



# JTC 1におけるIoT関連の標準化動向と 日本の取組み

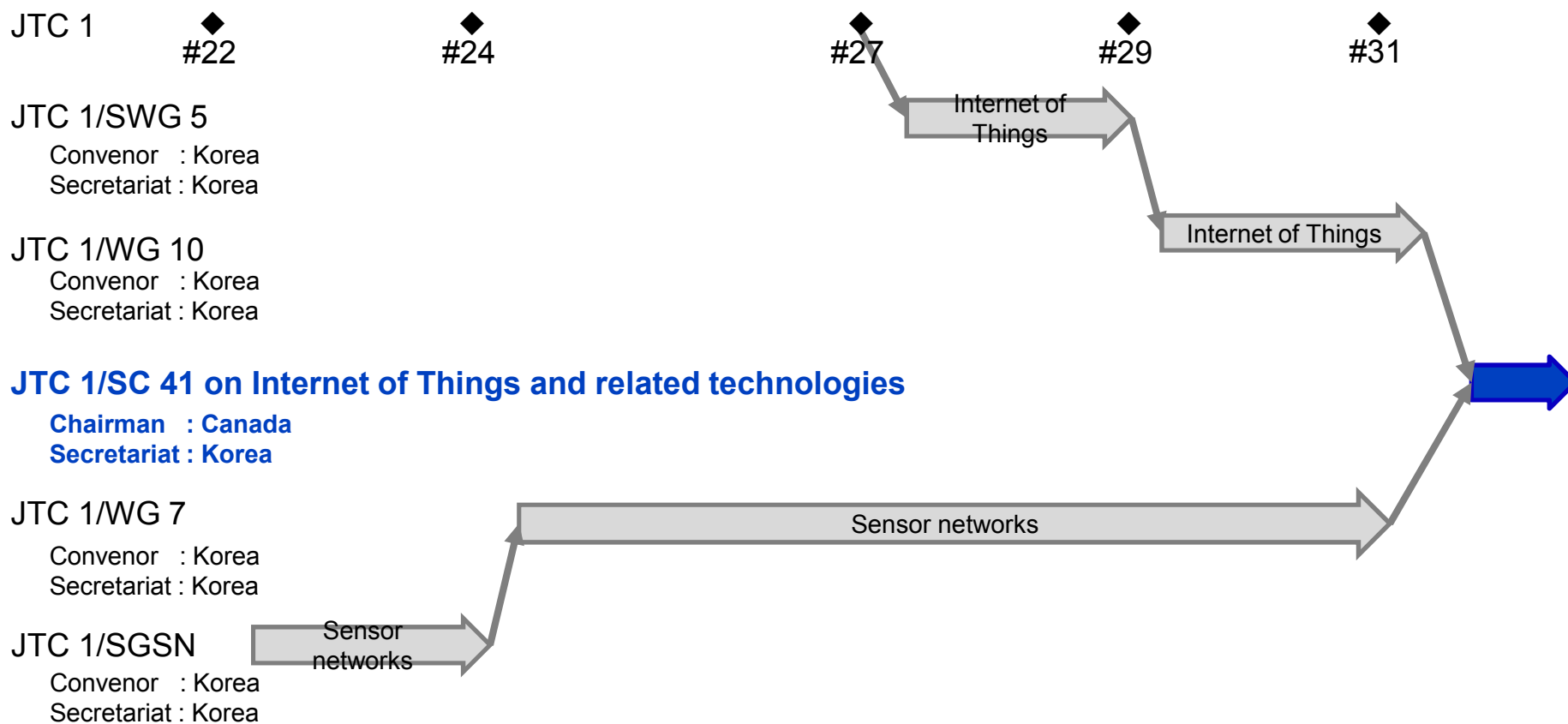
2017年5月23日

SC41専門委員会 委員長  
(独)情報処理推進機構

河合 和哉

# JTC 1 における IoT 関連の標準化

2009	2010	2009	2010	2011	2012	2013	2014	2015	2016	2017
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# JTC 1 /SGSN の所掌

- JTC 1 establishes a Study Group on Sensor Networks (SGSN) with the following Terms of Reference:

1) *Review the current definitions, visions and requirements for target applications of Sensor Networks*

within JTC1 and outside JTC1 in connection with different application areas (e.g. home, medical informatics, transport informatics, industrial communications, RFID etc) as well as JTC 1 SCs roles in these application areas

2) *Review and identify*

- *the unique characteristics of Sensor Networks and the commonalities and differences with other networks*
- *the system architectures of Sensor Networks in terms of functionalities*
- *the entities that together comprise Sensor Networks and their characteristics*
- *existing protocols that can be used for Sensor Networks and the elements of protocols that are unique to Sensor Networks*
- *the scope of infrastructure that can be considered to be a Sensor Network*
- *the types of data that need to be handled (acquired, processed, transported, stored, rendered etc) by Sensor Networks and any specific QoS attributes required by those categories*
- *the interfaces that need to be supported by Sensor Networks*
- *the services that need to be supported by Sensor Networks*
- *aspects such as security, privacy, identification that may be relevant to specific Sensor Networks*

# JTC 1 / SGSN の所掌

- 3) Monitor other activities in international standardisation bodies and consortia and for a where specifications related to Sensor Networks are being developed.
- 4) Produce a report covering 1) and 2) above and information on other relevant standardization activities
- 5) In the light of published SC scopes and work programmes and the results of 1) to 3) recommend potential areas of work to JTC 1 and appropriate SCs to ensure that all necessary aspects of Sensor Networks within the scope of JTC 1 are standardised.
- 6) Recommend how the work on Sensor Networks can be efficiently coordinated in JTC 1.
- 7) Hold workshops to gather requirements or publicise the results.
- 8) Meetings of the group may be physical or via electronic means.

# JTC 1 / WG 7 の所掌

- JTC 1 establishes JTC 1 Working Group 7 on Sensor Networks with the following terms of reference:
  - 1) In the area of [generic solutions for sensor networks](#), undertake standardization activities that support and apply to the technical work of all relevant JTC 1 entities and to other standards organizations. This would include activities in sensor networks such as the following:
    - a) [Standardization of terminology](#).
    - b) [Development of a taxonomy](#).
    - c) [Standardization of reference architectures](#).
    - d) [Development of guidelines for interoperability](#)
  - 2) In the area of [application-oriented sensor networks](#), identify gaps and commonalities as they may impact standardization activities within the scope of JTC 1. Further, share this information with relevant entities within and outside of JTC 1. Unless better pursued within another JTC 1 entity, the following standardization activities may be pursued as projects by this Working Group:
    - a) [Addressing the technology gaps within the scope of JTC 1 entities](#).
    - b) [Exploiting technology opportunities where it is desirable to provide common approaches to the use of sensor networks across application domains](#).

# JTC 1 / SWG 5 の所掌

- JTC 1 approves the revised Terms of Reference for the Special Working Group on Internet of Things (IoT) as follows:

## Terms of Reference

1. ***Identify market requirements and standardization gaps for IoT;***
2. Encourage JTC 1 SCs and WGs to address the need for ISO/IEC standards for IoT;
3. Facilitate cooperation across JTC 1 entities;
4. Promote JTC 1 developed standards relevant to IoT and encourage them to be recognized and utilized by industry and other standards setting organizations;
5. Facilitate the coordination of JTC 1 IoT activities with IEC, ISO, ITU and other organizations that are developing standards for IoT;
6. Periodically report results and recommendations to JTC 1/SWG on Planning;
7. Provide a written report of activities and recommendations to JTC 1 in advance of each JTC 1 Plenary meeting; and
8. ***Study IoT Reference Architectures/Frameworks and provide a study report. This study report should be written so it could be referenced in a possible JTC 1 New Work Item Proposal on IoT. The report shall be made available to JTC 1 no later than the 2014 JTC 1 Plenary.***



# SWG 5 Ad-Hoc 2 : 要求条件

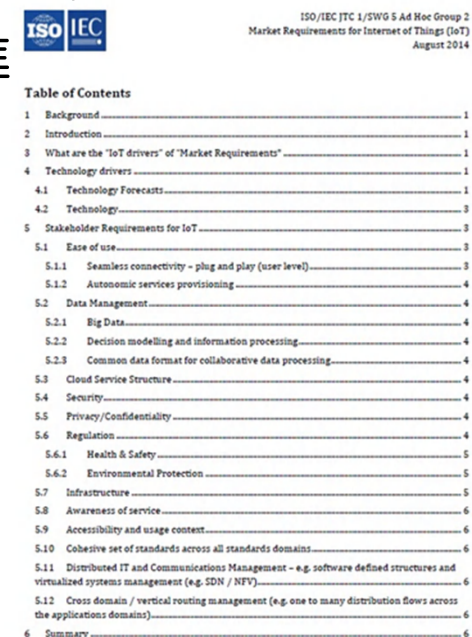
## ➤ Stakeholders requirements

- ✓ Ease of use (Seamless connectivity, Autonomic services provisioning)
- ✓ Data Management (Big Data, Decision modelling and information processing, Common data format for collaborative data processing)
- ✓ Cloud Service Structure
- ✓ Security
- ✓ Privacy/Confidentiality
- ✓ Regulation (Health & Safety, Environmental Protection)
- ✓ Infrastructure
- ✓ Awareness of service
- ✓ Accessibility and usage context
- ✓ Cohesive set of standards across all standards domains
- ✓ Distributed IT and Communications Management (e.g. SDN / NFV)
- ✓ Cross domain / vertical routing management (e.g. one to many distribution flows across the applications domains)



# SWG 5 Ad-Hoc 3 : 標準化ギャップ

- 情報収集のため、JTC 1内のみならず広く情報提供を要請するリエゾンレターを発出
- 9つの SDO (ISO, JTC 1, ITU-T, 3GPP, CEN, GS1, OGC, OMA, OMG) からIoTに関連した標準規格として418の標準を提示
- Mind Mapに沿った分類で、集まった418の標準を分類



ISO IEC  
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# SWG 5 Ad-Hoc 4：リファレンスアーキテクチャ

- 各 SDO で検討された IoT 関連の27のリファレンスアーキテクチャを調査
- 結論として、JTC 1としてのリファレンスアーキテクチャの必要性を提言

✓ IoT is emerging as a major horizontal activity which will impact the work of many JTC 1 SCs.

There is an urgent need for the development of a generic reference architecture which can help ensure a consistent approach to IoT standardization throughout JTC 1.

Study Report on IoT Reference Architectures/Frameworks  
August 2014.

## 1.1.3 ISO/IEC 29182-3: Information technology -- Sensor networks: Sensor Network Reference Architecture (SNRA) -- Part 3: Reference architecture views

ISO/IEC 29182-3:2014 provides Sensor Network Reference Architecture (SNRA) views. The architecture views include business, operational, systems, and technical perspectives, and these views are presented in functional, logical, and/or physical views where applicable. ISO/IEC 29182-3:2014 focuses on high-level architecture views which can be further developed by system developers and implementers for specific applications and services. Two such views are shown in Figures 1-2:

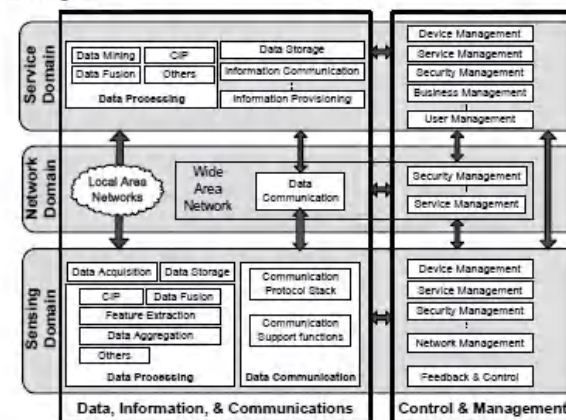


Figure 1- Sensor network functional architecture

# JTC 1/WG 10 の所掌

- JTC 1 establishes JTC 1 Working Group 10 on Internet of Things (IoT) reporting to JTC 1, with the transfer of project ISO/IEC 30141 (IoT Reference Architecture) from JTC 1 WG 7, with the following terms of reference:
  1. Serve as a focus of and proponent for JTC 1's IoT standardization program.
  - 2 . Develop foundational standards for IoT related to JTC 1 for guiding IoT efforts throughout JTC 1 upon which other standards can be developed.
  3. The work will cover:
    - Developing [Terms and Definitions for JTC 1 IoT Vocabulary](#)
    - Developing [IoT Reference Architecture](#) and [other foundational specifications](#) as JTC 1 standards
    - Continuing the work begun in SWG on IoT on [standardization gaps](#)
    - Establishing a liaison with JTC 1, ISO, IEC or other entities undertaking work related to IoT
    - Encouraging the prompt and efficient exchange of information within JTC 1 and with ISO, IEC, or other entities working on IoT, as appropriate
    - Monitoring the ongoing IoT regulatory, market, business and technology requirements
    - Developing other IoT standards that build on the foundational standards when relevant JTC 1 subgroups that could address these standards do not exist or are unable to develop them.

# JTC 1/WG 10 のfuture work -1

➤ **ISO/IEC JTC 1/WG 10 approves the re-establishment of the SRG 7 on Cyber Physical Systems (CPS) for Real-Time IoT. The Terms of Reference of SRG 7 are to:**

- a) Study the requirements and technologies on Cyber Physical Systems (CPS) for Real-Time IoT;
- b) Study the standardization requirements on Cyber Physical Systems (CPS);
- c) Identify organizations with which WG 10 should establish a liaison to share information or make joint work proposal;
- d) Review the existing Use Cases to define critical requirements related to real-time features;
- e) Review IEC SG 9 Report (WG10\_N0625);
- f) Identify the relevant metrics;
- g) Identify the possible new projects in this area for ISO/IEC JTC 1/SC 41;
- h) Submit the study report to ISO/IEC JTC 1/SC 41.

# JTC 1/WG 10 のfuture work -2

- **ISO/IEC JTC 1/WG 10 approves the establishment of the SRG 9 on Verification of use cases and implementation. The Terms of Reference of SRG 9 are to:**
  - a) Select typical uses cases, e.g., manufacturing
  - b) Study on requirements for implementation in these use cases
  - c) Study on definitions of functional blocks in IoT products
  - d) Study on interface models between these blocks
  - e) Study on operation guideline
  - f) Prepare initial draft documents for the NP proposal in ISO/IEC JTC 1/SC 41 meeting.

# JTC 1/WG 10 のfuture work -3

➤ **ISO/IEC JTC 1/WG 10 approves the establishment of the SRG 10 on Secure networking framework. The Terms of Reference of SRG 10 are to:**

- a) Survey network configuration for IoT through reviewing use cases
- b) Study on requirements on secure IoT network
- c) Survey standardization of network technologies including security and communication protocols for IoT, such as ITU-T, oneM2M, IETF, IEEE, etc. according to following aspects
  - Transport of user traffic
  - Network control
  - Network management
- d) Study on gap analysis in scope of communication view in ISO/IEC 30141
- e) Study on target performance in communication network collaborating with SRG 7 (Cyber Physical Systems (CPS) for Real-Time IoT)
- f) Prepare initial draft documents for the NP proposal in ISO/IEC JTC 1/SC 41 meeting.

# JTC 1/WG 10 のfuture work -4

- **ISO/IEC JTC 1/WG 10 approves the establishment of the SRG 11 on Classification of Internet of Things Use Cases. The Terms of Reference of SRG 11 are to:**
  - a) Build a classification of use cases
  - b) Create a link between use case classification and ISO/IEC 30141
  - c) Arrange the requirements of ISO/IEC 30141 into mandatory or recommended for every items of the classification
  - d) Consider ISO/IEC PDTR 22417 as a base of work and insert the existing use cases into classification
  - e) Improve current use case template to take into consideration classification and links to ISO/IEC 30141, Reference Architecture.

# JTC 1/SC 41 の所掌

- 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.

**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.



# JTC 1/SC 41 の体制

- Lilehammer 総会のSC設立の決議では以下とされ, SC 41 #1ではこの組織体制で会合開催予定.

SC 41 will establish its own substructure at its first meeting.

JTC 1 transfers the programmes of work and liaisons of JTC 1/WG 7 and JTC 1/WG 10 to SC 41 and recommends that SC 41 initially establish the following subgroups:

- [A working group on Sensor Networks](#) (based on JTC 1/WG 7)
- [A working group on Internet of Things](#) (based on JTC 1/WG 10)
- [A study group on Wearables technologies](#)  
(considering the Technology Trend Report document JTC 1 N 13113)

- 役職者は以下の体制.

Chairman : Mr. François Coallier (CA)

Secretariat : Ms. Jooran LEE (KR)

# 発行済みのプロジェクト(SN) -1

- ISO/IEC 29182, Information technology – Sensor networks: Sensor Network Reference Architecture (SNRA)
  - Part 1: General overview and requirements
  - Part 2: Vocabulary and terminology
  - Part 3: Reference Architecture views
  - Part 4: Entity models
  - Part 5: Interface definitions
  - Part 6: Applications
  - Part 7: Interoperability guidelines
  
- ISO/IEC 20005, Information technology – Sensor networks – Services and interfaces supporting collaborative information processing in intelligent sensor networks
  
- ISO/IEC 19637, Information technology - Sensor network testing framework

# 発行済みのプロジェクト(SN) -2

- ISO/IEC 30101, Information technology – Sensor networks: Sensor network and its interfaces for smart grid system
- ISO/IEC 30128, Information technology – Sensor networks – Generic Sensor Network Application Interface

# 開発中のプロジェクト(SN)

- ISO/IEC 30140, Information technology - Underwater acoustic sensor network (UWASN)
  - Part 1: Overview and requirements ⇒ DIS.3 (投票期間中)
  - Part 2: Reference architecture ⇒ FIDS ^
  - Part 3: Entities and interface ⇒ CD.2 (投票期間中)
  - Part 4: Interoperability ⇒ CD.2 (投票期間中)
- ✓ Editor : 韓国
  
- ISO/IEC 22560, Information technology - Sensor networks – Use cases of aeronautics industry: Active Air-flow Control ⇒ PDTR (投票期間中)
- ✓ Editor: オーストリア

# 開発中のプロジェクト (IoT)

- ISO/IEC 30141, Information technology - Internet of Things - Reference Architecture (IoT RA) ⇒ CD.2 (投票終了)
  - ✓ Editor : 中国
  - ✓ Co-editor : ドイツ, スウェーデン
- ISO/IEC 20924, Information technology - Internet of Things - Definition and Vocabulary ⇒ CD.2 (投票期間中)
  - ✓ Editor : 韓国
  - ✓ Co-editor : ドイツ, 中国
- ISO/IEC 21823-1, Information technology - Internet of Things – Interoperability for Internet of Things Systems - Part 1: Framework ⇒ WD
  - ✓ Editor : 韓国
  - ✓ Co-editor : 韓国, 中国
- ISO/IEC TR 22417, Information technology – Internet of Things – IoT Use cases ⇒ PDTR
  - ✓ Editor : 英国

# 提案予定のプロジェクト (IoT)

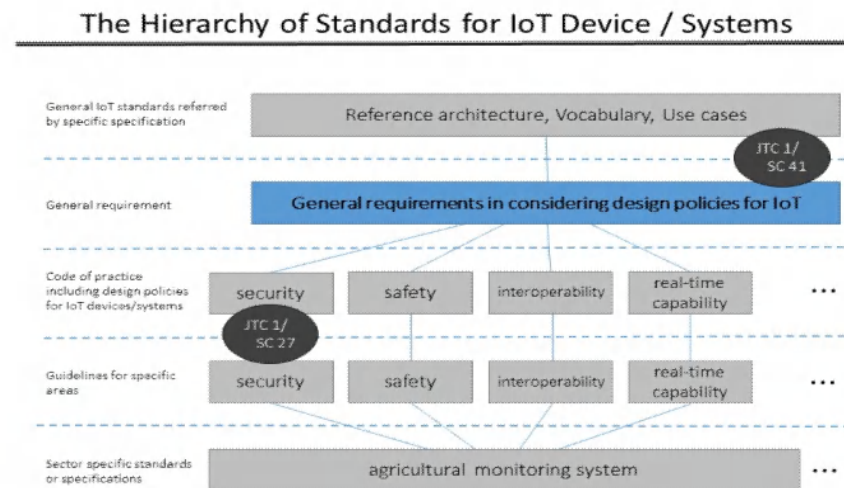
- ISO/IEC 21823-2, Information technology - Internet of Things – Interoperability for Internet of Things Systems - Part 2: Network connectivity
  - ✓ 提案国 : 中国
- ISO/IEC 21823-3, Information technology - Internet of Things – Interoperability for Internet of Things Systems - Part 3: Semantic interoperability
  - ✓ 提案国 : 韓国

# 日本提案に向けて(IoT) -1

- 収集したユースケース (ISO/IEC TR 22417) に関係なくプロジェクトが提案されている
- 提案されたユースケースを評価し、必要なプロジェクトを提案すべき旨をコメントし、SRG 9を設置することとなった
- IoTでは、センサー等からの軽量なデータが多く扱われることが想定される
- インターネット環境で、軽量な多数のデータが効率よく扱うことができることが求められる
- IoT向けの通信プラットフォームの提案を目途にSRG 10を設置することとなった

# 日本提案に向けて (IoT) -2

- 日本からIoT推進コンソーシアムが策定した「IoTセキュリティガイドライン」の国際標準化を提案.
- SC 27の A Study Period on “Guidelines for security and privacy in Internet of Things (IoT)” に提案.
- SC41に対して, 個別標準/仕様の策定にあたって検討すべき事項を一般的要求事項として提案予定.





# Internal Liaisons (WG 7)

JTC 1/WG 10	Internet of Things	
JTC 1/WG 11	Smart Cities	
JTC 1/SC 6	Telecommunications and information exchange between systems	
JTC 1/SC 31	Automatic identification and data capture techniques	
JTC 1/SC 37	Biometrics	
JTC 1/SC 38	Cloud Computing and Distributed Platforms	
IEC TC 65	Industrial-process measurement, control and automation	
IEC TC 100	Audio, video and multimedia systems and equipment	
IEC SyC AAL	Active Assisted Living	
IEC SEG 7	Smart Manufacturing	
IEC SG 9	Communication Technologies	
ISO TC 211	Geographic information/Geomatics	

# Internal Liaisons (WG 10)

JTC 1/WG 7	Sensor networks	
JTC 1/WG 9	Big Data	
JTC 1/SC 6	Telecommunications and information exchange between systems	
JTC 1/SC 25	Interconnection of information technology equipment	
JTC 1/SC 27	IT Security techniques	
JTC 1/SC 28	Office equipment	
JTC 1/SC 29/WG 11	Coding of audio, picture, multimedia and hypermedia information	Coding of moving pictures and audio
JTC 1/SC 31	Automatic identification and data capture techniques	
JTC 1/SC 35	User interfaces	
JTC 1/SC 38	Cloud Computing and Distributed Platforms	
JTC 1/SC 39	Sustainability for and by Information Technology	
IEC TC 1	Terminology	
IEC TC 91	Electronics assembly technology	
IEC TC 100	Audio, video and multimedia systems and equipment	
IEC SyC AAL	Active Assisted Living	
IEC SEG 7	Smart Manufacturing	
IEC SG 9	Communication Technologies	
ISO TC 184	Automation systems and integration	
ISO TC 211	Geographic information/Geomatics	
ISO TC 215	Health information	
ISO/TC 269	Railway applications	
ISO/TC 282/SC 2	Water reuse	Water reuse in urban areas
ISO SAG Industry4.0 /Smart Manufacturing	Industry 4.0 - Smart Manufacturing	

# External Liaisons (WG 7)

DEWI		
OGC	Open Geospatial Consortium	IoT Standardisation
ITU	International Telecommunication Union	
ITU-T SG 13	International Telecommunication Union Telecommunication Standardization Sector	Future networks (& cloud)
ITU-T SG 16	International Telecommunication Union Telecommunication Standardization Sector	Multimedia
IEEE I&MSTC-9		Instrumentation & Measurement Society Sensor Technology

# External Liaisons (WG 10)

AIM Global		
AIOTI/WG 3	The Alliance for Internet of Things Innovation	IoT Standardisation
ETSI IoT Group	European Telecommunications Standards Institute	
GS1	Global Standard One	
IEEE P2413		Standard for an Architectural Framework for the Internet of Things
IIC	Industrial Internet Consortium	
ITU-T JCA-IoT and SC&C	International Telecommunication Union Telecommunication Standardization Sector	Joint Coordination Activity on Internet of Things and Smart Cities and Communication
ITU-T SG 20	International Telecommunication Union Telecommunication Standardization Sector	IoT and its applications including smart cities and communities
NIST CPS PWG	National Institute of Standards and Technology	
OGC	Open Geospatial Consortium	
OMA DM	Open Mobile Alliance	Device Management
OMG	Object Management Group	
oneM2M		
The Open Group		
OCF	Open Connectivity Foundation	
W3C	World Wide Web Consortium	

# SC 41の会合予定

- Plenary and Working Groups
  - 2017-05-29 to 06-02 : Seoul, Korea
  - 2018-05-13 to 18 : Berlin, Germany
- Interim Meetings
  - 2017-11-13 to 17 : Delhi, India

# SC41 専門委員会

- 企業：NTTデータ, 日本IBM, パナソニック, 日立製作所, 富士ゼロックス, 富士通, 野村総合研究所, 三菱電機
- 大学：金沢工業大学, 拓殖大学, 北陸先端科学技術大学院大学, 早稲田大学
- その他：情報処理推進機構, 横浜市
- リエゾン：ビッグデータ活用実務フォーラム, SC38専門委員会, SC40専門委員会 (SC27専門委員会, SC31専門委員会：予定)
- オブザーバ：経済産業省, 総務省, 自動認識システム協会