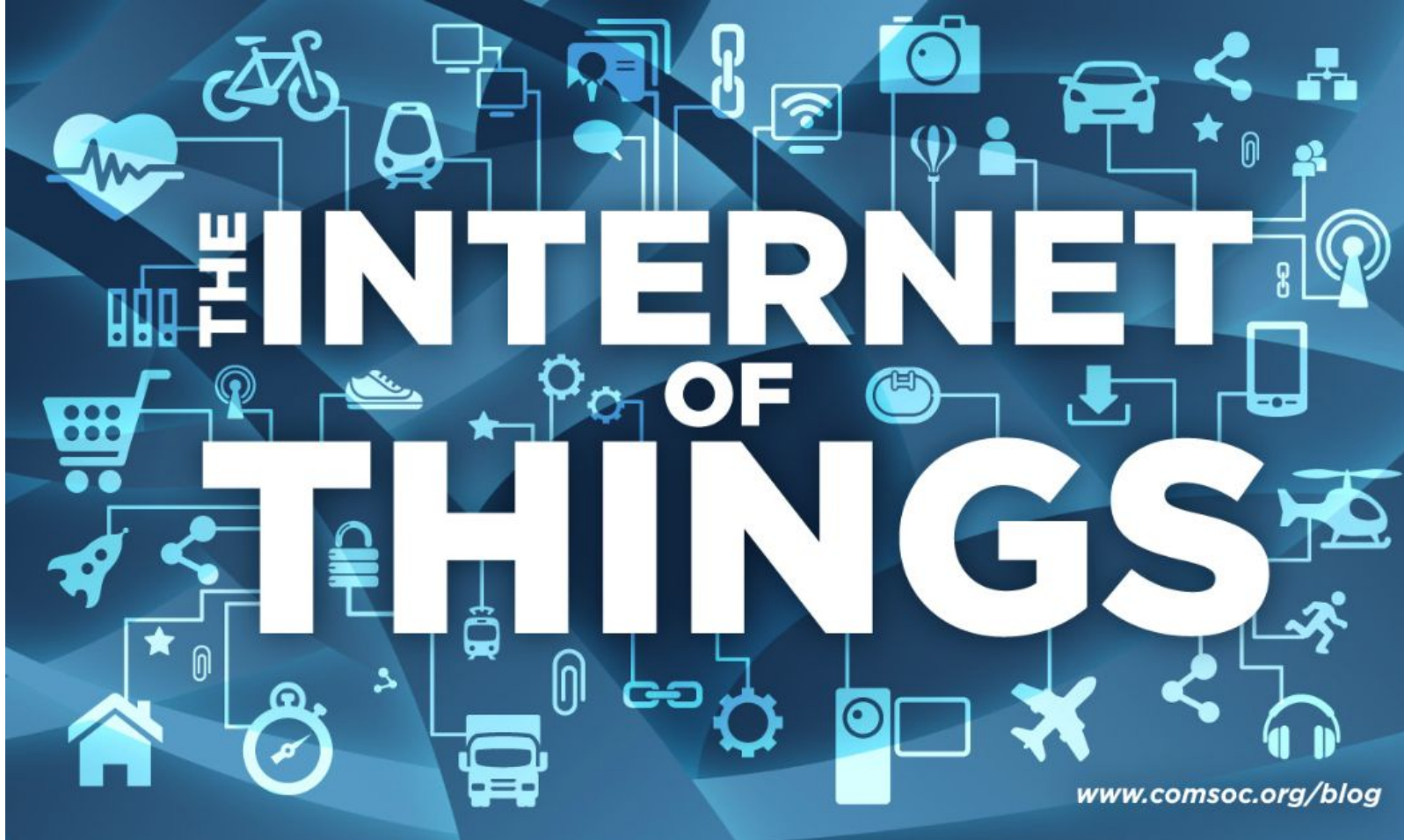


JTC 1/SC 41

ITU-T RFG,
2017-11-19

François Coallier, PhD, Eng.
Chair, ISO/IEC JTC 1/SC41
francois.coallier @etsmtl.ca

<http://www.elmofoto.com/NorthernCalifornia-3/Northern-California/i-wcm58rN/A>



Technical Areas	JTC1 Subcommittees and Working Groups
Application Technologies	SC 36 - Learning Technology
Cultural and Linguistic Adaptability and User Interfaces	SC 02 - Coded Character Sets SC 22/WG 20 – Internationalization SC 35 - User Interfaces
Data Capture and Identification Systems	SC 17 - Cards and Personal Identification SC 31 - Automatic Identification and Data Capture Techniques
Data Management Services	SC 32 - Data Management and Interchange
Document Description Languages	SC 34 - Document Description and Processing Languages
Information Interchange Media	SC 11 - Flexible Magnetic Media for Digital Data Interchange SC 23 - Optical Disk Cartridges for Information Interchange
Multimedia and Representation	SC 24 - Computer Graphics and Image Processing SC 29 - Coding of Audio, Picture, and Multimedia and Hypermedia Information
Networking and Middleware	SC 06 - Telecommunications and Information Exchange Between Systems SC 25 - Interconnection of Information Technology Equipment SC 38 - Cloud Computing and Distributed Platforms
Office Equipment	SC 28 - Office Equipment
Green IT	SC 39 – Sustainability for an by IT
Programming Languages and Software Interfaces	SC 22 - Programming Languages, their Environments and Systems Software Interfaces
Security	SC 27 - IT Security Techniques SC 37 - Biometrics
Software, Processes and Systems	SC 07 - Software and System Engineering SC40 – IT Governance and IT Management
Internet of Things	SC41 – Internet of Things and related technologies
Artificial Intelligence & Big Data	SC42 – Artificial Intelligence
Smart Cities	WG11 - Smart City
3D Scanning and Printing	WG12 – 3D Printing and Scanning

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

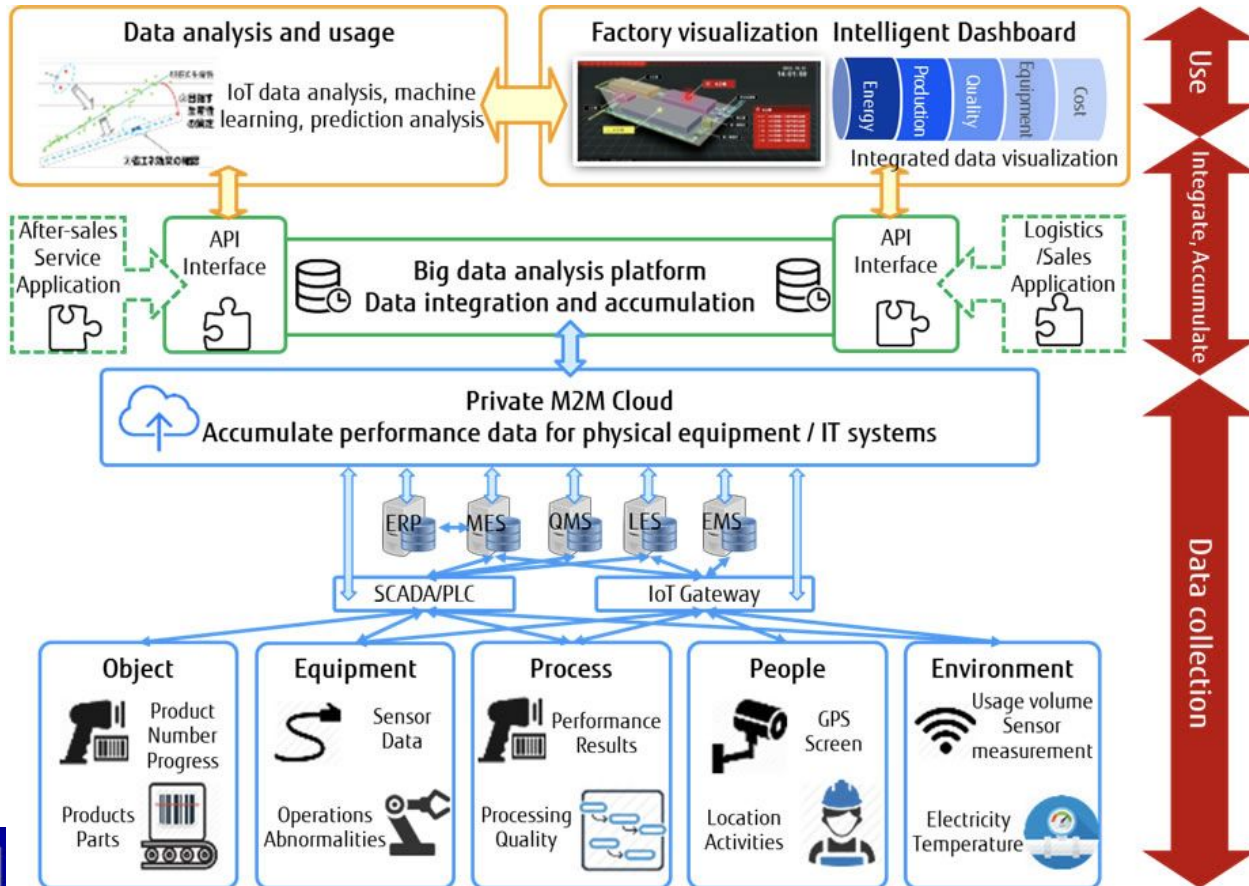
..an infrastructure of interconnected objects, people, systems and information resources together with intelligent services to allow them to process information of the physical and the virtual world and react.

ISO/IEC CD 20924

IoT systems

- Network centric
- Distributed
- Data intensive
- ‘Smart’ things/ embedded systems (Autonomous or semi-autonomous)
- M2M (communications, transactions)
- (Heterogeneous)
- (Socio-technical)

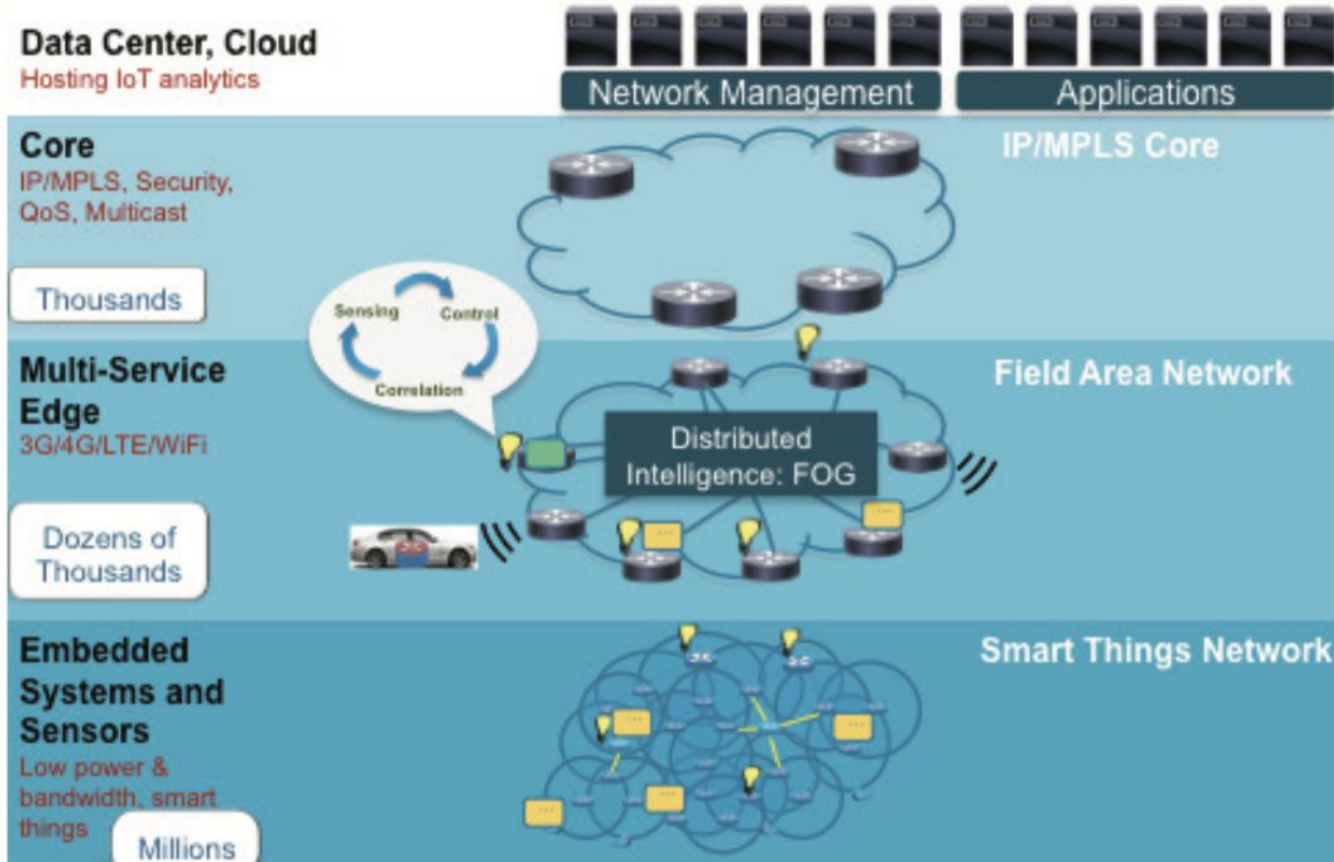
Example: Manufacturing 4.0 from the literature



Easily in the order of 0,5 TB per day

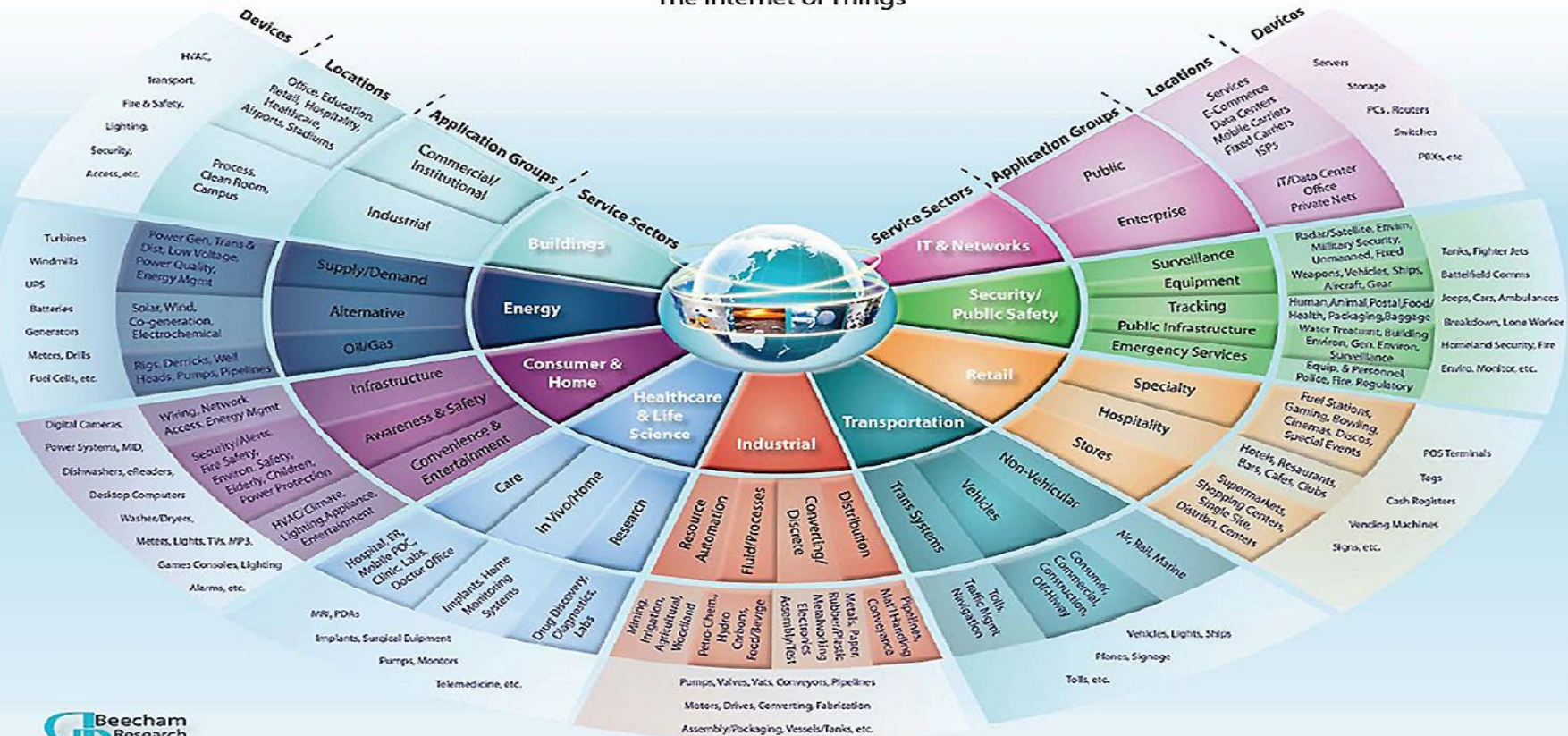
Modified from: Fujitsu and INESA Group Collaborate on Smart Manufacturing Project for "Made in China 2025"
 Fujitsu Limited, Fujitsu (China) Holdings Co., Ltd., INESA (Group) Co., Ltd.
 Tokyo and Shanghai, October 05, 2016,
<http://www.fujitsu.com/global/about/resources/news/press-releases/2016/1005-02.html>

Example: IoT distributed computing view from the literature



Modified from: *Fog Computing and Its Role in the Internet of Things*, Flavio Bonomi, Rodolfo Milito, Jiang Zhu, Sateesh Addepalli, Cisco Systems Inc.

The Internet of Things

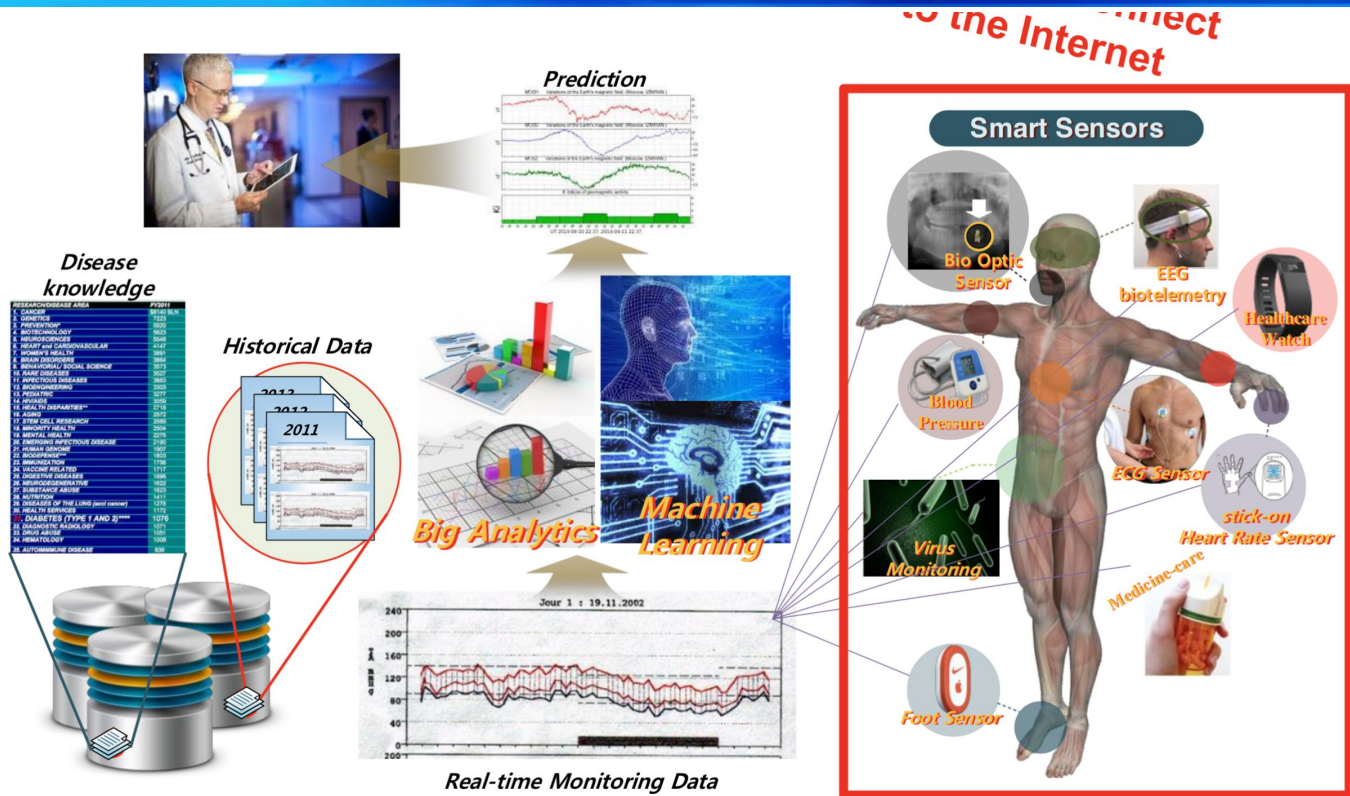


<http://www.symphio.com/2011/09/4-infographics-about-internet-of-things/>

WHAT YOU CAN DO WITH IOT IN AGRICULTURE

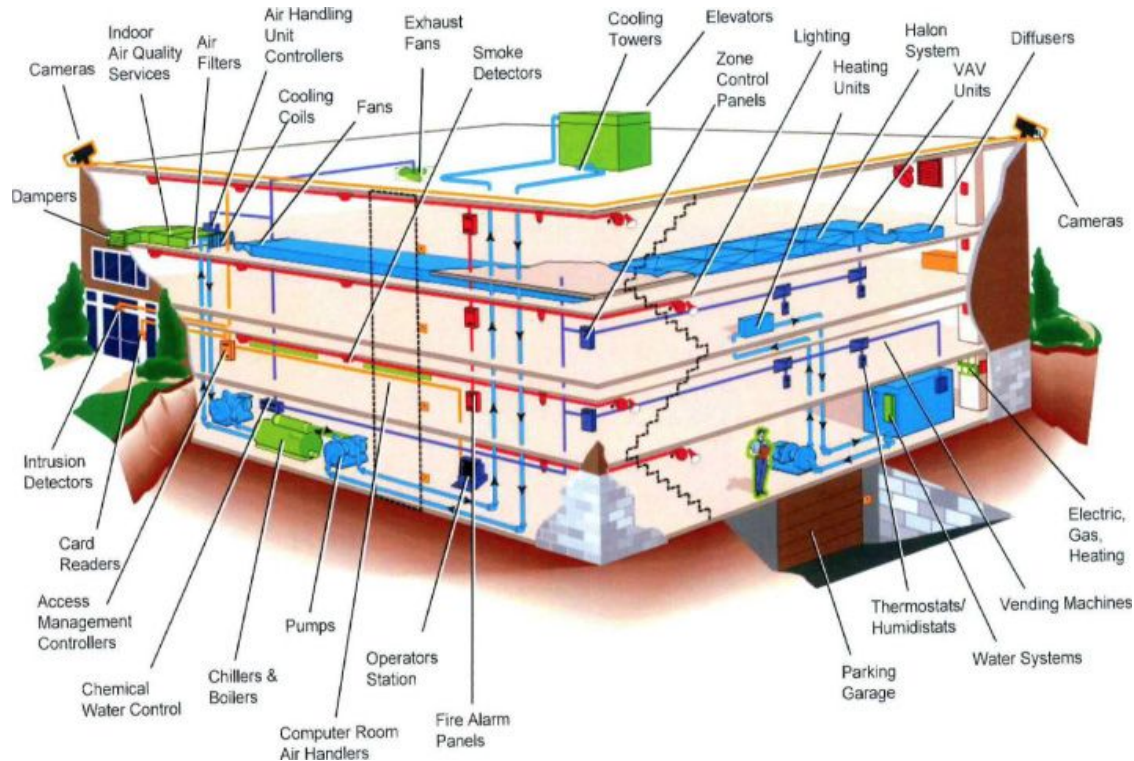


Example: Smart Healthcare from the literature



SNAIL Project for IoT Connectivity, MIREUM Ltd, July 29, 2014, Auto-ID Labs, KAIST
https://www.slideshare.net/gatordkim/snail-project-for-iot-connectivity?from_action=save

Industrial Internet / Smart Buildings



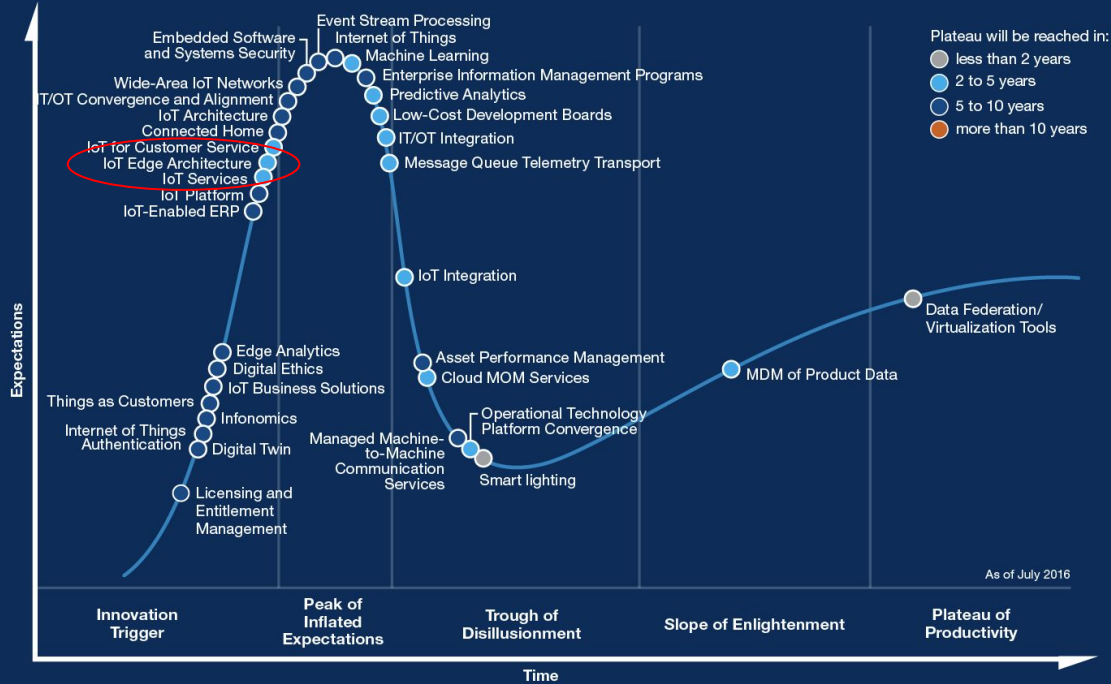
<https://securityledger.com/2016/08/nist-outlines-a-secure-network-of-things/>

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



gartner.com/SmarterWithGartner

Source: Gartner
© 2016 Gartner, Inc. and/or its affiliates. All rights reserved.

Gartner

JTC 1 Norway Plenary Resolution

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.

JTC 1 Systems Integration Matrix

Version 1.2, 2017-10-08

	Application technologies	Cultural and Linguistic Adaptability and User Interfaces	Data Capture and Identification Systems	Data Management Services	Document Description Languages	Information Interchange Media	Multimedia and Representation	Networking and Middleware	Office Equipment	Green IT	Programming Languages and Software Interfaces	Security Software Processes and Systems	Accessibility	Big Data	Internet Of Things	Cloud Computing	Smart Cities	3D Scanning & Printing	Smart Machines
SC 02 Coding		X																	
SC 06 Network							X						x	x	x	x			x
SC 07 Sw&Sys	X											X	x	x	x	x			x
SC 17 Cards ID			X										x	x	x	x			x
SC 22 Prog. Lang		x								X									x
SC 23 Disk					X														
SC 24 Graphic						X										x	x		
SC 25 Interc.							X							x					
SC 27 Security										X	x		x	x	x	x			x
SC 28 Office Eq.								X									x		
SC 29 Multimed.						X		x				x	x				x		
SC 31 Data Cap			X										x	x	x	x			x
SC 32 Data int.				X									x			x	x		
SC 34 Doc.					X														
SC 35 User Int.		X																	
SC 36 Learn	X																		
SC 37 Bio										X						x			
SC 38 Middl							X				x		x	x	X	x			x
SC 39 IT Sust.								X					x			x			
SC 40 Gov & M											X				x	x			x
SC 41 IoT			x				x			x	x		x	X	x	x			x
SC 42 AI	x									x	x		X	x	x	x			X
WG11 Smart Cities							x			x	x		x	x	x	X			x
WG12 3D Sc. & Pr.			x			x		x										X	

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

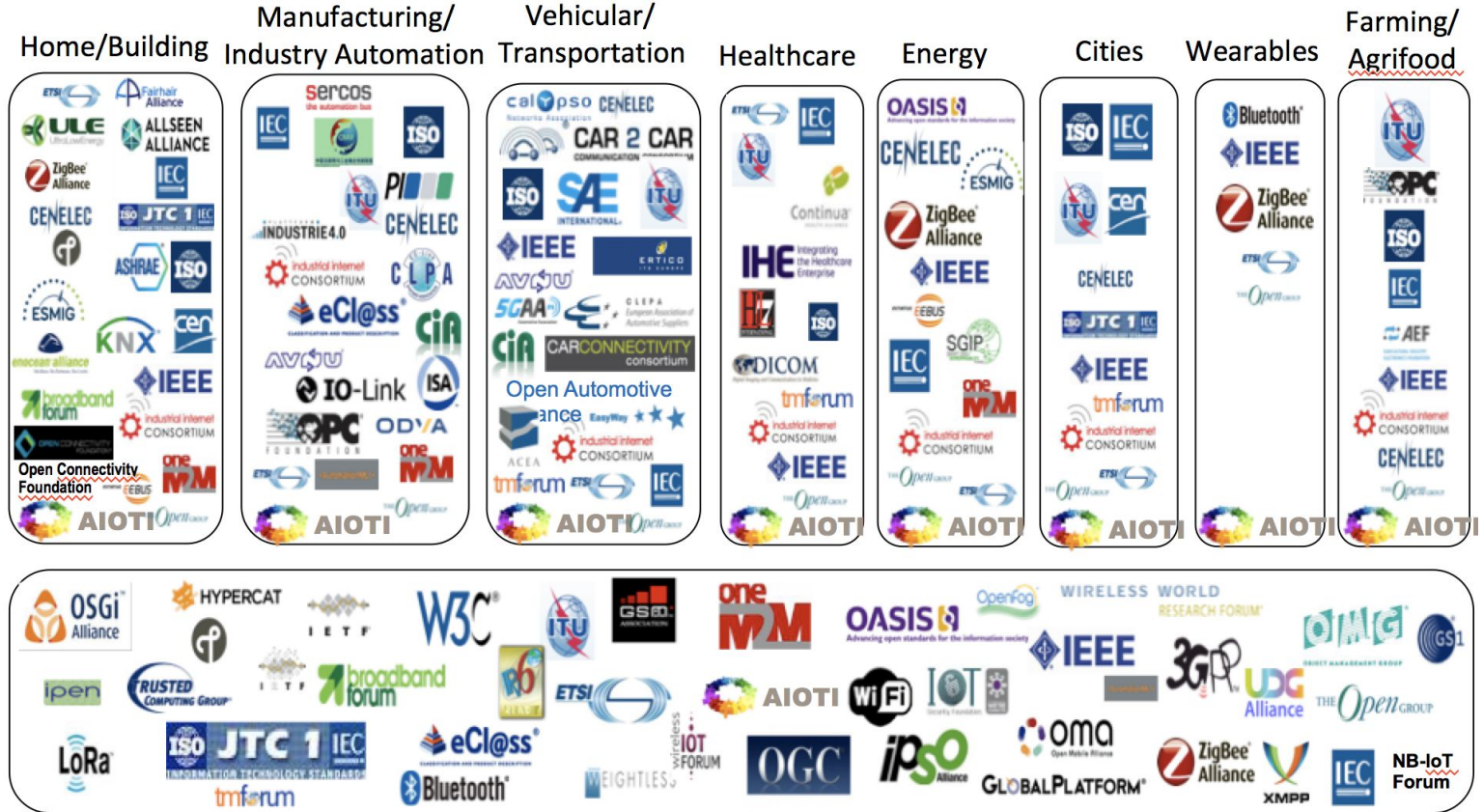
JTC 1 Liaisons

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)



Source: AIOI WG3 (IoT Standardisation) – Release 2.7

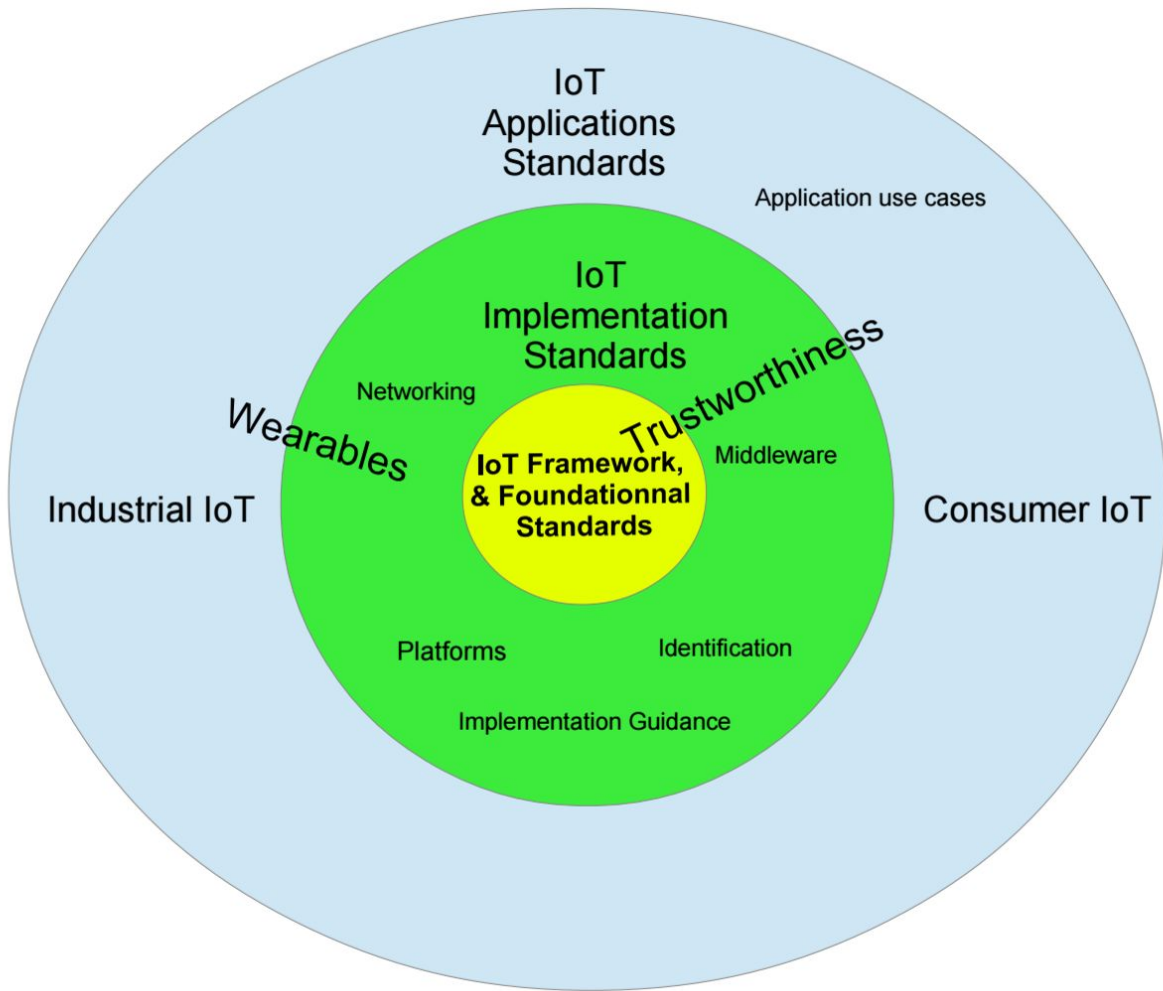
Horizontal/Telecommunication

ITU-T REG 2017-11-19

1st Plenary Highlites, Seoul, May 28 - June 2, 2017

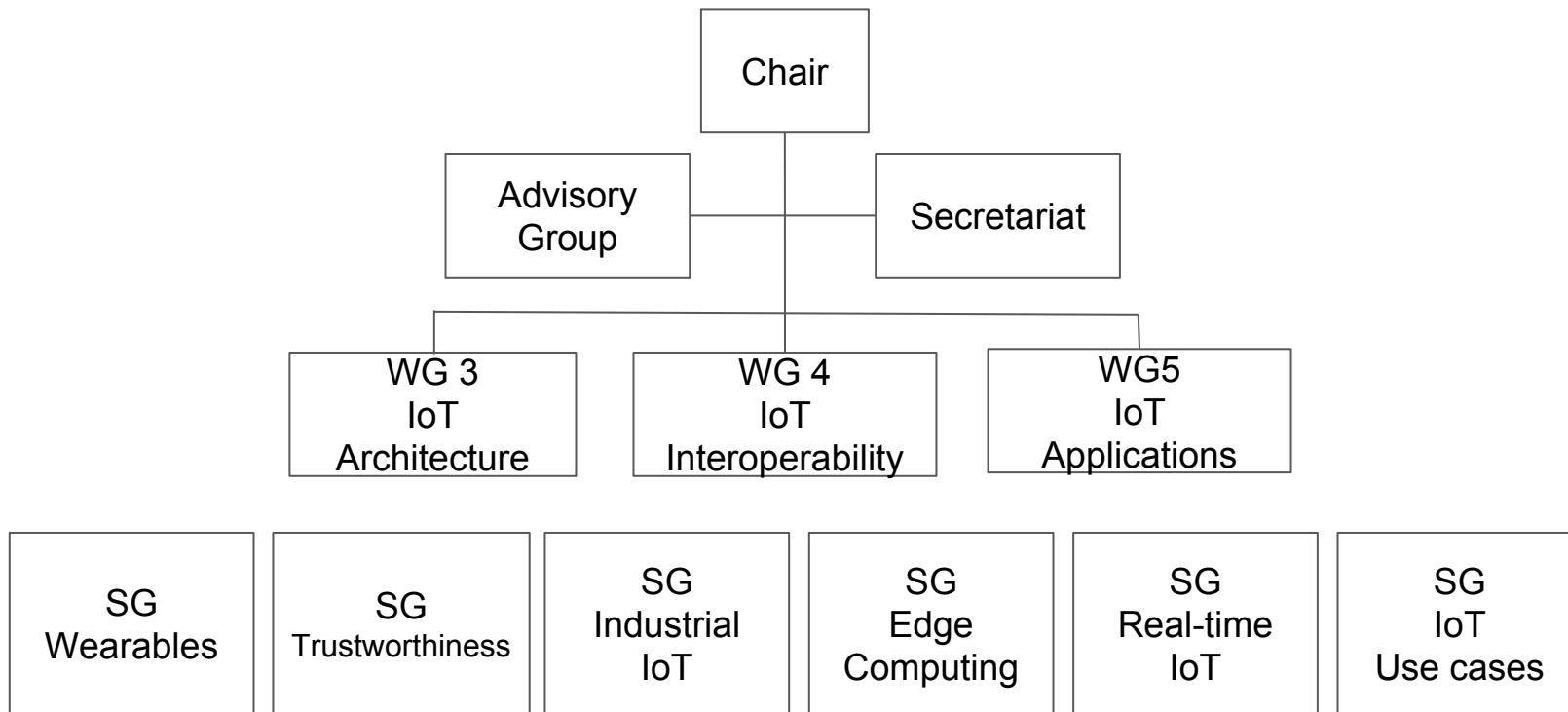
- 70 participants from 15 countries and 3 liaisons
- New organizational structure
- Creation of an AG
- Creation of six (6) Study Groups
- Four A liaisons recommended
- Progression of all (8) current projects
- Eight (8) NWIPs considered
- Two plenaries per year, integrated with WG and SG meetings
- Plenaries tentatively planned till mid 2020

SC41 Space

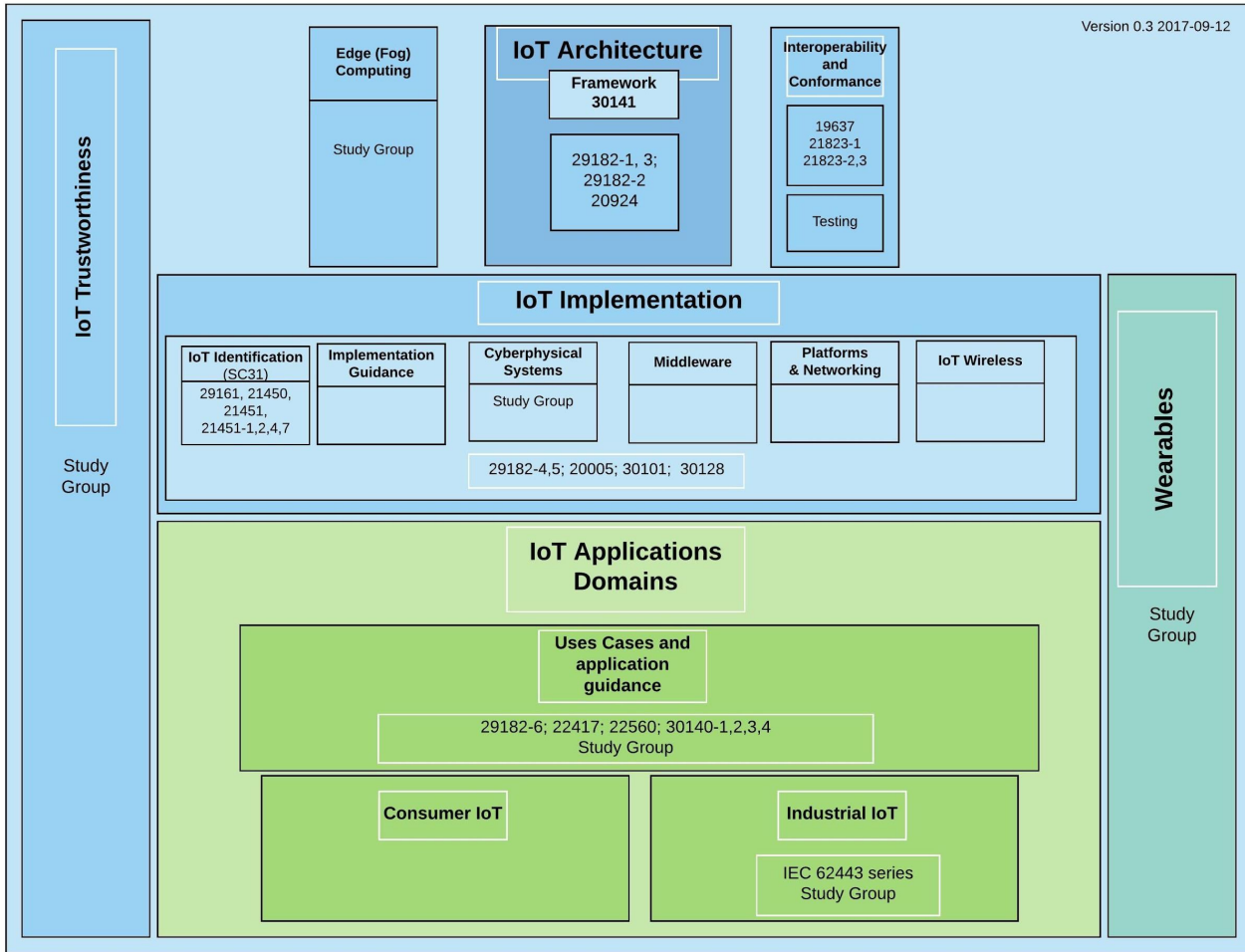


Preliminary view from the Chair

SC41 Structure (2017-06-02)



SC41 Space



Preliminary view from the Chair

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

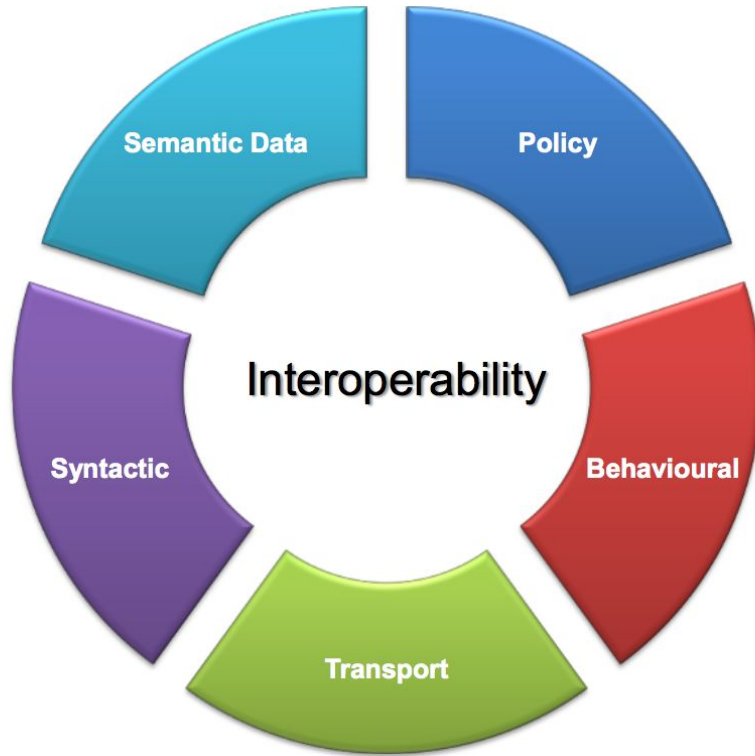
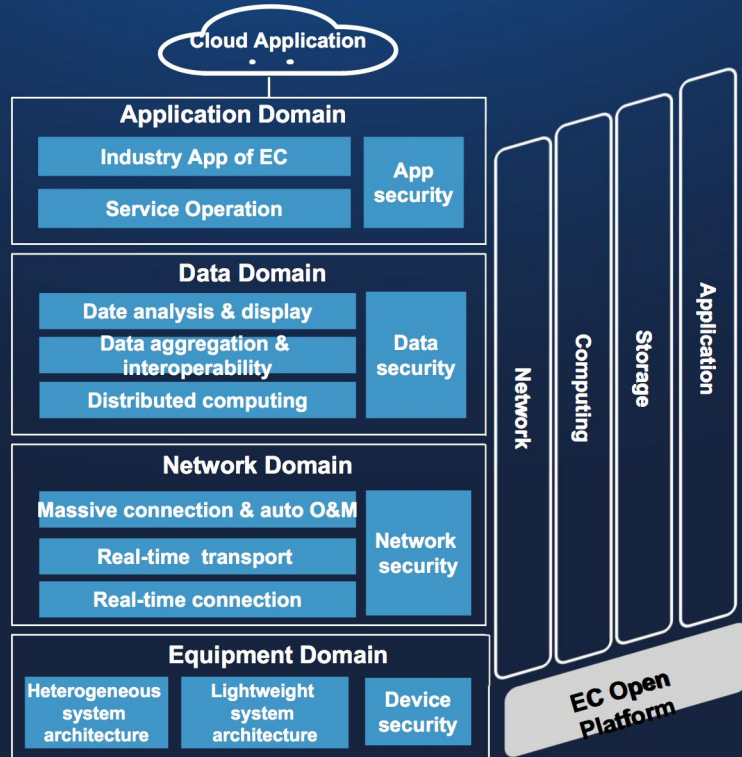


Figure 1 – Facets of IoT interoperability

ISO/IEC JTC 1/SC 41 N0157, Working draft of ISO/IEC 21823-1 Information technology – Internet of Things (IoT) – Interoperability for Internet of Things Systems – Part 1: Framework

Reference Architecture of Edge Computing



◆ **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

Reference Architecture 1.5

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.