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| **Source:** | Rapporteur RG-StdsStrat |
| **Title:** | Summary of the preparations of RG-StdsStrat panel and guidance to RG-StdsStrat |
| **Purpose:** | Information and discussion |
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| **Keywords:** | TSAG Rapporteur Groups, Standardization Strategy, Rapporteur panel |
| **Abstract:** | This TD highlights the preparations of the RG-StdsStrats panel, summarizes the outcome of the conference calls and electronic-correspondence meetings of the standardization strategy panel; provides the proposed composition of the standardization strategy panel, outlines the objectives and operation of the panel, and provides an analysis of the past three CTO group meetings and guidance from the panel to the Rapporteur Group. |

**Action**: TSAG RG-StdsStrat invited to use this document as input for its discussions and its further work.

# 1 Background of the TSAG Rapporteur Group on Standardization Strategy

The creation of a Rapporteur Group on Standardization Strategy was decided at the TSAG meeting in February 2016 as documented in the [TSAG R 7](https://www.itu.int/md/meetingdoc.asp?lang=en&parent=T13-TSAG-R-0007).

During WTSA-16, the Head of Delegation meeting agreed the TSB Director proposal to create **a panel of Rapporteurs** that would co-lead this RG. An initial proposal of the Standardization Strategy Panel members was agreed.

**2 Proposed composition of the Standardization Strategy Rapporteur Panel:**

* Mr Yoichi Maeda, CEO & S.V.P. of TTC, Japan
* Ms Judy Zhu, Standardization Director, Alibaba Group, China (P.R)
* Mr Didier Berthoumieux, Director Standards, Arch.& Sol. Applications Division
- CTO, Nokia, France
* Ms Rim Belhassine-Cherif, Chief Services and Innovation officer, Tunisie Telecom, Tunisia
* Mr Vasily Dolmatov, Expert in IT Security, Russian Federation
* Mr Stephen Hayes, Director of North American Standards, Ericsson, USA
* Mr David Ward, CTO of Engineering and Chief Architect of the Service Provider Division, Cisco, USA
* Latin America: TBD.

**3 Interim activities of the Standardization Strategy Panel**

Two conference calls took place among the panel members of the RG-StdsStrat to prepare for the RG meeting: Call #1 on 23 February 2017 and call #2 on 28 February 2017.

The members of the Standardization Strategy panel were invited to the North American CTO meeting held on 30 March 2017 in San Jose.

A face-to-face meeting will be held at lunch time on 1 May 2017.

**4 Objectives of the Panel**

* Develop inputs to the Rapporteur Group on Standardization Strategy including:
	+ Issues
	+ Priorities
	+ Challenges and strategy for standards
* Study on technical and market trends
* Identify industry needs and requirements
* Draft ITU-T standardization strategy (e.g. by expert groups and by issues).

**5 Operational guidance for the Standardization Strategy Rapporteur Panel**

* The chairmanship of the panel would rotate every 6 months among the 7 panellists; starting with Mr. Yoichi Maeda (1 January 2017 – 30 June 2017)
* The panel meets electronically every month for 90 minutes
* A SharePoint is set up for panellists to exchange documents
* The panel members are invited to the CTO meetings
* Input documents (on any topic) include:
	+ PPT Presentations and word documents
	+ CTO meeting input documents and communique
	+ Technical Reports
	+ Technology Watch Reports
	+ Other…

## **TSAG Rapporteur Group**

* The RG meets under the usual RG rules
* Contribution driven (member contributions, Liaisons and inputs from the panel)
* RG formulate recommendations to TSAG

**6 Summary of outcomes of CTO meetings**

**Introduction**

The RG-StdsStrat panels reviewed the communiques from the CTO meetings (ref. [TSAG TD 101](https://www.itu.int/md/meetingdoc.asp?lang=en&parent=T17-TSAG-170501-TD-GEN-0101)) which were held after the last TSAG meeting and propose to TSAG to encourage the relevant ITU-T SGs to proceed the proposed work items with considering the coordination with the relevant SDOs with a clear vision on standardization roadmap and landscape for each specific hot topic.

This document provides some key discussions extracted from the CTO Communiques and provides summary of hot standardization issues to identify industry needs and requirements for the ITU-T standardization. Three Regional and Global CTO consultation meetings took place since the last TSAG meeting and provided Communiques on the results of the meetings, namely:

1. [North American](https://www.itu.int/en/ITU-T/tsbdir/cto/Documents/170330/communique-170330.pdf) CTO Meeting. 30 March 2017, San Jose, CA, United States
2. [8th CTO Meeting](https://www.itu.int/en/ITU-T/tsbdir/cto/Documents/161123/Communique%20-%20CTO%20meeting%20Bangkok%20-%20final.pdf). 13 November 2016, Bangkok, Thailand
3. [CxO Meeting](https://www.itu.int/en/ITU-T/tsbdir/cto/Documents/161023/CxO_final_communique.pdf).  23 October 2016, Yasmine Hammamet, Tunisia.

**6.1 North American CTO meeting: 30 March 2017 in United States**

The focus of the CTOs in the North American region was standardization activities towards realizing the 5G Vision. The RG-StdsStrat recognized that 5G is one of important standardization issues in ITU-T and identified the interesting study issues in the communique. The RG-StdsStrat panels would like to encourage TSAG to promote and support the relevant standardization activities to realize the 5G vision in ITU-T.

**6.1.1 5G/IMT-2020 infrastructure**

1. CTOs were of the view that a unified, access-independent network management framework would be a key enabler of seamless service operation and provisioning across fixed and mobile networks. CTOs called on ITU-T to contribute to and coordinate the standardization required to enable **WiFi-cellular integration** (simultaneous radios), anchorless mobility, anchorless content and active endpoints at the service layer to enable the network capability of analyzing and optimizing the quality of user experience.
2. CTOs stated that 5G will have significant impacts on the semiconductor industry and that 5G will push digital signal-processing platforms to their limits. The discussions emphasized **the need for cost-effective novel chip architectures** to enable high-performance signal processing, while also meeting the demand for greater flexibility, security, lower power consumption, and limited chip size.
3. CTOs recognized a new Resolution/WTSA-16 on **non-radio aspects of 5G**, which calls on ITU-T to strengthen and accelerate its standardization activities in the field of 5G networks and services. CTOs recognized ITU-T standardization activities on 5G are led by **ITU-T SG13** with the FG’s delivery of a set of draft ITU standards and technical reports.
4. To foster convergence, participants invited ITU-T to collaborate with the various organizations active in this space, making full use of its recently established Joint Coordination Activity **(JCA) on IMT-2020**.

**6.1.2 5G applications and services**

1. **ICN (information-centric networking)** has the great potential to enable faster and more robust content delivery, supporting strategies to enable dynamic, experience-oriented performance and quality management, including for voice, video and data services. CTOs recognized ITU has delivered standards describing ICN’s framework, requirements and capabilities, and encouraged ITU-T to accelerate its ICN standardization activities, addressing issues such as scalability, mobility and security.
2. CTOs highlighted that **ICN software has been open sourced** and is currently being validated in research networks around the world. They invited ITU to contribute to the advancement of ICN technology and to contribute to the expansion of the community driving ICT innovation.
3. CTOs acknowledged that a key benefit of 5G systems and software-based networking functions would be the ability to optimize performance on a per-session basis. One of the most relevant performance targets would be to **enable good end-user experience across a range of services**. It was noted that emerging network and computing technologies should ultimately allow multiple media and metadata streams to be managed with a high quality of experience (QoE) for cross-service, user-centric sessions.
4. CTOs highlighted that fulfilling this potential would require the technology and standards community to determine how the targeted **user experience** should be defined. This definition would inform how services are specified, quantifying the targeted experience as part of a service template and enabling metrics to be made available within the service delivery platform to indicate whether or not the targeted experience is being achieved, providing associated feedback to network functions. Devices would be required to participate actively in the collection and reporting of the metrics.
5. CTOs encouraged ITU’s standardization expert group for ‘performance, QoS and QoE, **ITU-T SG12**, to identify candidate elements to populate the templates specifying the targeted user experience; study in-service mechanisms to evaluate whether or not the targeted experience is being achieved; and, in collaboration with other organizations active in this field, explore optimization priorities and strategies as well as define tokens for the allocation of network and computing resources.
6. **Performance-optimization strategies** could also have the potential to address concerns around the deteriorations in voice quality perceived by users of mobile communications. While CTOs acknowledged that poor voice quality could be attributable to operator policy and resource allocation rather than technical limitations, these CTOs suggested that standards and intelligent tools capable of measuring, logging and reporting end-user experience could make a valuable contribution to improved voice quality.
7. CTOs called for standardized approaches to the **mitigation of threats to security and privacy**, highlighting the potential to update or extend existing protocols such as SSL/TLS. Participants welcomed ITU’s initiative to investigate the potential of blockchain and its implications for security, and emphasized the value of distributed ledger technology in the provision of IoT services and digital financial services in a 5G environment.
8. CTOs were briefed on the establishment of a new ITU-T Focus Group to research **data processing and management** in the context of smart cities. The priority of this open group will be to propose mechanisms supporting the interoperability of datasets and data-management systems. The group will investigate established data-management technologies as well as emerging trends such as blockchain, promoting efficient, scalable approaches to the management of systems data.

**6.2 8th CTO meeting: 13 November 2016 in Thailand**

The results of the WTSA-16 and standards for future smart 5G systems were the key topics discussed at the CTO meeting held at the outset of ITU Telecom World 2016 in Bangkok, Thailand, and provided the private sector an opportunity to brief, advise and exchange views with ITU on industry needs and standardization priorities. This meeting discussed strategies to accelerate the deployment of **gigabit-speed broadband access networks** and the new industry dynamics introduced by the rise of **over-the-top (OTT) services**.

**6.2.1 Security, Privacy and Trust in Standardization**

The CTO meeting took note of the conclusions of the Global Standards Symposium (GSS-16) held the day prior to WTSA-16, which tackled the theme of ‘**Security, Privacy and Trust in Standardization**’. The conclusions of GSS-16 underlined the need to support and promote principles of transparency and technological integrity; mitigate the risks posed by IoT botnets using security standards; and assess the impact of quantum computing on security, privacy and trust.

**6.2.2 5G technology and standards landscape**

One of the key results of WTSA-16 was the agreement of a new Resolution (Resolution 92) on non-radio aspects of international mobile telecommunications (IMT), which calls on ITU-T to strengthen and accelerate its standardization activities in the field of IMT-2020 (5G). The meeting was informed of a recent cooperation agreement between ITU and the NGMN Alliance, highlighting the mutual intent of both organizations to coordinate their contributions to the development of 5G technology and architecture.

The CTO meeting discussed t**he phased approach employed by 3GPP in developing a new 5G system** architecture and core network. Phase 1 will comprise a basic system that meets expectations for initial deployments of 5G systems, including the new 5G core network. Phase 2 will build a complete, feature-rich 5G system using the basic system as a foundation to ensure backward compatibility, and enable convergence with the fixed network. While the work in 3GPP is central to 5G architecture, collaboration with BBF on convergence, and with ETSI on NFV and MEC, amongst others, is ongoing.

CTOs highlighted that **a single end-to-end network management standard covering both wireless and wireline networks**, and an integrated control, orchestration and management platform, would constitute stepping stones towards convergence, an important goal for future 5G systems. The system architecture should leverage **software-based networking functions** as well as **multi-access edge computing** to cater to a large number and variety of use cases, in different industry segments. Participants in the meeting also stressed **the need for a review of user and device authentication mechanisms**, including harmonized security-by-design frameworks, with a view to reducing fragmentation and discouraging unauthenticated access technologies.

CTOs were of the opinion that organizations working on 5G system architecture standards should **strengthen collaboration to foster a coherent set of 5G-relevant standards**, and encouraged ITU-T to ensure interoperability in a multi-vendor environment, e.g., by defining critical network interfaces. The meeting agreed that **standards and open-source software** make complementary contributions to the development of 5G systems, and that more effort should be made to facilitate the exchange of work between these communities.

The meeting highlighted the importance for **standardization efforts to be aligned with the IMT-2020 deliverables of ITU-R**, ensuring that work on the network aspects of 5G is informed by the progression of its radio-transmission systems.

CTOs recognized that standards, harmonized at a global level, would facilitate **collaboration between the ICT sector and other industry sectors**, enabling the development and roll-out of end-to-end solutions for multiple industries on a common network platform. In order to identify detailed requirements of the automotive, healthcare, utilities and other vertical sectors, and to address their needs in the ICT standardization processes, it was suggested to **establish and leverage cross-industry partnerships,** and to open future CTO meetings to high-level executives representing these markets.

The CTO meeting also encouraged ITU-T to identify strategies, in close **coordination with ITU-D**, to assist developing countries and emerging markets in the implementation of future 5G systems, identifying relevant cost-effective use cases for 5G systems and related migration scenarios.

**6.3 CxO meeting: 23 October 2016 in Tunisia**

Strategies to accelerate the deployment of **gigabit-speed broadband access networks** and the new industry dynamics ushered in by the rise of **over-the-top (OTT) services** were the key topics discussed at a CxO meeting (the high level executives including CEO, CTO, CSO, etc.), representing leading ICT companies, with the Arab and African regions especially well-represented, and the senior management of the ITU-T. This CxO meeting was held at the outset of ITU’s WTSA-16 in Hammamet, Tunisia.

The CxOs agreed to hold regular meetings in this format to review the progress, adjust and refine the recommendations for action. Trace Media Telecom Review kindly offered to host the next meeting in **Dubai, December, 2017**.

**6.3.1 Over-the-top (OTT) services – opportunities and challenges for telecommunications operators**

In recent years, telecommunications operators have witnessed exponential growth in data traffic, and declining revenues for their voice and messaging services. This trend has impacted the financial stability of certain operators, sometimes with significant implications for the GDP of national economies. Participants in the CxO meeting noted that operators have seen the emergence of new opportunities and challenges as a result of the proliferation of **services delivered over communications networks by third party providers, so-called OTT services**. Participants recognized that to date – despite frequent discussion, in many venues – no adequate, sustainable approach has been found to address the interplay of OTT service providers and operators. They requested a fair level playing field and that OTT players need to be subject to the same regulations as those of the telecoms sector, when providing an equivalent service.

The CxO meeting called on ITU-T to study **the economic impact of OTT services on operators**, and to develop international standards and a holistic approach to address the OTT market environment. CxOs suggested that ITU study groups should act as international platforms to the issues at play, **study viable business models and develop best practices**, and build partnerships between operators and OTT service providers. Collaboration with other standards bodies and industry organizations was encouraged.

Participants in the meeting highlighted that users, operators and service providers – particularly in developing countries – would benefit from **international standards, frameworks, best practices and guidelines addressing OTT services** in the telecom environment. The view of the CxOs is that this guidance would help to place industry players in developing countries in a stronger position to compete internationally, as well as provide a wider choice of ICT products and services at a lower cost, with greater quality and ease of access.

Concerning information security and privacy in today’s data-driven society, and in OTT services in particular, CxOs noted that conflicts can sometimes arise in the interests of users, network operators, service providers and governments. The meeting was of the view that **all stakeholders would need to increase their collaboration to address security and privacy**, sharing information on threats and data usage and establish appropriate risk-detection mechanisms and procedures to respond to data breaches.

It was also pointed out that a shift from system-centric to **data-centric security** will be necessary to account for the new security challenges associated with new data-driven applications and services. Participants in the meeting encouraged ITU to play a more active role in this regard, highlighting that international standards and frameworks for security, privacy and trust in ICT infrastructure and services are key ingredients to achieving the desired outcomes.

**6.3.2 G.fast and other broadband access technologies based on ITU standards**

Ambitious broadband targets set by governments worldwide, highly competitive ICT markets and the massive growth in data traffic, largely driven by video, are among the key factors motivating operators to provide **Gigabit-capable broad access services**.

The CxO meeting reviewed recent developments and **deployments of broadband access networks**, including those championed and standardized by ITU-T, such as G.fast, G.hn, VDSL2 and passive optical networks (e.g., NG-PON2).

The meeting also discussed fixed wireless access and solutions combining two or more heterogeneous networks (e.g., LTE and Wi-Fi) to achieve increases in bandwidth and reductions in network cost, especially to support the delivery of high-definition video services. The meeting invited ITU-T to consider **the inclusion of such hybrid approaches in its portfolio of access network standards**.

Participants agreed that hybrid, technology-agnostic networks would constitute a stepping stone towards **true fixed-mobile convergence**, an important requirement for the development of 5G networks.

**6.3.3 Augmented reality & virtual reality**

Augmented reality and online virtual reality form prime use cases for gigabit-speed connections and 5G networks. These applications offer an enhanced user experience, but these applications are very demanding of the network with respect to throughput and latency. A range of innovative technologies in transport, IP and access networking, media coding and cloud and edge computing are under development to fulfil these stringent requirements. The meeting recommended that ITU consider **augmented and virtual reality** as topics of great strategic importance, creating the necessary synergies between ITU study groups, and between relevant standards bodies in order to lay the foundations for standards and interoperability in this domain.

**6.4 Proposed summary of identified key issues in the Communiques**

The following key issues are extracted by the RG-StdsStrat panel to identify the candidates to study in the strategic standardization based on the industry needs and requirements. The RG-StdsStrat panel proposes TSAG to select the issues listed above with priorities and develop standardization strategy actions and reports for the selected topics.

* 5G/IMT-2020 infrastructure
	+ WiFi-Cellular integration (a unified access-independent network management)
	+ Integrated control, orchestration and management platform
	+ Collaboration with other SDOs; with 3GPP on 5G architecture, with BBF on convergence and with ETSI on NFV and MEC (Multi-access Edge Computing)
	+ Cost-effective novel chip architectures for high-performance 5G requirements.
* Gigabit-speed broadband access services and networks
	+ Support the delivery of high-definition video services
	+ Broadband access networks; G.fast, G.hn, VDSL2, NG-PON2
	+ True fixed-mobile convergence, hybrid fixed wireless.
* 5G applications and services
	+ ICN (Information Centric Networks) with scalability, mobility and security
	+ Software-based networking functions to optimize a per-session based performance
	+ Open-source software and standards
	+ Collaboration between the ICT sector and other industry sectors; requirements of the automotive, healthcare, utilities and other vertical sectors.
* Performance, QoS and QoE
	+ Good end-user experience for cross-service and user-centric sessions
	+ Performance-optimization strategies.
* Security, Privacy and Trust
	+ Principles of transparency and technological integrity
	+ Mitigation of the risks posed by IoT botnets
	+ Assessment of the impact of quantum computing
	+ Study the value of blockchain and distributed ledger technologies in an operator’s network
	+ Data-centric security.
* OTT services and the economic impacts, Cross-industry collaboration
	+ The interplay of OTT service providers and operators, particularly in developing countries
	+ The economic impact of OTT services and operators
	+ International standards, frameworks, best practices and guidelines on OTT services.
* Augmented reality & Virtual reality, Video services
	+ Applications with high network requirements in throughput and latency
	+ A range of innovative technologies in transport, IP and access networking, media coding and cloud and edge computing.

**7 Proposed actions by the RG-StdsStrat panel**

The following actions are proposed by the RG-StdsStrat panel to promote the strategic standardization issues based on the industry needs and requirements.

* Identify work items and activities that
	+ are already under work in study groups etc
	+ are already under work in other SDOs
	+ where new topics should be handled (SGs, FGs, etc)?

Encourage the establishment of Focus Groups on some strategic issues, if deemed necessary, in order to accelerate related studies within ITU-T and allow more entities from the industry to collaborate and share expertise as focus groups are also open to non-ITU members.

* Survey the standardization needs and the priorities on the innovative technologies
* Develop reports (white papers) on standardization roadmap and landscape for specific hot topics.

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