This document contains supplemental information referenced by the European Rolling Plan for ICT Standardisation.

IEEE Standards Activities for Smart Cities

Overview

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.

In addition, IEEE is working on standards projects and activities related to:
- IoT
- Smart Energy: Connecting to Smart Grids
- Smart Networking and Connectivity
- Smart Transportation
- Smart Homes and Buildings
- Smart Technologies

Relevant Standards Activities

IoT

Projects under Development*
- IEEE 2413-2019, IEEE Standard for an Architectural Framework for the Internet of Things (IoT)

Smart Energy: Connecting to Smart Grids

IEEE Standards Series*
- IEEE 1547 series on handling distributed resources in electric power systems
- IEEE 1815 series on electric power systems communications
- IEEE 2030 series on the Smart Grid, including electric vehicle infrastructure, microgrid, energy storage

Smart Networking and Connectivity

IEEE Standards Series*
- IEEE 802 series on wired and wireless networking
- IEEE 802.22 series on wireless regional area networks (WRAN)

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- IEEE 1451 series, addressing sensors (adopted by ISO/IEC)
- IEEE 1775 series on powerline communication equipment
- IEEE 1801 series on low-power chip design
- IEEE 1900 series on dynamic spectrum access
- IEEE 1901 series on broadband over powerline networks
- IEEE 1903 series on next generation system overlay networks
- IEEE 2302 series on the Intercloud and its related testbed
- IEEE 2700 series on sensors
- IEEE standard series on software define networks

Smart Transportation

Approved Standards*
- IEEE standard series of rail transit standards
- IEEE 1609 series on intelligent transportation
- IEEE 2030.1.1-2015, IEEE Standard Technical Specifications of a DC Quick Charger for Use with Electric Vehicles

Projects under Development*
- IEEE P2040 series on connected, automated, and intelligent vehicles
- IEEE P2690, IEEE Draft Standard for Charging Network Management Protocol for Electric Vehicle Charging Systems

Pre-standardization Industry Connections Activities
- IC13-002 Electric Vehicle Wireless Power Transfer

Smart Homes and Buildings

Approved standards*
- IEEE 1888 series, addressing ubiquitous green community control networks
- IEEE 1905.1-2013, addressing convergent digital home network for heterogeneous technologies

Smart Technologies

IEEE Standards Series*
- IEEE 1278 series on distributed interactive simulation
- IEEE 1451 series on smart sensors
- IEEE 1484 series on learning technologies
- IEEE 1516 series of modeling and simulation standards
- IEEE 1730 series, addressing a process for distributed simulation engineering and execution
- IEEE 1828 series on systems with virtual components

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- IEEE 1907.1 series on real-time mobile video communications
- IEEE 2200 series on stream management in media client devices

Pre-standardization Industry Connections Activities
- IC15-003 Smart City Compliance Indicators

Security

Approved Standards*
- IEEE 1363 series on public key cryptography
- IEEE 1619-2007, IEEE Standard for Cryptographic Protection of Data on Block-Oriented Storage Devices (adopted as ANSI/IEEE)
- IEEE 1619.1-2007, IEEE Standard for Authenticated Encryption with Length Expansion for Storage Devices
- IEEE 1619.2-2010, IEEE Standard for Wide-Block Encryption for Shared Storage Media
- IEEE 1667-2015, IEEE Standard for Discovery, Authentication, and Authorization in Host Attachments of Storage Devices
- IEEE 1686-2013, IEEE Standard for Intelligent Electronic Devices (IEDs) Cyber Security Capabilities
- IEEE 1888.3-2013, IEEE Standard for Ubiquitous Green Community Control Network: Security
- IEEE C37.240-2014, IEEE Standard for Cyber Security Requirements for Substation Automation, Protection and Control Systems

Projects under Development*
- IEEE P1402, IEEE Draft Guide for Physical Security of Electric Power Substations
- IEEE P1667, IEEE Draft Standard for Discovery, Authentication, and Authorization in Host Attachments of Storage Devices
- IEEE P1711, IEEE Draft Standard for a Cryptographic Protocol for EPS Serial Links
- IEEE P2030.102.1, IEEE Draft Standard for Interoperability of Internet Protocol Security (IPsec) Utilized within Utility Control Systems

Learning Technologies

Approved Standards*
- IEEE 1484.4-2007, IEEE Recommended Practice for Digital Rights Expression Languages (DRELs) Suitable for eLearning Technologies
- IEEE 1484.11.1-2004 (R2010), IEEE Standard for Learning Technology--Data Model for Content Object Communication
- IEEE 1484.11.2-2003 (R2009), IEEE Standard for Learning Technology--ECMAScript Application Programming Interface for Content to Runtime Services Communication
- IEEE 1484.11.3-2005, IEEE Standard for Learning Technology Extensible Markup Language (XML) Schema Binding for Data Model for Content Object Communication
- IEEE 1484.12.1-2002 (R2009), IEEE Standard for Learning Object Metadata

- IEEE 1484.12.1-2002/Cor 1 2011, IEEE Standard for Learning Object Metadata--Corrigendum 1: Corrigenda for 1484.12.1 LOM (Learning Object Metadata)
- IEEE 1484.12.3-2005, IEEE Standard for Extensible Markup Language (XML) Schema Definition Language Binding for Learning Object Metadata
- IEEE 1484.13.1-2012, IEEE Standard for Learning Technology--Conceptual Model for Resource Aggregation for Learning, Education, and Training
- IEEE 1484.13.2-2013, IEEE Recommended Practice for Learning Technology--Metadata Encoding and Transmission Standard (METS) Mapping to the Conceptual Model for Resource Aggregation
- IEEE 1484.13.3-2014, IEEE 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
- IEEE 1484.13.4-2016, IEEE Recommended Practice for Learning Technology--MS Content Packaging Information Model (CP) Version 1.2--Mapping to the Conceptual Model for Resource Aggregation
- IEEE 1484.13.5-2013, IEEE Recommended Practice for Learning Technology--IETF RFC 4287--Atom Syndication Format--Mapping to the Conceptual Model for Resource Aggregation
- IEEE 1484.13.6-2015, IEEE Recommended Practice for Learning Technology--Open Archives Initiative Object Reuse and Exchange Abstract Model (OAI-ORE)--Mapping to the Conceptual Model for Resource Aggregation
- IEEE 1484.20.1-2007, IEEE Standard for Learning Technology--Data Model for Reusable Competency Definitions

Projects under Development*
- IEEE P1589, IEEE Draft Standard for an Augmented Reality Learning Experience Model
- IEEE P2784, IEEE Draft Guide for the Technology and Process Framework for Planning a Smart City

*Draft standards projects, once approved, are often revised and/or used as the base for new projects. The status of these projects is updated periodically. For the most up-to-date status, please see the following link: <https://standards.ieee.org/project/index.html>

The following links provide additional information about the listed topics and the corresponding IEEE standards and projects:

Smart Grid: https://ieeesa.io/rp-smartgrid

Cloud Computing: https://ieeesa.io/rp-cloudcomputing

IoT (including Green Community Networks): https://ieeesa.io/rp-iot

Intelligent Transportation Systems: https://ieeesa.io/rp-its

eHealth: https://ieeesa.io/rp-ehealth