Global Standardization Activities

Technical Trends in ISO/IEC Joint Technical Committee 1

Hideaki Yamamoto

Abstract

The International Organization for Standardization (ISO)/International Electrotechnical Commission (IEC) Joint Technical Committee (JTC) 1 is an organization established by the ISO and IEC that is responsible for international standardization in the field of information technology. This article introduces the emerging technologies being addressed by the Advisory Group, which were identified in resolutions from two recent ISO/IEC JTC 1 Plenaries.

Keywords: ISO/IEC JTC 1, Plenary, Advisory Group

1. Introduction

The International Organization for Standardization (ISO)/International Electrotechnical Commission (IEC) Joint Technical Committee (JTC) 1 [1] was established by the ISO [2] and IEC [3] and is responsible for the international standardization of information technology. Formerly, ISO/Technical Committee (TC) 97 (established in 1960) and IEC/TC 53 (established in 1961) independently promoted standardization activities in the information technology field, resulting in the duplication of some technical fields between these organizations [4]. JTC 1 was established in 1987 to solve this problem. The secretariat of JTC 1 is the American National Standards Institute (ANSI). As of June 2019, JTC 1 comprised 34 P-members (active participants) and 65 O-members (observers).

The Plenary is JTC 1's highest decision-making meeting, and the main agenda is as follows:
- Establishment and/or abolition of Subcommittees (SCs) and Advisory Groups (AGs) under JTC 1
- Appointment of SC Convenors
- Revision of Directives
- Reports on SC activities

2. Organization of ISO/IEC JTC 1

The organization of JTC 1 is shown in **Fig. 1**. The development of standards is carried out by 22 SCs and 2 Working Groups (WGs) directly under JTC 1. Discussions on management issues such as the review of Directives and on technology issues such as examination of issues with a view to development of future standards, are carried out by AGs under JTC 1. JTC 1 has established liaisons with organizations other than JTC 1, including IEC/TC 65 (industrial-process measurement control and automation), IEC/TC 100 (audio, video, multimedia systems, and equipment), ISO/TC 215 (health informatics), ISO/TC 307 (blockchain and distributed ledger technologies), ITU-T (International Telecommunication Union - Telecommunication Standardization Sector), and Ecma International.

Until the JTC 1 Stockholm Plenary held in November 2018, the JTC 1 Advisory Group (JAG), which was established directly under JTC 1, handled both management and technology issues. Because the JAG meeting was not scheduled to be held after the JTC 1 Stockholm Plenary, a management-related meeting body and a meeting body for conducting research on emerging technologies were established and reorganized directly under JTC 1.

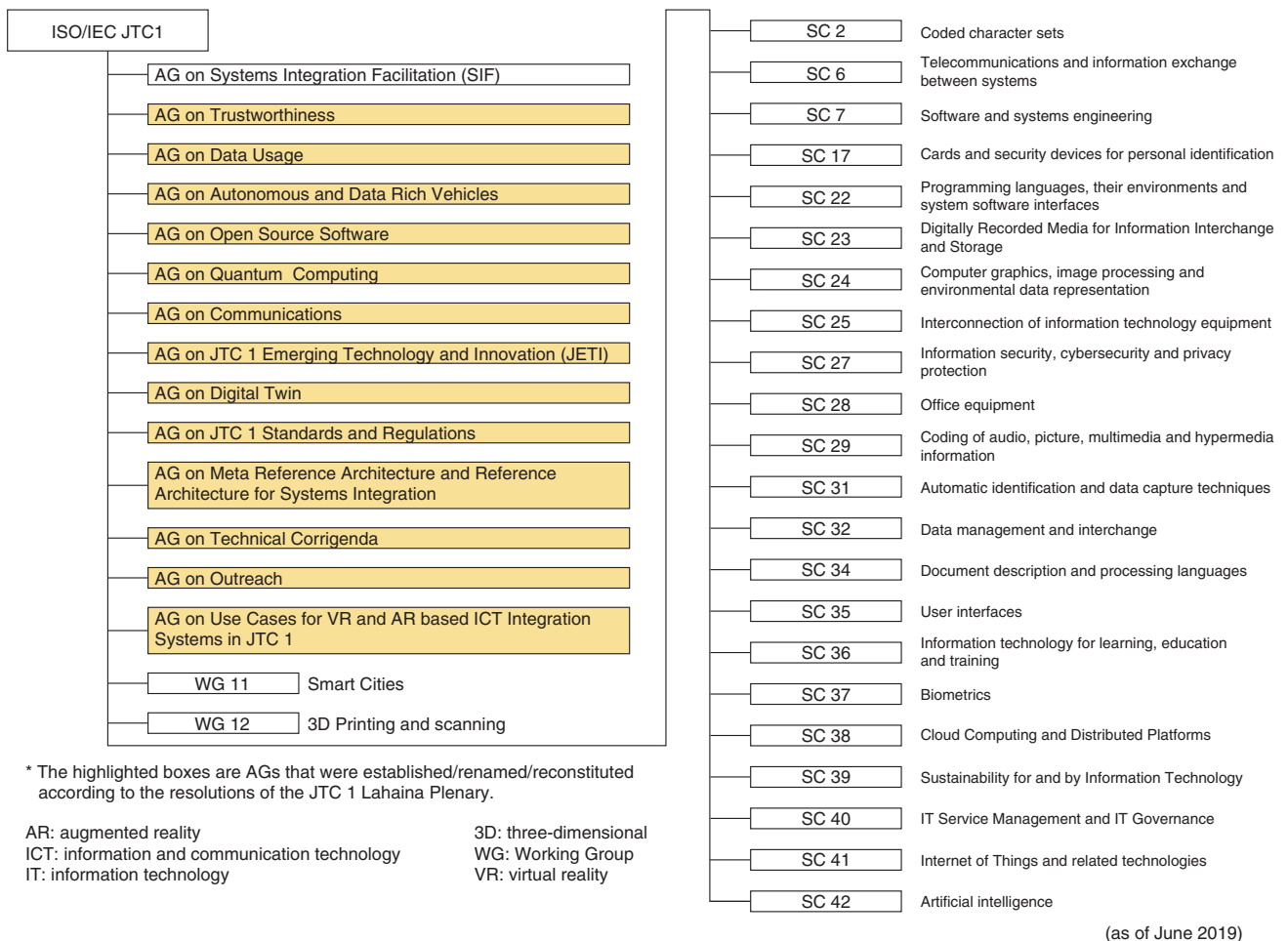Japan has contributed to the operation of JTC 1 as follows:

Fig. 1.   Organization of ISO/IEC JTC 1.

- P-members in all 22 SCs and 2 WGs directly under JTC 1
- Convenors and Secretaries of SC 2 (character code), SC 23 (digital storage media), SC 28 (office equipment), and SC 29 (media coding)
- Approximately 80 Project Editors (total in FY 2018)
- Hosts of JTC 1 Plenaries (four times, including the Okayama Plenary to be held in November 2020)

3.   Establishment of AG for emerging technologies and activities in Japan National Body

The two most recent JTC 1 Plenaries are the aforementioned one held in Stockholm and the one held in Lahaina, Hawaii, US, in May 2019.

During these Plenaries, the Japanese National Body (NB)* contributed in various ways to the management of JTC 1 activities, including by submitting contribution papers, discussing work items for newly established Study Groups (SG) (now renamed AGs), and through member participation in drafting committees.

The following sections introduce several AGs on emerging technologies. The establishment of these AGs was decided at the two recent JTC 1 Plenaries. Post-Plenary activities in the Japan NB are also introduced.

---

* NB: ISO uses the term MB (Member Body), and IEC uses NC (National Committee). As ISO/IEC JTC 1 is common to both organizations, it is called NB.

3.1 Major AGs on emerging technologies

(1) Quantum Computing

A technological survey of quantum computing in JTC 1 was conducted by the Joint Advisory Group on Emerging Technology and Innovation (JETI) [5]. JETI is an SG established within JAG in August 2016 for the purpose of identifying potential new standardization items to be addressed by JTC 1. After the JTC 1 Lahaina Plenary, JETI was reorganized as an AG just under JTC 1. JETI has defined 15 areas of top priority technology, and most recently identified 4 of those technology areas (digital twin technology, autonomous vehicles, quantum computing, and brain computer interfaces) as important emerging technologies.

In October 2018, JETI summarized a report called the Technology Trend Report (TTR), which included the results of a survey on quantum computing technology, the status of standardization activities on quantum computing in several standardization organizations, and a proposal to JTC 1. In response to this TTR, NBs including China and the US submitted contributions indicating that an SG for quantum computing should be created. The creation of the SG was decided at the JTC 1 Stockholm Plenary and renamed AG at the JTC 1 Lahaina Plenary.

This AG is chaired by Hong Yang (China), and its Terms of Reference (ToR) are listed in **Table 1**. The duration of this AG is through the May 2020 JTC 1 Plenary.

(2) Data Usage

The establishment of this AG (formerly SG) was proposed by an Australian contribution (Data Sharing Framework) submitted for the JTC 1 Stockholm Plenary. This contribution proposed to JTC 1 to consider data sharing and smart services.

Regarding this contribution, several opinions were put forward at the JTC 1 Stockholm Plenary that many SCs including SC 27 (security) and SC 38 (cloud computing) are concerned with data utilization, and this topic should be studied within JTC 1. It was raised by many countries, and the establishment of an SG (currently AG) was resolved.

This AG is chaired by Donald Deutsch (US), and its ToR is in Table 1. The duration of this AG is through the May 2020 JTC 1 Plenary.

(3) Trustworthiness

Although there is no established definition for trustworthiness, it often means "reliability in a wide sense" including safety, security, privacy, reliability (in a narrow sense), and resilience. As indicated in **Table 2**, there are different definitions of trustworthiness (trustworthy) among standards developing organizations.

In June 2018, ISO/IEC JTC 1 SC 41 (Internet of Things) raised an issue to JAG that the definition of trustworthiness should be considered at the JTC 1 level. A JAG Group on Trustworthiness was subsequently established at the JAG Toronto Meeting in August 2018. This group was reorganized as an SG directly under JTC 1 following the termination of the JAG Meeting and renamed an AG according to the resolution of the JTC 1 Lahaina Plenary.

This AG is chaired by Walter Fumy (Germany), and its ToR is indicated in Table 1. The duration of this AG is through the May 2020 JTC 1 Plenary.

(4) Digital Twin

In March 2019, JETI summarized a TTR on digital twin technology, which included the status of standardization activities on digital twin technology in several standardization organizations, and a proposal to JTC 1. This proposal requests that JTC 1 begin Digital Twin standardization, with the scope to include principles, overall framework, reference model, and reference architecture of Digital Twin, interoperability of Digital Twin, and application specific standardization in the work scope of JTC 1. In response to this TTR, the creation of the AG was decided at the JTC 1 Lahaina Plenary.

This AG is chaired by Sha Wei (China), and its ToR is also indicated in Table 1. The duration of this AG is through the November 2020 JTC 1 Plenary.

3.2 Post-Plenary activities in Japan NB

This section introduces Japan's activities after the JTC 1 Stockholm Plenary. In December 2018, the Information Technology Standards Commission of Japan (ITSCJ), corresponding to a Japanese mirror committee of ISO/IEC JTC 1 [6], established the JTC 1 Subgroup Subcommittee. This subcommittee comprehensively addresses the issues that the AGs are required to participate in as the NB. This subcommittee shares deliberations of each AG and discusses how to deal with AGs. If necessary, this subcommittee is ready to appoint experts to address the specific AGs and establish ad-hoc organizations for them. Japanese companies and organizations other than the members of this subcommittee are also interested in the emerging technology issues of data usage and trustworthiness. ITSCJ therefore established an ad-hoc organization for data usage and trustworthiness.

Table 1.   Examples of AGs for emerging technologies.

Technical field	Quantum Computing	Data Usage	Trustworthiness	Digital Twin

Terms of Reference	1. Provide a description of key concepts related to Quantum Computing, and describe relevant terminology;
	2. Study and document the technological, market and related societal requirements for the future ICT standardization on Quantum Computing;
	3. Study and document current technologies that are being deployed in Quantum Computing;
	4. Promote the awareness of JTC 1 activities on Quantum Computing outside JTC 1;
	5. Assess the current state of standardization activities relevant to Quantum Computing within JTC 1, in other relevant ISO and IEC Committees, in other SDOs and in consortia;
	6. Identify and propose how JTC 1 should address the ICT standardization needs of Quantum Computing;
	7. Engage with standards setting organizations that are involved in Quantum Computing standardization as approved by the AG on Quantum Computing.
		1. Conduct a study of potential standards for Data Sharing Frameworks that would describe factors to consider when sharing data.
		  a. Determine what is covered by data sharing frameworks.
		  b. Identify the JTC 1 subgroups that are relevant to data sharing frameworks and existing work in JTC 1, and other ISO and IEC groups.
		  c. Identify the concerns relating to data sharing frameworks, existing standards that address these concerns, and any gaps, such as:
		    i. lack of guidance and best practices for data sharing;
		    ii. why many data custodians remain hesitant to share data (cultural, economic or other reasons);
		    iii. privacy, security and safety as concerns that are raised by advocates as the capability of data analytics increases;
		2. Cooperate with SC 27, SC 32, SC 36, SC 38 and SC 42 on definitions and relationships between Personal Information and Personally Identifiable Information.
		3. Conduct a study of potential standards for defining and determining Personal Information Factor (PIF) levels along with a levels-of-assurance framework. The study should consider ISO/IEC 29115, Entity Authentication Assurance to inform the levels-of-assurance framework and consider ISO/IEC 38505-1, Governance of data.
		4. Engage with standards setting organizations that are involved in data sharing framework standardization as approved by the AG on Data Usage.
			1. Assess the current state of standardization activities relevant to Trustworthiness in JTC 1 SCs, JTC 1/WGs, other ISO and IEC Committees and other SDOs;
			2. Collect information about standardization gaps relevant to Trustworthiness;
			3. Develop a common JTC 1 definition of Trustworthiness;
			4. Describe a superset of components or considerations of Trustworthiness;
			5. Identify and propose how JTC 1 should address the standardization needs of Trustworthiness;
			6. Engage with standards setting organizations that are involved in Trustworthiness standardization as approved by the AG on Trustworthiness;
			7. Provide reports and recommendations to JTC 1 including whether a guidance document or a JTC 1 Standing Document on Trustworthiness should be developed.
				1. Provide a description of key concepts and relevant terminology related to Digital Twin;
				2. Identify current technologies and reference models that are being deployed in Digital Twin;
				3. Promote the awareness of JTC 1 activities on Digital Twin outside JTC 1;
				4. Assess the current state of standardization activities relevant to Digital Twin within JTC 1, in other relevant ISO and IEC Committees, in other SDOs and in consortia;
				5. Identify and propose the relevant standardization issues of Digital Twin that need to be addressed by JTC 1, covering at least foundational areas, ICT standardization needs, etc.
				6. Engage with standards setting organizations that are involved in Digital Twin standardization as approved by the AG on Digital Twin.
				7. Prepare a report and recommendations to JTC 1, which may include proposed New Work Items.

Source: Resolutions adopted at the meeting of ISO/IEC JTC 1, 6–10 May 2019 in Lahaina, Maui, Hawaii (ISO/IEC JTC 1 N 14262)
SDO: standards developing organization

4.   Future Plenaries

The JTC 1 Plenary will be held twice a year starting in 2019. The upcoming Plenaries will be held in New Delhi (India) in November 2019, Limerick (Ireland) in May 2020, and Okayama (Japan) in November 2020.

Table 2. Different definitions of *trustworthiness*.

Organization	Term	Definition
ISO/IEC JTC 1 SC 41	Trustworthiness	"Property of deserving trust or confidence" (Source: ISO/IEC 20924)
ISO/IEC JTC 1 SC 7	Trustworthy data	"Data and related information that is accurate, complete, relevant, readily understood by and available to those authorised users who need it to complete a task" (Source: ISO/IEC 19970-1)
IEC SC 45a	Trustworthiness	"Likelihood that an entity will behave as expected. In the context of industrial automation, attributes of trustworthiness include reliability, security, and resiliency" (Source: IEC 62918, ed. 1.0 (2014-07))

References

[1] ISO/IEC JTC 1, https://www.iso.org/isoiec-jtc-1.html
[2] ISO, https://www.iso.org/home.html
[3] IEC, https://www.iec.ch/
[4] Information Processing Society of Japan, "50-year History," 2010 (in Japanese), http://www.ipsj.or.jp/50anv/50nenshi/data/pdf/000050.pdf
[5] JETI, https://jtc1info.org/technology/jeti/
[6] ITSCJ, https://www.itscj.ipsj.or.jp/itscj_english/index.html

Hideaki Yamamoto
Manager, Information Security Management Section, NTT Information Network Laboratory Group.
He received a B.E. and M.E. in electronic engineering from Osaka University in 1994 and 1996. He joined NTT in 1996, where he has been engaged in research and development (R&D) of smart card systems, in security design of information and communication systems, and in standardization activities, mainly in ISO/IEC JTC 1/SC 17 (smart cards). He is currently in charge of risk management for NTT R&D's information and communication systems.
He received FY 2011 Industrial Standardization Awards from the Ministry of Economy, Trade and Industry for his outstanding contributions to activities regarding ISO/IEC SC 17/WG 8 (contactless cards). He is a member of the board of directors of ITSCJ and Vice Chairperson of Standard Assembly T60 (Task force for wireless card systems) in the Association of Radio Industries and Business of Japan.
He has been registered as a Professional Engineer, Japan (P.E.Jp) in electrical and electronics engineering since 2011 and in engineering management since 2015. He has been registered as an APEC Engineer (Electrical) and International Professional Engineer (IntPE) since 2015. He is a member of the Institute of Electronics, Information and Communication Engineers, the Japan Society of Applied Physics, the Information Processing Society of Japan, and the Institution of Professional Engineers, Japan.