Ontology Summit 2015 Internet of Things

Toward Smart Networked Systems
and Societies

Track D: Related standards & synergies for emerging iot ontologies

Track D Invitees

*William Miller, Chair ISO/IEC/IEEE 21451-1-4

*Geoff Brown (Oasis MQTT Chair, Sec'y)

*Shoumen Palit Austin Datta (Industry Internet Consortium, OMG)

Mark Hamilton, RTI Sr. Director of Services

Chuck Evanhoe, Chairman, IoT-SG, US Technical Advisors Group for ISO/IEC JTC 1/WG 10 – IoT Working Group

Dave Ragget, W3C Web of Things (Funding source: EU Compose project)

Roberto Minerva, Telecom Italia (IEEE, iot.ieee.org)

ZigBee (Gary Audin)

*Accepted

“The nice thing about standards is that there are so many to choose from.”

--Andrew tanenbaum

Reasons to Standardize

Avoid technological dead-ends*

Reduce dependence on vendors* or foreign countries

Promote universality*

Develop competitive edge or partnership, or respond to same

Solve a technical, enterprise or social problem

Bridge previously disparate technologies or disciplines

Incorporate elements from a related, entrenched standard

Lower cost by market-broadening

* Adapted from K. Jakobs, "Information Technology Standards, Standards Setting and Standards Research."

The Standards Semi-verse

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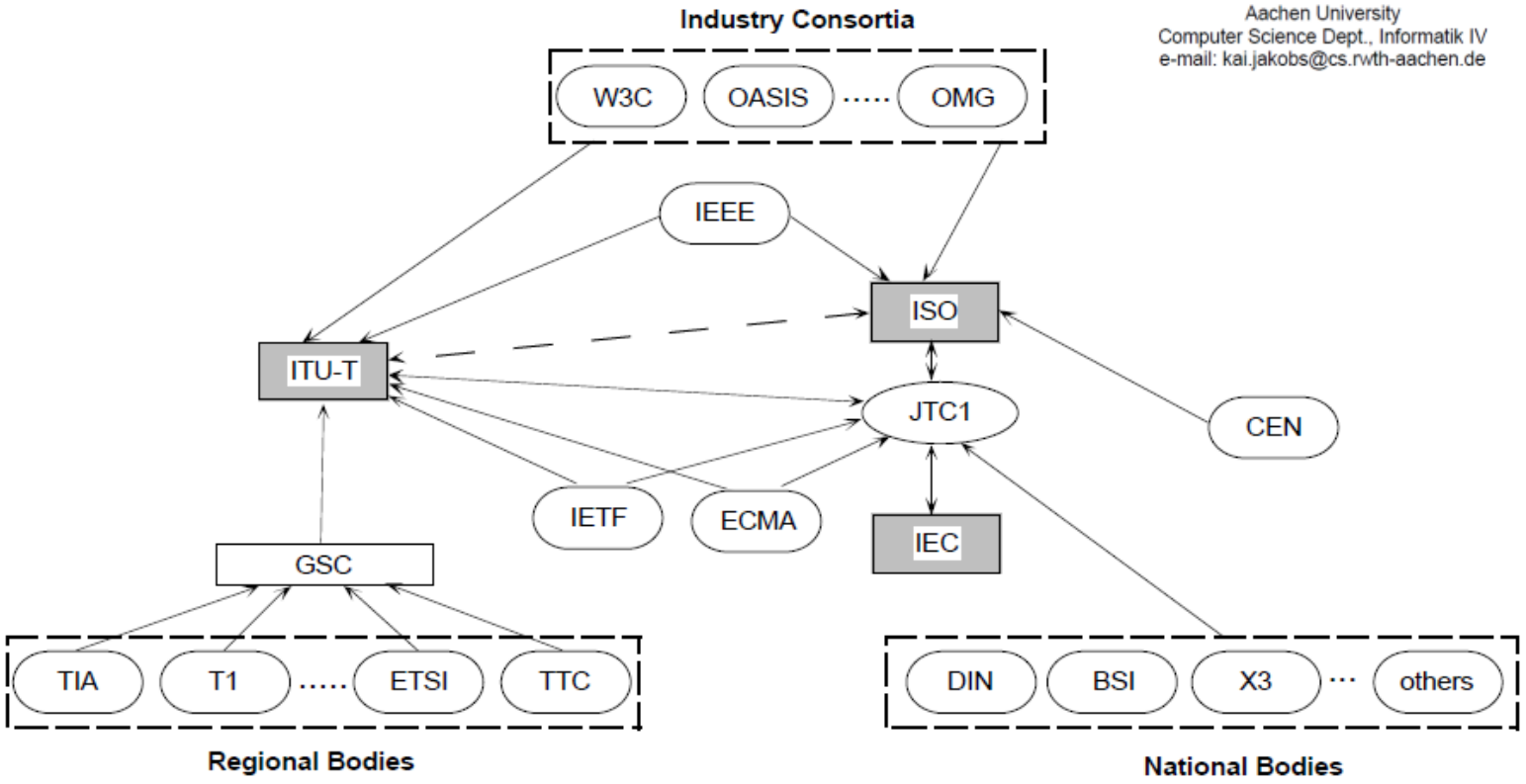

Figure 2: The IT standardisation universe today (excerpt)

The Standards Influence Maze

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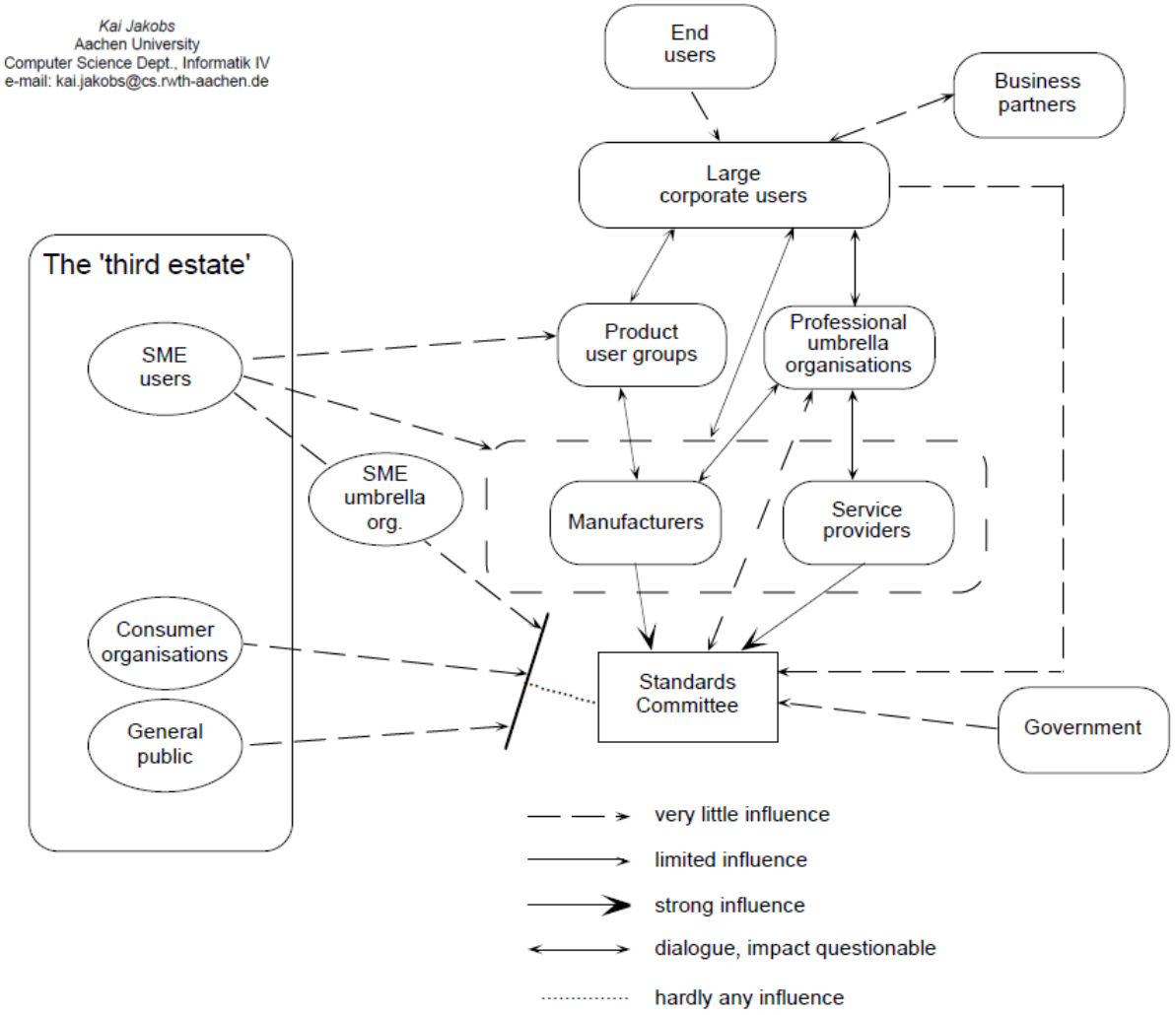


Figure 5: A more realistic view of the relations between stakeholders in standardisation

Mission Statement*

The existence of standards – both official and de facto – can dramatically influence the software development life cycle for ontology projects. This is especially for greenfield efforts, which can peg existing vocabulary, interoperability settings, test harnesses and verification processes to new projects. Standards may be essential for domain-specific data quality assurance. Standards also have a sociotechnical purpose. Communities of Interest (CoI) behind a standards effort can supersede a standard by concentrating expertise and collecting artifacts related to the standard. Because the world of “things” is by definition vast, standards can facilitate connecting software to devices by offering abstractions that impact domain-specific knowledge of the devices. This is helpful for building ontologies. That said, software development is a deregulated engineering process, and many successful software ventures have succeeded by ignoring or incorporating bits and pieces of unacknowledged standards work – sometimes creating new de facto standards in the process. The purpose of this track is to help potential IoT ontology developers understand the standards landscape – both official and de facto.

*Also appears as Abstract

Approach

- ►Survey “official” IoT standards
- ►Identify de facto standards
- ►Identify related standards, projects, bodies not officially designed as IoT or WoT
- ►Highlight domains where ontology efforts:
  - (1) are most needed; (2) have harmonious partnership opportunities; (3) available subcomponents
- ►Discuss Challenges: Power mgmt., security, signal post-processing, provenance, signal quality, discovery, metadata, network issues, Big Data
- ►Related work: Modsim (e.g., Yang Song, et al. 2012, Sensor Fusion, Linked Open Data, augmented reality, Software Defined Networks (SDN)
- ►Lessons from history: middleware, intelligent agents, CEP, embedded systems, DoD fusion
- ►Retrospective: Related Lessons from Ontology Big Data 2014

Track Agenda

Two Sessions (January 22, February 26)

Session 1

- Speaker Background & Introduction
- Standards Overview
- “Official” | De Facto
- Current IoT standards state of affairs
- Strengths, weaknesses, trends
- IoT standards “Semi-verse”
- Influencers
- Panel Q & A

Session 2

- Low-hanging Ontology Fruit
- Speakers’ Favorite Use Cases
- Moderator’s Puzzles
- Panel Q & A

Reference

Lists, references and related resources

Standards Orgs & Initiatives

W3C – Web of Things Community Group

Industrial Internet Consortium

ECHONET Consortium (home appliances, LITE spec, cert equip)

Share-PSI 2.0 Thematic Network (EU Open Data initiatives)

ZigBee Alliance (IEEE 802.15)

Oasis Message Queuing Telemetry Transport (IBM, Cisco, Red Hat, Tibco, Facebook)

ISO/IEEE 11073 Health Informatics Devices

OGC Sensor Web Enablement

International Telecommunication Union (IoT-GSI)

European Research Cluster on IoT

Project

Wi-SUN

AllJoyn

OPENIoT

Eu

XMPP IoT

AllSeen

OneM2M

Postscapes.com

Related Standards & Groups

Spatial Data (GeoSPARQL, NeoGeo, ISA Locn)

IEEE TC's: Smart Cities, Big Data, Cybersecurity, IoT Communities

Semantic Sensor Web (OGC + SWE specifications)

RFID

W3C Semantic Sensor Networks Incubator Group

BPMN – BPEL: Connect to other enterprise events, workflow

REST (Bosch)

Thread Group

Heterogeneous System Architecture Foundation

MEMS) Industry Group

Marine Metadata Interoperability Project

City Pulse Project Knoesis

SWRLTO

De Facto Standards and Influences

Intel Edison Embedded Processor, HDMI Compute Stick, Stick Computing (Android)

Activity Streams (Slides by C. Messina @Google)

Alliance for Wireless Power (Rezence)

ZigBee Ontology (Chien et al., 2013)

W3C Semantic Sensor Network XG Final Report (June 2011)

Misc Resources for Communique

Web of Things Meeting Report (June 2014)

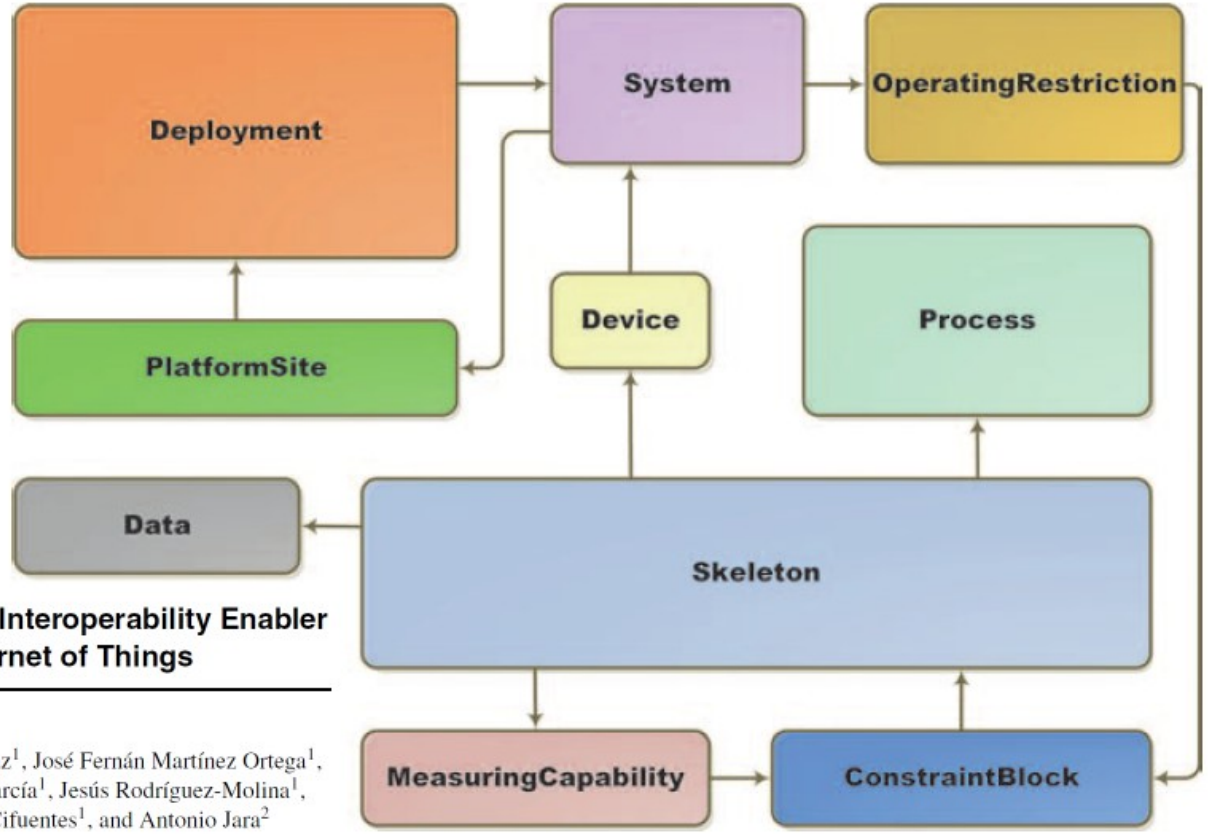
SeeControl (Cloud IoT)

Automated Buildings columnists

Libelium 50 Sensor Applications for IoT

IoT: Converging Technologies for Smart Environments (Ontology discussions, bibliography)

Semantic Sensor Network Ontology

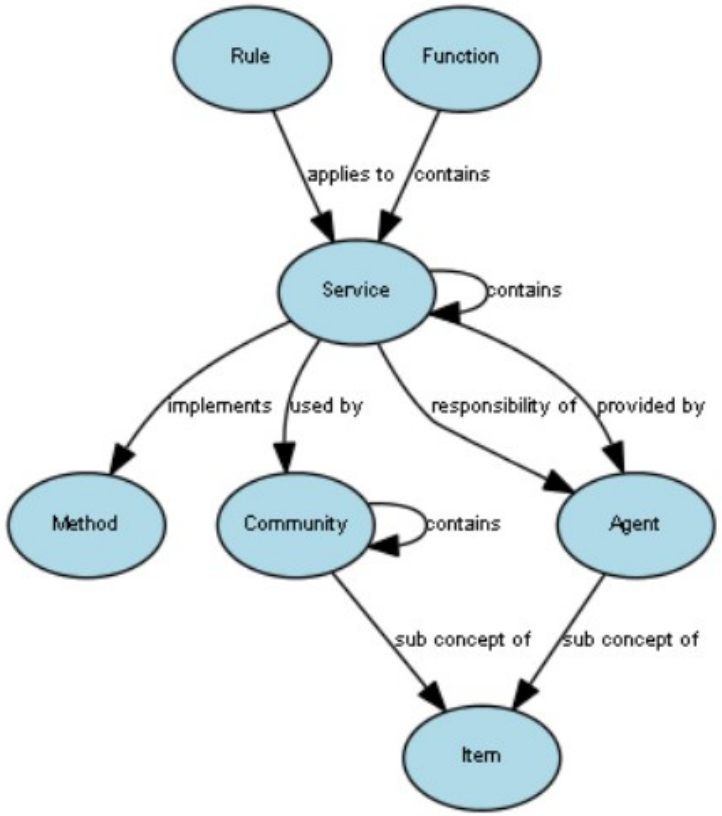


Semantic as an Interoperability Enabler in Internet of Things

Vicente Hernández Díaz[1], José Fernán Martínez Ortega[1], Alexandra Cuerva García[1], Jesús Rodríguez-Molina[1], Gregorio Rubio Cifuentes[1], and Antonio Jara[2]

Fig. 9.4 Overview of the Semantic Sensor Network ontology classes and properties.

Phil Archer phila@w3.org



Keynoter Candidates

Roberto Minerva (IEEE IoT)

Joseph Bradley (Cisco IoE Evangelist and VP)

William Sennett, Alex Wahl (?) (IBM Watson)

Rex St. John (Intel IoT Evangelist)

Carla Diana (Ted Talk)

Richard McElhinney Project Haystack