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ITU-T RFG 2017-11-19
Terms of references

Title: Internet of Things and related technologies
Scope: Standardization in the area of Internet of Things and related technologies.

1. Serve as the focus and proponent for JTC 1's standardization programme on the Internet of Things and related technologies, including Sensor Networks and Wearables technologies.

2. Provide guidance to JTC 1, IEC, ISO and other entities developing Internet of Things related applications.
ISO/IEC Definition

..an infrastructure of interconnected objects, people, systems and information resources together with intelligent services to allow them to process information of the physical and the virtual world and react.
IoT systems

- Network centric
- Distributed
- Data intensive
- ‘Smart’ things/ embedded systems (Autonomous or semi-autonomous)
- M2M (communications, transactions)
- (Heterogeneous)
- (Socio-technical)
Example: Manufacturing 4.0 from the literature

Easily in the order of 0.5 TB per day
Example: IoT distributed computing view from the literature

The Internet of Things

What you can do with IoT in Agriculture

- Smart Irrigation
- Livestock Monitoring
- Weather Monitoring and Forecasting
- Sensor-based Precision Agriculture
- Remote Crop Monitoring
- Remote Monitoring of Soil Quality
- Smart Warehousing, Logistics and Distribution
- Remote Asset Monitoring
- Wine Quality Enhancement
Example: Smart Healthcare from the literature

SNAIL Project for IoT Connectivity, Minkeun Ha, Jun 25, 2014, Auto-ID Labs, KAIST
https://www.slideshare.net/gatordkim/snail-project-for-iot-connectivity?from_action=save
Industrial Internet / Smart Buildings


ITU-T RFG 2017-11-19
Smart Cities

- Weather Sensing
  - Precipitation, air and ground temp

- Public Safety
  - Noise, motion, crowd detection

- Waste Management
  - Full compactor notification

- Electromagnetic Emissions
  - Monitoring cell towers and Wi-Fi routers

- Smart Lighting
  - Street lights with motion sensing for reduced energy consumption

- Safe & Orderly Streets
  - Sensors and enforcement tools to keep fire hydrants and no parking zones clear for emergency vehicles

- Air Quality
  - Monitoring pollution levels

- Item Location
  - Increased efficiency in warehouses and harbors

- Water Levels
  - Gauging storm drain run-off

- Public Health
  - Nuclear, chemical and biological monitoring

- Gas Leak Detection
  - Explosion prevention

- Sewer Monitoring
  - Keeping track of fluid levels

- Water Leak Detection
  - Preventing water loss

- Parking Access
  - Hang tags and special event parking

- Smart Parking
  - Wayfinding for available spots

- Water Quality
  - Monitoring pollutants

- Structural Integrity
  - Sensing vibrations

- Soil Moisture
  - For agricultural improvements
IoT systems

Large number of application domains:
-> Wide range of requirements (functional and non-functionals)
-> Many technical & applicative architecture & design patterns
Gartner Hype Cycle for the Internet of Things, 2016

http://www.slideshare.net/ghaff/devising-a-practical-approach-to-the-internet-of-things

gartner.com/SmarterWithGartner

Source: Gartner
© 2016 Gartner, Inc. and/or its affiliates. All rights reserved.
Resolution 12 – Establishment of JTC 1 Subcommittee SC 41, Internet of Things and related technologies

JTC 1 establishes a Systems Integration entity (see SD 24, Systems Integration Standardization Guidelines) in the form of a new Subcommittee 41 on Internet of Things and related technologies initially comprising the work of JTC 1/WG 7 and JTC 1/WG 10.
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A System Committee

Succinctly:

• Works in a collaborative fashion
• Maintain a holistic view of the area under its responsibility
• Communicate, socialize this view
• Seek and coordinate collaborative work (SWG, joint projects,...), with internal (ISO and IEC) and external (SDOs) entities
• May also delegate work to other internal entities
Membership 2017-11-03

21 ‘P’ Members
Austria, Belgium, Canada, China, Denmark, Finland, France, Germany, India, Israel, Italy, Japan, Korea, Luxembourg, Malaysia, Netherlands, Russia, Singapore, Sweden, UK, USA

11 ‘O’ Members
Argentina, Australia, Iceland, Iran, Ireland, Kenya, Mexico, Norway, Pakistan, Saudi Arabia, Switzerland

210 experts registered
Membership 2017-10-02

IEC Liaisons
SEG7, TC 1, TC 65, TC 91, TC100, TA 16, TC 124,

ISO Liaisons
TC 184, TC 211, TC 215, TC 269, TC 282/SC2, TC 307

JTC 1 Liaisons
SC6, 24, 25, 27, 28, 29, 31, 32, 35, 36, 37, 38, 39, 40

A Liaisons
AIM, GSI, IIC, OCF, OGC, ITU-T
IoT SDOs and Alliances Landscape
(Vertical and Horizontal Domains)

Home/Building
Manufacturing/
Industry Automation
Vehicular/
Transportation
Healthcare
Energy
Cities
Wearables
Farming/
Agrifood

Source: AIIOTI WG3 (IoT Standardisation) – Release 2.7
• 70 participants from 15 countries and 3 liaisons
• New organizational structure
• Creation of an AG
• Creation of six (6) Study Groups
• Four A liaisons recommended
• Progression of all (8) current projects
• Eight (8) NWIPs considered
• Two plenaries per year, integrated with WG and SG meetings
• Plenaries tentatively planned till mid 2020
SC41 Structure (2017-06-02)

Chair

Advisory Group

Secretariat

WG 3
IoT
Architecture

WG 4
IoT
Interoperability

WG5
IoT
Applications

SG Wearables

SG Trustworthiness

SG Industrial IoT

SG Edge Computing

SG Real-time IoT

SG IoT Use cases

ITU-T RFG 2017-11-19
### ISO/IEC TR 22417:2017, IoT use cases

#### Context
- Global
- Transport infrastructure
- Home
- Public buildings
- Offices
- Factories
- Process Plants
- Agriculture
- Forestry
- Fishing
- Body and Personal
- Healthcare
- Vehicles
- Smart Cities

#### Scenarios (1)
- IoT Network Security
- IoT Security Threat Detection and Management
- Remote Management of Large Equipment in a Plant
- Automated ICC Profile Discovery
- Tracking of Farm Products
- Warehouse Goods Monitoring
- Cooperation between Factories and Remote Applications
- Searching System for People with Cognitive Impairment
- Sleep Monitoring System
- Smart Glasses
- IoT Endpoint (Sensors and Actuators) Monitoring Systems
- Intelligent Assistive Parking in Urban Areas

#### Scenarios (2)
- Integrated Smart Pump System
- Remote Health Monitoring: Example of an AAL Use Case Relevant to IoT
- Connected Car Analytics
- Real Time Motor Monitor
- Smart Home Appliances
- Smart Home Insurance
- Machine Leasing
- IoT–based Energy Management System for Industrial Facilities
- Water Plant Management
- Smart Home Application
- Field Gateway Bridging IoT to Legacy Devices in Factories and Plants
- Production Monitoring of Textile Equipment
- Remote Management of Agricultural Greenhouses
Figure 1 – Facets of IoT interoperability
Definition of EC: Edge computing is performed on an open platform at the network edge near things or data sources, integrating network, computing, storage, and application core capabilities and providing edge intelligent services.

- **Application Domain**
  - Implement EC industry application and support EC service operation.

- **Data Domain**
  - Provide life cycle service, enable data security & privacy, support distributed computing, and scalability of ECN resource.

- **Network Domain**
  - Provide connection service for interconnected systems, data aggregation and bearing;
  - Satisfy real-time requirement of service through real-time connection and transmission.

- **Equipment Domain**
  - Support real-time intelligent interconnection and intelligent application of field equipment
  - Heterogeneous system architecture can meet the requirement of real-time service and intelligent equipment
  - Lightweight system architecture enable low power consumption
Future Plenary meetings

• 2017 : Delhi, India, November 13-17 (confirmed)
• 2018 : Berlin, Germany, May 13-18, 2018, (confirmed)
• 2018 : Japan, November 26-30 (to be confirmed)
• 2019 : China, May 26-31 (to be confirmed)
• 2019 : Sweden, November (to be confirmed)
• 2020 : Montréal, Canada, May (to be confirmed)
To conclude

• Capitalizing on the excellent work done by JTC 1/WG 7 and WG10, SC41 has already a substantial portfolio of standards and projects.
• Since ITU-T has an A liaison with JTC 1/SC41, ITU-T experts can and are invited to participate and contribute.
• Joint work with ITU-T entities is also possible.