ISO/IEC JTC 1/SWG 5
Internet of Things (IoT)
Secretariat: KATS (Korea, Republic of)

Document type: Meeting Report

Title: Report of the 1st Meeting of ISO/IEC JTC 1/SWG 5/Ad Hoc Group 1

Status:

Date of document: 2013-04-24

Source: Convenor, ISO/IEC JTC 1/SWG 5 Ad Hoc Group 1

Expected action: INFO

No. of pages: 12

Email of secretary: khj@etri.re.kr

Committee URL: http://isotc.iso.org/livelink/livelink/open/jtc1swg5

Report of the 1st Meeting of ISO/IEC JTC 1/SWG 5/Ad Hoc Group 1

April 18, 2013

The inaugural meeting of Ad Hoc Group 1 of ISO/IEC JTC 1/SWG 5 (IoT) was held via Webex web teleconferencing at 8AM EDT (New York, GMT-04:00) on April 18, 2013. A total of 17 delegates from 10 NBs and SDOs participated in the meeting. The list of delegates is given in Annex I to this report.

The terms of reference (ToR) and scope for Ad Hoc Group 1 was reviewed first. There was a brief discussion on whether people and interfaces as well as accessibility should be part of the Ad Hoc Group 1's work. A question was raised whether it was necessary to seek clarification from SWG 5 on this issue. The decision was made that since the SWG 5 recommendation leading to the formation of Ad Hoc Group 1 states that " ….. IoT has diverse applications and encompasses many technical and non-technical disciplines, including, but not limited to, ….." and given that people, interfaces, and accessibility had been discussed at the 1st SWG 5 Meeting in Berlin in March 2013, there was no need to seek clarification from SWG 5 and people, interfaces, and accessibility would be considered by Ad Hoc Group 1.

Co-Convenor Faud Khan presented the Mind Map for IoT that had been developed at the SWG 5 Meeting in Berlin. The Mind Map has been included as Annex II to this report. Three decisions were made in regards to further development of the Mind Map:

- The first level of the Mind Map emanating from the center of the diagram should consist of the following five topics:
    1. Technologies
    2. Standards
    3. Use Cases
    4. Requirements
    5. Stakeholders
- Given that SWG 5/Ad Hoc Group 3 is charged to study IoT standardization gaps, it does not make sense for the Mind Map to delve into standardization. There will be a pointer in the Mind Map under "Standards" to refer the reader to Ad Hoc Group 3's work.
- Faud Khan would further refine the Mind Map, taking the above two points into account, and distribute the updated version among Ad Hoc Group 1 members prior to the next meeting.

Co-Convenor Nader Moayeri presented a number of definitions for IoT and related concepts, such as M2M (Machine to Machine) and CPS (Cyber-Physical System), which he had put

together. These definitions have been included as Annex III to this report in no particular order. Before Ad Hoc Group 1 can develop a common understanding of and come up with a definition for IoT, it is necessary to review all the definitions that are already out there. In addition, if at all possible, it would be desirable for ISO/IEC JTC 1 to develop a common set of standards for the IoT, M2M, and CPS, because there is so much in common among these concepts. The table presented in Annex III has been made available to the Ad Hoc Group 1 mailing list for further contributions by members and collecting members' viewpoints on the pros and cons of each definition. At the end of its work, Ad Hoc Group 1 will either adopt one of the definitions that are already available or develop its own definition.

Action Items:

1. Ad Hoc Group 1 members will send any additional definitions they find for the IoT and related concepts, as well as their views on pros and cons of each definition, to Nader Moayeri by May 2, 2013.
2. Faud Khan will develop the next version of the IoT Mind Map and distribute among Ad Hoc Group 1 members by May 3, 2013.
3. Ad Hoc Group 1 members will review the updated IoT Mind Map and send any comments/suggestions to Faud Khan by May 10, 2013.
4. Nader Moayeri will compile the information he receives from Ad Hoc Group 1 members on IoT definitions and pros/cons, integrate all such input, and distribute an updated version of the table in Annex III among Ad Hoc Group 1 members by May 17, 2013.
5. Faud Khan will compile all the feedback he receives on the IoT Mind Map for presentation at the next Ad Hoc Group 1 meeting.
6. **The 2nd Meeting of ISO/IEC JTC 1/SWG 5/Ad Hoc Group 1 will be held via teleconferencing from 8AM to 10 AM EDT (New York, GMT-04:00) on May 22, 2013.**

The meeting was adjourned at 9:27AM EDT (New York, GMT-04:00).

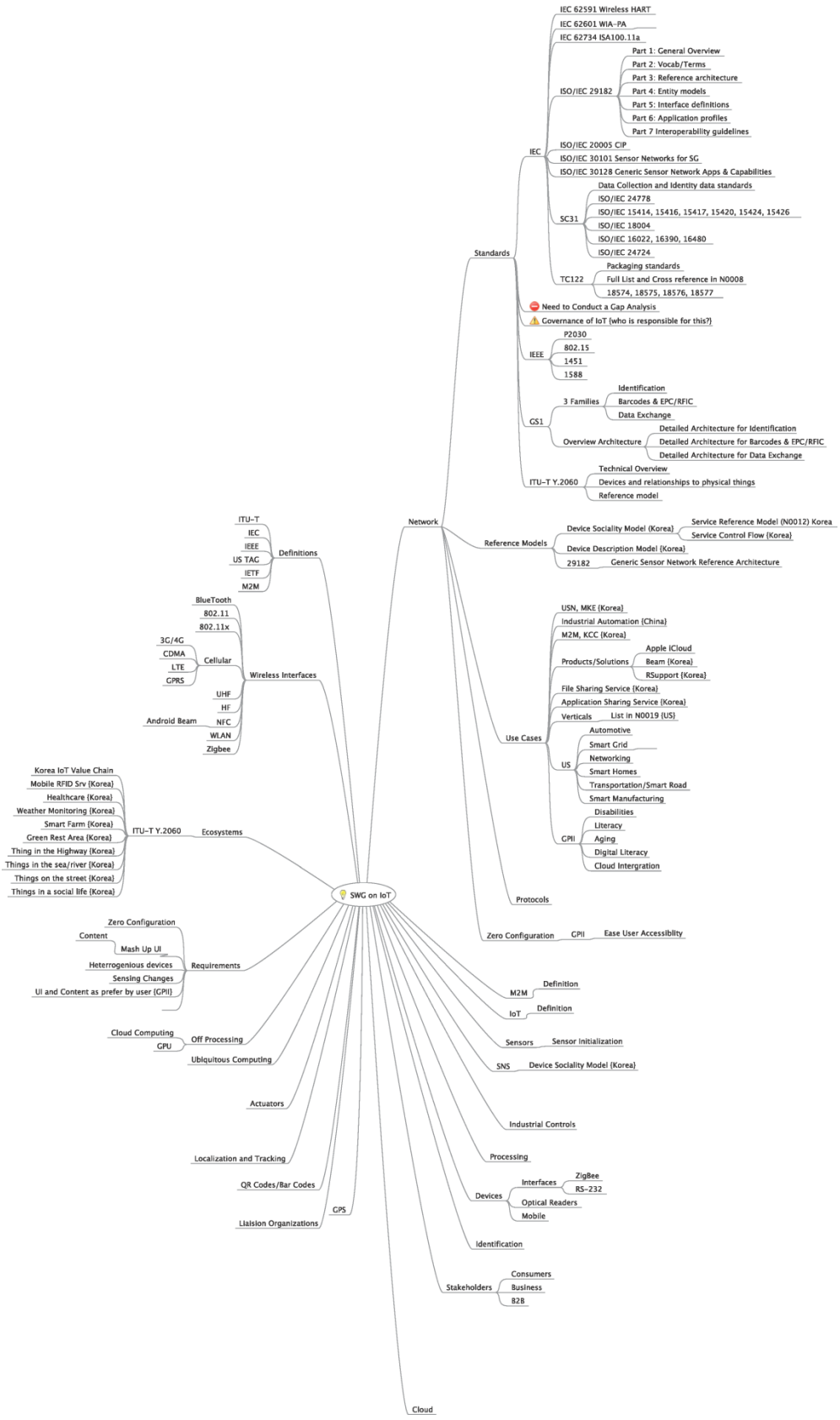
Annex I

List of Delegates

Representing	Name	Organization
Canada	Khan, Faud (Co-Convenor)	TwelveDot
China	Min, Wei	CQUPT
Germany	Seewald, Maik	Cisco
Germany	Tenhagen, Detlef	HARTING Electric
Japan	Kawai, Kazuya	Panasonic
SC31	Barthel, Henri	GS1 and ISO/IEC JTC 1/SC 31
Singapore	Ho, Buaey Qui	IDA
Singapore	Kong, Pei Wee	IDA
Singapore	Lau, Chee Dai	IDA
Singapore	Ng, Yee Jie	IDA
TC122	Harmon, Craig	QED Systems
UK	Heath, Andy	Axelrod
USA	Adams, Chuck	Huawei
USA	Ertel, Don	CDO Technologies
USA	Evanhoe, Chuck	Evanhoe & Associates
USA	Halliday, Steve	High Tech Aid
USA	Moayeri, Nader (Co-Convenor)	NIST

Annex II

IoT Mind Map


SWG on IoT
Network
Standards
IEC
IEC 62591 Wireless HART
IEC 62601 WIA-PA
IEC 62734 ISA100.11a
ISO/IEC 29182
Part 1: General Overview
Part 2: Vocab/Terms
Part 3: Reference architecture
Part 4: Entity models
Part 5: Interface definitions
Part 6: Application profiles
Part 7 Interoperability guidelines
ISO/IEC 20005 CIP
ISO/IEC 30101 Sensor Networks for SG
ISO/IEC 30128 Generic Sensor Network Apps & Capabilities
SC31
Data Collection and Identity data standards
ISO/IEC 24778
ISO/IEC 15414, 15416, 15417, 15420, 15424, 15426
ISO/IEC 18004
ISO/IEC 16022, 16390, 16480
ISO/IEC 24724
TC122
Packaging standards
Full List and Cross reference in N0008
18574, 18575, 18576, 18577
Need to Conduct a Gap Analysis
Governance of IoT (who is responsible for this?)
IEEE
P2030
802.15
1451
1588
GS1
3 Families
Identification
Barcodes & EPC/RFIC
Data Exchange
Overview Architecture
Detailed Architecture for Identification
Detailed Architecture for Barcodes & EPC/RFIC
Detailed Architecture for Data Exchange
ITU-T Y.2060
Technical Overview
Devices and relationships to physical things
Reference model
Reference Models
Device Sociality Model (Korea)
Service Reference Model (N0012) Korea
Service Control Flow (Korea)
Device Description Model (Korea)
29182
Generic Sensor Network Reference Architecture
Use Cases
USN, MKE (Korea)
Industrial Automation (China)
M2M, KCC (Korea)
Products/Solutions
Apple ICloud
Beam (Korea)
RSupport (Korea)
File Sharing Service (Korea)
Application Sharing Service (Korea)
Verticals
List in N0019 (US)
US
Automotive
Smart Grid
Networking
Smart Homes
Transportation/Smart Road
Smart Manufacturing
GPII
Disabilities
Literacy
Aging
Digital Literacy
Cloud Intergration
Protocols
Zero Configuration
GPII
Ease User Accessibility
Definitions
ITU-T
IEC
IEEE
US TAC
IETF
M2M
Wireless Interfaces
BlueTooth
802.11
802.11x
Cellular
3G/4G
CDMA
LTE
GPRS
UHF
HF
NFC
Android Beam
WLAN
Zigbee
ITU-T Y.2060
Ecosystems
Korea IoT Value Chain
Mobile RFID Srv (Korea)
Healthcare (Korea)
Weather Monitoring (Korea)
Smart Farm (Korea)
Green Rest Area (Korea)
Thing in the Highway (Korea)
Things in the sea/river (Korea)
Things on the street (Korea)
Things in a social life (Korea)
Requirements
Zero Configuration
Content
Mash Up UI
Heterrogenious devices
Sensing Changes
UI and Content as prefer by user (GPII)
Off Processing
Cloud Computing
GPU
Ubiquitous Computing
Actuators
Localization and Tracking
QR Codes/Bar Codes
GPS
Liaision Organizations
Cloud
M2M
Definition
IoT
Definition
Sensors
Sensor Initialization
SNS
Device Sociality Model (Korea)
Industrial Controls
Processing
Devices
Interfaces
ZigBee
RS-232
Optical Readers
Mobile
Identification
Stakeholders
Consumers
Business
B2B

Annex III

Various Definitions for the Internet of Things (IoT) and Related Concepts

Definition	Pros	Cons
ITU-T: IoT A global infrastructure for the information society, enabling advanced services by interconnecting (physical and virtual) things based on, existing and evolving, interoperable information and communication technologies [ITU-T Y.2060]		
ETSI: M2M Communication between two or more entities that do not necessarily need any direct human intervention. M2M services intend to automate decision and communication processes. [ETSI TS 102 689]		
IEEE: M2M Information exchange between a subscriber station and a server in the core network (through a base station) or between subscriber station, which may be carried out without any human interaction [IEEE 802.16p]		
IETF: IoT A world-wide network of interconnected objects uniquely addressable, based on standard communication protocols [draft-lee-iot-problem-statement-05.txt]		
3GPP: MTC (Machine Type Communication)		

A form of data communication which involves one or more entities that do not necessarily need human interaction. [3GPP TS 22.368]		
Seventh Framework Program: IoT A global network infrastructure, linking physical and virtual objects through the exploitation of data capture and communication capabilities [EU FP7 CASAGRAS]		
IEEE Computer Magazine (Guest Editors' Introduction to the February 2013 Cover Feature): IoT The term Internet of Things (IoT) describes several technologies and research disciplines that enable the Internet to reach out into the real world of physical objects. Technologies like RFID, short-range wireless communications, real-time localization, and sensor networks are becoming increasingly pervasive, making the IoT a reality.		
IEEE-SA Board of Governors: IoT IoT refers to any systems of interconnected people, physical objects, and IT platforms, as well as any technology to better build, operate, and manage the physical world via pervasive data collection, smart networking, predictive analytics, and deep		

optimization.		
Wikipedia: IoT Uniquely identifiable objects (things) and their virtual representations in an Internet-like structure.		
Gartner: IoT The Internet of Things is the network of physical objects that contain embedded technology to communicate and sense or interact with their internal states or the external environment.		
Techopedia: IoT The Internet of Things (IoT) is a computing concept that describes a future where everyday physical objects will be connected to the Internet and will be able to identify themselves to other devices. The term is closely identified with RFID as the method of communication, although it could also include other sensor technologies, other wireless technologies, QR codes, etc.		
US TAG to ISO/IEC JTC 1/SWG 5: IoT The Internet of Things (IoT) is a global network infrastructure, linking physical and virtual objects through the use of interoperable data capture and networking methods. Standards-based object identification, sensors, controls, actuators, and connection capability provide for the development of independent cooperative services and applications		

supported by data analytics and characterized by a user-defined degree of autonomy.		
IoT'2012: IoT In what is called the Internet of Things (IoT), sensors and actuators embedded in physical objects — from containers to pacemakers — are linked through both wired and wireless networks to the Internet. When objects in the IoT can sense the environment, interpret the data, and communicate with each other, they become tools for understanding complexity and for responding to events and irregularities swiftly. The IoT is therefore seen by many as the ultimate solution for getting fine grained insights into business processes — in the real-world and in real-time.		
IoT-A: IoT The global network connecting any smart object.		
IBM Smarter Planet: IoT Over the past century, we have seen the emergence of a kind of global data field. The planet itself—natural systems, human systems, physical objects—have always generated an enormous amount of data, but until recent decades, we weren't able to hear it, to see it, to capture it. Now we can because all of these things have been instrumented with microchips, UPC codes and		

other technologies. And they're all interconnected, so now we can actually have access to the data. In effect, the planet has grown a central nervous system and is developing intelligence. It's becoming a much smarter planet.		
IERC: IoT A dynamic global network infrastructure with self-configuring capabilities based on standard and interoperable communication protocols where physical and virtual “things” have identities, physical attributes, and virtual personalities, use intelligent interfaces, and are seamlessly integrated into the information network.		
Wikipedia: CPS A system featuring a tight combination of, and coordination between, the system’s computational and physical elements. Today, a pre-cursor generation of cyber-physical systems can be found in areas as diverse as aerospace, automotive, chemical processes, civil infrastructure, energy, healthcare, manufacturing, transportation, entertainment, and consumer appliances. This generation is often referred to as embedded systems. In embedded systems the emphasis tends to be more on the computational elements, and less on an intense link		

between the computational and physical elements.		
US NSF: CPS Systems in which physical processes are tightly intertwined with networked computing.		
UC Berkeley: CPS Cyber-Physical Systems (CPS) are integrations of computation, networking, and physical processes. Embedded computers and networks monitor and control the physical processes, with feedback loops where physical processes affect computations and vice versa.		
IEEE Control Systems Society: CPS The term cyber-physical system (CPS) refers to a new generation of systems with integrated computational and physical capabilities that can interact with humans through many new modalities. The ability to interact with, and expand the capabilities of, the physical world through computation, communication, and control is a key enabler for future technology developments.		
CMU: CPS Cyber-Physical Systems (CPS) represent a bold new generation of systems that integrate computing and communication capabilities with the dynamics of physical and engineered systems. Just like the Internet transformed how we interact with		

information systems, cyber-physical systems will transform how we interact with and manipulate the physical world.		