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|  | **Document CWG-Internet-19/2** |
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| Contribution 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***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 2023 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,38 Recommendations were approved by ITU-T SGs 5, 9, 11, 13, 16 and 17. Two Supplements were agreed by SGs 5 and 13, two Technical Reports were agreed by SGs 12 and 17, and six draft Recommendations are under approval in SGs 13 and 17. More information is available below:

**2.1.1** ITU-T SG5 approved [K.Suppl.16 “Electromagnetic field compliance assessments for 5G wireless networks”](https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=18506).ITU-T SG9 approved [Requirements for cable television services to use 5G radio system”](https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=18506).

**2.1.2** ITU-T SG11 approved the following Recommendations

* [ITU-T Q.5004 “Signalling architecture of Lite IMS for IMT-2020 network and beyond”](https://www.itu.int/ITU-T/recommendations/rec.aspx?rec=15256);
* [ITU-T Q.5005 “Requirement, framework and protocols for signalling network analysis and optimization in IMT-2020”](https://www.itu.int/ITU-T/recommendations/rec.aspx?rec=15257);
* [ITU-T Q.5006 "Signalling requirements for hierarchical network slicing service"](https://www.itu.int/ITU-T/recommendations/rec.aspx?rec=15586)
* [ITU-T Q.5025 “Protocol for managing User Plane function in IMT-2020 network”](https://www.itu.int/ITU-T/recommendations/rec.aspx?rec=15047);
* [ITU-T Q.5026 “Signalling Requirements and Protocol for Providing Network-oriented Data Integrity Verification Service based on Blockchain in IMT-2020 network”](https://www.itu.int/ITU-T/recommendations/rec.aspx?rec=15587); and
* [ITU-T Q.5027 "Protocol for IMT-2020 network Integration with Time Sensitive Network"](https://www.itu.int/ITU-T/recommendations/rec.aspx?rec=15588).

**2.1.3** ITU-T SG12 approved Recommendations [ITU-T Y.1540 Amd.2 “Internet protocol data communication service - IP packet transfer and availability performance parameters - Amendment 2: Revised Annex B: Additional search algorithms for IP-based capacity parameters and methods of measurement](https://www.itu.int/ITU-T/recommendations/rec.aspx?id=15491)”, and agreed [ITU-T Y Suppl.60 (revised) “Interpreting Y.1540 Maximum IP-Layer Capacity Measurements”](https://www.itu.int/ITU-T/recommendations/rec.aspx?id=14999) and [ITU-T Technical Report GSTR-5GQoE “QoE requirements for real-time multimedia services over 5G networks”](https://www.itu.int/pub/publications.aspx?lang=en&parent=T-TUT-QOS-2022-1)

**2.1.4** ITU-T SG13approved Technical Report “Requirements of semantic-aware networking for future networks” and the following Recommendations:

* [ITU-T Y.3079 “Information-Centric Networking in networks beyond IMT-2020: Framework of locally enhanced name mapping and resolution”](https://www.itu.int/rec/T-REC-x/recommendation.asp?lang=en&parent=T-REC-Y.3079);
* [ITU-T Y.3080 “Information-Centric Networking in networks beyond IMT-2020: Requirements and Mechanisms of Transport Layer”](https://www.itu.int/rec/T-REC-x/recommendation.asp?lang=en&parent=T-REC-Y.3080);
* [ITU-T Y.3082 “Mobile network sharing based on distributed ledger technology for networks beyond IMT-2020: Requirements and framework”;](https://www.itu.int/rec/T-REC-x/recommendation.asp?lang=en&parent=T-REC-Y.3082)
* [ITU-T Y.3083 “Information-centric networking in networks beyond IMT-2020: Reference model of on-site, elastic, and autonomous network”](https://www.itu.int/ITU-T/workprog/wp_item.aspx?isn=18116);
* [ITU-T Y.3117 “Quality of service assurance-related requirements and framework for smart education supported by IMT-2020 and beyond”](https://www.itu.int/rec/T-REC-x/recommendation.asp?lang=en&parent=T-REC-Y.3117);
* [ITU-T Y.3118 “Requirements and framework for jitter guarantee in large scale networks including IMT-2020 and beyond”](https://www.itu.int/rec/T-REC-x/recommendation.asp?lang=en&parent=T-REC-Y.3118);
* [ITU-T Y.3119 “Future networks including IMT-2020: capability classification framework for dedicated networks”](https://www.itu.int/rec/T-REC-x/recommendation.asp?lang=en&parent=T-REC-Y.3119);
* [ITU-T Y.3120 “Functional Architecture for latency guarantee in large scale networks including IMT-2020 and beyond”](https://www.itu.int/ITU-T/recommendations/rec.aspx?id=15234);
* [ITU-T Y.3121 “QoS requirements and framework for supporting deterministic communication services in local area network for IMT-2020”](https://www.itu.int/ITU-T/recommendations/rec.aspx?id=15235);
* [ITU-T Y.3123 “Framework of edge computing capability exposure for IMT-2020 networks and beyond”](https://www.itu.int/rec/T-REC-x/recommendation.asp?lang=en&parent=T-REC-Y.3123);
* [ITU-T Y.3124 “Quality of service monitoring requirements and framework for IMT-2020 and beyond”](https://www.itu.int/ITU-T/workprog/wp_item.aspx?isn=18046);
* [ITU-T Y.3137 “Technical requirements for supporting application addressing in edge computing for future networks including IMT-2020”](https://www.itu.int/rec/T-REC-x/recommendation.asp?lang=en&parent=T-REC-Y.3137);
* [ITU-T Y.3138 “Unified multi-access edge computing for supporting fixed mobile convergence in IMT-2020 networks”](https://www.itu.int/ITU-T/recommendations/rec.aspx?id=15055);
* [ITU-T Y.3139 “Fixed mobile convergence enhancements to support IMT-2020 based software-defined wide area networking service”](https://www.itu.int/ITU-T/recommendations/rec.aspx?id=15056);
* [ITU-T Y.3158 “Local shunting for multi-access edge computing in IMT-2020 networks”](https://www.itu.int/ITU-T/recommendations/rec.aspx?id=15057);
* ITU-T Y.3159 “Framework for classifying network slice level in future networks including IMT-2020”.
* [ITU-T Y.3160 “Architectural framework of end-to-end service level objective guarantee for future networks including IMT-2020”](https://www.itu.int/rec/T-REC-x/recommendation.asp?lang=en&parent=T-REC-Y.3160);
* [ITU-T Y.3181 “Architectural framework for Machine Learning Sandbox in future networks including IMT-2020”](https://www.itu.int/rec/T-REC-x/recommendation.asp?lang=en&parent=T-REC-Y.3181);
* [ITU-T Y.3201 “Fixed, mobile and satellite convergence – Framework for IMT-2020 networks and beyond”](https://www.itu.int/ITU-T/recommendations/rec.aspx?id=15239);
* [ITU-T Y.3202 “Fixed, mobile and satellite convergence - Mobility management for IMT-2020 networks and beyond”;](https://www.itu.int/rec/T-REC-x/recommendation.asp?lang=en&parent=T-REC-Y.3202)
* [ITU-T Y.3203 “Fixed, mobile and satellite convergence - Connection management for IMT-2020 networks and beyond”](https://www.itu.int/rec/T-REC-x/recommendation.asp?lang=en&parent=T-REC-Y.3203);
* [ITU-T Y.3204 “mobile and satellite convergence - Service continuity for IMT-2020 networks and beyond”](https://www.itu.int/ITU-T/workprog/wp_item.aspx?isn=18126)
* [ITU-T Y.Suppl.59 (revised) to ITU-T Y.3100 of Recommendations “IMT-2020 standardization roadmap”](https://www.itu.int/ITU-T/recommendations/rec.aspx?id=15248);

and the following draft Recommendations are under approval:

* [ITU-T Y.3125 “QoS assurance requirements and framework for cloud gaming supported by IMT-2020 network](https://www.itu.int/ITU-T/workprog/wp_item.aspx?isn=18084)”;
* [ITU-T Y.3126 “QoS requirements and framework of interworking capability for supporting deterministic communication services in local area network for IMT-2020 and beyond](https://www.itu.int/ITU-T/workprog/wp_item.aspx?isn=18084)”;
* [ITU-T Y.3127 “Future networks including IMT-2020 - Requirements and framework for self-organizing core network”;](https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=18114)
* [ITU-T Y.3128 “Requirements for network function communication between Public Networks and public network integrated Non-Public Networks in IMT-2020”;](https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=18432)
* [ITU-T Y.3400 “Coordination of networking and computing in IMT-2020 networks and beyond – Requirements”;](https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=18152)
* [ITU-T Y.3141 “Energy efficiency management of virtual resources in IMT-2020 networks and beyond”;](https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=18155)
* [ITU-T Y.3161 “Intent-based network management and orchestration for network slicing in IMT-2020 networks and beyond”;](https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=18124) and
* [ITU-T Y.3206 “Fixed, mobile and satellite convergence - Capability exposure for IMT-2020 networks and beyond](https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=18133)”;

**2.1.5** ITU-T SG17approved the following Recommendations

* [ITU-T X.1812 “Security framework based on trust relationship for IMT-2020 ecosystem”](https://www.itu.int/rec/T-REC-x/recommendation.asp?lang=en&parent=T-REC-X.1812);
* [ITU-T X.1813 “Security and monitoring requirements for operation of vertical services supporting ultra-reliable and low latency communication (URLLC) in IMT-2020 private network”](https://www.itu.int/ITU-T/recommendations/rec.aspx?id=14991);
* [ITU-T X.1814 “Security guidelines for IMT-2020 communication system”](https://www.itu.int/ITU-T/recommendations/rec.aspx?id=14992);
* [ITU-T X.1815 “Security guidelines and requirements for IMT-2020 edge computing services”](https://www.itu.int/ITU-T/recommendations/rec.aspx?id=15113);
* [ITU-T X.1816 “Guidelines and requirements for classifying security capabilities in IMT-2020 network slice”](https://www.itu.int/ITU-T/recommendations/rec.aspx?id=15114);
* [ITU-T X.1817 “Security requirements for 5G message service”](https://www.itu.int/rec/T-REC-x/recommendation.asp?lang=en&parent=T-REC-X.1817) and
* agreed [ITU-T Technical Report XSTP-5Gsec-RM “5G Security Standardization Roadmap”](https://www.itu.int/pub/publications.aspx?lang=en&parent=T-TUT-ICTS-2022-2).

The draft Recommendation [ITU-T X.1818 “Security controls for operation and maintenance of IMT-2020 network systems”](https://www.itu.int/ITU-T/workprog/wp_item.aspx?isn=18494) is under approval.

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

**2.2.1** In total,21 Recommendations were approved by SGs 11, 17 and 20, two Technical Reports were agreed by SG 3, two draft Recommendations are under approval in SG 17, and six draft Recommendations were determined by SG 20. More information is provided below:

* ITU-T SG3 agreed [ITU-T Technical Report TR\_Accounting IOT “Accounting & Billing aspects in IoT ecosystem and integrated approach using Distributed Ledger Technology (DLT)”](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=18201) (under publication), [ITU-T Technical Report dSTR-IoTM2M-Roaming “Roaming Aspects of IoT and M2M”](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=18197) (under publication).
* ITU-T SG11 approved [ITU-T Q.4069 “Testing requirements and procedures for Internet of Things based green data centres”](https://www.itu.int/rec/T-REC-x/recommendation.asp?lang=en&parent=T-REC-Q.4069);
* ITU-T SG17 approved [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 [Technical Report TR.ba-iot “Broadcast authentication schemes for IoT system”](https://www.itu.int/ITU-T/workprog/wp_item.aspx?isn=18347).
* ITU-T SG20 approved the following Recommendations:
	+ [ITU-T Y.4052 “Vocabulary for blockchain for supporting Internet of things and smart cities and communities in data processing and management aspects”](https://www.itu.int/ITU-T/recommendations/rec.aspx?id=15066)
	+ [ITU-T Y.4216 “Requirements of sensing and data collection system for city infrastructure”](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=17881)
	+ [ITU-T Y.4217 “Service requirements and capability framework for IoT-related crowdsourced systems”](https://www.itu.int/ITU-T/recommendations/rec.aspx?id=15068)
	+ [ITU-T Y.4218 “IoT and ICT requirements for deployment of smart services in rural communities”](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=17885)
	+ [ITU-T Y.4219 “Accessibility requirements for user interface of smart applications supporting IoT”](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=17948)
	+ [ITU-T Y.4220 “Requirements and capability framework of abnormal event detection system for smart home”](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=17931)
	+ [ITU-T Y.4223 “Common requirements and capabilities of smart cities and communities from IoT and ICT perspectives”](https://www.itu.int/ITU-T/recommendations/rec.aspx?rec=15477)
	+ [ITU-T Y.4481 “Framework for data middle-platform in IoT and smart sustainable cities”](https://www.itu.int/ITU-T/recommendations/rec.aspx?id=15069)
	+ [ITU-T Y.4482 “Requirements and framework for smart livestock farming based on the Internet of things”](https://www.itu.int/ITU-T/recommendations/rec.aspx?id=15070)
	+ [ITU-T Y.4483 “Reference architecture of service exposure for decentralized services for Internet of things applications”](https://www.itu.int/ITU-T/recommendations/rec.aspx?id=15071)
	+ [ITU-T Y.4484 “Framework to support Web of Objects ontology based semantic data interoperability of eHealth services”](https://www.itu.int/ITU-T/recommendations/rec.aspx?id=15072)
	+ [ITU-T Y.4485 “Requirements and Reference Architecture of Smart Education”](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=17902)
	+ [ITU-T Y.4486 “Framework of cross edge decentralized service by using DLT and edge computing technologies for IoT devices”](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=17928)
	+ [ITU-T Y.4500.3 ”oneM2M - Security solutions”](https://www.itu.int/ITU-T/recommendations/rec.aspx?id=15076)
	+ [ITU-T Y.4560 “Blockchain-based data exchange and sharing for supporting Internet of things and smart cities and communities”](https://www.itu.int/ITU-T/recommendations/rec.aspx?rec=14379)
	+ [ITU-T Y.4600 “Requirements and capabilities of a digital twin system for smart cities”](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=17906)
	+ [ITU-T Y.4601 “Requirements and capability framework of a digital twin for smart firefighting”](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=17930)
	+ [ITU-T Y.4602 “Data processing and management framework for IoT and smart cities and communities”](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=17904)
	+ [ITU-T Y.4603 “Requirements and functional model to support data quality management in IoT”](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=17905)
	+ [ITU-T Y.4604 “Metadata for camera sensing information of autonomous mobile IoT devices”](https://www.itu.int/ITU-T/recommendations/rec.aspx?rec=15480)
	+ [ITU-T Y.4909 “Assessment framework of IoT sensing quality”](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=17913)
	+ [ITU-T Y.4910 “Maturity model of digital supply chain for smart sustainable cities”](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=17941)

determined the following draft Recommendations

* + [ITU-T Y.4221 (ex Y.ElecMon-Reqts) “Requirements of IoT-based electric power infrastructure monitoring system”](https://www.itu.int/ITU-T/workprog/wp_item.aspx?isn=17933)
	+ [ITU-T Y.4222 (ex Y.smart-evacuation) “Framework of smart evacuation in a disaster or emergency in smart cities and communities”](https://www.itu.int/ITU-T/workprog/wp_item.aspx?isn=17886)
	+ [ITU-T Y.4487 (ex Y.RMDFS-arch) “A functional architecture of roadside multi-sensor data fusion systems for autonomous vehicles”](https://www.itu.int/ITU-T/workprog/wp_item.aspx?isn=17950)
	+ [ITU-T Y.4488 (ex Y.IoT-SPWE) “Requirements and functional architecture of data services provided via IoT-based technologies for safety protection of working environments”](https://www.itu.int/ITU-T/workprog/wp_item.aspx?isn=17945)
	+ [ITU-T Y.4490 (ex Y.water-SFP) “Framework of monitoring of water system for smart fire protection”](https://www.itu.int/ITU-T/recommendations/rec.aspx?rec=15684)
	+ [ITU-T Y.4491 (ex Y.BC-SON) “ Framework of blockchain-based self-organization networking in IoT environments”](https://www.itu.int/ITU-T/recommendations/rec.aspx?rec=15685&lang=en)
	+ [ITU-T Y.4492 (ex Y.dec-IoT-arch) “Decentralized IoT communication architecture based on information centric networking and blockchain”](https://www.itu.int/ITU-T/recommendations/rec.aspx?rec=15686&lang=en)
	+ [ITU-T Y.4493 (ex Y.IoT-AOS-prot) “Autonomic operations support protocols in the Internet of things”](https://www.itu.int/ITU-T/recommendations/rec.aspx?rec=15687)
	+ [ITU-T Y.4494 (ex Y.CDML-arc) “Reference architecture of collaborative decentralized machine learning for intelligent IoT services”](https://www.itu.int/ITU-T/recommendations/rec.aspx?rec=15688)
	+ [ITU-T Y.4703 (ex Y.TM.SM-API) “IoT Service Management API REST Specification”](https://www.itu.int/t/aap/recdetails/10601)
	+ [ITU-T Y.4704 (ex Y.TM.DM-API) “IoT Device Management API REST Specification”](https://www.itu.int/t/aap/recdetails/10602) and

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):

* SG20 is collaborating with IETF on use of *"ppk"* Uniform Resource Identifier (URI) scheme name in ITU-T Y.dec-IoT-arch *“Decentralized IoT communication architecture based on information centric networking and blockchain”*, with oneM2M on draft new *Recommendation ITU-T Y.oneM2M.SEC.SOL "oneM2M Security Solutions"*, with TMForum on draft Recommendation *ITU-T Y.TM.DM-API* “IoT Device Management API REST Specification” and *Y.TM.SM-API* “IoT Service Management API REST Specification”, with W3C on Decentralised Identifiers (DIDs) and with LoRa Alliance on Recommendation ITU-T Y.4480.
* The fourth J-SCTF meeting took place virtually on 27 and 29 September 2021, and the fifth meeting on 18 and 20 January 2022. It was clarified that J-SCTF will formally report to only three governing bodies of three SDOs (IEC SMB, ISO TMB, and ITU TSAG) and will 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.

**2.2.2** The standardization of IoT test specifications is accelerating, supported by the increasing collaboration of ITU-T and oneM2M. ITU-T SG20 continued coordination in its ITU-T JCA-IoT and SC&C and is also in close collaboration with IETF, oneM2M, W3C, LoRa Alliance and TMForum. SG20 created a new Correspondence Group on Artificial Intelligence of Things (CG-AIoT).

**2.2.3** 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%3A%5CUsers%5CSaran%5CAppData%5CLocal%5CMicrosoft%5CWindows%5CINetCache%5CContent.Outlook%5C97RS0L0D%5C%C2%A7%09https%3A%5Cwww.itu.int%5Cen%5Cpublications%5CDocuments%5Ctsb%5C2021-U4SSC-Smart-public-health-emergency-management-and-ICT-implementations%5Cindex.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) and [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).

**2.2.4** 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.

**2.2.5** More than 150 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: [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: [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).

**2.2.6** 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.

**2.2.7** 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.

**2.2.8** 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.

**2.2.9** The International Telecommunication Union (ITU), together with other organizations and UN agencies, is organizing a [series of webinars on “Digital Transformation”](https://www.itu.int/cities/standards4dt/). These webinars discuss topics related to cross-sectoral digital transformation and related standardization activities.

## 2.3 IP Cable:

ITU-T SG9 approved five Recommendations: [ITU-T J.299 (revised) “Functional requirements for remote management of cable STB by auto configuration server”](https://www.itu.int/ITU-T/recommendations/rec.aspx?id=14867); [ITU-T J.224 (revised) “Fifth-generation transmission systems for interactive cable television services - IP cable modems”](https://www.itu.int/ITU-T/recommendations/rec.aspx?id=15116); [ITU-T J.225 (revised) “Fourth-generation transmission systems for interactive cable television services - IP cable modems”](https://www.itu.int/ITU-T/recommendations/rec.aspx?id=15117); [ITU-T J.1611 (revised) “Functional requirements for Smart Home Gateway”](https://www.itu.int/ITU-T/recommendations/rec.aspx?id=15118); and [ITU-T J.1612 “The Architecture for Smart Home Gateway”](https://www.itu.int/ITU-T/recommendations/rec.aspx?id=14845). Recommendation [ITU-T J.484 “Requirements of multicast adaptive bitrate (M-ABR) IP delivery”](https://www.itu.int/ITU-T/workprog/wp_item.aspx?isn=17752) is under approval.

## 2.4 IPTV, Content Delivery Networks (CDN) and Digital Signage: ITU-T SG16 completed work on various Recommendations:

* [ITU-T H.721 (V3) (revised) “IPTV terminal devices: Basic model”](https://www.itu.int/ITU-T/recommendations/rec.aspx?id=14952)
* ITU-T F.744.5 "Requirements for content delivery networks based on P2P technology"
* ITU-T H.705.1 "Layered specification for the IPTV service platform functional architecture based on open service capabilities"
* ITU-T H.705.2 "Requirements for live streaming systems based on QUIC"
* ITU-T H.644.6 "Architecture for video distribution systems"

## 2.5 IP performance: ITU-T SG12 approved 46 standards including Recommendations Supplements, Amendments, Implementer’s Guide, and Technical Reports.

## 2.6 IP-based Cloud computing and Big Data:

**2.6.0 ITU-T SG5 approved** [ITU-T L.Suppl.55 “Environmental efficiency and impacts on United Nations Sustainable Development Goals of data centres and cloud computing”](https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=17744)**; ITU-T SG9 approved** [ITU-T J.1305 “Requirements of microservice architecture for audio-visual media in the converged media cloud”](https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=18519) **and** [ITU-T J.1306 “Specification of microservice architecture for audio-visual media in the converged media cloud”](https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=18520)**.**

**2.6.1** ITU-T SG13 approved nine Recommendations:

* [ITU-T Y.3532 “Cloud computing - Functional requirements of Platform as a Service for cloud native applications](https://www.itu.int/ITU-T/workprog/wp_item.aspx?isn=18103)”
* [ITU-T Y.3537 “Cloud computing – Functional requirements of cloud service partner for multi-cloud”](https://www.itu.int/ITU-T/recommendations/rec.aspx?id=15060);
* [ITU-T Y.3538 “Cloud computing - Global management framework of distributed cloud”](https://www.itu.int/ITU-T/recommendations/rec.aspx?id=15061);
* [ITU-T Y.3539 “Cloud computing - Framework of risk management”](https://www.itu.int/ITU-T/recommendations/rec.aspx?id=15241);
* ITU-T Y.3540 “Edge computing - Overview and high-level requirements”
* [ITU-T Y.3602 (revised) “Big data – Functional requirements for data provenance”](https://www.itu.int/ITU-T/recommendations/rec.aspx?id=15074);
* [ITU-T Y.3603 “Big data - Requirements and conceptual model of metadata for data catalogue”](https://www.itu.int/ITU-T/workprog/wp_item.aspx?isn=18128);
* [ITU-T Y.3607 “Big data – Functional architecture for data provenance”](https://www.itu.int/ITU-T/workprog/wp_item.aspx?isn=18123);
* [ITU-T Y.3655 "Big data driven networking – management and control mechanisms](https://www.itu.int/ITU-T/recommendations/rec.aspx?rec=15062)"; and
* [ITU-T Y.3656 “Big Data Driven Networking-Mechanism of network service provisioning](https://www.itu.int/ITU-T/workprog/wp_item.aspx?isn=18083)”;

**2.6.1bis** ITU-T SG16 approved four Recommendations:

* [ITU-T F.743.17 “Requirements for cloud gaming system”](https://www.itu.int/ITU-T/workprog/wp_item.aspx?isn=18123);
* [ITU-T F.746.14 “Requirements and reference framework for cloud virtual reality systems”](https://www.itu.int/ITU-T/workprog/wp_item.aspx?isn=18123);
* [ITU-T F.747.13 “Requirements and reference framework of cloud-edge collaboration in industrial machine vision systems”](https://www.itu.int/ITU-T/workprog/wp_item.aspx?isn=18123); and
* [ITU-T F.748.17 “Technical specification for artificial intelligence cloud platform: AI model development”](https://www.itu.int/ITU-T/workprog/wp_item.aspx?isn=18123).

**2.6.2** ITU-T SG17 approved five Recommendations:

* [ITU-T X.1333 “Security guidelines for use of remote access tools in Internet-connected control systems”](https://www.itu.int/ITU-T/recommendations/rec.aspx?id=14798);
* [ITU-T X.1380 “Security guidelines for cloud-based data recorders in automotive environments”](https://www.itu.int/ITU-T/recommendations/rec.aspx?id=15106);
* [ITU-T X.1643 “Security requirements and guidelines of virtualization container in cloud computing environment”](https://www.itu.int/ITU-T/recommendations/rec.aspx?id=14804);
* [ITU-T X.1644 “Security guidelines for distributed cloud”](https://www.itu.int/ITU-T/recommendations/rec.aspx?id=15112); and
* [ITU-T X.1645 “Requirements of network security situational awareness platform for cloud computing”](https://www.itu.int/ITU-T/workprog/wp_item.aspx?isn=17995).

## 2.7 Distributed ledger technology (DLT):

**2.7.1** ITU-T SG13 approved the following Recommendations:

* [ITU-T Y.2345 “Scenarios and requirements of network resource sharing based on distributed ledger technology”](https://www.itu.int/ITU-T/workprog/wp_item.aspx?isn=18072);
* [ITU-T Y.2247 “Framework and Requirements of Network-oriented Data Integrity Verification Service based on Blockchain in Future Network”;](https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=18118)
* [ITU-T Y.3081 “Self-Controlled Identity based on Blockchain: Requirements and Framework”;](https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=18077) and
* ITU-T [Y.3082 “Mobile network sharing based on distributed ledger technology for networks beyond IMT-2020: Requirements and framework](https://www.itu.int/ITU-T/workprog/wp_item.aspx?isn=18125)”.

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

* ITU-T F.751.3 " Requirements for change management in DLT-based decentralized applications";
* ITU-T F.751.4 " General framework for DLT-based invoices";
* ITU-T F.751.5 " Requirements for distributed ledger technology-based power grid data management";
* ITU-T F.751.6 " Performance assessment methods for distributed ledger technology platforms";
* ITU-T F.751.7 " Functional assessment methods for distributed ledger technology platforms";
* ITU-T F.751.8 " Technical framework for DLT to ITU-T SG16 completed work on the following DLT-related Recommendations cope with regulation";
* ITU-T F.751.9 "TEE-based confidential computing on distributed ledger technology systems";
* ITU-T F.751.10 "Framework and requirements for DLT-based digital collection services";
* ITU-T F.751.11 "Performance test suite for distributed ledger technology systems";
* ITU-T F.751.12 "Formal verification framework for smart contract on distributed ledger technology"; and
* ITU-T F.751.13 "Framework and requirements for distributed ledger technology-based distributed power trading systems".

**2.7.3** ITU-T SG17 approved Recommendations

* [ITU-T X.1409 “Security services based on distributed ledger technology”](https://www.itu.int/ITU-T/workprog/wp_item.aspx?isn=17966);
* [ITU-T X.1410 “Security architecture of data sharing management based on the distributed ledger technology”](https://www.itu.int/ITU-T/workprog/wp_item.aspx?isn=18017);
* [ITU-T X.1411 “Guideline on Blockchain as a service (BaaS) security”](https://www.itu.int/rec/T-REC-x/recommendation.asp?lang=en&parent=T-REC-X.1411); and
* [ITU-T X.1412 “Security requirements for smart contract management based on the distributed ledger technology”](https://www.itu.int/ITU-T/workprog/wp_item.aspx?isn=18015).

**2.7.4** ITU-T SG2 approved Recommendation [ITU-T M.3366 “Requirements for management of blockchain system”](https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=17419). ITU-T SG11 approved Recommendation [ITU-T Q.5026 “Signalling Requirements and Protocol for Providing Network-oriented Data Integrity Verification Service based on Blockchain in IMT-2020 network”](https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=17869). ITU-T SG20 approved Recommendation [ITU-T Y.4486 “Framework of cross edge decentralized service by using DLT and edge computing technologies for IoT devices”](http://www.itu.int/itu-t/workprog/wp_item.aspx?isn=17928), [ITU-T Y.4560 “Blockchain-based data exchange and sharing for supporting Internet of things and smart cities and communities”](https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=18469), and [ITU-T Y.4052 “Vocabulary for blockchain for supporting Internet of things and smart cities and communities in data processing and management aspects”](https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=17927).

## 2.8 Intelligent Transport System: ITU-T Study Groups approved the following Recommendations:

* [ITU-T F.749.6 “Requirements of vehicle information for automated driving in vehicle gateway platforms”](https://www.itu.int/rec/T-REC-x/recommendation.asp?lang=en&parent=T-REC-F.749.6);
* [ITU-T X.1377 “Guidelines for an intrusion prevention system for connected vehicles”](https://www.itu.int/rec/T-REC-x/recommendation.asp?lang=en&parent=T-REC-X.1377);
* [ITU-T X.1379 “Security requirements for roadside unit in intelligent transportation system”](https://www.itu.int/rec/T-REC-x/recommendation.asp?lang=en&parent=T-REC-X.1379);
* [ITU-T X.1380 “Security guidelines for cloud-based event data recorders in automotive environments”](https://www.itu.int/rec/T-REC-x/recommendation.asp?lang=en&parent=T-REC-X.1380);
* [ITU-T X.1381 “Security guidelines for Ethernet-based in-vehicle networks”](https://www.itu.int/rec/T-REC-x/recommendation.asp?lang=en&parent=T-REC-X.1381);
* [ITU-T X.1382 “Guidelines for sharing security threat information on connected vehicles”](https://www.itu.int/rec/T-REC-x/recommendation.asp?lang=en&parent=T-REC-X.1382);
* [ITU-T X.1383 “Security requirements for categorized data in vehicle-to-everything (V2X) communication”](https://www.itu.int/rec/T-REC-x/recommendation.asp?lang=en&parent=T-REC-X.1383); and
* [ITU-T Y.4487 “A functional architecture of roadside multi-sensor data fusion systems for autonomous vehicles”](https://www.itu.int/rec/T-REC-x/recommendation.asp?lang=en&parent=T-REC-Y.4487).

## 2.9 Miscellaneous Internet-related matters:

**2.9.1** ITU-T SG11 approved two Recommendations: [ITU-T Q.3647 “Signalling requirements for emergency service in IMS roaming environment”](https://www.itu.int/ITU-T/recommendations/rec.aspx?id=15254); [ITU-T Q.4069 “Testing requirements and procedures for Internet of Things based green data centres”](https://www.itu.int/ITU-T/recommendations/rec.aspx?id=15046).

**2.9.2** ITU-T SG16 approved the following Recommendations:

* ITU-T F.743.23 "Security requirements for video surveillance systems"
* ITU-T F.747.13 "Requirements and reference framework of cloud-edge collaboration in industrial machine vision systems";
* [ITU-T F.746.14 “Requirements and reference framework for cloud virtual reality systems”](https://www.itu.int/ITU-T/recommendations/rec.aspx?id=15188);
* [ITU-T F.748.17 “Technical specification for artificial intelligence cloud platform: AI model development”](https://www.itu.int/ITU-T/recommendations/rec.aspx?id=15194);
* ITU-T F.748.22 "Functional architecture for feature-based distributed intelligent systems"
* ITU-T F.748.23 "Requirements and framework for intelligent crowd sensing multimedia interaction based on deep learning"
* ITU-T F.748.24 "Trusted contribution evaluation framework on federated machine learning services";
* ITU-T F.748.25 "Requirements for speech interaction of intelligent customer services";
* [ITU-T H.225.0 (V8) (revised) “Call signalling protocols and media stream packetization for packet-based multimedia communication systems”](https://www.itu.int/ITU-T/recommendations/rec.aspx?id=14946);
* [ITU-T H.235.10 “H.323 security: Support of DTLS for media streams”](https://www.itu.int/ITU-T/recommendations/rec.aspx?id=14968);
* [ITU-T H.245 (V17) (revised) “Control protocol for multimedia communication”](https://www.itu.int/ITU-T/recommendations/rec.aspx?id=14947);
* [ITU-T H.323 (V8) (revised) “Packet-based multimedia communications systems”](https://www.itu.int/ITU-T/recommendations/rec.aspx?id=14950);
* [ITU-T H.644.5 “Functional architecture of content request routing service in multimedia content delivery networks”](https://www.itu.int/ITU-T/recommendations/rec.aspx?id=15205); and
* ITU-T H.644.7 "Functional architecture for media processing services".

## 2.10 Security:

**2.10.1** ITU-T SG17 approved the following Recommendations

* [ITU-T X.672 “Information technology - Open systems interconnection - Object identifier resolution system”](https://www.itu.int/rec/T-REC-x/recommendation.asp?lang=en&parent=T-REC-X.672);
* [ITU-T X.590 JSON Signature Scheme (JSS)](https://www.itu.int/rec/T-REC-x/recommendation.asp?lang=en&parent=T-REC-X.590)
* [ITU-T X.1051 (Revised) “Information security, cybersecurity and privacy protection - Information security controls based on ISO/IEC 27002 for telecommunications organizations”](https://www.itu.int/rec/T-REC-x/recommendation.asp?lang=en&parent=T-REC-X.1051);
* [ITU-T X.1095 Entity authentication service for pet animals using telebiometrics](https://www.itu.int/rec/T-REC-x/recommendation.asp?lang=en&parent=T-REC-X.1095)
* [ITU-T ITU-T X.1219 “Functional requirements for a secured process to evaluate technical vulnerabilities”](https://www.itu.int/rec/T-REC-x/recommendation.asp?lang=en&parent=T-REC-X.1219);
* [ITU-T X.1220 Security framework for storage protection against malware attacks on hosts](https://www.itu.int/rec/T-REC-x/recommendation.asp?lang=en&parent=T-REC-X.1220)
* [ITU-T X.1236 Security requirements and countermeasures for targeted email attacks](https://www.itu.int/rec/T-REC-x/recommendation.asp?lang=en&parent=T-REC-X.1236)
* [ITU-T X.1277.2 “Universal authentication framework (UAF) protocol specification”](https://www.itu.int/rec/T-REC-x/recommendation.asp?lang=en&parent=T-REC-X.1277.2);
* [ITU-T X.1278.2 “Client to authenticator protocol”](https://www.itu.int/rec/T-REC-x/recommendation.asp?lang=en&parent=T-REC-X.1278.2);
* [ITU-T X.1282 Security measures for countering password related online attacks](https://www.itu.int/rec/T-REC-x/recommendation.asp?lang=en&parent=T-REC-X.1282)
* [ITU-T X.1454 Security measures for location enabled smart office services](https://www.itu.int/rec/T-REC-x/recommendation.asp?lang=en&parent=T-REC-X.1454)
* [ITU-T X.1471 “Reference monitor for online analytics services”](https://www.itu.int/rec/T-REC-x/recommendation.asp?lang=en&parent=T-REC-X.1471);
* [ITU-T X.1771 “Requirements for data de-identification assurance”](https://www.itu.int/rec/T-REC-x/recommendation.asp?lang=en&parent=T-REC-X.1771);
* [ITU-T X.1715 “Security requirements and measures for integration of quantum key distribution network (QKDN) and secure storage network”](https://www.itu.int/rec/T-REC-x/recommendation.asp?lang=en&parent=T-REC-X.1715);
* ITU-T X.suppl.39 - Supplement to ITU-T X.1148 on requirements for data de-identification assurance;

and the following Technical Reports:

* Security considerations of collaboration of multiple computing power networks
* Broadcast authentication scheme for Internet of Things (IoT) system
* Fully Homomorphic Encryption (FHE) - based data aggregation in machine learning
* A use case of X.509 Attribute Certificate for Supply Chain
* Guidelines for Quantum-Safe DLT System

**2.10.1** ITU-T SG13 approved the following Recommendations:

* ITU-T Y.3815 “Quantum key distribution networks - overview of resilience”
* ITU-T Y.3818 “Quantum key distribution networks interworking – architecture”
* ITU-T Y.3816 “Quantum key distribution networks - Functional architecture enhancement of machine learning based quality of service assurance”;
* ITU-T Y.3817 “Quantum key distribution networks interworking - Requirements of quality of service assurance”;
* ITU-T Y.3058 “Functional architecture for trust enabled service provisioning”;
* ITU-T Y.3060 “Autonomous networks - overview on trust”;

**2.10.2** A separate report on ITU’s activities related to WSIS Action Line C5 on building confidence and security in the use of ICTs, including SG17’s work, is presented in Document [C23/38](https://www.itu.int/md/S23-CL-C-0038/en).

## 2.11 ITU-T Focus Groups: In total, seven 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 Metaverse (FG-MV)](https://www.itu.int/en/ITU-T/focusgroups/mv/Pages/default.aspx);
* [ITU-T Focus Group on Testbeds Federations for IMT-2020 and beyond (FG-TBFxG)](https://www.itu.int/en/ITU-T/focusgroups/tbfxg/Pages/default.aspx);
* [ITU-T Focus Group on Autonomous Networks (FG-AN)](https://www.itu.int/en/ITU-T/focusgroups/an/Pages/default.aspx);
* [ITU-T Focus Group on Artificial Intelligence (AI) and Internet of Things (IoT) for Digital Agriculture](https://www.itu.int/en/ITU-T/focusgroups/ai4a/Pages/default.aspx) (FG-AI4A);
* [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).

**2.12** 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)).

**2.13** 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).

**2.14** 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 [C23/35](https://www.itu.int/md/S23-CL-C-0035/en).

**2.15** 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

**2.16** 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”*.

**2.17** Several training courses were provided through the [ITU Academy](https://academy.itu.int/) and the [ITU Centers of Excellence](https://academy.itu.int/itu-d/projects-activities/centres-excellence/coe-overview) network, covering topics such as “New Broadband Internet, Cloud Computing, IoT/AI and Future Services”, “The development of Industrial Internet”, “Smart Manufacturing: Internet of Things, Artificial Intelligence, Digital Twins In Industry 4.0”, “Key Aspects and Governance of Internet of Things, Big Data and Artificial Intelligence”, and “The Last Mile Internet Connectivity”. A total of 502 participants took those courses, of which 215 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** ITU participated in the 18th IGF meeting held in Kyoto, Japan from 8 to 12 October 2023, including the opening ceremony and high-level sessions, and organized sessions on the CWG-Internet, WSIS+20 and WSIS Forum 2024 Open Consultation, measurement frameworks and indicators, and cybersecurity. ITU will continue to participate at the highest level at the 19th IGF meeting in Riyadh, Saudi Arabia.

**4.2** 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.

**4.3** 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.

**4.4** ITU continues to actively follow discussions in GAC as an observer. ITU attended ICANN78 in October, which marked the 25th Annual General Meeting. The ITU Secretary-General also joined ICANN78 and met the ICANN Board. ITU will participate in ICANN79 in March 2024.

# 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 one regional Recommendation for Africa on OTT voice bypass and is currently working on another regional Recommendation for Arab States and two Technical Reports to study the economic and policy aspects of OTTs.

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