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| **Council Working Group on International Internet-related Public Policy Issues Thirteenth meeting - Geneva, 19-20 September 2019** |  |
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| Report by the Secretary-General | |
| ITU INTERNET ACTIVITIES: RESOLUTIONS 101, 102, 133, 180 and 206 | |

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| Summary  This report summarizes ITU’s activities related to Plenipotentiary Conference (PP) Resolution 101 (Rev. Dubai, 2018), “Internet Protocol-based networks”; Resolution 102 (Rev. Dubai, 2018), “ITU’s role with regard to international public policy issues pertaining to the Internet and the management of Internet resources, including domain names and addresses”; Resolution 133 (Rev. Dubai, 2018), “Roles of administrations of Member States in the management of Internationalized (multilingual) domain names”; Resolution 180 (Rev. Dubai, 2018), “Facilitating the transition from IPv4 to IPv6” and Resolution 206 (Dubai, 2018), “OTTs”.  Action required  In line with Resolution 102 (Rev. Dubai, 2018), CWG-Internet is invited to consider and discuss the activities of the Secretary-General and Directors of the Bureaux in relation to the implementation of the resolutions.  \_\_\_\_\_\_\_\_\_\_\_\_  References  *Plenipotentiary Resolutions* [*101*](https://www.itu.int/en/council/Documents/basic-texts/RES-101-E.pdf)*,* [*102*](https://www.itu.int/en/council/Documents/basic-texts/RES-102-E.pdf)*,* [*133*](https://www.itu.int/en/council/Documents/basic-texts/RES-133-E.pdf)*,* [*180*](https://www.itu.int/en/council/Documents/basic-texts/RES-180-E.pdf) *(Rev. Dubai, 2018), Resolution* [*206*](https://www.itu.int/en/council/Documents/basic-texts/RES-206-E.pdf) *(Dubai, 2018); Council Resolutions* [*1305*](http://www.itu.int/md/S09-CL-C-0105) *(2009),* [*1336*](http://www.itu.int/md/S15-CL-C-0113/en) *(mod 2015),* [*1344*](http://www.itu.int/md/S15-CL-C-0112/en) *(mod 2015); WTSA Resolutions* [*47*](https://www.itu.int/pub/T-RES-T.47-2016)*,* [*48*](https://www.itu.int/pub/T-RES-T.48-2016) *(Rev. Dubai, 2012)* [*49*](https://www.itu.int/pub/publications.aspx?lang=en&parent=T-RES-T.49-2016)*,* [*50*](https://www.itu.int/pub/T-RES-T.50-2016)*,* [*52*](https://www.itu.int/pub/T-RES-T.52-2016) *(Rev. Hammamet, 2016),* [*58*](https://www.itu.int/pub/T-RES-T.58-2016)*,* [*60*](https://www.itu.int/pub/T-RES-T.60-2016) *(Rev. Dubai, 2012),* [*64*](https://www.itu.int/pub/T-RES-T.64-2016)*,* [*69*](https://www.itu.int/pub/T-RES-T.69-2016)*,* [*75*](https://www.itu.int/pub/T-RES-T.75-2016) *(Rev. Hammamet, 2016),* [*98*](https://www.itu.int/pub/T-RES-T.98-2016) *(Hammamet, 2016);* [*WTDC-17/Buenos Aires Action Plan Objective 3/Output 3.3*](https://www.itu.int/en/ITU-D/Conferences/WTDC/WTDC17/Documents/WTDC17_FinalReport_en.pdf) *, WTDC Resolutions* [*20, 30 , 63*](https://www.itu.int/en/ITU-D/Conferences/WTDC/WTDC17/Documents/WTDC17_FinalReport_en.pdf) *(Rev. Buenos Aires, 2017), and* [*45*](http://www.itu.int/en/action/internet/Documents/Resolution_45_wtdc14.pdf)  *(Rev. Dubai, 2014); Council Documents* [*C16/33*](http://www.itu.int/md/S16-CL-C-0033/en)*,* [*C17/33*](https://www.itu.int/md/S17-CL-C-0033/en)*,* [*C18/33*](https://www.itu.int/md/S18-CL-C-0033/en) *and* [*C19/33*](https://www.itu.int/md/S19-CL-C-0033/en)*.* |

# 1. Introduction

This report describes ITU’s activities related to the 2018 Plenipotentiary Conference Resolutions 101, 102, 133, 180 and 206 for the reporting period from Council 2018 till date.

# 2. Activities related to Internet Protocol (IP) networks, the development of next-generation networks (NGN) and future Internet, including policy and regulatory challenges

2.1 All ITU-T Study Groups continue their work in different areas of Internet, IPv4/IPv6-based networks, Internet-of-things, Internet naming and addressing, NGNs and their evolution, future network (FN), cloud computing, QoS, IPTV, and IP-based applications, uncertainty of origin, and international connectivity. 280 new/revised ITU-T Recommendations and other texts have been approved from 1 October 2018 to 16 August 2019. [Relevant recommendations](https://www.itu.int/itu-t/workprog/wp_search.aspx?isn_sp=3925&isn_status=-1,2&adf=2018-10-01&adt=2019-08-16&pg_size=100&details=0&field=acdefghijo) can be found under the different ITU-T Study Groups (SG).

2.2 An estimated 95 per cent of international traffic runs over optical transport networks built in conformance with ITU standards. ITU-T SG15 develops standards on telecommunication network infrastructure including optical transport networks, access networks and home networks. At the recent SG 15 meeting in July 2019, the Study Group:

* agreed to G.sup66 addressing PON for 5G fronthaul, started a new Recommendation for wavelength multiplexed point-to-multipoint 10-Gigabit-capable PON, progressed work on G.mgfast aiming at 5-10 Gbit/s access using copper cables, started new standardization projects on the use of G.hn for IoT and UHDTV;
* made progress on a revision of G.698.2 that considers extensions for 200 and 400Gbit/s application codes, agreed to create new work items to add 25 Gbit/s optical interface specifications operating in the C-band over 20 km distances and a maximum of 20 channels to Recommendations G.698.1, G.698.2 and G.698.4 to address the needs for optical interface technologies for mobile optimized transport; and
* agreed on a new supplement G.Sup.5gotn “Application of OTN to 5G transport” for supporting IMT 2020/5G transport, initiated four new work items on Metro Transport Network (MTN) equipment, protection, architecture and management, continued cooperation with IEEE 802.1, IEEE 802.3, ONF, MEF, BBF, and IETF to provide consistent information models and YANG data models for Ethernet.

2.3 Video is expected to account for over 80 per cent of all Internet traffic by 2020. The collaborative video work of IEC, ISO, and ITU continues for the development of the new [Versatile Video Coding project](https://news.itu.int/versatile-video-coding-project-starts-strongly/) with over 1000 contributions reviewed and over 300 experts in attendance at the recent meeting of the joint group (JVET) in July 2019.

Work also continues in improving management, storage and delivery of video over IP networks:

* ITU-T SG 16 approved Recommendation ITU-T F.743.9 “Use-cases and requirements for multimedia CDN” which illustrates content delivery network, and defines the use cases for multimedia CDN in two categories: content delivery and capability use cases, as well as the requirements for CDN.
* SG16 also approved Recommendation ITU-T H.643.1 “Architecture for deployment of information centric network” which describes the functional architecture for deployment of information centric network (DICN) including functional entities, reference points and service control flows. It also describes the required DICN capabilities.
* Approved Recommendation ITU-T H.644.1 “Functional architecture for virtual content delivery networks” describes a functional architecture for virtual content delivery network (VCDN). ITU-T Recommendation F.743.4 gives an overview and the requirements for VCDN with a focus on functional architecture.

2.4 Software-driven network management and orchestration continues to transform telecom operations. ITU-T’s [5G work](https://www.itu.int/en/mediacentre/Pages/2018-CM05.aspx) is supporting this transformation with the development of new standards for networking innovation, the evolution of the transport network, and environmental sustainability. ITU-T SG 11 approved Recommendation ITU-T Q.5020 “Protocol requirements and procedures for network slice lifecycle management” which includes the reference signalling architecture, requirements, and protocol procedures.

ITU-T SG 13 approved nine Recommendations on IMT-2020:

* Recommendation ITU-T Y.3072 “Requirements and Capabilities of Name Mapping and Resolution for Information Centric Networking in IMT-2020” specifies the requirements and capabilities of name mapping and resolution to achieve high performance such as low latency and scalability for a massive number of named objects for information centric networking in IMT-2020.
* Recommendation ITU-T Y.3073 “Framework for service function chaining in information centric networking” specifies the framework in applying information centric networking (ICN) to edge computing and service function chaining.
* Recommendation ITU-T Y.3074 “Framework for directory service for management of huge number of heterogeneously named objects in IMT-2020” introduces a directory service function in the IMT-2020 architecture.
* Recommendation ITU-T Y.3106 “QoS functional requirements for the IMT-2020 network” specifies the QoS functional requirements for the International Mobile Telecommunications (IMT) 2020 network.
* Recommendation Y.3107 “Functional architecture for QoS assurance management in the IMT-2020 network” first describes the functional architecture for QoS assurance management under the IMT-2020 network management and orchestration framework. It then specifies reference points between QoS functional entities and IMT-2020 network management and orchestration plane.
* Recommendation Y.3131 “Functional architecture for supporting fixed mobile convergence in IMT-2020 networks” presents the overview, framework and functional architecture for supporting fixed mobile convergence in IMT-2020 networks.
* Recommendation ITU-T Y.3151 “High-level technical characteristics of network softwarization for IMT-2020 - part: SDN” describes technical aspects of SDN part of network slice support, which assists in handling individual components of a network slice, and contains network infrastructure and its control/management [ITU-T Y.3150].
* Recommendation ITU-T Y.3152 “Advanced Data Plane Programmability for IMT-2020” addresses advanced data plane programmability (ADPP) as an underlying technology for network softwarization by enhancing SDN with more agility and flexibility to meet the requirements of IMT-2020 networks [ITU-T Y.3150].
* Recommendation ITU-T Y.3172 “Architectural framework for machine learning in future networks including IMT-2020” presents a set of architectural requirements and specific architectural components needed for machine learning in future networks including IMT-2020.

SG 13 also approved five Recommendations on cloud computing:

* Recommendation ITU-T Y.3507 “Cloud computing - Functional requirements of physical machine” provides the introduction of physical machine with physical machine components, physical machine types, virtualizations in physical machine as well as the scalability of components in physical machine.
* Recommendation ITU-T Y.3508 “Cloud computing - Overview and high-level requirements of distributed cloud” introduces the concept of the distributed cloud, and identifies the characteristics of distributed cloud.
* Recommendation ITU-T Y.3517 “Cloud computing - Overview of inter-cloud trust management” provides an overview of inter-cloud trust management by specifying isolation and security management mechanism, inter-cloud trust management model, reputation-based trust management in inter-cloud environment, cloud service evaluation framework and the relationship with cloud computing reference architecture.
* Recommendation ITU-T Y.3518 “Cloud computing - Functional requirements of inter-cloud data management” describes the typical use cases and specifies the functional requirements on three aspects, ranging from inter-cloud data policy, inter-cloud data isolation and protection, inter-cloud data management which are derived from the corresponding use cases.
* Recommendation ITU-T Y.3523 “Metadata framework for NaaS service lifecycle management” specifies the metadata framework for NaaS service lifecycle management in the closed loop automation environment. This Recommendation is the extension the Recommendation ITU-T Y.3512 and Recommendation ITU-T Y.3515 as the NaaS series Recommendations.

2.5 On Internet-of-things, ITU-T SG 20 consented to draft Recommendation ITU-T Y.4459 “An architecture for IoT interoperability” which introduces the Digital Object Architecture (DOA) and its prospective in addressing security and interoperability among IoT applications.

ITU-T SG 20 has approved the following Recommendations:

* Recommendation ITU-T Y.4202 “Framework of wireless power transmission application service” defines a framework for wireless power transmission (WPT) application service by describing concept, functional model, requirements, basic service flows and use cases.
* Recommendation ITU-T Y.4203 “Requirements of things description in the Internet of Things” specifies requirements for an effective way of representing things as far as possible in a homogeneous way.
* Recommendation ITU-T Y.4204 “Accessibility requirements for the Internet of things applications and services” addresses benefits of accessible IoT applications and services and accessibility requirements for IoT applications and services for persons with disabilities, persons with age‑related disabilities and those with specific needs to utilize IoT applications and services.
* Recommendation ITU-T Y.4555 “Service functionalities of self-quantification over Internet of things” clarifies the concept of self-quantification services, identifies their considerations, and specifies their requirements and functionalities.
* Recommendation ITU-T Y.4458 “Requirements and functional architecture of smart street light service” specifies requirements and the functional architecture of a smart street light (SSL) service.
* Recommendation ITU-T Y.4051 “Vocabulary for smart cities and communities” contains vocabulary applied to smart cities and communities (SC&C) works. Basically, the terms and definitions in this vocabulary are defined in published Recommendations and Supplements of ITU and published standards of other international SDOs (such as ISO and IEC, etc.). Additionally, this vocabulary also includes and defines some new terms to meet the needs of SC&C works of ITU.
* Recommendation ITU-T Y.4205 “Requirements and reference model of IoT-related crowdsourced systems” introduces the concept of crowdsourced systems, as well as the reference model of IoT-related crowdsourced systems for the support of Internet of things (IoT) applications and services to be provided via systems employing crowdsourcing principles.
* Recommendation ITU-T Y.4905 “Smart sustainable city impact assessment” is a holistic impact framework for assessment for smart and sustainable cities to address effects of digital innovation on social, economic, and environmental issues.
* Recommendation ITU-T Y.4206 “Requirements and capabilities of user-centric work space service” provides the requirements and capabilities of User-centric work space (UCS) service. The provided requirements and capabilities are necessary to implement various types of UCS services.
* Recommendation ITU-T Y.4207 “Requirements and capability framework of Smart Environmental Monitoring” provides the requirements and capability framework of smart environmental monitoring (SEM).
* Recommendation ITU-T Y.4460 “Architectural reference model of devices for IoT applications” describes the architectural reference models of devices for IoT applications, based on a classification of devices defined by processing power and communication capabilities.

Recommendation ITU-T Y.4906 “Assessment Framework for digital transformation of sectors in smart cities” enhances the sustainability of identified priority sectors in smart cities, in order to optimise economic, environmental and social benefits. SG 20 also determined draft Recommendation ITU-T Y.4556 “Requirements and functional architecture of smart residential community”, which presents the key components and specifies requirements and the functional architecture of smart residential community (SRC).

In April 2019, SG 3 established a new work item for a technical study and for a Recommendation on roaming aspects of IoT and M2M; liaison cooperation with SG 2 is taking place on this subject. SG 3 is studying in various work items at international level (TR\_IoTM2M\_roaming, D.IoT/M2M Roaming) and regional level (STUDY\_ROAMREG, D.ONARegionalRoaming, D6\_R\_ROAM, D7\_R\_ROAM) tariff, economic and policy issues of roaming. SG 3 finalized a questionnaire on the implementation status of Recommendations ITU-T D.98 and D.97, issued in a TSB Circular letter 168 Cor.1 on 14 May 2019 to all Member States and all ITU-T Sector Members.

ITU-T SG 17 is collaborating with IETF SUIT WG on Secure Software Update Procedure for IoT Devices, and with IETF WG TLS on Security framework for using Identity Based Cryptography for IoT services over telecom networks. SG 20 is collaborating with W3C on draft new Recommendation ITU-T Y.IoT-DIS-arc "Requirements and functional architecture of decentralized identification service for IoT devices”.

2.6 The standardization of Internet of Things (IoT) test specifications is accelerating, supported by the increasing collaboration of ITU-T and oneM2M.

2.7 More than 100 cities worldwide are measuring their progress using ‘Key Performance Indicators for Smart Sustainable Cities’ based on ITU standards, indicators promoted by the ‘United for Smart Sustainable Cities (U4SSC) initiative’. A case study on [“Implementing ITU-T International Standards to Shape Smart Sustainable Cities: The case of Moscow”](https://www.itu.int/en/publications/Documents/tsb/2018-U4SSC-Case-of-Moscow/index.html#p=1) was published in November 2018. The case study is also available in [Russian](https://www.itu.int/en/publications/Documents/tsb/2018-U4SSC-Case-of-Moscow-RU/index.html).

2.8 ITU-T work on performance, quality of service (QoS) and quality of experience (QoE) continues to evolve rapidly, in tune with the advances of the ICT industry.

SG 12 consented to Recommendation ITU-T Y.1540 “Internet protocol data communication service - IP packet transfer and availability performance parameters” which defines parameters that may be used in specifying and assessing the performance of speed, accuracy, dependability and availability of IP packet transfer of regional and international Internet protocol (IP) data communication services.

SG 12 is collaborating with ETSI TC STQ; IETF IPPM WG; BBF concerning harmonization of IP Capacity and Latency Parameters in the context of ITU-T Y.1540.

2.9 ITU-T offers a neutral platform for the international community to strengthen ties between technical innovation, business needs and economic and policy requirements. [New ITU standards](https://www.itu.int/en/ITU-T/studygroups/2017-2020/03/Documents/SG3%20Executive%20Summary%202019.pdf) address the relationship between network operators and providers of over-the-top (OTT) (ITU-T D.262), services competition in mobile financial services (ITU-T D.263), and principles for a unified format of price/tariffs/rates-lists used for exchanging telephone traffic (ITU-T D.198). ITU-T SG 3 finalized draft new Recommendation ITU-T D.264 (D.SpectrumShare) (under approval) “Shared use of spectrum and telecommunication infrastructure as possible methods for enhancing the efficiency of telecommunications” which proposes a set of possible methods to help telecommunication providers save costs and enhance efficiency through the shared use of spectrum and telecommunication infrastructure.

SG 3 is studying in work item D.DigID Guidelines for digital identity, and in work item D.princip\_bigdata a framework and principles for data protection in the context of big data relating to international telecommunication services. SG 3 RGM on Q12/3 agreed on baseline texts for two new Draft Recommendations on Mobile Financial Services. SG 3 further agreed on nine reports of the Focus Group on Digital Financial Services (FG-DFS) to be published as SG 3 Technical Reports; the TRs, inter alia, address the Digital Financial Services Ecosystem, regulation aspects, competition aspects, consumer protection aspects, social networks on digital liquidity, and Access to Payment Infrastructures. SG 3 is studying in several work items the economic and policy issues related to mobile financial services.

2.10 SG 11 approved Recommendation ITU-T Q.5050 “Framework for solution to combat counterfeit ICT devices” which aims to describe a reference framework, with high-level challenges and requirements that should be considered when deploying solutions to combat the circulation and use of counterfeit ICT devices.

2.11 SG 11 approved Recommendation ITU-T Q.3642 “IMS references to Release 12 for communication between IMS and NGN networks to support end-to-end service interoperability” which lists the references to specifications defining requirements for IMS to be used for the non-roaming architecture for 3GPP accesses as base for the communication between IMS and NGN Networks in order to support the end-to-end service interoperability.

SG 11 approved three testing specifications:

* Recommendation ITU-T Q.4014.1 “PSTN/ISDN terminal equipment using IP Multimedia core network subsystem; Conformance testing; Part 1: PICS” specifies the Protocol Implementation Conformance Statement to test PSTN/ISDN terminal equipment using IP Multimedia core network subsystem.
* Approved Recommendation ITU-T Q.4014.2 “PSTN/ISDN terminal equipment using IP Multimedia core network subsystem; Conformance testing; Part 2: TSS&TP” specifies the Test Suite Structure and Test purposes to test PSTN/ISDN terminal equipment using IP Multimedia core network subsystem.
* Approved Recommendation ITU-T Q.4060 “The structure of the testing of heterogeneous Internet of Things gateways in a laboratory environment” describes the testing methodology of the heterogeneous network gateway which is to be used for communication among IoT devices.

Following the completion of this standard, a new subcategory of the ITU-T Q.series was established: Q.4060-Q.4099 “Testing specifications for IMT-2020 and IoT”.

SG 11 is developing two work items on IoT testing: Q.39\_FW\_Test\_ID\_IoT “The framework of testing of identification systems used in IoT”, and Q.FW\_IoT/Test “Framework for IoT Testing”.

SG 11 also approved Recommendation ITU-T Q.4061 “Framework of SDN controller testing”.

2.12 ITU-T SG 9 approved Recommendation ITU-T J.298 “Requirements and technical specifications of cable TV hybrid set-top box that has the compatibility with terrestrial and satellite TV transport”. The major purpose of the Recommendation is to specify a minimum and basic requirement for a hybrid STB, which meets the requirements for developing countries and regions.

SG 9 also approved Recommendation ITU-T J.1210 “Requirements of IP Video Broadcast (IPVB) for CATV Networks” which specifies an IPVB technology, which simply adds a one-way IP-based video broadcast system to the existing low-cost bidirectional CATV networks (including both HFC and optical networks).

Draft Recommendation ITU-T J.1600 “Premium Cable Network Platform (PCNP) – Framework” (under approval) specifies the framework of the Premium Cable Network Platform (PCNP) for the cable TV and broadband network that exploit the cloud based artificial intelligence and network data to optimize the network and TV services, thus enable the high satisfaction of user’s experience of perceptual aspects of services.

2.13 On future packet-based networks, ITU-T SG 13 approved Recommendation ITU-T Y.2620 “T interface for Public packet Telecommunication Data Network (PTDN)” which identifies the T interface and its functions between PTDN edge devices and Address Translators (ADT).

Approved Recommendation ITU-T Y.2774 “Functional requirements of deep packet inspection for future networks” specifies the functional requirements of deep packet inspection for future networks (e.g., software defined networks (SDNs), network function virtualization (NFV), etc.). The scope of this Recommendation includes the general requirements of deep packet inspection (DPI) for future networks, DPI functional requirements for SDN, DPI functional requirements for NFV,DPI functional requirements for service function chain (SFC) and DPI as a service, as well as DPI functional requirements for network virtualization and DPI functional requirements for evolving mobile networks.

2.14 ITU-T Focus Groups are formed in response to immediate ICT standardization demands, tasked with establishing the basis for subsequent standardization work in ITU-T Study Groups. These groups are the place to explore new directions in ITU standardization. At present, [eight ITU-T Focus Groups are active](https://www.itu.int/en/ITU-T/focusgroups/Pages/default.aspx):

* [ITU-T Focus Group on Data Processing and Management to support IoT and Smart Cities & Communities (FG-DPM)](https://www.itu.int/en/ITU-T/focusgroups/dpm/Pages/default.aspx) studied and reviewed existing technologies, platforms, guidelines and standards for data processing and management, including data formats, in support of IoT and Smart Cities. The FG-DPM approved 15 deliverables, which were sent to the parent SG 20 for further consideration. The FG-DPM concluded on 19 July 2019.
* The [ITU-T Focus Group Digital Currency including Digital Fiat Currency (FG DFC)](https://www.itu.int/en/ITU-T/focusgroups/dfc/Pages/default.aspx) is a forum for dialogue among players in the banking, fintech and telecom sectors to share information and best practices and showcase innovations, as well as develop a series of deliverables highlighting requirements for network infrastructure and standards in the area of central bank issued digital currency. FG DFC finished its work and will submit its results and deliverables to TSAG.
* The [ITU-T Focus Group on Application of Distributed Ledger Technology (FG DLT)](https://www.itu.int/en/ITU-T/focusgroups/dlt/Pages/default.aspx) concluded its work on 1 August 2019 with the adoption of eight deliverables (3 technical specifications and 5 technical reports). This includes an ‘assessment framework’ to support efforts to understand the strengths and weaknesses of DLT platforms in different use cases. The group also developed a high-level DLT architecture – a reference framework – detailing the key elements of a DLT platform, as well as a technical specification on DLT related terms and definitions. The results of FG DLT will be considered by TSAG in September 2019.
* The [ITU-T Focus Group on Machine Learning for Future Networks including 5G (FG ML5G)](https://www.itu.int/en/ITU-T/focusgroups/ml5g/Pages/default.aspx) will propose standardization strategies to assist machine learning in contributing to the efficiency of emerging 5G systems. The group is defining the requirements of machine learning as they relate to interfaces, protocols, algorithms, data formats and network architectures.
* The [ITU-T Focus Group on Technologies for Network 2030 (FG NET-2030)](https://www.itu.int/en/ITU-T/focusgroups/net2030/Pages/default.aspx) had four meetings in the reporting period. It examines how emerging technologies can enhance network capabilities to meet the demands of 5G systems and future innovations. The group is studying new media, services and architectures to identify communication needs and use cases for the year 2030 and beyond. The Focus Group has created an initial vision for networks in the year 2030 by agreeing the White Paper “[Network 2030 - A Blueprint of Technology, Applications and Market Drivers Towards the Year 2030 and Beyond](https://www.itu.int/en/ITU-T/focusgroups/net2030/Documents/White_Paper.pdf)” in May 2019. Based on past developments it is now analysing emerging technologies. In focus are applications including augmented and virtual reality and holograms, and the group aims also respond to increasing user demands for time-sensitive applications (telemedicine, automated factory).
* The [ITU-T Focus Group on Artificial Intelligence for Health (FG AI4H)](https://www.itu.int/en/ITU-T/focusgroups/ai4h), driven in close collaboration by ITU and WHO, is working towards the establishment of a framework and associated process for the performance benchmarking of ‘AI for Health’ models. The group is currently working on 12 topic areas ("use cases") and is seeking participation of key stakeholders, including health regulators, medical professionals, AI developers, industry and academia.
* The [ITU-T Focus Group on Vehicular Multimedia (FG VM](https://www.itu.int/en/ITU-T/focusgroups/vm/Pages/default.aspx)) was established by ITU-T SG16 to identify the need for new vehicular multimedia standards based on space and terrestrial networks integration. The study will analyse and identify gaps in the vehicular multimedia standardization landscape and eventually draft technical reports and specifications covering, among others, vehicular multimedia use cases, requirements, applications, interfaces, protocols, architectures, and security, leveraging from previous work done by ITU in this field. At the last meeting, FG-VM has issued a [Call for Proposals](https://www.itu.int/en/ITU-T/focusgroups/vm/Documents/FGVM_CallForProposals.pdf) inviting contributions to the second phase of its work – the development of an architecture for vehicular multimedia. All interested stakeholders, namely OEMs, Tier1 and Tier2 suppliers, are invited to submit their proposals for an internationally agreed Vehicular Multimedia Architecture, to be discussed at next meeting of FG‑VM planned on 11-12 September 2019, in Budapest, collocated with the TELECOM WORLD. See also the related [news](https://news.itu.int/call-for-proposals-vehicular-multimedia-architecture/).
* The [ITU-T Focus Group on “Environmental Efficiency for AI and other Emerging Technologies”](https://www.itu.int/en/ITU-T/focusgroups/ai4ee/Pages/default.aspx) (FG-AI4EE) will identify the standardization gaps related to the environmental performance of AI and other emerging technologies including automation, augmented reality, virtual reality, extended reality, smart manufacturing, industry 5.0, cloud/edge computing, nanotechnology, 5G, among others. The Focus Group will develop technical reports and technical specifications to address the environmental efficiency, as well as water and energy consumption of emerging technologies. The first meeting of the FG-AI4EE will take place on 15 October 2019 in Vienna, Austria.

2.15 As ICT security is becoming increasingly important, ITU-T SG 17 (“Security”) is becoming more active/attractive for global security standardization, as reflected by the continuous high numbers of participants, written contributions received, new work items established (roughly 150 ongoing work items in ITU-T SG 17 out of more than 800 work items of all ITU-T SGs, see <https://www.itu.int/itu-t/workprog/wp_search.aspx?sg=17>) and standards approved. Recently approved security standards are highlighted in [C19/18](https://www.itu.int/md/S19-CL-C-0018/en).

Study on network architecture and security of quantum key distribution (QKD) has started in ITU SG 13 (five work items established since July 2018) and ITU-T SG 17 (six work items established since September 2018).

2.16 TSB has not received feedback concerning any reported incidents with regard to [WTSA Resolution 69](https://www.itu.int/net/ITU-T/res69/Default.aspx) on “Non-discriminatory access and use of Internet resources” (so far there have been 37 incidents since 2009, see all related [reports](https://www.itu.int/net/ITU-T/res69/secured/notifications.aspx)).

2.17 ITU-D SG 1 and SG 2 concluded their [2014-2017 study period](http://www.itu.int/itu-d/study-groups) and released a number of Internet-related reports and guidelines (See [ITU-D SG1](https://www.itu.int/pub/D-STG-SG01) and [ITU-D SG2](https://www.itu.int/pub/D-STG-SG02) reports). Following WTDC-17, work will continue on IP-related issues such as NGN interconnection, VoIP, cloud services, and strategies, policies, and technologies for the deployment of broadband. The groups will explore the transition from narrowband to high-speed, high-quality broadband networks (including transition to IMT-2020 networks), taking into account interconnection and interoperability features. New Q1/1 will work on “Strategies and policies for the deployment of broadband in developing countries” (merging former Q1/1 and Q2/1). Questions 4/1, 5/1, and 1/2 will continue their work from the previous study period with emphasis on the need to employ ICTs for sustainable social and economic development.

2.18 ITU-D continues implementing Internet broadband wireless connectivity and developing ICT applications to provide free or low cost digital access for schools and hospitals, and for underserved populations in rural and remote areas in selected countries (Burundi, Burkina Faso, Djibouti, Lesotho, Mali, Rwanda, Eswatini, Antigua and Barbuda, and St. Kitts and Nevis, etc.). The publication on “Setting the scene for 5G: Opportunities & Challenges” was published to assist developing countries with Broadband tools for their plans and Infrastructure developments.

2.19 ITU-R approved Recommendation ITU-R M.2083-0 “IMT Vision – Framework and overall objectives of the future development of IMT for 2020 and beyond”, Resolutions ITU-R 65 “Principles for the process of future development of IMT for 2020 and beyond” and ITU-R 66 “Studies related to wireless systems and applications for the development of the Internet of Things”, and Report ITU-R M.2440-0 “The use of the terrestrial component of International Mobile Telecommunications for narrowband and broadband machine-type communications”.

2.20 ITU continues its cooperation with the Corporation for National Research Initiatives (CNRI) and the DONA Foundation on the use of the Digital Object Architecture (DOA) – an advanced architecture for information management – in the use of its advanced digital object management features in ITU and interested UN agencies.

2.21 Several trainings were provided through [ITU Academy](https://academy.itu.int/) and the [ITU Centers of Excellence](https://academy.itu.int/index.php?option=com_content&view=article&id=154&Itemid=588&lang=en) network, covering topics such as “Training on IPv6 deployment”, “Strategic Aspects for Internet Governance and Innovations”, “ICT Infrastructure and IoT”, “Technologies of Fiber Optics accesses and Next Generation Networks”, “Technologies of fourth Generation: LTE and LTE Advanced”, “The future of Interface towards 5G”, “The role of ICTs on Smart Sustainable Cities”, etc.

2.22 ITU is also supporting the Costa Rican Institute of Electricity (ICE) strengthen its capacity building, including on NGN Networks, through a project called “Desarrollo del conocimiento en tecnologías, para especialistas del ICE”.

**3. IPv6**

3.1 ITU-T SG 3 continues to study the methodology and work items needed for the implementation of the relevant parts of WTSA Res. 64. SG 3 is studying in work item STUDY\_IPV6 the economic impact of transition from IPv4 to IPv6. ITU-T SG 11 and SG 20 are also working on draft ITU-T Recommendations on IPv6. ITU-T SG 11 approved new ITU-T standard Q.3405 on IPv6 protocol procedures for broadband services. Updates to 5GPPP SAVE (source address verification) using E.164 based IPv6 addresses were provided to ITU-T SG 2 meetings. SG 2 is collaborating with IETF concerning clarifications to IETF Process related to individual drafts and requests for IANA allocation related to IPv6 addressing. The [ITU-T IPv6 webpage](https://www.itu.int/en/ITU-T/ipv6/Pages/default.aspx) oversees the IPV6 activities within ITU-T.

3.2 BDT and MUST (Malaysia University of Science and Technology) continue working towards the establishment of an ITU IPV6/IoT Expertise Centre for supporting Member States in their transition from IPv4 to IPv6 for IoTs and Industry 4.0.

3.3 ITU-T SG 16 is working on the draft ITU-T Technical Paper [HSTP.IPTV-Guide.2](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=14423) on “IPTV service parameters for new IPTV service providers”. It includes the description of outcomes gained by conducting the ITU IPTV IPv6 Global Testbed ([I3GT](http://www.itu.int/en/ITU-T/C-I/interop/I3GT/Pages/default.aspx)) project experimented worldwide in different environments.

3.4 BDT continues to provide assistance to countries on the implementation of IPv6 policies and IPv6 test bed as requested by Member States, e.g.: In the Africa region, assistance was provided in setting up of an Internet protocol version 6 (IPv6) testbed in Côte d’Ivoire and Uganda, to be used as sub-regional test beds for IPv4 to IPv6 migration in Western and Eastern Africa, respectively; in Zimbabwe to be used as a sub-regional testbed for IPv4 to IPv6 migration in Southern Africa; and in Cameroon, to be used as a sub-regional testbed for IPv4 to IPv6 migration in Central Africa. An IPv6 test bed installation is ongoing in Sierra Leone. A Feasibility study has been conducted on IPv6 test beds improvement and a master plan is under development to facilitate African countries to adopt IPv6.

3.5 BDT continues to implement in close collaboration with NBTC ([Office Of The National Broadcasting Telecommunications Commission](http://house.nbtc.go.th/wps/portal/Eng/Home/Contactus/Headquarters/!ut/p/z1/04_Sj9CPykssy0xPLMnMz0vMAfIjo8ziDS1NPd0tLQx83L2dDA0czcKc_B29gwNDTUz1w8EKDFCAo4FTkJGTsYGBu7-RfhQx-vEoiMIwHtkioP4oVCv8zTzcgCZYGnmbObkFBvkYQhXgcyIhSwpyQyMMMj0VAZP0pEY!/?1dmy&urile=wcm%3apath%3a%2Feng%2Bsite%2F8contactus%2F81contactus_detail%2Foffice%2Bof%2Bthe%2Bnational%2Bbroadcasting%2Btelecommunications%2Bcommission)) to build capacity in priority areas of interest such as AI-Artificial Intelligence Overview [16-19 Sep 2019, Bangkok, Thailand] and Traffic engineering (CDN and international traffic routing) and advanced wireless (5G/IOT) network planning. [30 Sep-3 Oct, Bangkok, Thailand]. In partnership with APNIC and Australia, training on “Internet and IPv6 Infrastructure Security Program” was conducted in Tonga for the Pacific region and in 2018, the IPv6 Roadmap was developed and available for Mongolia and Brunei.

3.6 Through the ITU Academy, a training course on Internet and IPv6 Infrastructure Security continues to be provided in the Asia-Pacific region by the Centre of Excellence ALTTC, in partnership with MDES (Thailand) and APNIC.

3.7 In the Arab region, a project on human capacity building in relation to IPv6 was implemented under the framework cooperation agreement signed between the UAE’s Telecommunications Regulatory Authority (TRA) and ITU.

3.8 The [final report](https://www.itu.int/pub/D-STG-SG01.01.1-2017) in response to ITU-D SG 1 [Question 1/1](https://www.itu.int/net4/ITU-D/CDS/sg/rgqlist.asp?lg=1&sp=2014&rgq=D14-SG01-RGQ01.1&stg=1) is available and explores through case studies the experiences of countries in transitioning from IPv4 to IPv6 to enable IoT, M2M, Internet of Everything (IoE), and other future technologies.

# 4. Internet-related public policy issues including the management of domain names and addresses

4.1ITU participated in the 13th IGF meeting, held from 12 to 14 November 2018 in Paris, France. Due to an overlap with the ITU Plenipotentiary Conference, ITU participation at the IGF was not at the same level as previous years. ITU co-organized an Open Forum on Implementation of WSIS Action Lines for SDGs and WSIS Forum 2019 (co-organized by the WSIS Action Line Facilitators), and co-organized a workshop on capacity building in Internet governance.

ITU will continue to actively participate in the 14th IGF, to be hosted by the Government of Germany in Berlin from 25 to 29 November 2019. The ITU Secretary-General has confirmed his participation in the event. ITU will organize the annual Equals in Tech awards, the world’s largest event celebrating those working to close the gender digital divide, on 27 November as part of the IGF. ITU will also co-organize an Open Forum on Implementation of WSIS Action Lines for SDGs and WSIS Forum (co-organized by the WSIS Action Line Facilitators) to inform stakeholders on the related activities concerning to the WSIS Process.

4.2 ITU continues to follow the issue of protecting intergovernmental organization (IGO) names and acronyms in any new gTLDs, as part of the IGO coalition composed of approximately 35 IGOs including OECD, UN, UPU, WHO, WIPO, and the World Bank.

4.3 ITU-T SG 2 continues to follow the issue of possible perceived mapping of the ITU-T E.164 numbering plan into the DNS, with regard to the provision of all-numeric domain names by TELNIC, the domain name registry operator for .tel gTLD. ITU-T SG 2 is awaiting contributions from ITU-T membership after a call for contributions was made on this topic in its January 2016 meeting.

4.4 BDT continues to develop capacities in the field of Internet governance for the ITU membership. Several training and capacity building activities were implemented in 2018. A regional workshop on Internet governance was organized for the Africa region in Abuja, Nigeria, on 27-28 August 2018, in partnership with Diplo Foundation. The workshop attracted more than 100 participants. ITU also contributed to capacity building events during the WSIS Forum 2018 and the IGF 2018, in partnership with ICANN and Diplo Foundation.

**5. ENUM**

5.1 [Updated Information on ENUM](http://www.itu.int/ITU-T/inr/enum/) is being maintained by ITU-T. This includes information on approved ENUM Delegations and on ENUM trials.

5.2 ITU-T SG 2 liaised with IAB and RIPE NCC concerning the updated ENUM interim procedure for geographic country codes considering the issue of non-functioning ENUM delegations under e164.arpa.

5.3 ITU-T SG11 has been working on VoLTE/ViLTE interconnection and adoption of ENUM for IMS interconnection in liaising with SG2.

# 6. International Internet Connectivity (IIC)/Internet Exchange Points (IXPs)

6.1 BDT continues to provide assistance to countries in the creation of national IXPs, and on achieving efficient and cost-effective regional Internet connectivity by, e.g.: developing model interconnection as a basis for formulating National and Regional IXPs, as in the case of Guatemala; supporting strengthening capabilities of the national IXPs (Montenegro) and the National Internet Exchange in Timor Leste; developing a new publication on “Internet Exchanges” including Renewable Energies for Rural Communications, etc. Another sub-regional IXP is under consideration with Djibouti Telecom using their New Data Center and optical cables.

BDT has also developed an [ICT-data mapping platform](https://www.itu.int/itu-d/tnd-map-public/) to take stock of IXPs locations, national backbone connectivity (optical fibres, microwave links and satellite earth stations) as well as of other key metrics of the ICT sector.

6.2 ITU-T SG 3 continues to work on IIC, including framework for competitive IIC provision, IP peering, regional traffic exchange points, cost models, and cost of provision of services and International Internet Connectivity. A new study was started in April 2019 on Guidelines on implementation of Recommendation ITU-T D.52 focusing on operationalization of regional Internet exchange points. The Group, under the new Question 13/3, is also developing a new Standard on optimizing terrestrial cable utilization across multiple countries to boost regional and international connectivity.

SG 3, in April 2019, started new studies on IMT2020-related policy considering MVNOs, on guidelines on implementation of Recommendation ITU-T D.52 focusing on operationalization of regional Internet exchange points, on roaming aspects of IoT and M2M including any related economic and tariff principles, and is continuing studies on Interoperability for Competition in Mobile Financial Services, on Reducing the cost of the international Internet connectivity of the Central African Backbone (CAB) project, Central African Republic component, on International Internet Connectivity, on Cost model for international Internet connectivity, on Framework for the Competitive Provision of International Internet Connectivity (IIC), on Guidelines on implementation of Recommendation ITU-T D.52 focusing on operationalization of regional Internet exchange points, on International Internet Connectivity, including IP peering, Regional Traffic Exchange Points, and cost of provision of services, and on Economic impact of transition from IPv4 to IPv6.

**7. OTT**

7.1 ITU-T SG 3 approved a new ITU standard addressing the relationship between network operators and providers of OTT services. The new standard ITU-T D.262 on Collaborative Framework for OTTs provides parameters for analysis of the new financial dynamics of the ICT ecosystem, and how policy and regulatory frameworks could support competition, consumer protection, consumer benefits, dynamic innovation, sustainable investment and infrastructure development, accessibility, and affordability in relation to the global growth of OTTs.

7.2 SG 3 is also advancing work items D.OTT Consumer on Customer redress mechanism and consumer protection, D.50Supp\_OTT on OTTs in the context of IIC, D.OTTBypass on OTT Bypass, D.OTTMNO on Guidelines on OTT-MNO Partnerships, D7\_R\_OTTBypass on Regional Recommendation on OTT bypass including national and regional collaboration between Member States and operators to deal with the OTT bypass issue.

7.3 ITU-T SG 17 identified OTTs as one of the new actors in the ecosystem that impacts Security as part of its transformation of security studies. Several recommendations and current work items had and are already taking into account this challenge, and SG 17 has listed Cloud (covering OTTs) as potentially a new Question in SG 17’s long term prototypes (currently this issue concerns both Q7/17 and Q8/17).

7.4 Under ITU-D SG 1, new Q3/1 will work on “Emerging technologies, including cloud computing, m-services and OTTs: Challenges and opportunities, economic and policy impact for developing countries” (merging former Q1/1 and Q3/1).

7.5 ITU-T SG 2 have agreed two new work items on OTTs: TR.OTTnumber “Current use of E.164 numbers as identifiers for OTTs” and E.sup.OTTnum “Guidance on the use of E.164 numbers as identifiers for OTTs”.

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