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| ITU logo | INTERNATIONAL TELECOMMUNICATION UNION**TELECOMMUNICATIONSTANDARDIZATION SECTOR**STUDY PERIOD 2017-2020 | **TSAG-TD734** |
| **TSAG** |
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| **TD** |
| **Source:** | Rapporteur, TSAG RG-StdsStrat |
| **Title:** | Update of the hot topics list |
| **Purpose:** | Information, Discussion |
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| **Keywords:** | Standardization strategy; Hot topics; Status; CTO meeting; CxO meeting; |
| **Abstract:** | This TD provides an update of the list of hot topics taking into account the outcomes of the 11th TSB Director CTO Consultation Meeting (8 September 2019, Budapest, Hungary) and the last TSB Director CxO Consultation Meeting (11 December 2019, Dubai, United Arab Emirates). |

**Action**: TSAG RG-StdsStrat is invited to review this update.

During the last TSAG meeting in September 2019, RG-StdsStrat reviewed [TSAG-TD606](https://www.itu.int/dms_pub/itu-t/md/17/tsag/td/190923/GEN/T17-TSAG-190923-TD-GEN-0606%21%21MSW-E.docx) which proposed a consolidated list of hot topics based mainly on the analysis of the responses of ITU-T Study Groups to [TSAG LS-16](https://www.itu.int/ifa/t/2017/ls/tsag/sp16-tsag-oLS-00016.doc) on Hot Topics, and a revised version ([TSAG-TD606R1](https://www.itu.int/dms_pub/itu-t/md/17/tsag/td/190923/GEN/T17-TSAG-190923-TD-GEN-0606%21R1%21MSW-E.docx)) was provided following the discussion of this TD.

In the last interim meeting of the RG-StdsStrat, held on 20 January 2020, it was agreed to have the list of hot topics updated from the communiqués of the 11th TSB Director CTO Consultation Meeting (8 September 2019, Budapest, Hungary) and the last TSB Director CxO Consultation Meeting (11 December 2019, Dubai, United Arab Emirates) as in [TSAG-TD582](https://www.itu.int/dms_pub/itu-t/md/17/tsag/td/190923/GEN/T17-TSAG-190923-TD-GEN-0582%21%21MSW-E.docx) and [TSAG-TD661](https://www.itu.int/dms_pub/itu-t/md/17/tsag/td/200210/GEN/T17-TSAG-200210-TD-GEN-0661%21%21MSW-E.docx) respectively.

The two communiqués were reviewed and potential additional hot topics were identified as follows:

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| **Proposed additional hot topics** | **Source** | **Comments** |
| End-to-end security and trust in 5G | CTO meetingCxO meeting | Added as Sub Hot Topic to Hot Topic **5-** **Realizing 5G/ IMT-2020 vision** |
| Identify scenarios and best practices for Network infrastructure sharing | CTO meetingCxO meeting | Added as new Hot Topic |
| Establish a 5G observatory to gain lessons from various technical developments and implementations of 5G technology, use cases and vertical experiments | CTO meeting | Added as Sub Hot Topic to Hot Topic **5-** **Realizing 5G/ IMT-2020 vision** |
| Develop guidance for operators on the business rationale for 5G deployment | CTO meeting | Added as Sub Hot Topic to Hot Topic **5-** **Realizing 5G/ IMT-2020 vision** |
| Real-time monitoring of network performance  | CTO meeting | Added as Sub Hot Topic to a new Hot Topic: **Performance, QoS and QoE assessment** |
| Network performance prediction | CTO meeting | Added as Sub Hot Topic to a new Hot Topic: **Performance, QoS and QoE assessment** |
| Standardization of open, interoperable RAN interfaces and RAN functional architecture  | CxO meeting | Added as Sub Hot Topic to Hot Topic **5-** **Realizing 5G/ IMT-2020 vision** |
| Real-time network monitoring | CxO meeting | Added as Sub Hot Topic to Hot Topic **3-** **Intelligence for network automation, augmentation and amplification** |
| Automation informed by machine learning for network operation and maintenance | CxO meeting | Added as Sub Hot Topic to Hot Topic **3-** **Intelligence for network automation, augmentation and amplification** |
| Compliance, conformance and quality testing for Intelligent Transport Systems | CxO meeting | Added as Sub Hot Topic to a new Hot Topic: **Performance, QoS and QoE assessment** |
| Measurement of user-perceived QoS | CxO meeting | Added as Sub Hot Topic to a new Hot Topic: **Performance, QoS and QoE assessment** |

The hot topics list in [TSAG-TD606R1](https://www.itu.int/dms_pub/itu-t/md/17/tsag/td/190923/GEN/T17-TSAG-190923-TD-GEN-0606%21R1%21MSW-E.docx) was then updated to include the above-mentioned additional hot topics (updates are highlighted in yellow).

The same format of the list, as in [TSAG-TD606R1](https://www.itu.int/dms_pub/itu-t/md/17/tsag/td/190923/GEN/T17-TSAG-190923-TD-GEN-0606%21R1%21MSW-E.docx), was maintained as agreed during the interim meeting of the RG-StdsStrat last January. No updates were applied on the third column of the table on *Work items, (planned) activities (WS, FG, etc., comments)* as this column includes information provided by Study Groups.

**Updated List of topics (As of 9 February 2020)**

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| **Topic [References]** | **ITU-T Topic Point of Contacts**  | **Work items, (planned) activities (WS, FG, etc., comments** |
| 1. **OTT services and the economic impacts, Cross-industry collaboration [**[**TSAG TD101**](https://www.itu.int/md/meetingdoc.asp?lang=en&parent=T17-TSAG-170501-TD-GEN-0101)**]**
* 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.
 | **SG3****SG2****SG9****SG16****SG17** | **[SG3: TD330]**1. [D7\_R\_OTTBypass](https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=14531) (Regional Recommendation on OTT bypass including national and regional collaboration between Member States and operators to deal with the OTT bypass issue)
2. [D.50Supp\_OTT](https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=13500) (OTTs in the context of IIC);
3. [D.ConsumerOTT](https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=14123) (Customer redress mechanism and consumer protection);
4. [D.262 (ex D.OTT)](https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=13503) (Collaborative Framework for OTTs);
5. [D.OTTBypass](https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=13522) (OTT Bypass);
6. [D.OTTMNO](https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=13521) (Guidelines on OTT-MNO Partnerships).

**[SG2: TD344]**New work items on OTT are under development in SG2New work item in regards to the use of E.164 Numbers as identification for OTT. SG2 will be working on a technical report to study the current use of telephone numbers, as well as a supplement to provide guidance ([SG2-TD 683-R2](https://www.itu.int/md/T17-SG02-190219-TD-GEN-0683/en) and [SG2-TD 687-R2](https://www.itu.int/md/T17-SG02-190219-TD-GEN-0687)).**[SG9: TD404]**Regarding OTT services, SG9 has started a new work item on draft Recommendation J.cable-ott “System architecture and interfaces between a cable television operator and an OTT service provider”.**[SG16: TD347]**SG16 is working on technical aspects of provisioning of OTT service over IPTV**[SG17: TD 362]**SG17 Correspondence Group on transformation of security studies identified the OTTs as part of the Digital Service Providers (DSPs) ecosystem.- work items, e.g. X,1147 (X.srfb), X.1450 (X.hakm), X.sfop  |
| 1. **VoLTE/ViLTE interconnection and adoption of ENUM for IMS interconnection [**[**TSAG TD160**](https://www.itu.int/md/meetingdoc.asp?lang=en&parent=T17-TSAG-180226-TD-GEN-0160)**]**
 | **SG11** in cooperation with SG2 | **[SG11: TD349]**1. Related achievements of ITU-T SG11 include:* [Q.3640](https://www.itu.int/ITU-T/recommendations/rec.aspx?rec=13482): Framework of interconnection of VoLTE/ViLTE-based networks
* [Q.3953](https://www.itu.int/ITU-T/recommendations/rec.aspx?rec=13490): VoLTE/ViLTE interconnection testing for interworking and roaming scenarios
* Q.Suppl69: Framework for interconnection between VoLTE-based network and other networks supporting emergency telecommunications service (ETS)
* [ITU Regional Forum](https://www.itu.int/en/ITU-T/Workshops-and-Seminars/20180604/Pages/default.aspx) on “Internet of Things, Telecommunication Networks and Big Data as basic infrastructure for Digital Economy” (St. Petersburg, Russia, 4-6 June 2018)
* [ITU Regional Workshop](https://www.itu.int/en/ITU-D/Regional-Presence/CIS/Pages/EVENTS/2018/10_Samarkand/10_Samarkand.aspx) on deployment of VoLTE/ViLTE networks based on IMS. From standardization to implementation (Samarkand, Uzbekistan, 2-3 October 2018)

2. Related current work items of SG11 include:* Q.DEN\_IMS: Signalling architecture of distributed ENUM networking for IMS

**[SG17: TD362]**Q2/17 developed X.1041 (X.voltesec-1): Security Framework for voice-over-long-term-evolution (VoLTE) Network Operation. |
| 1. **Intelligence for network automation, augmentation and amplification [**[**TSAG TD160**](https://www.itu.int/md/meetingdoc.asp?lang=en&parent=T17-TSAG-180226-TD-GEN-0160)**,** [**TSAG-TD661**](https://www.itu.int/dms_pub/itu-t/md/17/tsag/td/200210/GEN/T17-TSAG-200210-TD-GEN-0661%21%21MSW-E.docx)**]**
* Identify the standardization needs for intelligence in 5G systems and the telecommunications sector.
* Automatic detection and resolution of anomalies and other incidents of inefficiency, as well as predictive maintenance will reduce the operational expenditure of network operators and service providers
* Address the architecture, interfaces, functional entities, service scenarios and protocols required for intelligence retrieval and actuation, and the performance benchmarking and certification of AI techniques
* Usage of AI in security management solutions
* Real-time network monitoring
* Automation informed by machine learning for network operation and maintenance
 | **SG13****SG9****SG20** | **[SG9: TD404]**Regarding intelligence for network automation, augmentation and amplification, SG9 has started a new work item on draft Recommendation J.pcnp-fmw “Premium Cable network platform with embedded intelligent analyzer and controller for enabling advanced multimedia services”.**[SG13: TD356]**Y.sfes: Smart Farming Education Service based on u-learning environmentY.qos-ml-arc: Architecture of machine learning based QoS assurance for IMT-2020 networkY.MecTA-ML: Mechanism of traffic awareness for application-descriptor-agnostic traffic based on machine learningY.MLaaS-reqts: Cloud computing - Functional requirements for machine learning as a serviceY.IMT2020-ML-arc: Architectural framework for machine learning in future networks including IMT-2020**[SG17: TD362]**Network automation, augmentation and amplification with the promise of a “Zero Touch” will include Security at its design level. SG17 identified this gap as well as others and is putting 5G Security at the core of its Q6/17 as lead question SG17 and SG13 should collaborate here.**[SG5: TD374]**ITU-T SG5 draft L.DCIM “Specifications for datacentre infrastructure management system based on big data and artificial intelligence technology”.**[SG20]**Y.4116: “Requirements of transportation safety service including use cases and service scenarios”.Y.IoT-AV-Reqts: “Requirements and capability framework of IoT infrastructure to support network-assisted autonomous vehicles”. |
| 1. **Open APIs, enabling third parties to access and build on network capabilities to develop innovative, reusable services [**[**TSAG TD160**](https://www.itu.int/md/meetingdoc.asp?lang=en&parent=T17-TSAG-180226-TD-GEN-0160)**]**
 | **SG13****SG11** (Cooperating SG)SG20 | **[SG13: TD356]**Y.PTDN-T-interface: T interface in Public packet Telecommunication Data Network (PTDN)**[SG11: TD349]**Work item in Q6/11Q.CE-APIMP: Protocol for managing capability exposure APIs in IMT-2020 network**[SG17: TD362]**Open APIs cannot be delivered without Security (by design) which is what Q7/17 covers. SG17 and SG13 should collaborate here.**[SG20]**Y.IoT-NCM-reqts: Requirements and capabilities of network connectivity management in the Internet of things. |
| 1. **Realizing 5G/ IMT-2020 vision [**[**TSAG TD101**](https://www.itu.int/md/meetingdoc.asp?lang=en&parent=T17-TSAG-170501-TD-GEN-0101)**,** [**TSAG TD160**](https://www.itu.int/md/meetingdoc.asp?lang=en&parent=T17-TSAG-180226-TD-GEN-0160)**,** [**TSAG C27-R2**](https://www.itu.int/md/meetingdoc.asp?lang=en&parent=T17-TSAG-C-0027)**,** [**TSAG C29**](https://www.itu.int/md/meetingdoc.asp?lang=en&parent=T17-TSAG-C-0029)**, TSAG-TD582**,[**TSAG-TD661**](https://www.itu.int/dms_pub/itu-t/md/17/tsag/td/200210/GEN/T17-TSAG-200210-TD-GEN-0661%21%21MSW-E.docx)**]**
* Unified access-independent network management
* Standardization roadmap on IMT-2020
* ICN (Information Centric Networks) with scalability, mobility and security
* Open-source software and standards for 5G
* Software-based networking functions to optimize a per-session based performance
* Emerging fronthaul and midhaul technologies to support the 5G deployment
* Large-bandwidth backhaul and fronthaul solutions
* Concrete strategies for the migration from 4G to 5G systems.
* End-to-end network orchestration, control and management
* Service-based network architecture
* Open service management APIs for the Internet of Things
* Electromagnetic field (EMF) studies around 5G beam-forming capabilities
* Interoperability of services supporting public safety.
* Control and management protocols for IMT-2020
* Virtualized deployment of recommended methods for network performance, quality of service (QoS) and quality of experience (QoE) assessment.
* Establish a 5G observatory to gain lessons from various technical developments and implementations of 5G technology, use cases and vertical experiments
* Develop guidance for operators on the business rationale for 5G deployment
* Standardization of open, interoperable RAN interfaces and RAN functional architecture
* End-to-end security and trust in 5G
 | **SG13** in cooperation with SGs 2, 3, 5, 11, 12, **15,** 16, 17 and 20 | **[SG5: TD374]**ITU-T SG5 has established the vision on “Setting the Environmental Requirements for 5G”. During its September 2018 meeting, ITU-T SG5 has agreed on the Supplement K.Suppl.16 (ex. K.Supp-5G\_EMF\_Compliance) on Electromagnetic field (EMF) compliance assessments for 5G wireless networks.Additionally, SG5 is working on the following work items:* ITU-T L.5g\_powering on “Sustainable power feeding solutions for 5G network”
* ITU-T L.EE\_5G on “Energy efficiency Metrics and measurement methodology for 5G solutions”
* ITU-T L.ENV-KPI-5G-ARCH on “Environmental KPIs/metrics for 5G architectures”

**[SG13: TD356]**Y.NGNe-O-arch: Functional architecture of orchestration in NGNeY.IMT2020-qos-fa: QoS functional architecture for IMT-2020 networks[Y.IMT2020-qos-req](https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=14740); QoS requirements for IMT-2020 networkY.qos-ml-arc: Architecture of machine learning based QoS assurance for IMT-2020 networkY.IMT-2020.qos-mon: IMT-2020 network QoS monitoring architectural frameworkY.IMT2020-CEF: Network capability exposure function in IMT-2020 networksY.3MO: Requirements and Architectural Framework of Multi-layer, Multi-Domain, Multi-Technology OrchestrationY.IMT2020-ADPP: Advanced Data Plane Programmability for IMT-2020Y.NetSoft-SSSDN: High level architectural model of network slice support for IMT-2020 - Part: SDNY.NSOM: Network slicing orchestration and managementY.FMC-ARCH: Functional architecture for supporting fixed mobile convergence in IMT-2020 networksY.FMC-CE: Capability exposure enhancement for supporting FMC in IMT-2020 networkY.FMC-EC: Unified edge computing for supporting fixed mobile convergence in IMT-2020 networksY.FMC-MM: Mobility management for fixed mobile convergence in IMT-2020 networksY.FMC-ReqMO: IMT-2020 FMC functional requirements for management and orchestrationY.FMC-SM: Session management for fixed mobile convergence in IMT-2020 networksY.FMC-SS: Service scheduling for supporting FMC in IMT-2020 network**[SG11: TD349]**1. Related achievement of SG11:* Q.5001: Signalling requirements and architecture of intelligent edge computing

2.Related current work items of Q6/11:* Q.NS-LCMP: Protocol for network slice lifecycle management
* Q.CE-APIMP, Protocol for managing capability exposure APIs in IMT-2020 network
* Q.D2D-EECP: Energy efficient D2D communication protocol for IMT 2020 network
* Q.IMT2020-PFW: Protocol Framework for IMT-2020

3. Related current work items of Q7/11:Q.QMP-TCA QoS management protocol for time constraint applications over SDN**[SG12: TD337]**Draft new Recommendation Y.cvms, “Considerations for Realizing Virtual Measurement Systems”, in Question 8/12**[SG17: TD362]**SG17 support to this Hot Topic and the update covering the last two SG17 meetings to date consists of- Q2 and 6/17 have supporting mandates with substantial work programs especially on SDN/NFV and 5G and Q8/17 dealing with Cloud Computing has connected work under developmentSince last TSAG meeting SG17 can update this Hot Topic with:- Approved new draft Recommendations: X.1042 (X.sdnsec-1) and X.1043 (X.sdnsec-3)- New Work Items established: X.5Gsec-guide, X.sr\_cphr, X.nsom-sec, X.5Gsec-netec- There are currently a growing number of 9 work items in the work programs of SG17.**[SG15: TD385]**Work items of ITU-T SG15 in cooperation with SG13* Transport network to support IMT-2020/5G,
* Optical access transport systems to serve the 5G fronthaul application,
* incl. Fronthaul, midhaul and backhaul network considerations for IMT-2020/5G.

**[SG20]**Draft new Recommendation ITU-T Y.UAV.arch “Functional architecture for unmanned aerial vehicles and unmanned aerial vehicle controllers using IMT-2020 networks” |
| 1. **Gigabit-speed broadband access services and networks [**[**TSAG TD101**](https://www.itu.int/md/meetingdoc.asp?lang=en&parent=T17-TSAG-170501-TD-GEN-0101)**]**
* 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.
 | **SG15**SG9 | **[SG17: TD362]**SG17 may support the new FG-NET2030 through Q2/17, Q6/17, Q8/17 , and consider in its current transformation of security studies.**[SG15: TD385]**Work items of ITU-T SG15 WP1* Optical systems for fibre access networks: XG(S)-PON, NG-PON2, Higher-Speed PON and MW-PON (Multi-wavelength PON),
* Broadband access over metallic conductors: VDSL2, G.fast and G.mgfast (Multi-Gigabit fast),
* Broadband in-premises networking: G.hn and G.hn2 (unified high-speed wire-line based home networking transceivers), indoor optical camera communication transceivers (G.occ), and high speed indoor visible light communication transceiver (G.vlc).

**[SG9: TD404**SG9 started two new work items to standardize the 5th Generation DOCSIS which is capable of gigabit broadband access over cable networks (DOCSIS 3.1 full duplex |
| 1. **Data Center Interconnection for OTT and vertical industries [**[**TSAG C37**](https://www.itu.int/md/meetingdoc.asp?lang=en&parent=T17-TSAG-C-0037)**]**
* OTT’s business and services models in relation to telecom services
* Requirements from OTT for DCI/metro network technologies (such as short distance, large bandwidth, low-cost optical (WDM) technology, fixed network), and standards.
 | **SG15****SG11** (Cooperating SG)SG9 | **[SG11: TD349]**Work item in Q4/11Q.SD-DCI: Signalling requirements and information model of SD-DCI service**[SG17: TD362]**- work items: Q6/17 and Q7/17- workshops: 5G Security The underlying AI/ML topic necessary here is not listed.**[SG15: TD385]**Work items of ITU-T SG15* ITU-T SG15 provides the network infrastructure for DCI and does not consider the applications using the infrastructure.

**[SG9: TD404]**Regarding OTT services, SG9 has started a new work item on draft Recommendation J.cable-ott “System architecture and interfaces between a cable television operator and an OTT service provider”. |
| 1. **Augmented reality & virtual reality, video services [**[**TSAG C6**](https://www.itu.int/md/meetingdoc.asp?lang=en&parent=T17-TSAG-C-0006)**,** [**TSAG TD101**](https://www.itu.int/md/meetingdoc.asp?lang=en&parent=T17-TSAG-170501-TD-GEN-0101)**]**
* 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.
* NG video codec standardization with emphasis on 5G and vertical industries
* Future Content Delivery Network (CDN) technologies and standards.
* Immersive live experience (ILE)
* Digital signage
 | **SG16****SG12 (**It is necessary to include SG12 as a cooperating study group for AR/VR and Video topic**SG11** (Cooperating SG)SG9SG20 | **[SG16: TD347]**1. New Recs. H.430-series on immersive live experience
2. Activities: Three Mini-workshops on ILE were held on Sep 2016 and Jan, Oct 2017.
3. Related SDOs: MPEG, DVB, EBU, 3GPP, VRIF
4. H.780 “Digital signage: Service requirements and IPTV-based architecture”
5. H.DS-FIS “Digital signage: Framework for interactive services”

**[SG11: TD349]**Work items in Q8/111. [X.609.3 (ex X.mp2p-mssr)](https://www.itu.int/ITU-T/recommendations/rec.aspx?rec=13345) Managed P2P communications: Multimedia streaming signalling requirements
2. [X.609.4 (ex X.mp2p-mspp)](https://www.itu.int/ITU-T/recommendations/rec.aspx?rec=13493) Managed P2P communications: Multimedia streaming peer protocol
3. [X.609.5 (ex X.mp2p-msomp)](https://www.itu.int/ITU-T/recommendations/rec.aspx?rec=13494) Managed P2P communications: Multimedia streaming overlay management protocol
4. X.mp2p-cdsr: Managed P2P communications: Content distribution signalling requirements
5. X.mp2p-cdpp: Managed P2P communications: Content distribution peer protocol

**[SG9: TD404]**Regarding augmented reality & virtual reality, video services, SG9 consented J.302amd-1 “System specifications of augmented reality smart television service Amd #1”, and has started to develop a new technical paper TP.b-catv “Broadband CATV system using server-side reception and processing” for enabling advanced video services (e.g. 360 degree video) through existing broadband CATV system.**[SG20]**Y.IoT-AR: Framework for AR and VR based control in IoT: Q4/20Y.Supp.42: Use cases of user-centric work space service: Q2/20Y.UCS-Reqts: Requirements and capabilities of user-centric work space service: Q2/20 |
| 1. **Accessibility by design, mainstreaming the consideration of needs of persons with disabilities and other persons with specific needs to build inclusive ICT solutions [**[**TSAG TD160**](https://www.itu.int/md/meetingdoc.asp?lang=en&parent=T17-TSAG-180226-TD-GEN-0160)**]**
 | **SG16****SG2****SG20** | **[SG2: TD344]**a global resource for services to promote accessibility.New work item was created for a recommendation that specifies a country code that is available for use by entities who wish to offer international telecommunication services for persons with disabilities and persons with specific needs (ITU-T E.disab, [SG2-C140](https://www.itu.int/md/T17-SG02-C-0140/en)).**[SG16: TD 347]**H.702 "Accessibility profiles for IPTV systems"F.791 "Accessibility terms and definitions"F.921 "Audio-based indoor and outdoor network navigation system for persons with vision impairment"F.930 "Multimedia telecommunication relay services".**[SG20]**Y.4204 “Accessibility requirements for the Internet of things applications and services”: Q2/20Y.ACC-PTS “Accessibility requirements for smart public transportation services”: Q2/20 |
| 1. **Security and Trust [**[**TSAG TD101**](https://www.itu.int/md/meetingdoc.asp?lang=en&parent=T17-TSAG-170501-TD-GEN-0101)**,** [**TSAG TD160**](https://www.itu.int/md/meetingdoc.asp?lang=en&parent=T17-TSAG-180226-TD-GEN-0160)**]**
* Principles of transparency and technological integrity
* Mitigation of the risks posed by IoT botnets
* Assessment of the impact of quantum computing
* Potential of blockchain and its implications for security
* Data-centric security
* Security and privacy by design, considering security and privacy from the outset of ICT services’ development through to the proactive monitoring and protection of live services
* Security, privacy, and trust in the presence of AI and ML
* Application security and quantum-safe cryptography through an “incubation” process
* Identity and authorization, providing for the reliable identification essential to secure, efficient service provision.
* Security and privacy of human factor (intersection of computer science and the humanities)
* Security of Robotics/IoT
* Cybersecurity Services
* Technical aspects of Cybersecurity Insurance
* Edge Cloud Security
 | **SG2****SG17** | **SG2**New work item on "spoofing" in regards to E.156 and E.157. Unwanted calling appears to be on the rise around the world. The unwanted calls often use non-existent telephone numbers, or use a number that is not the number of the originator. This work will provide information on nuisance calling, spoofing, etc. and initiatives to address those concerns. ( [SG2-TD 665](https://www.itu.int/md/T17-SG02-190219-TD-GEN-0665/en)).**[SG17: TD362]**SG17 support to this Hot Topic covering the two last SG17 meetings consist of1. For what concerns the list of sub Hot Topics:
* Workshops: Workshop on AI/ML and Security
* AI/ML is now part of question text of Q2, 4, 5 and 6/17
* New Work Items: TR.cs-ml on AI/ML
1. For what concerns more generally this Hot Topics
* Workshops: ITU Workshop on Fintech Security, Mini-workshop on Cybersecurity Challenges in Automated Driving
* Emerging new topics are establishing and develop and through the incubation mechanism pilot in particular about Quantum based security (see Hot Topic 15), but as well several new aspects of Security Architecture (Schemas for Integrated Cyber Defence, etc.)
* Through these observations, SG17 would like TSAG to consider potential changes on Hot Topic 10 sub items as Security Architecture topics emerged in Q2 and 4/17 (X.arch-design, TP.sec-arch, TP.ics-schemas, X.rf-csap, X.tf-mpc) but as well a significant development **security for verticals with not only increase of activity for ITS with Q13/17 but the qualification** of its usage by industry. As well finance work items in Q7/17 considerations of Question text changes and in relation to the Workshop listed above

We observe too a densification of work in the area of Managed Security Services and Cyber Defence Centres X.fram-cdc; DLT; Cloud Computing with the key containerisation X.sgcc and various deployment scenarios X.sgdc, etc.;Cybersecurity Insurance aspects initiated with X.ciag * existing partnership with ISO/IEC JTC1/SC27/WG1 on this topic with 27102 “Guidelines for Cyber Insurance” which was published in 2019.
 |
| 1. **Analytics, supporting the development of evidence-based, data driven services [**[**TSAG TD160**](https://www.itu.int/md/meetingdoc.asp?lang=en&parent=T17-TSAG-180226-TD-GEN-0160)**]**
* Data processing and management for IoT and SC&C
* Common things description methodology
* Interoperability framework and functional architecture for IoT and SC&C
* Industry dependent data models and formats to support development of data driven IoT and SC&C services
* Features, requirements, framework and functional architecture of IoT device, gateway, platform, network
* Edge Computing to support evidence-based, data driven IoT and SC&C services
* Distributed ledger technologies for IoT and SC&C
* IoT identification to support evidence-based data driven IoT and SC&C services
* AI enabled IoT and SC&C
* Data driven IoT verticals
* Data Security
 | **SG20****SG17** | **[SG17: TD362]**- Questions: Q7/17, Q8/17, Q13/17- work items: X.srfb, WTSA-16 Res.94, etc.**[SG20: TD339]**1. Y.SC-OpenData (Framework of Open Data in Smart Cities): Q1/20
2. [Y.IoT-BPM-reqts-caps](https://www.itu.int/ITU-T/workprog/wp_item.aspx?isn=14497) (Specific Requirements and Capabilities of the Internet of Things): Q2/20
3. [Y.4203](https://www.itu.int/ITU-T/workprog/wp_item.aspx?isn=13687)  (Requirements of things description in the Internet of Things): Q2/20
4. Y.IoT-EC-reqts (IoT requirements for edge computing): Q2/20
5. Y.4116 (Requirements of transportation safety service including use cases and service scenarios): Q2/20
6. Y.4555 (Service functionalities of self-quantification over Internet of things): Q4/20
7. Y.4457 (Architectural framework for transportation safety services): Q4/20
8. Y.smart-evacuation (Framework of Smart Evacuation during emergencies in Smart Cities and Communities): Q4/20
9. Y.disaster-notification (Framework of the disaster notification of the population in Smart Cities and Communities): Q4/20
10. Y.dev-IoT-arch (Architectural reference models of devices for IoT applications): Q3/20
11. Y.SCCE-arch (Reference architecture of spare computational capability exposure of IoT devices for smart home): Q3/20
12. Y.cnce-IoT-arch (Functional architecture of cellular-radio network capability exposure for smart hospital based on Internet of things):Q3/20
13. Y.dec-IoT-arch (Decentralized IoT communication architecture based on information centric networking and blockchain): Q3/20
14. Y.AERS-msd (Minimum set of data structure for automotive emergency response system): Q3/20
15. Y.AERS-mtp (Minimum set of data structure for automotive emergency response system): Q3/20
16. Y.IoT-rf-dlt (OID-based Resolution framework for transaction of distributed ledger assigned to IoT resources): Q3/20
17. Y.IoT-ics (Requirements and functional architecture of open IoT identity correlation service): Q3/20
18. Y.UIIS (Unified identity/identifier/locator split (UIIS) services and architecture in IoT environment): Q3/20
19. Y.NDA-arch (Functional architecture of network-based driving assistance for autonomous vehicles): Q3/20
20. Y.SSC-AISE-arc (Reference architecture of artificial intelligence service exposure for smart sustainable cities): Q3/20
21. Y.smoke-detection (Requirements and Functional Architecture of Smart Fire Smoke Detection Service): Q4/20
22. Y.STD (Functional Architecture for Management to Smart Tourist Destinations): Q4/20
23. Y.STIS-fm (Function and metadata of Spatiotemporal Information Service for SSC): Q4/20

**[FG-DPM]**1. Technical Specification D3.2: SensorThings API – Sensing;
2. Technical Specification D3.3: Framework to support data interoperability in IoT environments;
3. Technical Report D3.5: Overview of blockchain for supporting IoT and SC&C in DPM aspects;
4. Technical Specification D3.7: Blockchain-based data management for supporting IoT and SC&C.
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| 1. **Intelligent network management towards future networks** **[**[**TSAG TD**](https://www.itu.int/md/meetingdoc.asp?lang=en&parent=T17-TSAG-180226-TD-GEN-0160)**344]**
* Smart operation, management and maintenance.
* Telecom anti-fraud management
* REST-based network management framework
 | **SG2** | **[SG2: TD344]**1. M.somm: Framework of smart operation, management and maintenance.
2. M.tsm: Principles for telecommunications smart maintenance.
3. M.rtsmf: Requirements for telecommunications smart maintenance management functions
4. M.tsm-gim: Generic information model for telecommunications smart maintenance
5. M.rdm: Requirements for Data Management in the TMN
6. M.rtafm: Requirements for Telecom anti-Fraud Management in the TMN.
7. X.rest : Guidelines for the definition of REST-based managed objects and management interface
8. Q.rest: REST-based management services
9. M.rcsnsm: A new work item was created for a Recommendation that specifies the requirements for cloud and SDN-based network synergy management ([SG2-TD-673-R1](https://www.itu.int/md/T17-SG02-190219-TD-GEN-0673)).
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| 1. **Environmental efficiency of emerging technologies**

Assessment of the environmental impacts of deploying and implementing AI, Blockchain, and other emerging technologies. | **SG5** | **[SG5: TD374]****A proposal for a new Focus Group on Environmental Efficiency for Artificial Intelligence and other emerging technologies** has been presented during the SG5 meeting that took place from 11-21 September 2018. The Final approval of this FG will be decided during the next SG5 meeting planned in May 2019. |
| 1. **Digital health**
 | **SG16****SG20** | **[SG16: TD347]**1. H.870 (ex F.SLD) on safe listening systems
2. H.810-series on personal connected health
3. H.860-series on multimedia brain information platform
* Q28/16 and FG AI4H with AI with its applications in certain medical and health domains.

**[SG20]*** 1. Y.IoT-EH-PFE (Performance evaluation frameworks of e-health systems in the IoT): Q7/20
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| 1. **Quantum based Security [SG17: TD362]**

Quantum cryptography and key distributions are essential to the long term resistance of any digital life. It is a major problem to address within a 10 years horizon, yet facing challenges of the high incentives of the Quantum Computing ‘attack’ weaponry to succeed sooner.The impending arrival of quantum computing poses significant risks to security. Quantum-safe cryptography is essential to preparations for that arrival. Public key cryptography is a cornerstone of authentication over public networks. Quantum computing is quick to solve integer-factoring and discrete-logarithm problems, problems relied on by almost all public key cryptography. Recognizing the increasing importance of quantum-safe public key cryptography, SG17 identified the need for ITU standards to provide for interoperable quantum-safe communications, in particular the secure distribution of symmetric encryption keys. | **SG17****SG13** | **[SG17]** SG17 update on this Hot Topics covering the two last SG17 meetings to date* Organized a Mini workshop on Secure Quantum Communications
* Temporarily agrees to refer to this field as to “Quantum based security” subject to change in future meetings
* Established the following new work items: X.sec\_QKDN-km, X.sec-QKDN-ov, X.sec-QKDN-tn
* Experts participated in the ITU Workshop on Quantum in Shanghai
* Experts contribute to SG13 work in Q16/13 and in particular to Y.3800

Agreed to collaborate with SG13 under the form of a collocated RGM meeting of Q4/17 and Q16/13.**[SG13]**Y.QKDN\_FR Framework for Networks to supporting Quantum Key Distribution |
| 1. **Assessment and evaluation of smart city and IoT verticals (e.g. detailed mobility, detailed energy management, detailed water management, etc.)**
 | **SG20** | **Proposed new hot topic**  |
| 1. **Solutions in smart sustainable cities using emerging technologies (e.g. IoT, AI, etc).**
 | **SG20** | **Proposed new hot topic** |
| 1. **Smart villages and rural areas**
 | **SG20** | **Proposed new hot topic** |
| 1. **Identify scenarios and best practices for Network infrastructure sharing** [[TSAG-TD582](https://www.itu.int/md/T17-TSAG-190923-TD-GEN-0582/en), [TSAG-TD661](https://www.itu.int/dms_pub/itu-t/md/17/tsag/td/200210/GEN/T17-TSAG-200210-TD-GEN-0661%21%21MSW-E.docx)]
 | **SG2, SG3, SG13, SG15** |  |
| 1. **Performance, QoS and QoE assessment** [[TSAG-TD582](https://www.itu.int/md/T17-TSAG-190923-TD-GEN-0582/en), [TSAG-TD661](https://www.itu.int/dms_pub/itu-t/md/17/tsag/td/200210/GEN/T17-TSAG-200210-TD-GEN-0661%21%21MSW-E.docx)]
* Real-time monitoring of network performance
* Network performance prediction
* Compliance, conformance and quality testing for Intelligent Transport Systems
* Measurement of user-perceived QoS
 | **SG12****SG16****ITU Focus Group on 'AI for autonomous and assisted driving'** |  |

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