processes. Generic business processes common between smart cities and commercial organizations are identified but not detailed.

📁 CATEGORY Strategies, Policies and Planning

📅 PUBLISHED 1/5/2021

ISO IEC 30145-2 - Smart City ICT Reference Framework - Knowledge Management Framework

🔗 <https://www.iso.org/standard/76372.html>

This document specifies a generic knowledge management framework for a smart city, focusing on creating, capturing, sharing, using and managing smart city knowledge. It also gives the key practices which are required to be implemented to safeguard the use of knowledge, such as interoperability of heterogeneous data and governance of multi-sources services within a smart city.

📁 CATEGORY Strategies, Policies and Planning

📅 PUBLISHED 1/10/2020

ISO IEC 30145-3:2020 - Information technology - Smart City ICT reference framework - Part 3: Smart city engineering framework

<https://www.iso.org/standard/76373.html>

This document describes a framework, structured in layers of ICT technologies, essential for smart cities' operation. This framework also provides the mapping of the ICT techniques to various system entities in order to support the smart city's business, knowledge management, and operational systems from the engineering perspective.

📁 CATEGORY Strategies, Policies and Planning

📅 PUBLISHED 1/8/2020

ISO IEC 30146:2019 - Information technology - Smart city ICT indicators

<https://www.iso.org/standard/70302.html>

This document defines a comprehensive set of evaluation indicators specially related to information and communication technologies (ICT) adoption and usage in smart cities. Firstly, it establishes an overall framework for all the indicators. Then, it specifies the name, description, classification and measurement method for each indicator.

📁 CATEGORY Strategies, Policies and Planning

📅 PUBLISHED 1/10/2019

ISO/TR 37150:2014 Smart community infrastructures - Review of existing activities relevant to metrics

<https://www.iso.org/standard/62564.html>

ISO/TR 37150 2014 provides a review of existing activities relevant to metrics for smart community infrastructures. In ISO/TR 37150 2014, the concept of smartness is addressed in terms of performance relevant to technologically implementable solutions, in accordance with sustainable development and resilience of communities, as defined in ISO/TC 268. ISO/TR 37150 2014 addresses community infrastructures such as energy, water, transportation, waste and information and communications technology (ICT). It focuses on the technical aspects of existing activities which have been published, implemented or discussed. Economic, political or societal aspects are not analyzed in ISO/TR 37150 2014.

📁 CATEGORY Strategies, Policies and Planning

📅 PUBLISHED 1/2/2014

ISO/TS 37107:2019 Sustainable cities and communities - Maturity model for smart sustainable communities

<https://www.iso.org/standard/62066.html>

This document provides a top-level maturity model for smart sustainable communities (MMSSC), which can be used for self-assessment by individual cities and communities and as the basis for cross-city benchmarking. The MMSSC is a simple way for community leaders to assess how mature their community is in its journey towards adoption of good practices as set out in ISO standards for sustainable and smart-enabled development; to identify strengths and weaknesses; and then to quickly find their way to the international standards and guidance that are most relevant to their needs.

📁 CATEGORY Strategies, Policies and Planning

📅 PUBLISHED 1/12/2019

ISO/TS 37151:2015 Smart community infrastructures - Principles and requirements for performance metrics

 <https://www.iso.org/standard/61057.html>

ISO/TS 37151 2015 gives principles and specifies requirements for the definition, identification, optimization, and harmonization of community infrastructure performance metrics. It gives recommendations for analysis, including smartness, interoperability, synergy, resilience, safety, and security of community infrastructures. Community infrastructures include, but are not limited to, energy, water, transportation, waste, and ICT. The principles and requirements of ISO/TS 37151 2015 are applicable to communities of any size sharing geographic areas that are planning, commissioning, managing, and assessing all or any element of its community infrastructures. However, the selection and the importance of metrics or (key) performance indicators of community infrastructures is a result of the application of ISO/TS 37151 2015 and depends on the characteristics of each community.

 CATEGORY Strategies, Policies and Planning

 PUBLISHED 1/5/2015

ISO 28902-2:2017, 3.1. Air quality: Environmental meteorology - Part 2: Ground-based remote sensing of wind by heterodyne pulsed Doppler lidar

 <https://www.iso.org/standard/59210.html>

ISO 28902-2 2017 specifies the requirements and performance test procedures for heterodyne pulsed Doppler lidar techniques and presents their advantages and limitations. The term, Doppler lidar, used in this document applies solely to heterodyne pulsed lidar systems retrieving wind measurements from the scattering of laser light onto aerosols in the atmosphere. A description of performances and limits are described based on standard atmospheric conditions. This document describes the determination of the line-of-sight wind velocity (radial wind velocity). ISO 28902-2 2017 may be used for the following application areas meteorological briefing for, e.g. aviation, airport safety, marine applications and oil platforms; wind power production, e.g. site assessment and power curve determination; routine measurements of wind profiles at meteorological stations; air pollution dispersion monitoring; industrial risk management (direct data monitoring or by assimilation into micro-scale flow models); and exchange processes (greenhouse gas emissions). ISO 28902-2 2017 addresses manufacturers of heterodyne pulsed Doppler wind lidars, as well as bodies testing and certifying their conformity. Also, this document provides recommendations for the users to make adequate use of these instruments.

 CATEGORY Sustainability and Resilience

 PUBLISHED 1/7/2017

ISO Smart Cities

 <https://www.iso.org/files/live/sites/isoorg/files/store/en/PUB100423.pdf>

Cities need to plan now to be able to deliver the resources and services needed to ensure their populations survive - and thrive. Public transport and facilities, water supply, sanitation, energy, food and security are just some of the pressure points that will be affected by rising urbanization. ISO International Standards provide the tools, foundations and platforms to take cities into the future. A holistic approach to the challenges that cities face, and will continue to face in the future, are complex and multisectorial. They are also very specific - no two cities are the same. ISO standards represent the international consensus on best practice in a wide range of areas that contribute to making a city function better and fulfil the United Nations Sustainable Development Goals to end poverty, protect the planet and ensure prosperity for all. These include overarching frameworks that city leaders and planners can use to define objectives and priorities for making their cities

more sustainable, as well as specific guidelines for things like energy management systems, road safety, intelligent transport, responsible water consumption, health and well-being, cybersecurity, connectivity and more.

📁 CATEGORY Sustainability and Resilience

📅 PUBLISHED 1/4/2020

ISO/TR 37121:2017 Sustainable development in communities - Inventory of existing guidelines and approaches on sustainable development and resilience in cities

🔗 <https://www.iso.org/standard/63790.html>

ISO/TR 37121 2016 provides an inventory of existing guidelines and approaches on sustainable development and resilience in cities. It focuses on resilience understood as the ability of a city, system, community, local government or society exposed to hazards to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions. Resilience indicators are intended to assess the extent to which cities are helping residents, businesses, institutions, and infrastructure resist, absorb, accommodate to and recover from the effects of hazards in a timely and efficient manner.

📁 CATEGORY Sustainability and Resilience

📅 PUBLISHED 1/1/2017

ISO 37100:2016 Sustainable cities and communities - Vocabulary

🔗 <https://www.iso.org/standard/71914.html>

Defines terms relating to sustainable development in communities, smart community infrastructure and related subjects.

📁 CATEGORY Terms and Definitions

📅 PUBLISHED 1/12/2016

ISO 24511:2007, 2.24. Activities relating to drinking water and wastewater services - Guidelines for the management of wastewater utilities and for the assessment of wastewater services

🔗 <https://www.iso.org/standard/37247.html>

ISO 24511 2007 provides guidelines for the management of wastewater utilities and for the assessment of wastewater services. It is applicable to publicly and privately owned and operated wastewater utilities, but does not favour any particular ownership or operational model. ISO 24511 2007 addresses wastewater systems in their entirety and is applicable to systems at any level of development (e.g. pit latrines, on-site systems, networks, treatment facilities). The following are within the scope of ISO 24511 2007 the definition of a language common to different stakeholders; objectives for the wastewater utility; guidelines for the management of wastewater utilities; and service assessment criteria and related examples of performance indicators, all without setting any target values or thresholds.

📁 CATEGORY Water

📅 PUBLISHED 1/12/2007

ISO 24512:2007 - Activities relating to drinking water and wastewater services - Guidelines for the management of drinking water utilities and for the assessment of drinking water services

 <https://www.iso.org/obp/ui#iso:std:iso:24512:en>

ISO 24512 2007 provides guidelines for the management of drinking water utilities and for the assessment of drinking water services. ISO 24512 2007 is applicable to publicly and privately owned and operated water utilities. It does not favour any particular ownership or operating model. ISO 24512 2007 addresses drinking water systems in their entirety and is applicable to systems at any level of development (e.g. on-site systems, distribution networks, treatment facilities). The following are within the scope of ISO 24512 2007 the definition of a language common to different stakeholders; the definition of the components of drinking water supply systems; guidelines for the management of drinking water utilities; and guidelines for objectives, service assessment criteria and related performance indicators, appropriate for the assessment of drinking water services.

 CATEGORY Water

 PUBLISHED 1/12/2007

ISO 6107:2021 Water quality - Vocabulary

 <https://www.iso.org/standard/67643.html>

The definitions in this edition of ISO 6107 are based on available standards and aim to harmonise the understanding of terms used within ISO TC147 Water quality to facilitate clear understanding and application of the water quality standards and to reduce variation of interpretation as far as possible. Source information is provided where available. This standard aims to improve and feed the terminology database for ISO TC147 and to serve as a reference document for all water quality characterisation committees and users. Terms and the interpretation thereof may differ in various fields i.e. chemistry microbiology and ecotoxicology. This is indicated in brackets, if applicable, after the term being defined. ISO 6107 is restricted to definitions for terms which appear in standards of ISO/TC 147, Water quality.

 CATEGORY Water

 PUBLISHED 6/1/2021

ISO/IEC 21972:2020 Information technology: Upper level ontology for smart city indicators

<https://www.iso.org/standard/72325.html>

This document establishes general principles and gives guidelines for an indicator upper level ontology (IULO) for smart cities that enables the representation of indicator definitions and the data used to derive them. It includes concepts (e.g., indicator, population, cardinality); and properties that relate concepts (e.g., cardinality_of, parameter_of_var).

📁 CATEGORY Data and Architecture

📅 PUBLISHED 1/1/2020

ISO/IEC 30182:2017, 2.10. Smart city concept model: Guidance for establishing a model for data interoperability

<https://www.iso.org/standard/53302.html>

ISO/IEC 30182 2017 describes, and gives guidance on, a smart city concept model (SCCM) that can provide the basis of interoperability between component systems of a smart city, by aligning the ontologies in use across different sectors. It includes (a) concepts (e.g. ORGANIZATION, PLACE, COMMUNITY, ITEM, METRIC, SERVICE, RESOURCE); and (b) relationships between concepts (e.g. ORGANIZATION has RESOURCES, EVENT at a PLACE). The SCCM does not replace existing models where they exist, but, by mapping from a local model to a parent model, questions can be asked about data in a new and joined-up way. ISO/IEC 30182 2017 is aimed at organizations that provide services to communities in cities, and manage the resulting data, as well as decision-makers and policy developers in cities. The SCCM is relevant wherever many organizations provide services to many communities within a place. It does not cover the data standards that are relevant to each concept in the SCCM and does not attempt to list or recommend the sources of identifiers and categorizations that cities map to the SCCM. The SCCM has been devised to communicate the meaning of data. It does not attempt to provide concepts to describe the metadata of a dataset, for example, validity and provenance of data. It covers semantic interoperability, that is, defining the meaning of data, particularly from many sources.

📁 CATEGORY Data and Architecture

📅 PUBLISHED 1/5/2017

ITU-T Framework of open data in smart cities

https://www.itu.int/ITU-T/workprog/wp_item.aspx?isn=13670

This Recommendation defines a framework of open data in smart cities, in order to promote the sharing of data between different entities in a smart city, fully exploit potentialities of data in smart cities, and ultimately build better and smarter cities. The scope of this Recommendation includes the concept of open data in smart cities; the benefits of open data in smart cities; the key phases of open data in smart cities; the key roles and activities in open data in smart cities; the framework of open data in smart cities; and the general requirements of open data in smart cities.

 CATEGORY Data and Architecture

 PUBLISHED 13/1/2020

ITU-T Open data application programming interfaces (APIs) for IoT data in smart cities and communities

<https://www.itu.int/ITU-T/recommendations/rec.aspx?rec=14374&lang=en>

A growing number of smart cities and administrations are inclined to collaborate and mutualize their efforts and resources for IoT deployments and open data sharing. This Recommendation studies the concept and potential of developing a secure open and interoperable API in the context of IoT deployment and open data management in smart cities. It subsequently specifies an open and interoperable API for secure open data architecture, as well as for supporting IoT data interoperability for smart cities. This Recommendation presents a complete set of Open APIs dedicated to smart cities offering different features covering the needs of interoperable smart city framework development. In order to achieve interoperability between heterogeneous platforms and the development of smart cities, the Recommendation has proposed interoperability points, in southbound and northbound interfaces in a smart city framework. It provides a list of core API sets focusing on data interoperability, including context data management APIs, data transactions APIs, data storage APIs and security APIs. Through the mechanism of subscriptions, it is possible to get a performant and scalable context data management. The data storage APIs allow a granular management of the saved data for all cases. The data transaction APIs facilitate exposure and access to the data through a data marketplace. In addition, security and privacy APIs are seriously taken into account to provide secure data exchange.

 CATEGORY Data and Architecture

 PUBLISHED 29/8/2020

ITU-T Y.4200 - Requirements for the interoperability of smart city platforms

<https://www.itu.int/rec/T-REC-Y.4200/en>

Recommendation ITU-T Y.4200 defines the requirements for the interoperability of a smart city platform (SCP) and its reference points in order to ensure the correct functioning of city services. The SCP offers services to a smart city. Interoperability between SCPs allows the increase in the number of services provided and their quality. It enables the provision of better services to citizens, and at the same time ensures maximum efficiency, scalability and simple integration. By permitting interoperability with other platforms the SCP will also encourage local economic development through innovation and competition.

 CATEGORY Data and Architecture

 PUBLISHED 6/2/2018

ITU-T Y.4209 - Requirements for interoperation of the smart port with the smart city

<https://www.itu.int/ITU-T/recommendations/rec.aspx?rec=14163&lang=en>

Recommendation ITU-T Y.4209 addresses the interoperation of the smart port with the smart city, identifying the requirements for the smart port platform to be able to interoperate with smart city platforms and other smart elements in the environment where the port is located, in order to provide enhanced services. Nautical services and other services management provided by the smart port are out of the scope of this Recommendation. Security aspects required by customs and immigration authorities are out of scope of this Recommendation. Interoperation with other ports is out of scope of this Recommendation given the focus of this Recommendation is on interoperation between the smart port and the smart city. Clause 6 provides an overview of the smart port in terms of interoperation with the components of the smart port ecosystem. Clause 7 describes high-level requirements for the smart port platform to enable interoperation with smart city platforms and/or other smart elements. Clause 8 describes the requirements of interoperation between the smart port platform and smart city platforms and/or other smart elements. Clause 9 describes the smart services provided by the smart port platform interoperating with smart city platforms and/or other smart elements.

📁 CATEGORY Data and Architecture

📅 PUBLISHED 6/4/2020

ITU-T Y.4470 - Reference architecture of artificial intelligence service exposure for smart sustainable cities

<https://www.itu.int/ITU-T/recommendations/rec.aspx?rec=14373&lang=en>

Recommendation ITU-T Y.4470 establishes artificial intelligence service exposure (AISE) for smart sustainable cities (SSCs), and provides the common characteristics and high-level requirements, reference architecture and relevant common capabilities of AISE. AISE is one of the basic supporting functional entities for SSCs, with which SSC services can use uniform reference points (exposed by AISE) to integrate and access the artificial intelligence (AI) capabilities of AI services (e.g., machine learning services for image recognition, natural language processing services and traffic prediction services). In addition, AISE can collect and open SSC data, and it supports AI services to train and supply AI capabilities in AISE in SSCs.

📁 CATEGORY Data and Architecture

📅 PUBLISHED 29/8/2020

ITU-T Y.4805 - Identifier service requirements for the interoperability of smart city applications

https://www.itu.int/rec/dologin_pub.asp?lang=e&id=T-REC-Y.4805-201708-!!!PDF-E&type=items

Recommendation ITU-T Y.4805 specifies a set of requirements for identifier services in smart city applications with a view to ensure that such systems are interoperable and secure. This set of requirements may additionally serve as guidelines for developing new identifier services for smart cities. The Recommendation includes security features for service integrity and data confidentiality. The Recommendation defines a full list of identifier service requirements, including security requirements, for the identifier service.

📁 CATEGORY Data and Architecture

📅 PUBLISHED 28/2/2017

ITU-T Y.4900/L.1600 (06/2016) - Overview of key performance indicators in smart sustainable cities

https://www.itu.int/rec/dologin_pub.asp?lang=e&id=T-REC-L.1600-201606-!!!PDF-E&type=items

Recommendation ITU-T Y.4900/L.1600 gives a general guidance to cities and provides an overview of key performance indicators (KPIs) in the context of smart sustainable cities (SSCs). This Recommendation is one of series of the Recommendations and Supplements that define KPIs. The series of KPI definitions documents also include Recommendation ITU-T Y.4901/L.1601 on key performance indicators (KPIs) related to the use of information and communication technology (ICT) in smart sustainable cities. This Recommendation lists the KPIs focusing on ICT use in smart sustainable cities (SSCs); Recommendation ITU-T Y.4902/L.1602 on key performance indicators (KPIs) related to the sustainability impacts of information and communication technology (ICT) in smart sustainable cities. This Recommendation lists the KPIs used for ICT impact on sustainability; and Supplement ITU-T Y-Suppl. 39 on key performance indicators (KPIs) for smart sustainable cities. This document provides information regarding KPIs and evaluation index systems of smart cities, KPIs of sustainable cities, etc.

📁 CATEGORY Data and Architecture

📅 PUBLISHED 17/4/2019

ITU-T Y.4901/L.1601. Key performance indicators related to the use of information and communication technology in smart sustainable cities

https://www.itu.int/rec/dologin_pub.asp?lang=E&id=T-REC-L.1601-201606-!!!PDF-E&type=items

Recommendation ITU-T Y.4901/L.1601 gives a general guidance to cities and provides the definitions of key performance indicators (KPIs) related to the use of information and communication technology (ICT) in the context of smart sustainable cities (SSCs). This Recommendation is one of series of the Recommendations and Supplements that define KPIs. The series of KPI definitions documents also include Recommendation ITU-T Y.4900/L.1600 on overview of key performance indicators (KPIs) in smart sustainable cities; Recommendation ITU-T Y.4902/L.1602 on key performance indicators (KPIs) related to the sustainability impacts of information and communication technology (ICT) in smart sustainable cities. This Recommendation lists the KPIs used for ICT impact on sustainability; and Supplement ITU-T Y-Suppl. 39 on key performance indicators (KPIs) for smart sustainable cities. This document provides information regarding KPIs and evaluation index systems of smart cities, KPIs of sustainable cities, etc.

📁 CATEGORY Data and Architecture

📅 PUBLISHED 1/8/2016

ITU-T Y.4902/L.1602. Key performance indicators related to the sustainability impacts of information and communication technology in smart sustainable cities


https://www.itu.int/rec/dologin_pub.asp?lang=e&id=T-REC-L.1602-201606-!!!PDF-E&type=items

Recommendation ITU-T Y.4902/L.1602 gives a general guidance to cities and provide the definitions of key performance indicators (KPIs) related to the sustainability impact of information and communication technology (ICT) in the context of smart sustainable cities (SSCs). This Recommendation is one of series of the Recommendations and Supplements that define KPIs. The series of KPI definitions documents also include Recommendation ITU-T Y.4900/L.1600 on overview of key performance indicators (KPIs) in smart sustainable cities; Recommendation ITU-T Y.4901/L.1601 on key performance indicators (KPIs) related to the use of information and communication technology (ICT) in smart sustainable cities. This Recommendation lists the KPIs used for ICT use in SSC; and Supplement ITU-T Y. Suppl. 39 on key performance indicators (KPIs) for smart sustainable cities. This document provides information regarding KPIs and evaluation index systems of smart cities, KPIs of sustainable cities, etc.

📁 CATEGORY Data and Architecture

📅 PUBLISHED 1/6/2016

ITU-T Y.4903/L.1603. Key performance indicators for smart sustainable cities to assess the achievement of sustainable goals

 https://www.itu.int/rec/dologin_pub.asp?lang=e&id=T-REC-Y.4903-201610-I!!PDF-E&type=items

This Recommendation outlines the key performance indicators (KPIs) in the context of smart sustainable cities (SSC) used to assess the achievement of sustainable development goals (SDGs). Evaluating these indicators can help cities as well as their stakeholders understand to what extent they may be perceived as smart and sustainable. The sustainability of a smart city is based on five main aspects: Economic, the ability to generate income and employment for the livelihood of the inhabitants; Social, the ability to ensure that the welfare (safety, health, education, etc.) of the citizens can be equally delivered despite differences in class, race or gender; Environmental, the ability to protect future quality and reproducibility of natural resources; Governance, the ability to maintain social conditions of stability, democracy, participation and justice; and Cultural, the ability to promote cultural identity and adequacy, value and emotional well-being.

 CATEGORY Data and Architecture

 PUBLISHED 1/10/2016

ITU-T Y.4908 - Performance evaluation frameworks of e-health systems in the Internet of things

 <http://handle.itu.int/11.1002/1000/14425-en?locatt=format:pdf&auth>

Currently e-health systems are being implemented by governments and stakeholders to increase the effectiveness, efficiency and the quality of health care services. The Internet of things (IoT) as a relatively new technology is transforming e-health systems to further enhance health care services. However, this transformation concomitantly creates a need for effective performance evaluation frameworks of e-health systems in the IoT. Recommendation ITU-T Y.4908 addresses this need for effective performance evaluation frameworks of e-health systems in the IoT and includes a classification of e-health services in the IoT; a non-exhaustive set of non-functional performance evaluation factors applicable to the e-health systems in the IoT; and performance evaluation frameworks for e-health systems in the IoT.

 CATEGORY Health

 PUBLISHED 16/12/2020

ITU-T Blockchain-based data exchange and sharing for supporting Internet of things and smart cities and communities

 <https://www.itu.int/ITU-T/recommendations/rec.aspx?rec=14379&lang=en>

Blockchain is an emerging technology, its most important characteristics are traceable, un-erasable, immutable, and time-stamped. It is able to efficiently ensure integrity, authenticity, and auditability for all transactions. Blockchain has important impacts and benefits for data exchange and sharing in support of Internet of things (IoT) and smart cities and communities (SC and C). In most of the IoT and SC and C scenarios, it is necessary to ensure data processing, circulation, sharing and management for all trust operations. Blockchain technologies can meet these needs. Recommendation ITU-T Y.4560 specifies the requirements, functional models, a platform, and deployment modes of blockchain-based data exchange and sharing for supporting IoT and SC and C.

 CATEGORY Information Processing

 PUBLISHED 29/8/2020

ITU-T Blockchain-based data management for supporting Internet of things and smart cities and communities

<https://www.itu.int/ITU-T/recommendations/rec.aspx?rec=14380&lang=en>

Along with the development of the Internet of things (IoT) and smart cities and communities (SC and C), various applications have different kinds of requirements for data management, and there are many challenges, especially in data representing, data processing, data service provisioning, and other aspects in a secure and effective manner. Meanwhile, blockchain as an emerging technology possesses the characteristics of trust, transparency, traceability and accountability. It has the potential capabilities to solve the existing issues in data management. Recommendation ITU-T Y.4561 specifies the requirements, generic reference model, common capabilities, and procedures of blockchain-based data management.

📁 CATEGORY Information Processing

📅 PUBLISHED 29/8/2020

ITU-T OID-based resolution framework for transactions of a distributed ledger assigned to IoT resources

<https://www.itu.int/ITU-T/recommendations/rec.aspx?rec=14578&lang=en>

An object identifier (OID) is an identifier to name an object in a hierarchically assigned namespace. In the Internet of things (IoT), thousands of IoT resources will be intricately provided as fusion types of various services. For the thousands of IoT resources, object identifiers (OIDs) can provide a resolution framework with unlimited scalability. On the other hand, IoT resources need to secure their data, so the distributed ledger technology (DLT) can guarantee its integrity. In consequence, the convergence of DLT and OIDs provides a good solution for identifying secured data of IoT resources. Recommendation ITU-T Y.4476 therefore specifies a resolution framework for the transactions of a distributed ledger assigned to IoT resources. Recommendation ITU-T Y.4476 also describes the concepts, functional requirements, architecture and procedures of an OID-based resolution framework by using DLT.

📁 CATEGORY Information Processing

📅 PUBLISHED 6/2/2021

ITU-T Y.4201 - High-level requirements and reference framework of smart city platforms


https://www.itu.int/rec/dologin_pub.asp?lang=e&id=T-REC-Y.4201-201802-!!!PDF-E&type=items

This Recommendation defines the reference framework and high-level requirements of smart city platforms. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published.

📁 CATEGORY Information Processing

📅 PUBLISHED 6/2/2018

ITU-T Y.4119 - Requirements and capability framework for IoT-based automotive emergency response system

 https://www.itu.int/rec/dologin_pub.asp?lang=e&id=T-REC-Y.4119-201803-!!!PDF-E&type=items

Recommendation ITU-T Y.4119 provides an overview of an Internet of things (IoT)-based automotive emergency response system (AERS), identifies requirements of the AERS for aftermarket devices, and provides a capability framework of the AERS.

 CATEGORY Mobility

 PUBLISHED 1/3/2018

ITU-T Y.4211 - Accessibility requirements for smart public transport services

 <https://www.itu.int/ITU-T/recommendations/rec.aspx?rec=14577&lang=en>

Recommendation ITU-T Y.4211 specifies accessibility requirements for smart public transport services. The concept of accessibility in public transport services has been mainly concerned with eliminating physical barriers such as adopting accessible trains and buses that allow wheelchair accessibility by mechanical lowering-entrance floors. In smart public transport services, the use of Internet of things (IoT), when properly designed, may increase accessibility of public transport services by providing access of information and physical accessibility. The IoT can be used to create tools for persons with many types of disability and specific needs, including physical, visual, hearing and cognitive disabilities. In order for the smart transport services to appropriately provide accessible services, information about accessibility profiles must be agreed upon in advance. Such accessibility profiles should basically include information on accessibility needs while travelling on public transport services.

 CATEGORY Mobility

 PUBLISHED 14/12/2020

ITU-T Y.4456 - Requirements and functional architecture for smart parking lots in smart cities


 https://www.itu.int/rec/dologin_pub.asp?lang=e&id=T-REC-Y.4456-201803-!!!PDF-E&type=items

Smart parking lots (SPLs) integrate parking information to enable the coordination of parking facilities within smart cities. SPLs work with other systems to provide various parking services. This Recommendation specifies the requirements and functional architecture for SPLs. The scope of this Recommendation includes introduction of SPLs; requirements for SPL; Functional architecture of SPL. For use cases of SPL see Appendix I. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published.

 CATEGORY Mobility

 PUBLISHED 1/3/2018

ITU-T Y.4457 - Architectural framework for transportation safety services

 https://www.itu.int/rec/dologin_pub.asp?lang=e&id=T-REC-Y.4457-201806-I!!PDF-E&type=items

This Recommendation addresses a transportation safety management model that describes disaster management steps based on Internet of things (IoT) technologies in order to reduce damage from disasters. An architectural model for transportation safety services is described based on [ITU-T Y.4116] and on requirements according to the IoT reference model [ITU-T Y.4000]. The scope and characteristics of transportation disasters from various transportations (e.g., road, railway, maritime and air transportation) are based on [ITU-T Y.4116]. Transportation safety management parameters (e.g., safety index and driver tiredness) are presented respectively in Annex A and Annex B and sensing data pre-processing procedure and characteristics of transportation application services are described in the appendices of this Recommendation.

 CATEGORY Mobility

 PUBLISHED 29/6/2018

ITU-T Framework for bootstrapping of devices and applications for open access to trusted services in distributed ecosystems

 <https://www.itu.int/ITU-T/recommendations/rec.aspx?rec=14594&lang=en>

Rapid advancements in communications and associated technologies has led to the emergence of distributed ecosystems with a large number of devices, applications and use cases requiring open access to trusted services. This open access to trusted services in distributed ecosystems can be provisioned by using the inherent security capabilities and mechanisms already present in the devices and the underlying networks. Recommendation ITU-T Y.3056 provides a concept of bootstrapping of devices and applications by network operators who can share the network security capabilities with users and providers of new devices and services. It describes the requirements to be fulfilled by the entities of the ecosystem such that they may benefit from the bootstrapping capabilities. Based on the requirements, a reference model as well as a functional architecture is provided, which together describe the elements, functions and reference points needed for provisioning of the bootstrapping capabilities. Finally, this Recommendation provides the information flows required to enable the bootstrapping capabilities.

 CATEGORY Privacy and Security

 PUBLISHED 13/2/2021

ITU-T Y.4907 - Reference architecture of blockchain-based unified KPI data management for smart sustainable cities

 <http://handle.itu.int/11.1002/1000/14382-en?locatt=format:pdf&auth>

This Recommendation introduces the concept of blockchain-based unified key performance indicator data management for smart sustainable cities (BKDMS), analyses its common characteristics and high-level requirements, defines a reference architecture of BKDMS and relevant common capabilities, gives a common data structure of KPIs according to the KPIs definition of the ITU-T Y.4900 series.

 CATEGORY Privacy and Security

 PUBLISHED 29/8/2020

ITU-T Y.4905 - Smart sustainable city impact assessment

https://www.itu.int/rec/dologin_pub.asp?lang=e&id=T-REC-Y.4905-201902-!!!PDF-E&type=items

Recommendation ITU-T Y.4905 is a holistic impact framework for the assessment of smart and sustainable cities to address the effects of digital innovation on social, economic and environmental issues. Smart sustainable city (SSC) initiatives have been proposed as potential solutions to economic, social and environmental challenges and pressures encountered by cities. Advances in information and communication technologies (ICTs) enable significant transformation potential in the way city resources, services and infrastructures are planned and managed. More specifically, ICT can play an enabling role to address the urban challenges of the twenty-first century. Smart sustainable cities harness ICTs (including various subtopics under ICT such as digital transformation, data, Internet of things (IoT), digital services, etc.) and intend to deliver city enhancements through a portfolio of action items. By their very nature, SSC initiatives impact the underlying cities. It is important to identify and assess this impact. The identification and assessment of impact will allow for better planning, the setting expectations with stakeholders, better informed budgeting, more effective public private partnerships and the promotion of alternative financing mechanisms. This will also help in communicating SSC initiatives.

📁 CATEGORY Strategies, Policies and Planning

📅 PUBLISHED 1/2/2019

ITU-T Y.4906 - Assessment framework for digital transformation of sectors in smart cities

<http://handle.itu.int/11.1002/1000/13922-en?locatt=format:pdf&auth>

The ultimate objective of this Recommendation is to enhance the sustainability of identified priority sectors in smart cities, in order to optimise economic, environmental and social benefits. Cities will decide on their digital transformation priorities. For example, cities might also want to encourage collaboration to deliver desired outcomes. This kind of engagement based on the assessment framework can incentivize industry engagement and investment. Recommendation ITU-T Y.4906 contains the following 1) Introduction of the assessment framework and its components. 2) Identification of indicators - Examples of categories of indicators to assist in this objective for the assessment frameworks include Digital infrastructure; Digital transformation initiatives for sectors; Collaboration efforts on digital transformation; Economic, environmental and social benefits according to sector digital transformation. 3) Sector assessment and analysis.

📁 CATEGORY Strategies, Policies and Planning

📅 PUBLISHED 7/7/2019

ITU-T Y.4904 - Smart sustainable cities maturity model

<http://handle.itu.int/11.1002/1000/13864-en?locatt=format:pdf&auth>

This Recommendation contains a maturity model for smart sustainable cities. This maturity model helps identify the goals, levels and key measures that are recommended for cities to effectively examine their current situation and determine critical capabilities needed to progress toward the long-term goal of becoming SSCs. The Recommendation includes Smart Sustainable City Maturity Model (SSC-MM); maturity dimensions in smart sustainable cities; maturity levels for smart sustainable cities; and mapping of key performance indicators in smart sustainable cities.

📁 CATEGORY Sustainability and Resilience

📅 PUBLISHED 6/12/2019

ITU-T Y.4051 - Vocabulary for smart cities and communities

<https://www.itu.int/ITU-T/recommendations/rec.aspx?rec=13855&lang=en>

Recommendation ITU-T Y.4051 contains vocabulary applied to the work on smart cities and communities (SC and C). The vocabulary terms and definitions in this Recommendation are defined in published ITU-T Recommendations and Supplements, and standards from other international standards developing organizations (SDOs) such as the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC). Additionally, this vocabulary also includes and defines new terms to meet the needs of the work of ITU on SC and C.

📁 CATEGORY Terms and Definitions

📅 PUBLISHED 7/7/2019

OECD

OECD Smart Cities and Inclusive Growth

https://www.oecd.org/cfe/cities/OECD_Policy_Paper_Smart_Cities_and_Inclusive_Growth.pdf

This paper has been prepared in the framework of the OECD Programme on Smart Cities and Inclusive Growth. It offers a synthesis of the lively discussions held during the 1st OECD Roundtable on Smart Cities and Inclusive Growth (9 July 2019, OECD Headquarters, Paris, France), enriched with analytical research. Next steps in the Programme will further advance knowledge on the drivers and pitfalls of smart cities, help better measure smart city performance, and provide targeted support to interested cities and countries to improve the effectiveness of their smart city initiatives.

📁 CATEGORY Data and Architecture

📅 PUBLISHED 1/1/2020

OECD Leveraging digital technology and data for human-centric smart cities: The case of smart mobility

<https://www.itf-oecd.org/sites/default/files/docs/data-human-centric-cities-mobility-g20.pdf>

Countries and sub-national governments have deployed many smart city and smart mobility programs. Many of these are highlighted in the responses of DETF members and guests to the Survey on Smart Mobility initiated by the G20 Saudi Presidency. Survey responses indicate robust engagement with smart city and community initiatives and the deployment of many smart mobility projects. They also indicate the need for a compelling set of principles to guide action and to help overcome several confounding factors relating to smart mobility deployment. These include challenges to scaling smart mobility practices; conflicting roles among stakeholders; insufficient or inconsistent coordination among stakeholders; and lack of international standards for the deployment of smart mobility technologies.

📁 CATEGORY Mobility

📅 PUBLISHED 1/1/2020

OECD Enhancing the contribution of Digitalisation to the smart cities of the future

<https://www.oecd.org/cfe/regionaldevelopment/Smart-Cities-FINAL.pdf>

This paper (re)defines smart cities as initiatives or approaches that effectively leverage digitalisation to boost citizen well-being and deliver more efficient, sustainable and inclusive urban services and environments as part of a collaborative, multi-stakeholder process. The paper argues that harnessing the benefits of digitalisation in cities is critical to deliver growth and well-being across our economies and societies. It seeks to take stock of a decade of experimentation, uptake and proliferation of smart cities initiatives across the globe, in order to help understand what has worked, what has not worked, and what can be improved to leverage fully their potential to drive inclusive and sustainable growth. The first part of the paper explores the range of definitions and measurement frameworks that have been proposed around the smart city concept. The second part assesses some of the main opportunities, challenges, risks and trade-offs stemming from digitalisation in cities, to outline the main policy implications for governments in OECD countries. The third part sketches ways forward for the OECD to address the proposed policy questions.

📁 CATEGORY Strategies, Policies and Planning

📅 PUBLISHED 1/1/2019

oneM2M

oneM2M Smart Cities Done Smarter

https://www.onem2m.org/images/files/oneM2M_WhitePaper_SmartCitiesDoneSmarter.pdf

Cities are starting to appoint people with cross-department responsibilities in order to reduce duplication of hardware and IT software. During this on-going period of austerity, with city budgets invariably cut, the need to drive greater cross-department synergies is even more important. oneM2M is a response to the growing demand for a smarter approach to smart cities. Based on open standards developed in partnership with its some 250 members worldwide, which include eight of the world's preeminent standards development organizations (SDOs), known as Partner Type 1's, notably ARIB (Japan), ATIS (United States), CCSA (China), ETSI (Europe), TTA (USA), TSDSI (India), TTA (Korea) and TTC (Japan), together with six industry fora, consortia or standards bodies (Broadband Forum, CEN, CENELEC, Global Platform, Next Generation M2M Consortium, OMA) known as Partner Type 2's, oneM2M marks a seismic change in the IoT landscape. It combats market fragmentation by bringing the parties together whilst respecting their individuality. Instead of the vertical approach, where cities might have several dedicated IoT platforms, one for smart metering, another for waste management and so on, oneM2M enables different IoT use cases to be supported by the same platform. The horizontal approach.

📁 CATEGORY Information Processing

📅 PUBLISHED 1/7/2018

oneM2M TR-0036 Adaptation of oneM2M for Smart City

<http://member.onem2m.org/APPLICATION/DOCUMENTAPP/DOWNLOADLATESTREVISION/?DOCID=20071>

This technical report consists of case studies from oneM2M adapted smart cities, analysis on those cities in terms of oneM2M specifications, and some implications for future smart cities based on oneM2M.

📁 CATEGORY Information Processing

📅 PUBLISHED 16/9/2019

UN SDG Indicators. Global Database beta 0.2.43

<https://unstats.un.org/sdgs/indicators/database/>

The metadata available in this repository is a work in progress. It reflects the latest reference metadata information provided by the UN System and other international organizations on data and statistics for the Tier I and II indicators in the global indicator framework. Since Tier III indicators are still under methodological development, a link to the webpage that includes all available work plans is being provided. This repository will be further updated and periodically reviewed in cooperation with the respective data compilers.

📁 CATEGORY Data and Architecture

📅 PUBLISHED 1/4/2021

UN Smart Sustainable Cities: Reconnaissance Study

https://joinup.ec.europa.eu/sites/default/files/document/2016-04/smart_cities_report.pdf

This study discovered a wide variation of Smart City initiatives in different geographic locations. There are Smart City initiatives in both developed and developing countries, and Europe leads the way with 37pc of initiatives found followed by Asia Pacific (28pc), Africa (13pc), North America (13pc), and Latin America and Caribbean (9pc). Most Smart City initiatives (25pc) focused on Smart Living, i.e. how digital technology enables healthy and safe lifestyles; Smart Environment (21pc), e.g. technology-enabled energy grids, waste management and other initiatives for reducing pollution; and Smart Economy (19pc); and less on other initiatives, such as Smart Mobility (13pc), i.e. technology-enabled and integrated transport and logistic systems; Smart Governance (13pc), i.e. technology-enabled policy and governance processes; and Smart People (9pc), e.g. people with e-skills, working on technology-enabled jobs. The majority of initiatives focused on one (40pc) or two (24pc) objectives and a few (8pc) tried to balance all six objectives. The majority of initiatives (66pc) are implemented by governments, followed by industry (19pc) and NGOs (15pc). Most were concerned with planning (60pc), and the rest by implementation (40pc). Interestingly, despite the discourse in the literature that contrasts topdown and bottom-up initiatives, it is clear that top-down or government-led initiatives (83pc) are dominant, while only 17pc are bottom-up or citizen-driven.

📁 CATEGORY Sustainability and Resilience

📅 PUBLISHED 15/3/2016

UN TMB TF 16: Task Force on UN SDGs: Final report and recommendations to the TMB

https://isotc.iso.org/livelink/livelink/fetch/-15620806/15620808/15623592/17584461/TMB_Task_Force_16_on_UN_SDGs_-_Final_report_and_recommendations.pdf?nodeid=19802760&vernum=-2

The committee report reviews the mapping of existing ISO standards against each one of the 17 UN Sustainable Development Goals (SDGs) and recommends consolidation of existing ISO material on standards that support the SDGs, such as webpages, articles, brochures. Working with the ISO/CS web team, a concept for a website to showcase SDG-related content and mapping of ISO standards to the SDGs (incl. user guide for website, background information, and maintenance plan) was developed. Annex 1 contains an excel file mapping ISO standards to UN SDGs, considered a living document with just under 600 standards at the moment. The purpose of the mapping is not to be made public, but to provide the content for the website.

📁 CATEGORY Sustainability and Resilience

📅 PUBLISHED 1/6/2018

■ UNECE

UNECE People-Smart Sustainable Cities

[🔗 https://unece.org/sites/default/files/2021-01/SSC%20nexus_web_opt_ENG.pdf](https://unece.org/sites/default/files/2021-01/SSC%20nexus_web_opt_ENG.pdf)

This publication advocates a cities-based approach to sustainable development. This approach recognises the central and integrating role that cities and urban living play in developing sustainability. As a dominant form of spatial organization within society today, cities are the centrepiece of economic, social, and cultural life. Without localising SDGs at the urban level, few can be effectively addressed at all. By their nature, cities represent a complex arrangement of many interrelated systems, both social and technical, so that they are best placed to address multiple sustainability goals at once. Cities also offer more rapid, practice-informed and grounded responses to sustainability challenges.

📁 CATEGORY Sustainability and Resilience

📅 PUBLISHED 1/1/2020

■ UNESDOC

UNESDOC A journey through Smart Cities: Between Datapolis and Participolis

[🔗 https://unesdoc.unesco.org/ark:/48223/pf0000234422](https://unesdoc.unesco.org/ark:/48223/pf0000234422)

This book is a journey within some among the largest cities in the world to describe how each one has addressed its challenges and what solutions were adopted. More than a pure list of technological solutions, the book aims to provide the reader an analysis of the uses and impacts of ICT solutions and innovative Smart in the daily life of citizens. This book aims to contribute to the understanding of strong changes in our societies and how information and knowledge play a major role through ICTs.

CATEGORY Case Studies and Rankings

PUBLISHED 1/1/2015

WEF Smart at Scale: Cities to Watch. 25 Case Studies

 http://www3.weforum.org/docs/WEF_Smart_at_Scale_Cities_to_Watch_25_Case_Studies_2020.pdf

The cities in this paper - their leaders, public officials, administrators, businesses, universities and communities - have taken extraordinary steps to render the urban environment more inclusive, equitable, agile, open to new ideas and, ultimately, resilient. The fundamental purpose of this publication is to inspire us in committing to even more experiments for urban innovation. Without a doubt, some efforts will work better than others, will go to scale and will be adapted and adopted by other cities, which is why it is so important to explore novel ideas in a broad range of fields affecting our everyday lives. We hope these case studies will help advance the conversation and offer useful insights for our common urban future.

 CATEGORY Case Studies and Rankings

 PUBLISHED 1/8/2020

WEF Agile Cities Preparing for the Fourth Industrial Revolution

 http://www3.weforum.org/docs/WP_Global_Future_Council_Cities_Urbanization_report_2018.pdf

This report by the World Economic Forum's Global Future Council on Cities and Urbanization begins to create a framework and provide metrics and guidelines for agility in the following key areas - city buildings, land, security, energy, mobility, education, governance and IT - that together will form the city agility index. Starting from city-specific case studies sourced through the Global Future Council, the report illustrates how cities are being agile and serve as potential examples that can be improved upon and adapted by other cities to help them transform.

 CATEGORY Sustainability and Resilience

 PUBLISHED 1/9/2017

WTO Decisions and Recommendations Adopted by the WTO Committee on Technical Barriers to Trade since 1 January 1995

 <https://docs.wto.org/dol2fe/Pages/SS/directdoc.aspx?filename=q:/G/TBT/1R12.pdf>

This document contains the twelfth revision of the compilation of the TBT Committee's Decisions and Recommendations. This revision, which supersedes all previous G/TBT/1 documents, is in two parts. Part 1 contains the Committee's decisions and recommendations adopted since 1 January 1995. Part 2 contains the Committee's Rules of Procedure including Guidelines for Observer Status for Governments and International Intergovernmental Organizations. Good Regulatory Practice (GRP) can contribute to the improved and effective implementation of the substantive obligations under the TBT Agreement. Effective implementation through best practices is seen as an important means of avoiding unnecessary obstacles to trade. Institutionalizing the various mechanisms, processes and procedures of GRP through laws, regulations and guidance, as well as through the creation and designation of institutions within Member governments to oversee regulatory processes, is seen as a means of giving effect to GRP. Effective internal policy coordination, including among regulators, standardizing bodies and trade officials implementing the TBT Agreement, is stressed. Additionally, regulatory cooperation between Members is an effective means of disseminating GRP.

 CATEGORY Strategies, Policies and Planning

 PUBLISHED 21/1/2015

WTO World Trade Statistical Review 2017

 https://www.wto.org/english/res_e/statis_e/wts2017_e/wts2017_e.pdf

World Trade Statistical Review provides a detailed analysis of the latest developments in world trade. It is the WTO's flagship statistical publication and is produced on an annual basis. World merchandise trade in volume terms recorded a slight decline of 0.1 per cent in 2019 after rising by 2.9 per cent in the previous year. Merchandise trade is measured as the average of exports and imports. In value terms, trade declined by 3.0 per cent compared with an 10.2 per cent increase in 2018. World trade in commercial services increased by 2.1 per cent in 2019, slowing substantially from its 8.4 per cent rise in 2018. Transport exports declined by 0.8 per cent as merchandise trade faltered. Other commercial services recorded the highest export growth (3.3 per cent) among services sectors in 2019, buoyed by slowing, but continued, growth in the telecommunications, computer and information services sector.

 CATEGORY Strategies, Policies and Planning

 PUBLISHED 1/1/2017

■ Spain

■ IESE

IESE IESE Cities in Motion Index

 <https://media.iese.edu/research/pdfs/ST-0542-E.pdf>

IESE Cities in Motion is a research platform launched jointly by the Center for Globalization and Strategy and the Department of Strategy of the IESE Business School. The initiative connects a global network of experts in cities, specialist private companies and local governments from around the world. The aim is to promote changes at the local level and to develop valuable ideas and innovative tools that will lead to more sustainable and smarter cities. The mission of the platform is to promote the Cities in Motion model, with an innovative approach to city governance and a new urban model for the 21st century based on four main factors sustainable ecosystem, creative activities, equality among citizens, and connected territory. The IESE Cities in Motion Index is a study published annually by the business school of the University of Navarra (IESE) that aims to evaluate the development of global cities.

 CATEGORY Case Studies and Rankings

 PUBLISHED 1/10/2020


■ Sweden

■ EasyPark

EasyPark The Cities of the Future Index

 <https://easyparkgroup.com/studies/cities-of-the-future/en/>

At EasyPark, we are leaders in using innovative technologies to make mobility in cities smarter. For several years we have studied smart cities and their development and, in the face of new challenges, decided to focus our research in order to learn from those urban areas that are setting examples for others to follow. Many cities are currently adopting cutting edge technology to provide a more sustainable future and improve the wellbeing of its residents through intelligent solutions, such as electric vehicle charging or camera parking. We analysed thousands of cities across the world, including the 3,200 that EasyPark Group currently operates in. We recognise that cities face their own unique challenges and develop differently depending on a variety of factors, including their size, so we split this study into three categories based on the population of each city. Whilst thousands of urban areas across the globe were assessed, here we rank the 50 best scoring cities in each size category.

 CATEGORY Case Studies and Rankings

 PUBLISHED 1/10/2021

■ USA

■ NIST

NIST IES - City Framework Release v1.0

 <https://pages.nist.gov/smartcitiesarchitecture/>

This IES-City Framework is the product of an open, international public working group seeking to reduce the high cost of application integration through technical analyses of existing smart city applications and architectures. This Framework documents the findings of the authors and provides valuable tools that are based on the findings and that can lower barriers to an expanded smart city marketplace.

 CATEGORY Data and Architecture

PUBLISHED 30/9/2018



■ Specifications by Category

Title Displayed	Webpage URL
Citizen: Education, Training and Learning	
IEEE: 1484.11.2-2020 - Standard for Learning Technology - ECMA Script Application - Programming Interface for Content to Runtime Services Communication	https://standards.ieee.org/standard/1484_11_2-2020.html
IEEE: 1484.12.1-2020 - Standard for Learning Object Metadata	https://standards.ieee.org/standard/1484_12_1-2020.html
IEEE: 1484.12.3-2020 - Standard for Learning Technology - Extensible Markup Language (XML) Schema Definition Language Binding for Learning Object Metadata	https://standards.ieee.org/standard/1484_12_3-2020.html
IEEE: 1484.13.1-2012 - Standard for Learning Technology - Conceptual Model for Resource Aggregation for Learning, Education, and Training	https://standards.ieee.org/standard/1484_13_1-2012.html
IEEE: 1484.13.2-2013 - Recommended Practice for Learning Technology - Metadata Encoding and Transmission Standard (METS) Mapping to the Conceptual Model for Resource Aggregation	https://standards.ieee.org/standard/1484_13_2-2013.html
IEEE: 1484.13.3-2014 - Recommended Practice for Learning Technology - ISO 21000-2:2005 Information Technology--Multimedia Framework (MPEG-21) - Part 2: Digital Item Declaration Mapping to the Conceptual Model for Resource Aggregation	https://standards.ieee.org/standard/1484_13_3-2014.html
IEEE: 1484.13.4-2016 - Recommended Practice for Learning Technology - IMS Content Packaging Information Model (CP) Version 1.2 - Mapping to the Conceptual Model for Resource Aggregation	https://standards.ieee.org/standard/1484_13_4-2016.html
IEEE: 1484.13.5-2013 - Recommended Practice for Learning Technology: IETF RFC 4287 - Atom Syndication Format - Mapping to the Conceptual Model for Resource Aggregation	https://standards.ieee.org/standard/1484_13_5-2013.html
IEEE: 1484.13.6-2015 - Recommended Practice for Learning Technology - Open Archives Initiative Object Reuse and Exchange Abstract Model (OAI-ORE) - Mapping to the Conceptual Model for Resource Aggregation	https://standards.ieee.org/standard/1484_13_6-2015.html
IEEE: 1589-2020 - Standard for Augmented Reality Learning Experience Model	https://standards.ieee.org/standard/1589-2020.html
IEEE: P1484.11.1 - Standard for Learning Technology - Data Model for Content Object Communication	https://standards.ieee.org/project/1484_11_1.html
IEEE: P2784 - Guide for the Technology and Process Framework for Planning a Smart City	https://standards.ieee.org/project/2784.html

Title Displayed	Webpage URL
Citizen: Health	
ETSI EP eHEALTH: SR 002 564 V2.0.0 Applicability of existing ETSI and ETSI/3GPP deliverables to eHealth	https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKI_ID=26302
ETSI EP eHEALTH: Whitepaper 29: The argument in favour of eHealth standardization in ETSI	https://www.etsi.org/images/files/ETSIWhitePapers/etsi_wp29_ehealth_standardization_FINAL.pdf
ETSI TC SmartM2M: SmartM2M; Asynchronous Contact Tracing System; Fighting pandemic disease with Internet of Things (IoT)	http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=62484
ETSI TC SmartM2M: SmartM2M; Extension to SAREF; Part 8: eHealth/Ageing-well Domain	http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=51404
ETSI TC SmartM2M: SmartM2M; Extension to SAREF; Part 9: Wearables Domain	http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=51406
IEEE: 11073-10207-2017 - Health informatics--Point-of-care medical device communication Part 10207: Domain Information and Service Model for Service-Oriented Point-of-Care Medical Device Communication	https://standards.ieee.org/standard/11073-10207-2017.html
IEEE: P11073-10107 - Standard for Nomenclature for External Control of Medical Devices	https://standards.ieee.org/project/11073-10107.html
IEEE: P11073-10700 - Standard for Common Base Requirements for Participants in a Service-Oriented Device Connectivity (SDC) System	https://standards.ieee.org/project/11073-10700.html
ISO: 18369-1:2017, 3.1.9.2.Ophthalmic optics - Contact lenses - Part 1: Vocabulary, classification system and recommendations for labelling specifications	https://www.iso.org/standard/66338.html
ISO: 25237:2017, 3.42.Health informatics: Pseudonymization	https://www.iso.org/standard/63553.html
ISO: TR 14292:2012, 2.11.Health informatics: Personal health records - Definition, scope and contexts	https://www.iso.org/standard/54568.html
ISO: TR 18307:2001, 3.51. Health informatics: Interoperability and compatibility in messaging and communication standards - Key characteristics	https://www.iso.org/standard/33396.html
ISO: TR 19669:2017, 3.11. Health informatics: Re-usable component strategy for use case development	https://www.iso.org/standard/65948.html
ISO: TS 13972:2015, 2.31. Health informatics: Detailed clinical models, characteristics and processes	https://www.iso.org/standard/62416.html
ISO: TS 14265:2011, 2.9. Health Informatics - Classification of purposes for processing personal health information	https://www.iso.org/standard/54547.html
ISO: TS 17975:2015, 3.1. Health informatics: Principles and data requirements for consent in the collection, use or disclosure of personal health information	https://www.iso.org/standard/61186.html

Title Displayed	Webpage URL
ISO: TS 21089:2018 Health informatics -Trusted end-to-end information flows	https://www.iso.org/standard/66936.html
ITU-T: Y.4908 - Performance evaluation frameworks of e-health systems in the Internet of things	http://handle.itu.int/11.1002/1000/14425-en?locatt=format:pdf&auth

Citizen: Safety and Emergencies

ETSI SC EMTEL: Emergency Communications (EMTEL); Guidelines for alert message content accessibility	http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=45969
ETSI SC EMTEL: Emergency Communications (EMTEL); Requirements for communications from authorities/ organizations to individuals, groups or the general public during emergencies; authorities to citizens	https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKI_ID=31391
ETSI SC EMTEL: Emergency Communications (EMTEL); Total Conversation Access to Emergency Services	https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKI_ID=39305
ETSI SC EMTEL: EMTEL; Study of use cases and communications involving IoT devices in provision of emergency situations	http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=53371

Citizen: Social Community and Well-being

CEN/CLC/JTC 11 Accessibility in Buildings: EN 17210 Accessibility and usability of the built environment - Functional requirements	https://standards.cen.eu/dyn/www/f?p=204:110:0:::FSP_PROJECT:65077&cs=1A6586A527F39633C2093573B08986567
EC: Directive (EU) 2019/882 of the European Parliament and of the Council of 17 April 2019 on the accessibility requirements for products and services (PE/81/2018/REV/1)	https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2019.151.01.0070.01.ENG&toc=OJ:L:2019:151:TOC
ESPRESSO: ESPRESSO - systEmic standardisation apPRoach to Empower Smart citieS and cOMmunities	http://espresso.espresso-project.eu/
ETSI SC USER: User Group; Collection of user requirements from visually impaired people for e-accessibility to ICT products and services	https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKI_ID=41273
ETSI TC HF: ETSI TC HF EN 301 549 Accessibility Requirements	http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=50127
ETSI TC HF: Human Factors (HF); A study of user context dependent multilingual communications for interactive applications	https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKI_ID=34721
ETSI TC HF: Human Factors (HF); An annotated bibliography of documents dealing with Human Factors and disability	http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=35706
ETSI TC HF: Human Factors (HF); Guidelines for the design of mobile ICT devices and their related applications for people with cognitive disabilities	https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKI_ID=37153

Title Displayed	Webpage URL
ETSI TC HF: Human Factors (HF); Guidelines to identify Design-for-All aspects in ETSI deliverables	https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKI_ID=35796
ETSI TC HF: Human Factors (HF); Smart cities and communities standardization for citizens and consumers	http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=50103
ETSI TC HF: Human Factors (HF); User-centred terminology for existing and upcoming ICT devices, services and applications Device and service terminology	https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKI_ID=35174
ETSI TC HF: Universal Communications Identifier (UCI); Improving communications for disabled, young and elderly people	https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKI_ID=15616
ETSI TC HF: User Centric Approach: Guidance for users; Best practices to interact in the Digital Ecosystem User Centric-User	http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=52879
ETSI TC HF: User Group; User Centric Approach; Guidance for providers and standardization makers. User Centric-Providers	http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=52880
ETSI SC USER: User Group; User centric approach in Digital Ecosystem	http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=47208
ETSI SC USER: User Group; User Centric Approach; Guidance for providers and standardization makers	http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=52880
ETSI SC USER: User Group; User centric approach; Qualification of the interaction with the digital ecosystem	http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=52881
Infrastructure: Buildings	
CEN TC 442 Building BIMs: Building construction - Organization of information about construction works - Part 3: Framework for object-oriented information (ISO 12006-3:2007)	https://standards.cen.eu/dyn/www/f?p=204:110:0:::FSP_PROJECT:62046&cs=1102A598E88C2278A2FFA63784A5EE755
CEN TC 442 Building BIMs: EN ISO 29481-2:2016 Building information models - Information delivery manual - Part 2: Interaction framework (ISO 29481-2:2012)	https://standards.cen.eu/dyn/www/f?p=204:110:0:::FSP_PROJECT:62043&cs=1BB9990EC11C268B4FF15E089E24BA6E2
ETSI TC ATTM: (ATTM); Sustainable Digital Multiservice Cities; Broadband Deployment and Energy Management; Part 2: Multiservice Networking Infrastructure and Associated Street Furniture; Sub-part 1: General requirements	http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=51282
ETSI TC ATTM: (ATTM); Sustainable Digital Multiservice Cities; Broadband Deployment and Energy Management; Part 2: Multiservice Networking Infrastructure and Associated Street Furniture; Sub-part 2: The use of lamp-posts for hosting sensing devices and 5G networking	http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=54714

Title Displayed	Webpage URL
ETSI TC ATTM: (ATTM); Sustainable Digital Multiservice Communities; Broadband Deployment and Energy Management; Part 2: Multiservice Networking Infrastructure and Associated Street Furniture; Sub-part 2: The use of lamp-posts for hosting sensing devices and 5G networking	http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=59451
ETSI TC SmartM2M: SmartM2M; Extension to SAREF; Part 3: Building Domain	http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=59271
ETSI TC SmartM2M: SmartM2M; Smart Lifts IoT System	http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=63409
IEEE: 1905.1-2013 - Standard for a Convergent Digital Home Network for Heterogeneous Technologies	https://standards.ieee.org/standard/1905_1-2013.html
ISO: 16739-1:2018 Industry Foundation Classes (IFC) for data sharing in the construction and facility management industries: Part 1: Data schema	https://www.iso.org/standard/70303.html
ISO: 19650-1:2018 Organization and digitization of information about buildings and civil engineering works, including building information modelling (BIM): Information management using building information modelling: Part 1: Concepts and principles	https://www.iso.org/standard/68078.html
Infrastructure: Connectivity	
IEEE: 1900.1-2019 - Standard for Definitions and Concepts for Dynamic Spectrum Access: Terminology Relating to Emerging Wireless Networks, System Functionality, and Spectrum Management	https://standards.ieee.org/standard/1900_1-2019.html
IEEE: 1900.4.1-2013 - Standard for Interfaces and Protocols Enabling Distributed Decision Making for Optimized Radio Resource Usage in Heterogeneous Wireless Networks	https://standards.ieee.org/standard/1900_4_1-2013.html
IEEE: 1900.4a-2011 - Standard for Architectural Building Blocks Enabling Network-Device Distributed Decision Making for Optimized Radio Resource Usage in Heterogeneous Wireless Access Networks Amendment 1: Architecture and Interfaces for Dynamic Spectrum Access Networks in White Space Frequency Bands	https://standards.ieee.org/standard/1900_4a-2011.html
IEEE: 1900.5.1-2020 - Standard for Policy Language for Dynamic Spectrum Access Systems	https://standards.ieee.org/standard/1900_5_1-2020.html
IEEE: 1900.5.2-2017 - Standard for Method for Modeling Spectrum Consumption	https://standards.ieee.org/standard/1900_5_2-2017.html
IEEE: 1900.5-2011 - Standard for Policy Language Requirements and System Architectures for Dynamic Spectrum Access Systems	https://standards.ieee.org/standard/1900_5-2011.html
IEEE: 1900.6-2011 - Standard for Spectrum Sensing Interfaces and Data Structures for Dynamic Spectrum Access and other Advanced Radio Communication Systems	https://standards.ieee.org/standard/1900_6-2011.html

Title Displayed	Webpage URL
IEEE: 1900.6a-2014 - Standard for Spectrum Sensing Interfaces and Data Structures for Dynamic Spectrum Access and Other Advanced Radio Communication Systems - Amendment 1: Procedures, Protocols, and Data Archive Enhanced Interfaces	https://standards.ieee.org/standard/1900_6a-2014.html
IEEE: 1900.7-2015 - Standard for Radio Interface for White Space Dynamic Spectrum Access Radio Systems Supporting Fixed and Mobile Operation	https://standards.ieee.org/standard/1900_7-2015.html
IEEE: 1901.1.1-2020 - Standard Test Procedures for 1901.1(TM) for Medium Frequency (less than 15 MHz) Power Line Communications for Smart Grid Applications	https://standards.ieee.org/standard/1901_1_1-2020.html
IEEE: 1901.1-2018 - Standard for Medium Frequency (less than 12 MHz) Power Line Communications for Smart Grid Applications	https://standards.ieee.org/standard/1901_1-2018.html
IEEE: 1901.2-2013 - Standard for Low-Frequency (less than 500 kHz) Narrowband Power Line Communications for Smart Grid Applications	https://standards.ieee.org/standard/1901_2-2013.html
IEEE: 1901-2020 - Standard for Broadband over Power Line Networks: Medium Access Control and Physical Layer Specifications	https://standards.ieee.org/standard/1901-2020.html
IEEE: 1903.1-2017 - Standard for Content Delivery Protocols of Next Generation Service Overlay Network	https://standards.ieee.org/standard/1903_1-2017.html
IEEE: 2700-2017 - Standard for Sensor Performance Parameter Definitions	https://standards.ieee.org/standard/2700-2017.html
IEEE: 802.15.4-2020 - Standard for Low-Rate Wireless Networks	https://standards.ieee.org/standard/802_15_4-2020.html
IEEE: 802.16-2017 - Standard for Air Interface for Broadband Wireless Access Systems	https://standards.ieee.org/standard/802_16-2017.html
IEEE: 802.21-2017 - Standard for Local and metropolitan area networks - Part 21: Media Independent Services Framework	https://standards.ieee.org/standard/802_21-2017.html
IEEE: 802.22-2019 - Standard - Information Technology - Telecommunications and information exchange between systems - Wireless Regional Area Networks-Specific requirements - Part 22: Cognitive Wireless RAN MAC and PHY specifications: Policies and Procedures for Operation in the Bands that Allow Spectrum Sharing where the Communications Devices May Opportunistically Operate in the Spectrum of Primary Service	https://standards.ieee.org/standard/802_22-2019.html
IEEE: 802.3-2018 - Standard for Ethernet	https://standards.ieee.org/standard/802_3-2018.html
IEEE: P1801 - Draft Standard for Design and Verification of Low Power, Energy Aware Electronic Systems	https://standards.ieee.org/project/1801.html

Title Displayed	Webpage URL
IEEE: P2302 - Standard for Intercloud Interoperability and Federation (SIIF)	https://standards.ieee.org/project/2302.html
IEEE: P802.11 - Standard for Information Technology - Telecommunications and Information Exchange Between Systems Local and Metropolitan Area Networks -- Specific Requirements - Part 11: Wireless Local Area Network (LAN) Medium Access Control (MAC) and Physical Layer (PHY) Specifications	https://standards.ieee.org/project/802_11.html
ISO: IEC 30145-2 - Smart City ICT Reference Framework -Knowledge Management Framework	https://www.iso.org/standard/76372.html
ISO: IEC 30145-3:2020 - Information technology - Smart City ICT reference framework - Part 3: Smart city engineering framework	https://www.iso.org/standard/76373.html
ISO: IEC 30146:2019 - Information technology - Smart city ICT indicators	https://www.iso.org/standard/70302.html
ETSI TC ATTM: (ATTM); Broadband Deployment and Energy Management; Part 7: Digital multiservice cities; Sub-part 1: Multiservice Street Furnitures	http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=46659
ETSI TC ATTM: (ATTM); Ethernet and power over cables; Part 2: Ethernet and power over coaxial cables for IP video surveillance	http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=56880
Infrastructure: Energy	
EC: Ecodesign requirements for energy related products Directive (ErP - 2009/125/EC)	https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:285:0010:0035:en:PDF
ETSI TC ATTM: ATTM; Broadband Deployment and Energy Management; Part 7: Digital multiservice cities; Sub-part 1: Multiservice Street Furnitures	http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=46659
ETSI TC ATTM: Open Smart Grid Protocol (OSGP); Smart Metering/Smart Grid Communication Protocol	http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=50572
ETSI TC ATTM: Open Smart Grid Protocol (OSGP); Smart Metering/Smart Grid Communication Protocol	http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=56288
ETSI TC ERM TG28: Electromagnetic compatibility and Radio spectrum Matters (ERM); System Reference document (SRdoc): Spectrum Requirements for Short Range Device, Metropolitan Mesh Machine Networks (M3N) and Smart Metering (SM) applications	http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=34078
ETSI TC SmartM2M: Machine-to-Machine communications (M2M); Smart Metering Use Cases	http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=30460
IEC TC 57 Power Systems: IEC 62325-451-10:2020 ED1 Framework for energy market communications - Part 451-10: Profiles for Energy Consumption Data (My Energy Data)	https://www.iec.ch/dyn/www/?p=103:38:0:::FSP_ORG_ID,FSP_APEX_PAGE,FSP_PROJECT_ID:1273,109,101123#
IEEE: 1402-2000 - Guide for Electric Power Substation Physical and Electronic Security	https://standards.ieee.org/standard/1402-2000.html

Title Displayed	Webpage URL
IEEE: 1547.1-2020 - Standard Conformance Test Procedures for Equipment Interconnecting Distributed Energy Resources with Electric Power Systems and Associated Interfaces	https://standards.ieee.org/standard/1547_1-2020.html
IEEE: 1547.4-2011 - Guide for Design, Operation, and Integration of Distributed Resource Island Systems with Electric Power Systems	https://standards.ieee.org/standard/1547_4-2011.html
IEEE: 1547.6-2011 - Recommended Practice for Interconnecting Distributed Resources with Electric Power Systems Distribution Secondary Networks	https://standards.ieee.org/standard/1547_6-2011.html
IEEE: 1547.7-2013 - Guide for Conducting Distribution Impact Studies for Distributed Resource Interconnection	https://standards.ieee.org/standard/1547_7-2013.html
IEEE: 1547-2018 - Standard for Interconnection and Interoperability of Distributed Energy Resources with Associated Electric Power Systems Interfaces	https://standards.ieee.org/standard/1547-2018.html
IEEE: 1547a-2020 - Standard for Interconnection and Interoperability of Distributed Energy Resources with Associated Electric Power Systems Interfaces- - Amendment 1: To Provide More Flexibility for Adoption of Abnormal Operating Performance Category III	https://standards.ieee.org/standard/1547a-2020.html
IEEE: 1815-2012 - Standard for Electric Power Systems Communications - Distributed Network Protocol (DNP3)	https://standards.ieee.org/standard/1815-2012.html
IEEE: 2030-2011 - Guide for Smart Grid Interoperability of Energy Technology and Information Technology Operation with the Electric Power System (EPS), End-Use Applications, and Loads	https://standards.ieee.org/standard/2030-2011.html
IEEE: C37.240-2014 - Standard Cybersecurity Requirements for Substation Automation, Protection, and Control Systems	https://standards.ieee.org/standard/C37_240-2014.html
IEEE: P1547.2 - Application Guide for 1547(TM), Standard for Interconnecting Distributed Resources with Electric Power Systems	https://standards.ieee.org/project/1547_2.html
IEEE: Standards Activities for Smart Cities	https://standards.ieee.org/content/dam/ieee-standards/standards/web/documents/other/smartcities.pdf
ISO: 35106:2017, 3.9.Petroleum and natural gas industries: Arctic operations - Metocean, ice, and seabed data	https://www.iso.org/standard/64254.html
ETSI TC SmartM2M: SmartM2M; Extension to SAREF; Part 1: Energy Domain	http://webapp.etsi.org/workprogram/Report_Workitem.asp?WKI_ID=59273

Title Displayed	Webpage URL
Infrastructure: Mobility	
DATEX2: DATEX Traffic Information Exchange	http://www.datex2.eu
ETSI ISG MEC: Multi-access Edge Computing (MEC); Study on MEC Support for V2X Use Cases	http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=52949
ETSI TC ITS WG1: Intelligent Transport System (ITS); Vulnerable Road Users (VRU) awareness; Part 2: Functional Architecture and Requirements definition; Release 2: VRU Architecture	http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=53493
ETSI TC ITS WG1: Intelligent Transport Systems (ITS); Infrastructure to Vehicle Communication; Electric Vehicle Charging Spot Notification Specification	s://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKI_ID=35131
ETSI TC ITS WG2: Intelligent Transport Systems (ITS); Framework for Public Mobile Networks in Cooperative ITS (C-ITS)	https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKI_ID=37107
IEEE: 1609.0-2019 - Guide for Wireless Access in Vehicular Environments (WAVE) Architecture	https://standards.ieee.org/standard/1609_0-2019.html
IEEE: 1609.12-2019 - Standard for Wireless Access in Vehicular Environments (WAVE) - Identifiers	https://standards.ieee.org/standard/1609_12-2019.html
IEEE: 1609.2-2016 - Standard for Wireless Access in Vehicular Environments - Security Services for Applications and Management Messages	https://standards.ieee.org/standard/1609_2-2016.html
IEEE: 2030.1.1-2015, Standard Technical Specifications of a DC Quick Charger for Use with Electric Vehicles	https://standards.ieee.org/standard/2030_1_1-2015.html
IEEE: P2040 - Standard for General Requirements for Fully Automated Vehicles Driving on Public Roads	https://standards.ieee.org/project/2040.html
ISO: 11519-1:1994, 3.9.Road vehicles - Low-speed serial data communication: Part 1: General and definitions	https://www.iso.org/standard/19469.html
ISO: 24100:2010, 3.3. Intelligent transport systems - Basic principles for personal data protection in probe vehicle information services	https://www.iso.org/standard/42017.html
ISO: TR 17427-9:2015, 2.5. Intelligent transport systems: Cooperative ITS - Part 9: Compliance and enforcement aspects	https://www.iso.org/standard/66961.html
ITU-T: Y.4119 - Requirements and capability framework for IoT-based automotive emergency response system	https://www.itu.int/rec/dologin_pub.asp?lang=e&id=T-REC-Y.4119-201803-!!!PDF-E&type=items
ITU-T: Y.4211 - Accessibility requirements for smart public transport services	https://www.itu.int/ITU-T/recommendations/rec.aspx?rec=14577&lang=en
ITU-T: Y.4456 - Requirements and functional architecture for smart parking lots in smart cities	https://www.itu.int/rec/dologin_pub.asp?lang=e&id=T-REC-Y.4456-201803-!!!PDF-E&type=items

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ITU-T: Y.4457 - Architectural framework for transportation safety services	https://www.itu.int/rec/dologin_pub.asp?lang=e&id=T-REC-Y.4457-201806-!!!PDF-E&type=items
MobileData: GTFS: Making Public Transit Data Universally Accessible	https://gtfs.org
OECD: Leveraging digital technology and data for human-centric smart cities: The case of smart mobility	https://www.itf-oecd.org/sites/default/files/docs/data-human-centric-cities-mobility-g20.pdf
ETSI TC SmartM2M: SmartM2M; Extension to SAREF; Part 7: Automotive Domain	http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=51402

Infrastructure: Water

IEEE: P2886 - Standard for General Requirements for Smart Residential Water Systems	https://standards.ieee.org/project/2886.html
ISO: 24511:2007, 2.24. Activities relating to drinking water and wastewater services - Guidelines for the management of wastewater utilities and for the assessment of wastewater services	https://www.iso.org/standard/37247.html
ISO: 24512:2007 - Activities relating to drinking water and wastewater services — Guidelines for the management of drinking water utilities and for the assessment of drinking water services	https://www.iso.org/obp/ui#iso:std:iso:24512:en
ISO: 6107:2021 Water quality - Vocabulary	https://www.iso.org/standard/67643.html
ETSI TC SmartM2M: SmartM2M; Extension to SAREF; Part 10: Water Domain	http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=53015

Policy: Case Studies and Rankings

CITYkeys: CITYkeys D3.3 - Recommendations for the Smart City Index	http://www.citykeys-project.eu/citykeys/resources/general/download/CITYkeys-D3-3-Recommendations-for-the-Smart-City-Index-WSWE-AJENM8
EasyPark: The Cities of the Future Index	https://easyparkgroup.com/studies/cities-of-the-future/en/
Eden Strategy Institute: Top 50 Smart City Governments	https://static1.squarespace.com/static/5b3c517fec4eb767a04e73ff/t/5b513c57aa4a99f62d168e60/1532050650562/Eden-OXD_Top+50+Smart+City+Governments.pdf
IESE: IESE Cities in Motion Index	https://media.iese.edu/research/pdfs/ST-0542-E.pdf
IMD: Smart City Index	https://www.imd.org/smart-city-observatory/smart-city-index/

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UNESDOC: A journey through Smart Cities: Between Datapolis and Participolis	https://unesdoc.unesco.org/ark:/48223/pf0000234422
WEF: Smart at Scale: Cities to Watch. 25 Case Studies	http://www3.weforum.org/docs/WEF_Smart_at_Scale_Cities_to_Watch_25_Case_Studies_2020.pdf

Policy: Ethics

ETSI SAI ISG: ETSI GR SAI 004 - Securing Artificial Intelligence (SAI); Problem Statement	https://www.etsi.org/deliver/etsi_gr/SAI/001_099/004/01.01.01_60/gr_SAI004v010101p.pdf
HLEG-AI: EC HLEG - Ethics Guidelines for Trustworthy AI	https://ec.europa.eu/digital-single-market/en/news/ethics-guidelines-trustworthy-ai
IEEE: 7000-2021 - Standard Model Process for Addressing Ethical Concerns during System Design	https://standards.ieee.org/standard/7000-2021.html

Policy: Strategies, Policies and Planning

BSI: BSI PAS 181 Smart city framework	https://www.bsigroup.com/en-GB/smart-cities/Smart-Cities-Standards-and-Publication/PAS-181-smart-cities-framework/
BSI: BSI PD 8100 Smart cities overview	https://www.bsigroup.com/en-GB/smart-cities/Smart-Cities-Standards-and-Publication/PD-8100-smart-cities-overview/
BSI: BSI PD 8101 Smart city planning guidelines	https://www.bsigroup.com/en-GB/smart-cities/Smart-Cities-Standards-and-Publication/PD-8101-smart-cities-planning-guidelines/
CityProtocol: CPA-I_001-v2 City Anatomy: A Framework to support City Governance, Evaluation and Transformation	https://cityprotocol.cat/wp-content/uploads/2019/07/CPA-I_001-v2_City_Anatomy.pdf
DG GROW: EC Directorate-General for Internal Market, Industry, Entrepreneurship and SMES, GROW/F3 - Rolling Plan for ICT Standardisation	https://joinup.ec.europa.eu/collection/rolling-plan-ict-standardisation/rolling-plan-2021
EC: Annual activity report; department achievements, resources used during previous year	https://ec.europa.eu/info/publications/annual-activity-report-2016-communications-networks-content-and-technology_en
EC: Commission work programme: overview of institution-wide deliverables for current year	https://ec.europa.eu/info/publications/2018-commission-work-programme-key-documents_en
EC: Smart City Guidance Package (SCGP)	https://eu-smartcities.eu/sites/default/files/2019-06/Smart%20City%20Guidance%20Package%20LowRes%201v21.pdf

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EIP-SCC: Trends for smart city strategies in Emerging Asia	https://www.oecd-ilibrary.org/docserver/4fcef080-enpdf?expires=1621414411&id=id&accname=guest&checksum=772B9E5DF8C0EE2D4B346220F2ADC54D
ISO: 37101 Management system for sustainable development.	https://www.iso.org/standard/61885.html
ISO: 37152 Smart community infrastructures - Common framework for development and operation	https://www.iso.org/standard/66898.html
ISO: 37153:2017, 3.9. Smart community infrastructures: Maturity model for assessment and improvement	https://www.iso.org/standard/69225.html
ITU-T: Y.4905 - Smart sustainable city impact assessment	https://www.itu.int/rec/dologin_pub.asp?lang=e&id=T-REC-Y.4905-201902-!!!PDF-E&type=items
ITU-T: Y.4906 - Assessment framework for digital transformation of sectors in smart cities	http://handle.itu.int/11.1002/1000/13922-en?locatt=format:pdf&auth
OECD: Enhancing the contribution of Digitalisation to the smart cities of the future	https://www.oecd.org/cfe/regionaldevelopment/Smart-Cities-FINAL.pdf
WTO: Decisions and Recommendations Adopted by the WTO Committee on Technical Barriers to Trade since 1 January 1995	https://docs.wto.org/dol2fe/Pages/SS/directdoc.aspx?filename=q:/G/TBT/1R12.pdf
WTO: World Trade Statistical Review 2017	https://www.wto.org/english/res_e/statis_e/wts2017_e/wts2017_e.pdf
Sustainability: Sustainability and Resilience	
BSI: BSI 8001 Framework for implementing the principles of the circular economy in organizations	https://www.bsigroup.com/en-GB/standards/benefits-of-using-standards/becoming-more-sustainable-with-standards/BS8001-Circular-Economy/
ETSI ISG OEU: Energy Efficient IP Video Surveillance Systems over Coaxial Cables; Energy Efficient IP Video Surveillance Systems over Coaxial Cables	https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKI_ID=56848
ETSI ISG OEU: Operational energy Efficiency for Users (OEU); Energy Consumption Measurement of Operational Information Technology Servers	http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=41200
ETSI ISG OEU: Operational energy Efficiency for Users (OEU); Energy Consumption Measurement of Operational Technical Equipment of Copper and Optical Fixed Access	http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=43806
ETSI ISG OEU: Operational energy Efficiency for Users (OEU); Global KPIs for ICT Sites	http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=45996

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ETSI ISG OEU: Operational energy Efficiency for Users (OEU); Referential specification to define sustainable levels of Fixed Broadband access networks	http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=46572
ETSI ISG OEU: Operational energy Efficiency for Users (OEU); Referential specification to define sustainable levels of ICT Sites	http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=41205
ETSI ISG OEU: Operational energy Efficiency for Users (OEU); Technical Global KPIs for Fixed Access Networks	http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=43807
ETSI ISG OEU: Operational energy Efficiency for Users (OEU); Waste management of ICT equipment	http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=46573
ETSI SC USER: User Group; User centric approach in Digital Ecosystem	https://portal.etsi.org/webapp/WorkProgram/Report_WorkItem.asp?WKI_ID=47208
ETSI TC ATTM: ATTM; Broadband Deployment and Lifecycle Resource Management; Part 5: Customer network infrastructures; Sub-part 1: Homes (single-tenant)	http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=49991
ETSI TC CABLE: Integrated broadband cable telecommunication networks (CABLE); Energy management; Operational infrastructures; Global KPIs; Part 4: Design assessments; Sub-part 4: Cable Access Networks	http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=47544
ETSI TC EE EEPS: Environmental Engineering (EE); Assessment of mobile network energy efficiency	http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=41179
ETSI TC EE EEPS: Environmental Engineering (EE); Best practice to assess energy performance of future Radio Access Network (RAN) deployment	http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=47216
ETSI TC EE EEPS: Environmental Engineering (EE); Measurement method for energy efficiency of Network Functions Virtualisation (NFV) in laboratory environment	http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=47210
ETSI TC EE EEPS: Environmental Engineering (EE); Measurement method for power consumption and energy efficiency of wireless access network equipment	http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=41181
ETSI TC EE EEPS: Environmental Engineering (EE); Mobile Network (MN) Energy Consumption (EC) estimation method; Energy estimation method based on statistical approach	http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=50597
ETSI TC EE EEPS: Environmental Engineering (EE); Standardization terms and trends in energy efficiency	http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=44554
ETSI TC EE EEPS: Environmental Engineering (EE); Study on methods and metrics to evaluate energy efficiency for future 5G systems	http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=50092
ETSI TC EE EEPS: Environmental Engineering (EE); Testing methodology for equipment able of dynamic performances adaptation	http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=43756

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ICLEI: ICLEI Resilient Cities Report 2018	https://resilientcities2018.iclei.org/wp-content/uploads/RC2018_Report.pdf
IEEE: 1888-2014 - Standard for Ubiquitous Green Community Control Network Protocol	https://standards.ieee.org/standard/1888-2014.html
ISO: 28902-2:2017, 3.1. Air quality: Environmental meteorology - Part 2: Ground-based remote sensing of wind by heterodyne pulsed Doppler lidar	https://www.iso.org/standard/59210.html
ISO: IEC 30145-1 Smart City ICT Reference Framework - Business Process Framework	https://www.iso.org/standard/76371.html
ISO: Smart Cities	https://www.iso.org/files/live/sites/isoorg/files/store/en/PUB100423.pdf
ITU-T: Y.4904 - Smart sustainable cities maturity model	http://handle.itu.int/11.1002/1000/13864-en?locatt=format:pdf&auth
UN: Smart Sustainable Cities: Reconnaissance Study	https://joinup.ec.europa.eu/sites/default/files/document/2016-04/smart_cities_report.pdf
UN: TMB TF 16: Task Force on UN SDGs: Final report and recommendations to the TMB	https://isotc.iso.org/livelink/livelink/fetch/-15620806/15620808/15623592/17584461/TMB_Task_Force_16_on_UN_SDGs_-_Final_report_and_recommendations.pdf?nodeid=19802760&vernum=-2
UNECE: People-Smart Sustainable Cities	https://unece.org/sites/default/files/2021-01/SSC%20nexus_web_opt_ENG.pdf
WEF: Agile Cities Preparing for the Fourth Industrial Revolution	http://www3.weforum.org/docs/WP_Global_Future_Council_Cities_Urbanization_report_2018.pdf
ETSI TC SmartM2M: SmartM2M; Extension to SAREF; Part 2: Environment Domain	http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=59272
Technology Platforms: Data and Architecture	
ETSI ISG CIM: Context Information Management (CIM); Information Model (MOD0)	http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=51351
ETSI ISG CIM: Context Information Management (CIM); NGSI-LD API	http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=62573
ETSI ISG CIM: Context Information Management (CIM); Use Cases (UC)	http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=51347
ETSI ISG OEU: Operational energy Efficiency for Users (OEU); KPIs for Smart Cities	http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=49519
ETSI TC ATTM SDMC: Key Performance Indicators for Sustainable Digital Multiservice Cities	http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=50113

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IEEE: 1278.1-2012 - Standard for Distributed Interactive Simulation - Application Protocols	https://standards.ieee.org/standard/1278_1-2012.html
IEEE: 2200-2012 - Standard Protocol for Stream Management in Media Client Devices	https://standards.ieee.org/standard/2200-2012.html
IEEE: 2413-2019 - Standard for an Architectural Framework for the Internet of Things (IoT)	https://standards.ieee.org/standard/2413-2019.html
IEEE: P1516 - Standard for Modeling and Simulation (M and S) High Level Architecture (HLA), Framework and Rules	https://standards.ieee.org/project/1516.html
IEEE: P1931.1 - Standard for an Architectural Framework for Real-time Onsite Operations Facilitation (ROOF) for the Internet of Things	https://standards.ieee.org/project/1931_1.html
ISO TC 268: (2014) 37120: Sustainable development of communities - indicators for city services and quality of life	https://www.iso.org/standard/68498.html
ISO/IEC JTC 1: 21972:2020 Information technology: Upper level ontology for smart city indicators	https://www.iso.org/standard/72325.html
ISO/IEC JTC 1: 30182:2017, 2.10. Smart city concept model: Guidance for establishing a model for data interoperability	https://www.iso.org/standard/53302.html
ISO: 37120 Sustainable development of communities - Indicators for city development and operation	https://www.iso.org/standard/68498.html
ITU-T SG20: Framework of open data in smart cities	https://www.itu.int/ITU-T/workprog/wp_item.aspx?isn=13670
ITU-T SG20: Open data application programming interfaces (APIs) for IoT data in smart cities and communities	https://www.itu.int/ITU-T/recommendations/rec.aspx?rec=14374&lang=en
ITU-T SG20: Y.4900/L.1600 (06/2016) - Overview of key performance indicators in smart sustainable cities	https://www.itu.int/rec/dologin_pub.asp?lang=e&id=T-REC-L.1600-201606-!!!PDF-E&type=items
ITU-T SG20: Y.4901/L.1601. Key performance indicators related to the use of information and communication technology iin smart sustainable cities	https://www.itu.int/rec/dologin_pub.asp?lang=E&id=T-REC-L.1601-201606-!!!PDF-E&type=items
ITU-T SG20: Y.4902/L.1602. Key performance indicators related to the sustainability impacts of information and communication technology in smart sustainable cities	https://www.itu.int/rec/dologin_pub.asp?lang=e&id=T-REC-L.1602-201606-!!!PDF-E&type=items
ITU-T SG20: Y.4903/L.1603. Key performance indicators for smart sustainable cities to assess the achievement of sustainable goals	https://www.itu.int/rec/dologin_pub.asp?lang=e&id=T-REC-Y.4903-201610-!!!PDF-E&type=items
ITU-T: Y.4200 - Requirements for the interoperability of smart city platforms	https://www.itu.int/rec/T-REC-Y.4200/en
ITU-T: Y.4209 - Requirements for interoperation of the smart port with the smart city	https://www.itu.int/ITU-T/recommendations/rec.aspx?rec=14163&lang=en

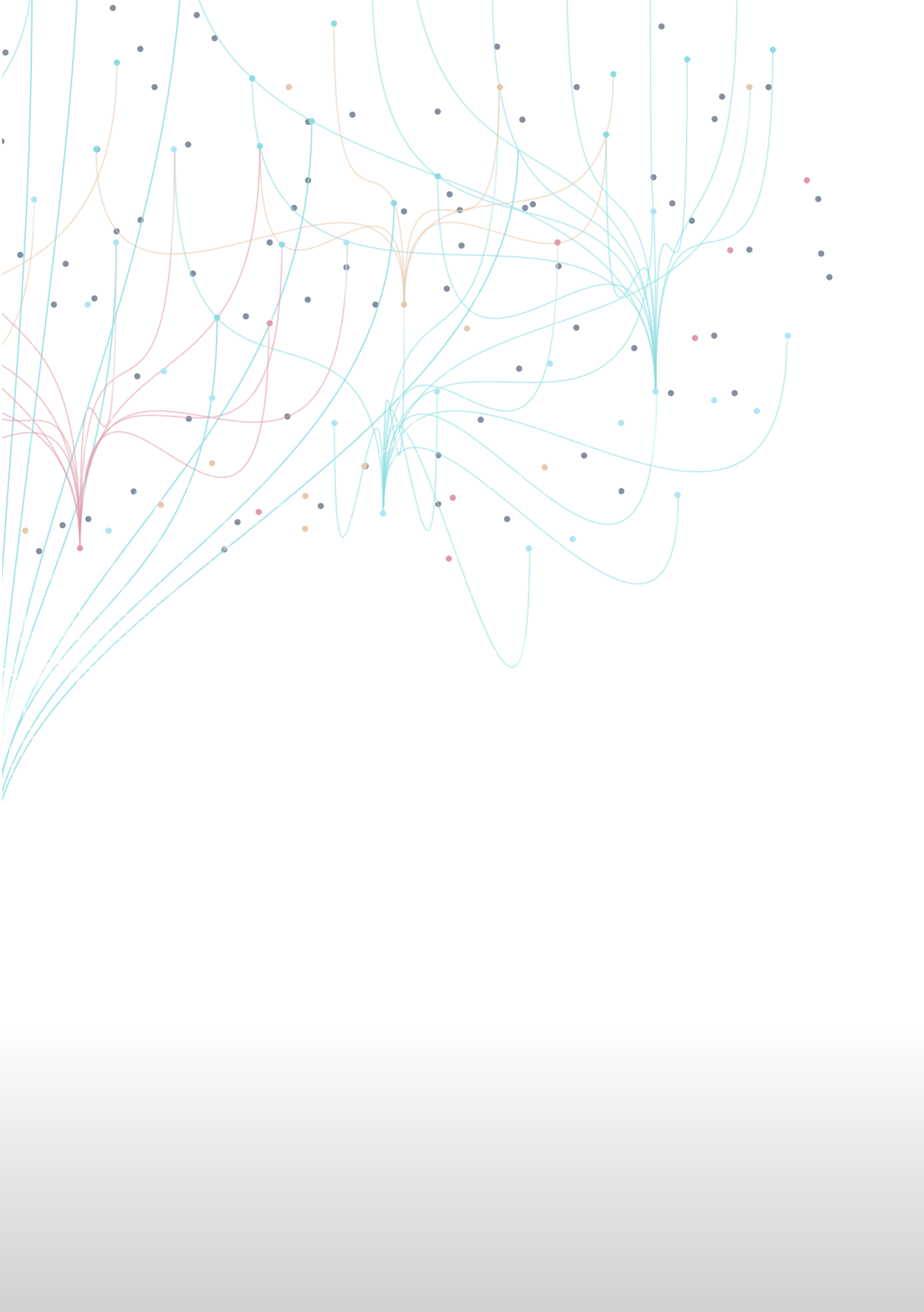
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ITU-T: Y.4470 - Reference architecture of artificial intelligence service exposure for smart sustainable cities	https://www.itu.int/ITU-T/recommendations/rec.aspx?rec=14373&lang=en
ITU-T: Y.4805 - Identifier service requirements for the interoperability of smart city applications	https://www.itu.int/rec/dologin_pub.asp?lang=e&id=T-REC-Y.4805-201708-!!!PDF-E&type=items
NIST: IES - City Framework Release v1.0	https://pages.nist.gov/smartcitiesarchitecture/
OECD: Smart Cities and Inclusive Growth	https://www.oecd.org/cfe/cities/OECD_Policy_Paper_Smart_Cities_and_Inclusive_Growth.pdf
UN: SDG Indicators. Global Database beta 0.2.43	https://unstats.un.org/sdgs/indicators/database/

Technology Platforms: Information Processing

EIP-SCC: EIP Integrated Infrastructure Urban Platform	https://docbox.etsi.org/Workshop/2016/201611_M2MIoTWS/00_WORKSHOP/S03_SMARTCITIES_INITIATIVES/EIP_DELATHOUWER.pdf
IEEE: P1451-99 - Standard for Harmonization of Internet of Things (IoT) Devices and Systems	https://standards.ieee.org/project/1451-99.html
ITU-T: Blockchain-based data exchange and sharing for supporting Internet of things and smart cities and communities	https://www.itu.int/ITU-T/recommendations/rec.aspx?rec=14379&lang=en
ITU-T: Blockchain-based data management for supporting Internet of things and smart cities and communities	https://www.itu.int/ITU-T/recommendations/rec.aspx?rec=14380&lang=en
ITU-T: OID-based resolution framework for transactions of a distributed ledger assigned to IoT resources	https://www.itu.int/ITU-T/recommendations/rec.aspx?rec=14578&lang=en
ITU-T: Y.4201 - High-level requirements and reference framework of smart city platforms	https://www.itu.int/rec/dologin_pub.asp?lang=e&id=T-REC-Y.4201-201802-!!!PDF-E&type=items
oneM2M: Smart Cities Done Smarter	https://www.onem2m.org/images/files/oneM2M_WhitePaper_SmartCitiesDoneSmarter.pdf
oneM2M: TR-0036 Adaptation of oneM2M for Smart City	http://member.onem2m.org/APPLICATION/DOCUMENTAPP/DOWNLOADLATESTREVISION/?DOCID=20071

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Technology Platforms: Manufacturing	
ETSI TC SmartM2M: SmartM2M; Extension to SAREF; Part 5: Industry and Manufacturing Domains	http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=59269
Technology_Platforms: Privacy and Security	
IEEE: 1619.1-2018 - Standard for Authenticated Encryption with Length Expansion for Storage Devices	https://standards.ieee.org/standard/1619_1-2018.html
IEEE: 1619.2-2021 - Approved Draft Standard for Wide-Block Encryption for Shared Storage Media	https://standards.ieee.org/standard/1619_2-2021.html
IEEE: 1619-2018 - Standard for Cryptographic Protection of Data on Block-Oriented Storage Devices	https://standards.ieee.org/standard/1619-2018.html
IEEE: 1667-2018 - Standard for Discovery, Authentication, and Authorization in Host Attachments of Storage Devices	https://standards.ieee.org/standard/1667-2018.html
IEEE: 1686-2013 - Standard for Intelligent Electronic Devices Cyber Security Capabilities	https://standards.ieee.org/standard/1686-2013.html
IEEE: 1888.3-2013 - Standard for Ubiquitous Green Community Control Network: Security	https://standards.ieee.org/standard/1888_3-2013.html
IEEE: 2030.102.1-2020 - Standard for Interoperability of Internet Protocol Security (IPsec) Utilized within Utility Control Systems	https://standards.ieee.org/standard/2030_102_1-2020.html
IEEE: P1402 - Draft Guide for Physical Security of Electric Power Substations	https://standards.ieee.org/project/1402.html
IEEE: P1711 - Standard for a Cryptographic Protocol for Electric Power System (EPS) Communications Links	https://standards.ieee.org/project/1711.html
IEEE: P1711.1 - Standard for a Cryptographic Protocol for Cyber Security of Substation Serial Links: Substation Serial Protection Protocol	https://standards.ieee.org/project/1711_1.html
IEEE: P1912 - Standard for Privacy and Security Framework for Consumer Wireless Devices	https://standards.ieee.org/project/1912.html
ITU-T: Framework for bootstrapping of devices and applications for open access to trusted services in distributed ecosystems	https://www.itu.int/ITU-T/recommendations/rec.aspx?rec=14594&lang=en
ITU-T: Y.4907 - Reference architecture of blockchain-based unified KPI data management for smart sustainable cities	http://handle.itu.int/11.1002/1000/14382-en?locatt=format:pdf&auth
ETSI SC USER: User Group; User Centric Approach: Guidance for users; Best practices to interact in the Digital Ecosystem	http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=52879
ETSI TC SmartM2M: SmartM2M; Guidelines for Security, Privacy and Interoperability in IoT System Definition; A Concrete Approach	http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=57974

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Technology Platforms: SmartCity	
ETSI TC ATTM: (ATTM); Sustainable Digital Multiservice Cities (SDMC); Broadband Deployment and Energy Management; Part 1: Overview, common and generic aspects of societal and technical pillars for sustainability	http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=51275
ETSI TC SmartM2M: SmartM2M; Extension to SAREF; Part 4: Smart Cities Domain	http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=59270
ETSI TC SmartM2M: SmartM2M; SAREF extension investigation; Requirements for Smart Cities	http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=51396
Technology Platforms: Terms and Definitions	
BSI: BIS PAS 180 Smart cities. Vocabulary	https://www.bsigroup.com/en-GB/smart-cities/Smart-Cities-Standards-and-Publication/PAS-180-smart-cities-terminology/
DG TRADE: Smart City Terminology	https://termcoord.eu/2019/08/smart-city-terminology/
ITU-T SG20: Y.4051 - Vocabulary for smart cities and communities	https://www.itu.int/ITU-T/recommendations/rec.aspx?rec=13855&lang=en
Technology Platforms: Food and Agriculture	
ETSI TC SmartM2M: SmartM2M; Extension to SAREF; Part 6: Smart Agriculture and Food Chain Domain	http://webapp.etsi.org/workprogram/Report_WorkItem.asp?WKI_ID=59268





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