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|  | **Document CWG-Internet-20/2-E** |
| **30 August 2024** |
| **English only** |
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| Report by the secretariat | |
| ITU INTERNET ACTIVITIES: RESOLUTIONS 101, 102, 133, 180 AND 206 | |
| **Purpose**  This report summarizes ITU’s activities related to Plenipotentiary Conference (PP) Resolution 101 (Rev. Bucharest, 2022), “Internet Protocol-based networks”; Resolution 102 (Rev. Bucharest, 2022), “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. Bucharest, 2022), “Roles of administrations of Member States in the management of Internationalized (multilingual) domain names”; Resolution 180 (Rev. Bucharest, 202), “Promoting deployment of Internet Protocol version 6” and Resolution 206 (Dubai, 2018), “OTTs”.  **Action required**  In line with Resolution 102 (Rev. Bucharest, 2022), 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**  [*CWG-Internet website*](https://www.itu.int/en/council/cwg-internet/Pages/default.aspx)*; Plenipotentiary Resolutions* [*101*](https://www.itu.int/en/council/Documents/basic-texts-2023/RES-101-E.pdf)*,* [*102*](https://www.itu.int/en/council/Documents/basic-texts-2023/RES-102-E.pdf)*,* [*133*](https://www.itu.int/en/council/Documents/basic-texts-2023/RES-133-E.pdf)*,* [*180*](https://www.itu.int/en/council/Documents/basic-texts-2023/RES-180-E.pdf) *(Rev. Bucharest, 2022), Resolution* [*206*](https://www.itu.int/en/council/Documents/basic-texts-2023/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/publications.aspx?lang=en&parent=T-RES-T.47-2022) *(Rev. Dubai, 2012),* [*48*](https://www.itu.int/pub/publications.aspx?lang=en&parent=T-RES-T.48-2022) *(Rev. Geneva, 2022),* [*49*](https://www.itu.int/pub/publications.aspx?lang=en&parent=T-RES-T.49-2016) *(Rev. Hammamet, 2016),* [*50*](https://www.itu.int/pub/publications.aspx?lang=en&parent=T-RES-T.50-2022) *(Rev. Geneva, 2022),* [*52*](https://www.itu.int/pub/publications.aspx?lang=en&parent=T-RES-T.52-2022) *(Rev. Hammamet, 2016),* [*58*](https://www.itu.int/pub/publications.aspx?lang=en&parent=T-RES-T.58-2022)*,* [*60*](https://www.itu.int/pub/publications.aspx?lang=en&parent=T-RES-T.60-2022)*,* [*64*](https://www.itu.int/pub/publications.aspx?lang=en&parent=T-RES-T.64-2022) *(Rev. Geneva, 2022),* [*69*](https://www.itu.int/pub/publications.aspx?lang=en&parent=T-RES-T.69-2022)*,* [*75*](https://www.itu.int/pub/publications.aspx?lang=en&parent=T-RES-T.75-2022) *(Rev. Geneva, 2022),* [*98*](https://www.itu.int/pub/publications.aspx?lang=en&parent=T-RES-T.98-2022) *(Rev. Geneva, 2022);* [*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)*,* [*C19/33*](https://www.itu.int/md/S19-CL-C-0033/en)*,* [*C20/33*](https://www.itu.int/md/S20-CL-C-0033/en)*,* [*C21/33*](https://www.itu.int/md/S21-CL-C-0033/en)*,* [*C22/33*](https://www.itu.int/md/S22-CL-C-0033/en)*,* [*C23/33*](https://www.itu.int/md/S23-CL-C-0033/en) | |

# 1 Introduction

This report describes ITU’s activities related to the 2022 Plenipotentiary Conference Resolutions 101, 102, 133, 180 and 206 for the reporting period from February 2024 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

The new/revised [ITU-T Recommendations](https://www.itu.int/itu-t/workprog/wp_search.aspx?isn_sp=8265&isn_status=-1,2&details=0&field=acdefghijo) and other texts which have been approved for this reporting period, including those relevant to this Report, can be found under the different ITU-T Study Groups (SGs).

## 2.1 IMT-2020

In total,11 Recommendations were approved by ITU-T SGs 39, 11, 13, and 16. One Supplements was revised by SG 13, one Technical Report were agreed by SG 3, and 22 draft Recommendations are under approval in SGs 13 and 17. More information is available below:

**2.1.1** ITU-T SG3 approved [Technical report“5G related policy considering MVNOs”](https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=18195).

**2.1.2** ITU-T SG9 approved Recommendation [ITU-T J.153 “System architecture for cable television services to use IMT-2020 radio system”](https://www.itu.int/rec/T-REC-J.153).

**2.1.3** ITU-T SG11 approved the following five Recommendations:

– [ITU-T Q.5009 “Signalling Requirements and Protocols for enhanced quality assured connections in IMT-2020 network and beyond”](https://www.itu.int/rec/T-REC-Q.5011);

– [ITU-T Q.5012 “Signalling architecture of WLAN access network for interworking with 5G network”](https://www.itu.int/rec/T-REC-Q.5012);

– [ITU-T Q.5013 “Signalling Requirements and Protocol procedures for two-way QoS mechanism between access networks and core networks in IMT-2020 network and beyond”](https://www.itu.int/rec/T-REC-Q.5013);

– [ITU-T Q.5031 “Protocol for traffic flow coordination of multi-modality communication”](https://www.itu.int/rec/T-REC-Q.5031).

**2.1.4** ITU-T SG13approved revised [Supplement 59 to ITU-T Y.3100-series “IMT-2020 and beyond standardization roadmap”](https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=19403) and the following five Recommendations:

– [ITU-T Y.3129 “Requirements and framework for stateless fair queuing in large scale networks including IMT-2020 and beyond”](https://www.itu.int/rec/T-REC-Y.3129/en);

– [ITU-T Y.3142 “Requirements and framework for AI/ML-based network design optimization in future networks including IMT-2020”](https://www.itu.int/rec/T-REC-Y.3142);

– [ITU-T Y.3186 “Requirements and framework for distributed joint learning to enable machine learning in future networks including IMT-2020”;](https://www.itu.int/rec/T-REC-Y.3186)

– [ITU-T Y.3162 “Evaluating intelligence capability for network slice management and orchestration in IMT-2020 network and beyond”](https://www.itu.int/rec/T-REC-Y.3162);

– [ITU-T Y.3207 “Fixed, mobile and satellite convergence - Integrated network control architecture framework for IMT-2020 networks and beyond”](https://www.itu.int/rec/T-REC-Y.3207/en).

SG13 has 20 more draft Recommendations on IMT-2020 under approval.

**2.1.5** ITU-T SG16 approved Recommendation [ITU-T F.743.26 “Technical requirements of cloud gaming platform based on IMT-2020 mobile edge computing”](https://www.itu.int/rec/T-REC-F.743.26).

**2.1.6** ITU-T SG17started approval of two draft Recommendations on security of IMT-2020/5G edge computing and core network respectively.

## 2.2 Internet-of-things (IoT) and Smart Cities

**2.2.1** In total, six Recommendations were approved by ITU-T SGs 5, 11, 16, 17, and 20. Two Supplements and one Technical Report was approved by SG20, one Technical Paper was approved by SG16, and 14 draft Recommendations are under approval in SGs 5, 17 and 20. More information is available below:

– ITU-T SG5 approved [ITU-T L.1640](https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=18397) “Methodology for dynamic monitoring and analysis of greenhouse gas emissions in city” and started approval of [ITU-T L.1632](https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=18973) “Identification method for building infrastructure equipment in a sustainable city”

– ITU-T SG11 approved [ITU-T Q.4075 “Test specifications for remote testing of Internet of Things using the probes”](https://www.itu.int/ITU-T/recommendations/rec.aspx?rec=15962)

– ITU-T SG16 approved [Technical Paper “Construction guidelines for city-level distributed ledger technology (DLT) infrastructure”](https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=18996)

– ITU-T SG17 approved [Amendment 1 to ITU-T X.1352 “Security Requirements for Internet of things (IoT) device and gateway”](https://www.itu.int/rec/T-REC-x/recommendation.asp?lang=en&parent=T-REC-X.1352) and started approval of two more Recommendations on IoT security;

– ITU-T SG20 approved the following four Recommendations:

• Recommendation [ITU-T Y.4221 “Requirements of IoT-based electric power infrastructure monitoring system”](https://www.itu.int/rec/T-REC-Y.4221)

• [Recommendation ITU-T Y.4225](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=17947) “Requirements and capability framework of digital twin for intelligent transport system”

• [Recommendation ITU-T Y.4488](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=17945) “Requirements and functional architecture of data services provided via IoT-based technologies for the safety of manufacturing-related working environments”

• [Recommendation ITU-T Y.4497](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=17923) “Requirements and functional architecture of smart sharing bicycle service”.

two Supplements:

• Supplement 82 “Standardization gaps and roadmap for AI and IoT in digital agriculture”

• Supplement 83 “Optimizing Digital Agriculture with Best Practices for Integrating AI and IoT”

• Technical Report “Intelligent Anomaly Detection System for IoT”.

And started approval of three more Recommendations on smart cities and eight more Recommendations on Internet of things (IoT).

**2.2.2** The standardization of IoT test specifications is accelerating, supported by the increasing collaboration of ITU-T and oneM2M. ITU-T SG20 continued coordination on IoT in its ITU-T Joint Coordination Activity on Internet of Things and Smart Cities and Communities (JCA-IoT and SC&C) and is also in close collaboration with IETF, oneM2M, W3C, LoRa Alliance and TMForum. SG20 is collaborating with IETF on use of "ppk" Uniform Resource Identifier (URI) scheme name in [draft Recommendation ITU-T Y.4492 (ex Y.dec-IoT-arch)](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=17893) “Decentralized IoT communication architecture based on information centric networking and blockchain”, with oneM2M on [Recommendation ITU-T Y.4500.3](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=17890) "oneM2M Security Solutions", with TM Forum on [Recommendation ITU-T Y.4703](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=17919) “Internet of things service management application programming interface Representational State Transfer specification” and [ITU-T Y.4704](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=17920) “Internet of things device management application programming interface Representational State Transfer specification”, with W3C on Decentralised Identifiers (DIDs) and with LoRa Alliance on [draft Recommendation ITU-T Y.4480rev](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=18747) “Low power protocol for wide area wireless networks”.

**2.2.3** From January-July 2024, J-SCTF held 3 meetings. J-SCTF formally reports to three governing bodies of three SDOs (IEC SMB, ISO TMB, and ITU TSAG) and informally exchange with the Standardization Programme Coordination Group ([SPCG](https://www.worldstandardscooperation.org/what-we-do/spcg/)), as appropriate, to share knowledge, ideas, and experiences.

**2.2.4** The SG20 Correspondence Group on Artificial Intelligence of Things (CG-AIoT) has concluded its work in September 2024.

**2.2.5** The [United for Smart Sustainable Cities (U4SSC)](https://u4ssc.itu.int/) initiative, supported by 19 UN bodies, advocates for public policy to ensure that ICTs –and ICT standards in particular– play a definitive role to accelerate digital transformation in cities. Under the [United for Smart Sustainable Cities (U4SSC) initiative](https://u4ssc.itu.int/), the following deliverables were published:

– [Guidelines on tools and mechanisms to finance smart sustainable cities projects](https://www.itu.int/en/publications/Documents/tsb/2021-A-U4SSC-deliverable-Guidelines-on-tools-and-mechanisms-to-finance-SSC-projects/index.html)

– [Digital solutions for integrated city management and use cases](https://www.itu.int/en/publications/Documents/tsb/2021-U4SSC-Digital-solutions-for-integrated-city-management-and-use-cases/index.html#p=1)

– [Compendium of survey results on integrated digital solutions for city platforms around the world](https://www.itu.int/en/publications/Documents/tsb/2021-U4SSC-Compendium-of-survey-results/index.html#p=1)

– [Smart public health emergency management and ICT implementations](file:///C:/Users/Saran/AppData/Local/Microsoft/Windows/INetCache/Content.Outlook/97RS0L0D/§%09https:/www.itu.int/en/publications/Documents/tsb/2021-U4SSC-Smart-public-health-emergency-management-and-ICT-implementations/index.html#p=1)

– [Reference framework for integrated management of an SSC](http://u4ssc.itu.int/wp-content/uploads/2023/07/U4SSC-Reference-framework-integrated-management-of-an-SSC-E.pdf)

– [Procurement guidelines for smart sustainable cities](https://www.itu.int/en/publications/Documents/tsb/2023-U4SSC-Procurement-guidelines-for-SSC/index.html#p=1)

– [Compendium of practices on innovative financing for smart sustainable cities projects](https://www.itu.int/en/publications/Documents/tsb/2023-U4SSC-Compendium-Practices-Innovative-Financing-SSC-Projects/index.html#p=1), [Smart tourism: A path to more secure and resilient destinations](https://www.itu.int/en/publications/Documents/tsb/2022-U4SSC-Smart-tourism/index.html#p=1)

– [Redefining smart city platforms: Setting the stage for Minimal Interoperability Mechanisms](https://www.itu.int/en/publications/Documents/tsb/2022-U4SSC-Redefining-smart-cityplatforms/index.html#p=1)

– [Guiding principles for artificial intelligence in cities](https://www.itu.int/en/publications/Documents/tsb/2024-U4SSC-Guiding-principles-artificial-intelligence-in-cities/index.html#p=1).

**2.2.6** The [7th meeting of the U4SSC Initiative](https://u4ssc.itu.int/latest-meetings/7th-meeting/) took place on 20 June 2023 where a new working group on Data and APIs in smart city platforms and working Group on Smart destination platforms (under the Thematic Group on City Platforms), a new working group on Autonomous cities (under the Thematic Group on Artificial intelligence in cities), working group on Methodology to support cities to implement the procurement guidelines (under the Thematic Group on Procurement for smart sustainable cities) and a new Thematic Group on Digital Wellbeing have been established. The next U4SSC meeting will take place on 19 September 2024, in Madrid, Spain.

**2.2.7** More than 200 cities worldwide are measuring their progress using *“Key Performance Indicators for Smart Sustainable Cities”* based on ITU standards (ITU-T Y.4903). Additionally, the following city snapshots were launched: [Anyang (Republic of)](https://www.itu.int/en/publications/Documents/tsb/2023-U4SSC-City-Snapshot-Anyang-Republic-of-Korea/index.html#p=1), [Canton of Geneva, Switzerland](https://www.itu.int/en/publications/Documents/tsb/2022-U4SSC-State-Snapshot-Canton-of-Geneva-Switzerland/index.html#p=1), [Kyebi, Ghana](https://www.itu.int/en/publications/Documents/tsb/2022-U4SSC-City-Snapshot-Kyebi-Ghana/index.html#p=1), [Tromsø, Norway](https://www.itu.int/en/publications/Documents/tsb/2022-U4SSC-City-Snapshot-Tromso-Norway/index.html), [Narvik, Norway](https://www.itu.int/en/publications/Documents/tsb/2022-U4SSC-City-Snapshot-Narvik-Norway/index.html#p=1), [Mashhad, Iran (Islamic of)](https://www.itu.int/en/publications/Documents/tsb/2021-U4SSC-City-Snapshot-Mashhad-Iran/index.html), [Larvik, Norway](https://www.itu.int/en/publications/Documents/tsb/2021-U4SSC-City-Snapshot-Larvik-Norway/index.html#p=1), [Daegu, Korea (Republic of)](https://www.itu.int/en/publications/Documents/tsb/2021-U4SSC-City-Snapshot-Daegu-Republic-of-Korea/index.html#p=1). The following county snapshot was launched: [More og Romsdal, Norway](https://www.itu.int/en/publications/Documents/tsb/2021-U4SSC-City-Snapshot-More-og-Romsdal-Norway/index.html#p=1). The following verification reports were launched: [Anyang, Korea (Republic of)](https://www.itu.int/en/publications/Documents/tsb/2023-U4SSC-Verification-Report-Anyang-Republic-of-Korea/index.html#p=1), [Canton of Geneva, Switzerland](https://www.itu.int/en/publications/Documents/tsb/2022-U4SSC-Verification-Report-Canton-of-Geneva-Switzerland/index.html#p=1), [Tromsø, Norway](https://www.itu.int/en/publications/Documents/tsb/2022-U4SSC-Verification-Report-Tromso-Norway/index.html), [Narvik, Norway](https://www.itu.int/en/publications/Documents/tsb/2022-U4SSC-Verification-Report-Narvik-Norway/index.html#p=1), [Mashhad, Iran (Islamic of)](https://www.itu.int/en/publications/Documents/tsb/2021-U4SSC-Verification-Report-Mashhad-Iran/index.html), [Larvik, Norway](https://www.itu.int/en/publications/Documents/tsb/2021-U4SSC-Verification-Report-Larvik-Norway/index.html#p=1), [Daegu, Korea (Republic of)](https://www.itu.int/en/publications/Documents/tsb/2021-U4SSC-Verification-Report-Daegu-Republic-of-Korea/index.html#p=1).

**2.2.8** The first United for Smart Sustainable Cities (U4SSC) Austrian U4SSC Country Hub was approved during the 6th U4SSC meeting and is hosted by the Austrian Economics Center in Vienna, Austria. The city of Kyebi, Ghana, has also set up a U4SSC Country Hub in Ghana which is the first in Africa. The key objectives of the U4SSC country hubs are to promote the work of U4SSC.

**2.2.9** A [Toolkit on Digital Transformation for People-Oriented Cities and Communities](https://toolkit-dt4c.itu.int/) has been developed to support cities and communities. The resources contained in this Toolkit include international standards and guidance, the latest research and projections, and cutting-edge reports on a variety of timely topics relevant to the digital transformation of cities and communities.

**2.2.10** A [Digital Transformation Resource Hub](https://www.itu.int/cities/dt-resource-hub/) has been created in February 2023. The Digital Transformation Resource Hub provides a wide range of quality publications on digital transformation topics, including smart sustainable cities, cities’ actions to tackle COVID-19, artificial intelligence, Internet of things, blockchain, digital twin, metaverse and digital transformation trends.

**2.2.11** The International Telecommunication Union (ITU), together with other organizations and UN agencies, has been organizing the [**Digital Transformation Dialogues (DTD)**](https://www.itu.int/cities/digitaltransformationdialogues/). DTD offer a dynamic platform to facilitate a deeper understanding of emerging technologies to reshape traditional processes, improve operational efficiency and unlock new possibilities for innovation and standardization. The Digital Transformation Dialogues seeks to address evolving themes associated with digital transformation, foster cooperation among city stakeholders, and examine the role of standardization within this domain. The Digital Transformation Dialogues serve as a unique platform for highlighting the latest work and outcomes of the ITU-T Focus Groups, Initiatives and ITU-T Study Groups.

**2.2.12** Throughout 2024, the ITU has consistently published the Digital Transformation and Cities Digest, with editions being released in [January](https://www.itu.int/cities/wp-content/uploads/2024/01/ITU-Digital-Transformation-and-Cities-Digest-Jan2024.html), [March](https://www.itu.int/cities/wp-content/uploads/2024/03/ITU-Digital-Transformation-and-Cities-Digest-Mar2024.htm), [May](https://www.itu.int/cities/wp-content/uploads/2024/05/ITU-Digital-Transformation-and-Cities-Digest-May2024.htm) and [July](https://www.itu.int/cities/wp-content/uploads/2024/07/ITU-Digital-Transformation-and-Cities-Digest-July2024.htm). Copies of the Digest are available for access on the [Digital Transformation and Cities Digest webpage](https://www.itu.int/cities/dt-digest/).

## 2.3 IP Cable

ITU-T SG9 approved four Recommendations:

– [ITU-T J.153 “System architecture for cable television services to use IMT-2020 radio system”](https://www.itu.int/rec/T-REC-J.153)

– [ITU-T J.1630 “End to End network characteristics requirement for video services over integrated broadband cable network”](https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=17753)

– [ITU-T J.298 “Requirements and technical specifications of a cable TV hybrid set-top box compatible with terrestrial and satellite TV transport”](https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=18899)

– [ITU-T J.1291 “Requirements and functional specification of Audio and Video interface on cable set-top box”](https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=19222)

## 2.4 IPTV, Content Delivery Networks (CDN) and Digital Signage

ITU-T SG16 approved two Recommendations:

– [ITU-T H.705.3 " Requirements and architecture for open IPTV multicast service"](https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=17632)

– [ITU-T H.725 " IPTV Terminal Device: Virtualized model"](https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=17448)

## 2.5 IP performance

ITU-T SG12 approved [nine standards](https://www.itu.int/itu-t/workprog/wp_search.aspx?isn_sp=8265&isn_sg=8271&isn_status=-1,7,2&adf=2024-02-01&adt=2024-08-19&pg_size=100&details=0&field=acdefghijo) including Recommendations Supplements, Amendments, Implementer’s Guide, and Technical Reports.

## 2.6 IP-based Cloud/edge computing and Big Data

In total, 13 Recommendations were approved by ITU-T SGs 9, 11, 13, and 16. and four draft Recommendations are under approval in SGs 13, and 17. More information is available below:

– ITU-T SG9 approved three Recommendations:[J.1305Cor.1](https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=19465) Requirements of microservice architecture for audio-visual media in the converged media cloud, [J.1306 Cor.1](https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=19466) Specification of microservice architecture for audio-visual media in the converged media cloud, [J.1311](https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=17758) Technical Requirements for Cloud Gaming Service Platforms.

– ITU-T SG11 approved four Recommendations:[Q.4143](https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=18446) Signalling requirements for cloud-based control plane and pooled user plane of vBNG (virtualized Broadband Network Gateway), [Q.5011 (ex Q.IEC-EEMA)](https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=18482) Signalling requirements and interfaces of edge-aided energy management agent at intelligent edge computing. [Q.5029 (ex Q.IEC-DTINF)](https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=19131) Data management interfaces in digital twin smart aquaculture system with intelligent edge computing, and [Q.5030 (ex Q.IEC-FWINF)](https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=18918) Data management interfaces for intelligent edge computing-based flowing-water smart aquaculture system.

– ITU-T SG13 approved two Recommendations: [Y.3551](https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=18106) “Cloud computing - Framework and functional requirements of cloud data mobility management” and [Y.3658](https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=18137) “Big Data Driven Networking- Functional requirements and functional architecture of network programmability”, and started approval of two more Recommendations (Y.3553, Y.3163) on edge computing.

– ITU-T SG16 approved four Recommendations: [F.748.26](https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=17616) Technical specification for artificial intelligence cloud platforms: Performance evaluation, [F.748.38](https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=17575) Technical specification for artificial intelligence cloud platform: General architecture, [F.743.26](https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=17582) Technical requirements of cloud gaming platform based on IMT-2020 mobile edge computing, and [H.626.6](https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=17475) Architecture for big data application in video surveillance systems.

– ITU-T SG17 started approval of two Recommendations (X.1819, X.1384) on edge computing security.

## 2.7 Distributed ledger technology (DLT)/blockchain

**2.7.1** ITU-T SG16 completed work on the following DLT-related Recommendations:

– [ITU-T F.751.14 “Reference architecture for information tracing of renewable energy consumption based on distributed ledger technology”](https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=18614)

– [ITU-T F.751.15 "Assessment methods for distributed ledger technology (DLT) management service platforms"](https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=17639)

– [ITU-T F.751.16 "Reference framework for distributed ledger technology (DLT) management service platforms"](https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=17654)

– [ITU-T F.751.17 "Smart contract lifecycle management requirements for distributed ledger technology systems"](https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=18615)

– [ITU-T F.751.18 "Framework for DLT-based energy metering data sharing"](https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=17642)

– [ITU-T F.751.19 "Framework and requirements for distributed ledger technology based on sharding technique"](https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=18610)

– [ITU-T F.751.20 "Reference architecture for DLT-based multimedia data delivery management systems](https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=17638)"

– [ITU-T F.751.21 "Technical Requirements on inter-chain interoperability for permissioned distributed ledger technologies"](https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=18617)

– [ITU-T F.751.22 "Financial distributed ledger technology application guideline"](https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=17558).

**2.7.2** ITU-T SG17 approved Recommendation [X.1353](https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=18007) Blockchain-based Security Methodology for Zero-Touch Deployment of Massive IoT.

**2.7.3** ITU-T SG20 approved Recommendations [Y.4227](https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=17932) IoT requirements and capabilities for support of blockchain, and [Y.4508](https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=18467) Functional requirements and architecture of blockchain-based activity logs management for IoT data processing and management.

**2.7.4** ITU-T SG13 started approval of four Recommendations on DLT (Y.2348, Y.2349, Y.3326, Y.3210).

## 2.8 Intelligent Transport System (ITS)

ITU-T SG16 approved [ITU-T F.749.18 “Framework and requirements for emergency services using civilian unmanned aerial vehicles”](https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=17634), SG17 approved revised [X.1373](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=17976) Secure software update capability for intelligent transportation system communication devices and started approval of one Recommendation (X.1384) and SG20 started approval of two Recommendations (Y.4230, Y.4231) on ITS.

## 2.9 Security

**2.9.1** ITU-T SG17 approved the following Recommendations, in addition to what’s reported above:

|  |  |
| --- | --- |
| [TR.zt-acp](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=18032) | Guidelines for zero trust-based access control platform in telecommunication networks |
| [X.1144](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=18020) | eXtensible Access Control Markup Language (XACML) 3.1 |
| [X.1150](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=18035) | Security assurance framework for digital financial services |
| [X.1455](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=18001) | Security Measure for Smart Residential Community |
| [X.1771](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=18022) | Security guidelines for combining de-identified data using trusted third party |
| [X.2011](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=18023) | Security guidelines for digital twin network |
| [X.supp.40](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=18350) | ITU-T X.1152 - Supplement on Use cases for digital COVID-19 certificates |
| [X.1280](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=18036) | Framework for out-of-band server authentication using mobile devices |
| [X.1281](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=18778) | APIs for interoperability of identity management systems |
| [X.1713](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=17988) | Security requirements for the protection of quantum key distribution nodes |
| [X.1715 Amd.1](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=19049) | Security requirements and measures for integration of quantum key distribution network and secure storage network |

**2.9.2** ITU-T SG13 approved the following Recommendations: [Y.2776 (ex Y.DPI-IMM-PIB)](https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=18136) Deep packet inspection - intelligent management and maintenance of policy information base and [Y.3820 (ex Y.QKDNi-SDNC)](https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=18424) Quantum Key Distribution Network Interworking - Software Defined Networking Control.

**2.9.3** SG11 developed set of standards defining the procedure for incorporating and validating digital public-key certificates at the signalling level, including signing the CLI in SS7-based and VoIP-based networks. More details are available on the dedicated webpage at: <https://itu.int/go/SIG-SECURITY>. Among standards recently developed are:

– ITU-T Q.3062 “Signalling procedures and protocols for enabling interconnection between trustable network entities in support of existing and emerging networks”;

– ITU-T Q.3063 “Signalling procedures of calling line identification authentication”;

– Amd.2 to ITU-T Q.931 “ISDN user-network interface layer 3 specification for basic call control. Amendment 2: Extensions for the support for the calling line identification authentication”;

– Amd.6 to ITU-T Q.1902.3 “Bearer Independent Call Control protocol (Capability Set 2) and Signalling System No. 7 ISDN User Part: Formats and codes. Amendment 6: Extensions for the support for the calling line identification authentication”;

– Amd.7 to ITU-T Q.763 “Signalling System No. 7 – ISDN User Part formats and codes. Amendment 7: Extensions for the support for the calling line identification authentication”.

Currently, SG11 is developing draft new Recommendation ITU-T Q.TSCA “Requirements for issuing End-Entity and Certification Authority certificates for enabling trustable signalling interconnection between network entities” which defines requirements for the verification of information elements in certificate signing requests.

**2.9.4** ITU-T SG2 is developing draft new Recommendation ITU-T E.RAA4Q.TSCA “Registration Authority Assignment criteria to issue digital public certificates for use by Q.TSCA” which defines the criteria for the selection of registration authorities for use in relation to Q.TSCA, and the process by which the criteria would be used to select registration authorities to support the allocation of digital public certificates that will facilitate implementation in support of Q.TSCA.

**2.9.5** ITU-T SG20 developedRecommendation [ITU-T Y.4500.3 “oneM2M - Security solutions”](https://www.itu.int/ITU-T/recommendations/rec.aspx?id=15076) and [Technical Report YSTR-IADIoT](https://www.itu.int/ITU-T/workprog/wp_item.aspx?isn=17917) “Intelligent Anomaly Detection System for IoT”.

## 2.10 ITU-T Focus Groups

In total, three ITU-T Focus Groups are active:

– [ITU-T Focus Group on cost models for affordable data services](https://www.itu.int/en/ITU-T/focusgroups/cd) (FG-CD);

– [ITU-T Focus Group on AI for Natural Disaster Management (FG-AI4NDM)](https://www.itu.int/en/ITU-T/focusgroups/ai4ndm/Pages/default.aspx); and

– [ITU-T Focus Group on Artificial Intelligence for Health (FG AI4H)](https://www.itu.int/en/ITU-T/focusgroups/ai4h).

**2.11** In the reporting period, TSB has not received reports or information on concerning any incidents covered by [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](https://www.itu.int/net/ITU-T/res69/secured/notifications.aspx)).

**2.12** ITU-D SG 1 and SG 2 continue their work on IP-related issues. New Q1/1 is working on *“Strategies* and *policies for the deployment of broadband in developing countries”* (merging former Q1/1 and Q2/1).

**2.13** Projects have been implemented successfully by BDT on Internet broadband wireless connectivity to provide free or low-cost digital access for schools and hospitals, and for underserved populations in rural and remote areas in selected countries. The impact for the countries where projects have been implemented includes but is not limited to:

– Burundi: 10 cities connected in 2.5 GHz frequency band, 15 engineers trained for operations and maintenance, and 437 schools, hospitals and Government agencies connected.

– Djibouti: 20 cities connected in 2.5 GHz Frequency Band, and 48 Schools, 43 Hospitals/clinics and 23 Ministries connected.

– Eswatini: 4G LTE Broadband Wireless Network installed in 10 sites and 15 technical training sessions completed for local experts on the RF Monitoring and Planning and Operation and Maintenance of the deployed 4G LTE Broadband Wireless Network.

Other initiatives are also ongoing related to this subject such as GIGA and Partner2Connect. More information is available in Document [C24/35](https://www.itu.int/md/S23-CL-C-0035/en).

**2.14** ITU-D is working closely with Intelsat to connect 100 Schools globally. As of November 2023, the beneficiary countries include the following countries: Lao PDR, Mongolia, Timor-Leste, Zambia, Burundi, Tanzania, Central African Republic (RCA), Zimbabwe, Nepal, Malawi, Mali, Niger, Cambodia, Papua New Guinea, Philippines, Mexico.

**2.15** 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”.

**2.16** Several training courses were provided through the [ITU Academy](https://academy.itu.int/) and the [ITU Academy Training Centers](https://academy.itu.int/itu-d/projects-activities/centres-excellence/coe-overview), covering topics such as “ Wireless access technologies to internet network", "Strategic aspects for Internet governance and innovations”, and “The Last Mile Internet Connectivity”. A total of 627 participants took those courses, of which 149 received a certificate.

# 3 IPv6

**3.1** The [ITU-T IPv6 webpage](https://www.itu.int/en/ITU-T/ipv6/Pages/default.aspx) highlights the IPv6 activities within ITU-T, including [approved](https://www.itu.int/ITU-T/workprog/wp_search.aspx?isn_sp=-1&isn_status=-1%2c2&title=IPv6&details=0&field=aebcgfkjl) and [under development](https://www.itu.int/ITU-T/workprog/wp_search.aspx?isn_sp=-1&isn_status=-1%2c1&title=IPv6&pg_size=100&details=0&field=aebcgfkjl) ITU-T deliverable related to IPv6. Trainings/courses are being organized on all forms of IoT connectivity, including information security and privacy.

**3.2** BDT and Telecommunications and Post Regulatory Authority- of Sudan established a regional “ITU IPv6 and IoT Expertise Center for Arab Region” hosted by TPRA-Sudan to [provide trainings](https://www.itu.int/en/ITU-D/Regional-Presence/ArabStates/Pages/Projects/IPv6%26IoT/IPV6-IOT.aspx).

**3.3** BDT is also providing technical assistance on IPv6 to Montenegro. The IPv6 Laboratory is now installed and operational at the University of Montenegro. Capacity-building programs are taking place to train students and operators at this newly established IPv6 Laboratory.

**3.4** BDT is providing assistance on IPv6 test bed implementation in Cameroon and in Congo. Technical assistance is being provided to Iraq, State of Palestine, Somalia, and Sudan for developing their national IPv6 transition strategies and the creation of national IPv6 task forces.

**3.5** BDT is also focusing on a special program to train the trainers on “IPv6 Over 5G Networks”. 31 participants completed the training and 20 have been certified.

**3.6** 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. An [essential Guide](https://www.itu.int/en/ITU-D/Study-Groups/2018-2021/Pages/Publications.aspx) is available in order to assist developing countries to implement IPv6 over 5G Networks.

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

**4.1** Pursuant to the nineteenth meeting of the CWG-Internet, ITU launched an open consultation on [*The developmental aspects to strengthen the Internet*](https://www.itu.int/en/council/cwg-internet/Pages/consultation-feb2024.aspx) in March 2024.

**4.2** ITU will participate at the highest level at the 19th IGF meeting in Riyadh, Saudi Arabia, and is also continuing to contribute to various working groups and dynamic coalitions of the IGF.

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

**4.4** In allthe activities listed in the various sections of this Report, particularly with regard to beneficiary countries on IPv6, broadband and capacity building activities, ITU aims to address the challenges faced by landlocked developing countries as per the Vienna Programme of Action.

**4.5** ITU continues to actively follow discussions in GAC as an observer.

**4.6** ITU has also been following and contributing to the ongoing Global Digital Compact process. More information on this is contained in Document [CWG-WSIS&SDG-41/9](https://www.itu.int/md/S24-CWGWSIS41-C-0009/en).

# 5 ENUM

[Updated Information on ENUM](http://www.itu.int/ITU-T/inr/enum/) is being maintained by ITU-T. ITU-T SG2 is continuing work on a new draft Recommendation to differentiate between ENUM and Infrastructure ENUM. ITU-T SG2 is continuing work on a new draft Recommendation ITU-T E.ENUMINF *“*Differentiating *between ENUM and Infrastructure ENUM”*. ITU-T SG2 experts have noted that a number of countries have stale delegates (i.e., either not functioning due to technical reasons, or not registered in the RIPE database), and are discussing the expected usefulness of ENUM delegation of E.164 Geographic Country Codes in the future.

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

BDT continues its work on providing assistance on IXP related issues. This year, assistance was provided to the Armenian Government and industry to help the ARMIX to analyse data on IXP performance with the following results:

– Good peering efficiency was found in terms of the number of network addresses peering with Internet Exchange Point

– Mobile network performance above regional peers assessed (average 33.13 Mbps down, 19.83 Mbps up).

IXPs locations are available at the ICT Infrastructure interactive mapping: <https://bbmaps.itu.int/bbmaps/>.

# 7 OTT

**7.1** Under **ITU-D Q3/1**, work continues on “Emerging technologies, including cloud computing, m-services and OTTs: Challenges and opportunities, economic and policy impact for developing countries”.

**7.2** **ITU-T SG2** is progressing two work items on OTTs (TR.OTTnum “Current use of E.164 numbers as identifiers for OTTs”, and draft Recommendation ITU-T E.ACP “Alternative calling procedures”)

**7.3** **ITU-T SG3** approved [Regional Recommendation ITU-T D.608R “OTT voice bypass”](https://www.itu.int/ITU-T/recommendations/rec.aspx?rec=14772) (Africa region) and [Regional Recommendation ITU-T D.700R “Principles for dealing with OTTs”](https://www.itu.int/ITU-T/recommendations/rec.aspx?rec=15576) (Arab region). SG3 also agreed on [ITU-T Technical Report DSTR-OTTBypass “OTT Bypass”](https://www.itu.int/ITU-T/workprog/wp_item.aspx?isn=18200), (under publication) and [ITU-T Technical Report DSTR-STUDY\_DRCI “Dispute Resolution Processes”](https://www.itu.int/ITU-T/workprog/wp_item.aspx?isn=18168) between traditional telecommunication services providers and over-the-top (OTT) providers.

SG3 is currently working on:

– [Recommendation on “Guidelines on Potential Cost Contribution mechanisms between OTT service providers and telecom network service operators towards the expansion and development of high-capacity telecom networks”](https://www.itu.int/ITU-T/workprog/wp_item.aspx?isn=19649),

– [Recommendation on “OTT Bypass”](https://www.itu.int/ITU-T/workprog/wp_item.aspx?isn=18175), and

– [Study on “Policy, regulatory, and economic aspects of OTTs in the context of international telecommunication/ICT services and networks”](https://www.itu.int/ITU-T/workprog/wp_item.aspx?isn=18579).

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