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| **Keywords:** | SG; Lead Study Group; IMT-2020; 5G; cloud computing; trust and trusted network infrastructures; roadmap; report; workshop; cooperation; |
| **Abstract:**  | This document reports a progress to date on each of the lead study group roles of SG13. It covers the period from end of TSAG meeting, February 2020, and addresses some anticipated activities. |

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# Assigned lead study group duties

WTSA-16 assigned Study Group 13 to be the lead study group:

* on future networks such as IMT-2020 networks (non-radio related parts)
* on mobility management
* on cloud computing
* on trusted network infrastructures

# Lead study group activities on future networks such as IMT-2020 networks (non-radio related parts)

The studies on IMT-2020 networks are being carried out by Q6/13, Q20/13, Q21/13, Q22/13 and Q23/13 belonging to WP1/13.

## *2.1 SG13 related studies*

SG13 has continued its active role in IMT2020/5G standardization by approving/consenting the following new standards since the last TSAG meeting:

* Y.3109 “QoS requirements and framework for virtual reality delivery using mobile edge computing supported by IMT-2020”
* Y.3173 “Framework for evaluating intelligence levels of future networks including IMT-2020”
* Y.3174 “Framework for data handling to enable machine learning in future networks including IMT-2020”
* Y.3175 “Functional architecture of machine learning-based quality of service assurance for the IMT-2020 network”
* Y.3154 “Resource pooling for scalable network slice service management and orchestration in the IMT-2020 network”
* Y.3176 “Machine learning marketplace integration in future networks including IMT-2020”
* Y.3155 “Enhanced SDN Data Plane for IMT-2020”
* Y.3156 “Framework of network slicing with AI-assisted analysis in IMT-2020 networks”
* Y.3150 “High-level technical characteristics of network softwarization for IMT-2020” (revised)
* Y.3075 “Requirements and capabilities of ICN routing and forwarding based on control and user plane separation in IMT-2020”
* Y.3076 “Architecture of ICN-enabled Edge network in IMT-2020”
* Y.3134 “IMT-2020 fixed mobile convergence functional requirements for management and orchestration”
* Y.3136 “Session management for fixed mobile convergence in IMT-2020 networks”
* Supplement 64 to ITU-T Y.3100-series “Awareness on Use Cases and Migration Aspects of IMT-2020”
* Supplement 59 to Y.3100-series “IMT-2020 standardization roadmap”
* Supplement 64 to Y.3100-series “Awareness on Use Cases and Migration Aspects of IMT-2020”
* Supplement 66 to ITU-T Y.3000-series “Network 2030 Services: Capabilities, performance and design of new communications services for the Network 2030 applications”
* Supplement 67 to ITU-T Y.3000-series “Representative use cases and key network requirements for Network 2030”

Liaison relations concerning Future Networks including IMT2020 include besides ITU-T SG’s organizations outside ITU as IETF, IRTF, IEEE, 3GPP, ETSI, ARIB, ATIS, CCSA, TTA, TTC, OIF, ONF, NGMN Alliance, GSMA, Broadband Forum, Wi-Fi Alliance.

Currently progressing work items include (among others) Y.IMT2020-qos-lg (Requirements for latency guarantee in IMT-2020 network), Y.IMT2020-qos-req-tcn (QoS requirements for train communication network supported by IMT-2020), Y.IMT2020-qos-req-sg (QoS requirements for smart grid supported by IMT-2020), Y.IMT2020-qos-lstn-req (Requirements and framework of Deterministic QoS in large-scale telecommunications networking for IMT-2020 networks and beyond), Y.ML-IMT2020-NA-RAFR (Architecture framework of AI-based network automation for resource adaptation and failure recovery in future networks including IMT-2020), Y.ML-IMT2020-serv-prov (Architecture framework of user-oriented network service provisioning for future networks including IMT-2020), Y.IMT2020-NSC (IMT-2020 network slice configuration), Y.IMT2020-mAI (Traffic typization IMT-2020 management based on an artificial intelligent approach), Y.IMT2020-EIL (Evaluating intelligence capability for network slice management and orchestration in IMT-2020), Y.IMT2020-NSL-fra (Framework for classifying network slice level in future networks including IMT-2020), Y.ICN-DOS (Requirements and capabilities of data object segmentation in information centric networking for IMT-2020), Y.ICN-interworking (Framework on internetworking of heterogeneous application domain connected objects through information-centric networking in IMT-2020), Y.ICN-NMR (Framework of locally enhanced name mapping and resolution for information centric networking in IMT-2020), Y.ICN-TL (Requirements and Capabilities of Transport Layer for ICN in IMT-2020), Y. FMSC-MEC (Multi-access Edge Computing for fixed, mobile and satellite convergence in IMT-2020 networks and beyond), Y.FMC-SDWAN (Fixed Mobile Convergence enhancements to support IMT-2020 based Software-defined wide area networking service). For details see SG13 work program which can be found at SG13 homepage.

Considering the activities related to IMT, the development of Q.174X-series of Recs in collaboration with organizational partners of 3GPP and 3GPP2 (ARIB, ETSI, TIA, ATIS, TTC, TTA, CCSA) is currently on hold due to lack of editors.

The activities of the FG ML5G were concluded, its mandate was accomplished. SG13 closed the FG ML5G.

The activities of the FG NET2030 were concluded, its mandate was accomplished. SG 13 closed the FG NET2030.

Each of the focus groups passed over six (FG ML5G) and five more deliverables (FG NET2030) to SG13 for action. These found its place in the SG13 work programme and Q2/13 living list.

## *2.2 IMT-2020/5G related Correspondence activities with other ITU-T Study Groups*

SG2 and SG13 are running a correspondence group to tackle network management issues for IMT2020/5G. This group intends to bundle the expertise of SG2 and SG13 experts on this topic, in particular to mutual review and progress studies related to common scope.

## *2.3 JCA IMT-2020*

SG13, through its JCA-IMT2020, coordinates work with the focus on the non-radio aspects within ITU-T and coordination of the communication with standards development organizations, consortia and forums also working on IMT2020 related standards. Tool for this is the IMT-2020 standardization roadmap. It represents a snapshot who is doing what in this area in the standardization world.

The current revision of the roadmap can be found in Supplement 59 to ITU-T Y-series. The roadmap is also available via data base access <https://www.itu.int/net4/ITU-T/roadmap#?topic=0.130&workgroup=1&searchValue=&page=2&sort=Revelance>.

The recent JCA-IMT2020 meeting took place on 13 July 2020. Following the request of the JCA, SG13 agreed on revised Terms of Reference of the JCA and on continuation of its activities for year 2021. Per Recommendation ITU-T A.1, JCA IMT2020 meets not only during SG13 meetings but also alongside other Group meetings involved in IMT2020 standardization.

Next meeting of JCA IMT2020 is scheduled to take place alongside the first meeting of the group succeeding SG13 in 2021 – 2024 study period.

## *2.4 IMT2020/5G related activities by other ITU-T study groups*

For IMT2020/5G related activities of other ITU-T Study Groups (as SG2, SG5, SG11, SG15, SG17 and S20) it is referred to the corresponding Work Program of those Study Groups.

#  Lead study group activities on mobility management

The studies on mobility management (MM) are being carried out by Q23/13.

Currently progressing work items include MM aspect: Y.FMSC-MEC (Multi-access Edge Computing for fixed, mobile and satellite convergence in IMT-2020 networks and beyond), Y. FMSC-MM (Mobility Management for fixed mobile, NGSO-satellite convergence in IMT-2020 networks), Y.Suppl.MM-SDN (Supplement on use cases of mobility management over SDN) and seven more. For details see SG13 work program which can be found at SG13 homepage.

#  Lead study group activities on cloud computing

The studies on Cloud Computing are being carried out by Q17/13, Q18/13 and Q19/13 belonging to WP2/13.

##  *SG13 related studies*

SG13 has continued its active role in cloud computing standardization by approving/consenting the following new standards since the last TSAG meeting:

* Y.3531: Cloud computing- functional requirements for machine learning as a service
* Y.3530: Cloud computing - functional requirements for blockchain as a service
* Y.3525: Cloud computing – Requirements for cloud service development and operation management

After approval of [Supplement 49](https://www.itu.int/rec/T-REC-Y.Sup49/en) to Y.3500-series in 2018 with *the Cloud Computing Standard Roadmap* further updates to it were kept on the Q17/13 workplan in the living document, [TD397/WP2](https://www.itu.int/md/T17-SG13-190304-TD-WP2-0397/en). Roadmap represents a snapshot who is doing what in this area in the standardization world.

Liaison relations concerning cloud computing include beside ITU-T SG’s organizations outside ITU as ATIS, BBF, DMFF, IEEE, ISO/IEC, MEF, TMF.

## Currently progressing work items include studies on BigData (Y.BD-arch, Y.bDDN-FunArch, -req, - MCMec, -MLMec, Y.bdi-reqts, Y.sup.bdsr2), on Cloud Computing (Y.ecloud-reqts , Y.CCDCFA, Y.ccdm-reqts ,Y. scb-arch, Y.cccm-reqts, Y.ccrm, Y.mc-reqts, Y.ccfrcm, Y.ccgmfdc, Y.e2efapm, Y.ccvnf-dm). For details see SG13 [work program](https://www.itu.int/itu-t/workprog/wp_search.aspx?sg=13) which can be found at SG13 homepage.

March 2020 SG13 meeting revised the Terms of Reference of the SG13RG-AFR with the inclusion into the priority areas the Future Computing topic.

## *4.2 Cloud Computing related activities by other ITU-T study groups*

For Cloud Computing activities of other ITU-T Study Groups it is referred to the corresponding Work Program of those Study Groups.

#  Lead study group activities on trusted network infrastructures

The studies on trusted network infrastructures are being carried out by Q16/13 belonging to WP3/13.

## *5.1 SG13 related studies*

SG13 has continued its active role in trusted network infrastructures standardization by establishing in March 2020 a project with the roadmap on **trustworthy networking** and services including quantum enhanced networks ([TD486/WP3](https://www.itu.int/md/T17-SG13-200720-TD-WP3-0486/en)). This roadmap provides the standardization roadmap on trustworthy networking and services including quantum enhanced networks. It breaks out as:

* landscape and related technical areas of trust technologies from an ITU-T perspective and
* collection of related standards and publications on trust technologies in standards development organizations.

In addition, SG13 has consented the following new standard since the last TSAG meeting:

* Y.3055: “Framework for Trust based Personal Data Management”

Since summer 2018 SG13 start working on quantum key distribution network. Since the last TSAG meeting the following new standards have been approved/consented: Y.3801 (Functional requirements for quantum key distribution networks), Y.3802 (Quantum key distribution networks - Functional architecture), Y.3803 (Quantum key distribution networks - Key management), Y.3804 (Quantum key distribution networks - Control and Management).

Currently progressing work items include studies on Y.trust-index, Y.trust-arch, Y.SNS-trust, Y.OBF\_trust, Y.SBN-TR, Y.energy-brokerage and Y.DNI-fr. For details see SG13 work program which can be found at SG13 homepage.

Six other drafts on this technology are under development (Y.QKDN-req, -frint, -SDNC, -BM, qos-gen and –qos-req).

## *5.2 Trusted network infrastructures related activities by other ITU-T study groups*

For Trusted network infrastructures related activities of other ITU-T Study Groups it is referred to the corresponding Work Program of those Study Groups.

# Other important activities of SG13 related to its Lead Study Group mandate

## *6.1 Workshops related to SG13 lead activities*

SG13RG-AFRmet in Abuja, Nigeria, on 5 – 6 February 2020 and held the associated Regional Workshop for Africa on "*Standardization of Future Networks towards building a better connected Africa*" on 3 – 4 February 2020 at the same location. Focus Group FG ML5G held virtual meetings on 17-18 March and 2-3 June 2020 and Joint ITU-ETSI E-Workshop on Machine Learning in​ Communication N​etworks​​ on 16 March 2020.

***6.2 Next Study Period preparations***

Up to now SG13 approved the set of 12 Questions for study in 2021-2024 study period as appears in [TSAG TD 888](https://www.itu.int/md/T17-TSAG-200921-TD-GEN-0888/en). The meeting further approved the new title, mandate description, points of guidance, lead Study Group roles and the series of ITU-T Recommendations under SG13 responsibility for the next study period ([TSAG TD 909](https://www.itu.int/md/T17-TSAG-200921-TD-GEN-0909/en)).

The meeting agreed to consider the remaining unresolved issue, Questions F and G texts related to “Future Vertical Network Architecture”, at the one-day SG13 meeting on 17 December 2020 at the end of the co-located rapporteur groups meeting. Current Questions F and G texts may be found in [TSAG TD 888](https://www.itu.int/md/T17-TSAG-200921-TD-GEN-0888/en). In the meantime the discussions might continue in [the dedicated drafting group on [Questions F&G]](https://www.itu.int/en/ITU-T/studygroups/2017-2020/13/Pages/correspondence.aspx), that was established by SG13 July 2020 meeting.

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