

International Telecommunication Union

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

Y.3100

(09/2017)

SERIES Y: GLOBAL INFORMATION
INFRASTRUCTURE, INTERNET PROTOCOL ASPECTS,
NEXT-GENERATION NETWORKS, INTERNET OF
THINGS AND SMART CITIES

Future networks

Terms and definitions for IMT-2020 network

Recommendation ITU-T Y.3100



ITU-T Y-SERIES RECOMMENDATIONS

GLOBAL INFORMATION INFRASTRUCTURE, INTERNET PROTOCOL ASPECTS, NEXT-GENERATION NETWORKS, INTERNET OF THINGS AND SMART CITIES

GLOBAL INFORMATION INFRASTRUCTURE	
General	Y.100–Y.199
Services, applications and middleware	Y.200–Y.299
Network aspects	Y.300–Y.399
Interfaces and protocols	Y.400–Y.499
Numbering, addressing and naming	Y.500–Y.599
Operation, administration and maintenance	Y.600–Y.699
Security	Y.700–Y.799
Performances	Y.800–Y.899
INTERNET PROTOCOL ASPECTS	
General	Y.1000–Y.1099
Services and applications	Y.1100–Y.1199
Architecture, access, network capabilities and resource management	Y.1200–Y.1299
Transport	Y.1300–Y.1399
Interworking	Y.1400–Y.1499
Quality of service and network performance	Y.1500–Y.1599
Signalling	Y.1600–Y.1699
Operation, administration and maintenance	Y.1700–Y.1799
Charging	Y.1800–Y.1899
IPTV over NGN	Y.1900–Y.1999
NEXT GENERATION NETWORKS	
Frameworks and functional architecture models	Y.2000–Y.2099
Quality of Service and performance	Y.2100–Y.2199
Service aspects: Service capabilities and service architecture	Y.2200–Y.2249
Service aspects: Interoperability of services and networks in NGN	Y.2250–Y.2299
Enhancements to NGN	Y.2300–Y.2399
Network management	Y.2400–Y.2499
Network control architectures and protocols	Y.2500–Y.2599
Packet-based Networks	Y.2600–Y.2699
Security	Y.2700–Y.2799
Generalized mobility	Y.2800–Y.2899
Carrier grade open environment	Y.2900–Y.2999
FUTURE NETWORKS	Y.3000–Y.3499
CLOUD COMPUTING	Y.3500–Y.3999
INTERNET OF THINGS AND SMART CITIES AND COMMUNITIES	
General	Y.4000–Y.4049
Definitions and terminologies	Y.4050–Y.4099
Requirements and use cases	Y.4100–Y.4249
Infrastructure, connectivity and networks	Y.4250–Y.4399
Frameworks, architectures and protocols	Y.4400–Y.4549
Services, applications, computation and data processing	Y.4550–Y.4699
Management, control and performance	Y.4700–Y.4799
Identification and security	Y.4800–Y.4899
Evaluation and assessment	Y.4900–Y.4999

For further details, please refer to the list of ITU-T Recommendations.

Recommendation ITU-T Y.3100

Terms and definitions for IMT-2020 network

Summary

Recommendation ITU-T Y.3100 describes essential terms and their definitions for IMT-2020 network to provide a general common understanding for ITU-T IMT-2020 related standard documents. It can be used as a guideline for the further development of IMT-2020 related documents.

The terms defined in this Recommendation will constitute a reference for other ITU-T IMT-2020 related standard documents.

History

Edition	Recommendation	Approval	Study Group	Unique ID*
1.0	ITU-T Y.3100	2017-09-13	13	11.1002/1000/13349

Keywords

IMT-2020, definitions, network slice, network softwarization, orchestration, terms.

* To access the Recommendation, type the URL <http://handle.itu.int/> in the address field of your web browser, followed by the Recommendation's unique ID. For example, <http://handle.itu.int/11.1002/1000/11830-en>.

FOREWORD

The International Telecommunication Union (ITU) is the United Nations specialized agency in the field of telecommunications, information and communication technologies (ICTs). The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of ITU. ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

The World Telecommunication Standardization Assembly (WTSA), which meets every four years, establishes the topics for study by the ITU-T study groups which, in turn, produce Recommendations on these topics.

The approval of ITU-T Recommendations is covered by the procedure laid down in WTSA Resolution 1.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

NOTE

In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

Compliance with this Recommendation is voluntary. However, the Recommendation may contain certain mandatory provisions (to ensure, e.g., interoperability or applicability) and compliance with the Recommendation is achieved when all of these mandatory provisions are met. The words "shall" or some other obligatory language such as "must" and the negative equivalents are used to express requirements. The use of such words does not suggest that compliance with the Recommendation is required of any party.

INTELLECTUAL PROPERTY RIGHTS

ITU draws attention to the possibility that the practice or implementation of this Recommendation may involve the use of a claimed Intellectual Property Right. ITU takes no position concerning the evidence, validity or applicability of claimed Intellectual Property Rights, whether asserted by ITU members or others outside of the Recommendation development process.

As of the date of approval of this Recommendation, ITU had not received notice of intellectual property, protected by patents, which may be required to implement this Recommendation. However, implementers are cautioned that this may not represent the latest information and are therefore strongly urged to consult the TSB patent database at <http://www.itu.int/ITU-T/ipr/>.

© ITU 2017

All rights reserved. No part of this publication may be reproduced, by any means whatsoever, without the prior written permission of ITU.

Table of Contents

	Page
1 Scope.....	1
2 References.....	1
3 Definitions	1
3.1 Terms defined elsewhere	1
3.2 Terms defined in this Recommendation.....	2
4 Abbreviations and acronyms	4
5 Conventions	4
Bibliography.....	5

Recommendation ITU-T Y.3100

Terms and definitions for IMT-2020 network

1 Scope

This Recommendation contains common terms and definitions to provide a general understanding for IMT-2020 standard documents and a guideline for the development of IMT-2020 related documents.

This Recommendation provides terms and definitions, which are considered particularly suitable and applicable to the development of IMT-2020 standard documents and have already been defined in published ITU-T Recommendations and other relevant specifications. New terms are also defined as required in this Recommendation.

2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

- [ITU-T Y.1714] Recommendation ITU-T Y.1714 (2009), *MPLS management and OAM framework*.
- [ITU-T Y.2011] Recommendation ITU-T Y.2011 (2004), *General principles and general reference model for Next Generation Networks*.
- [ITU-T Y.2012] Recommendation ITU-T Y.2012 (2006), *Functional requirements and architecture of the NGN release 1*.
- [ITU-T Y.3011] Recommendation ITU-T Y.3011 (2012), *Framework of network virtualization for future networks*.
- [ITU-T Y.3300] Recommendation ITU-T Y.3300 (2014), *Framework of software-defined networking*.
- [ITU-T Y.3321] Recommendation ITU-T Y.3321 (2015), *Requirements and capability framework for NICE implementation making use of software-defined networking technologies*.
- [ITU-T Y.4406] Recommendation ITU-T Y.4406/Y.2016 (2009), *Functional requirements and architecture of the NGN for applications and services using tag-based identification*.
- [ITU-R M.2083-0] Recommendation ITU-R M.2083-0 (2015), *IMT Vision – Framework and overall objectives of the future development of IMT for 2020 and beyond*.

3 Definitions

3.1 Terms defined elsewhere

This Recommendation uses the following terms defined elsewhere:

3.1.1 control plane [ITU-T Y.2011]: The set of functions that controls the operation of entities in the stratum or layer under consideration, plus the functions required to support this control.

3.1.2 data plane [ITU-T Y.2011]: The set of functions used to transfer data in the stratum or layer under consideration.

NOTE – In the ITU-T IMT-2020 related standard documents, "User plane" is used preferentially rather than "Data plane".

3.1.3 functional architecture [ITU-T Y.4406]: A set of functional entities used to describe the structure of an NGN. These functional entities are separated by reference points, and thus, they define the distribution of functions. The functional entities can be used to describe a set of reference configurations. These reference configurations identify which reference points are visible at the boundaries of equipment implementations and between administrative domains.

3.1.4 logical resource [ITU-T Y.3011]: An independently manageable partition of a physical resource, which inherits the same characteristics as the physical resource and whose capability is bound to the capability of the physical resource.

NOTE – "independently" means mutual exclusiveness among multiple partitions at the same level.

3.1.5 management plane [ITU-T Y.2011]: The set of functions used to manage entities in the stratum or layer under consideration, plus the functions required to support this management.

3.1.6 network virtualization [ITU-T Y.3011]: A technology that enables the creation of logically isolated network partitions over shared physical networks so that heterogeneous collection of multiple virtual networks can simultaneously coexist over the shared networks. This includes the aggregation of multiple resources in a provider and appearing as a single resource.

3.1.7 software-defined networking [ITU-T Y.3300]: A set of techniques that enables to directly program, orchestrate, control and manage network resources, which facilitates the design, delivery and operation of network services in a dynamic and scalable manner.

3.1.8 user plane [ITU-T Y.1714]: Refers to the set of traffic forwarding components through which traffic flows.

NOTE – "User plane" is referred to as "transport plane" in other ITU-T Recommendations.

3.1.9 virtual resource [ITU-T Y.3011]: An abstraction of physical or logical resource, which may have different characteristics from the physical or logical resource and whose capability may be not bound to the capability of the physical or logical resource.

3.1.10 virtualized network function [ITU-T Y.3321]: A network function whose functional software is decoupled from hardware, and runs on virtual machine(s).

3.2 Terms defined in this Recommendation

This Recommendation defines the following terms:

3.2.1 backhaul: A network path between base station systems and a core network.

3.2.2 evolved IMT-advanced RAT: The enhanced version of IMT-advanced radio access technologies (RAT).

NOTE – IMT-advanced is the ITU's official terminology for so-called LTE-advanced.

3.2.3 fixed mobile convergence: In the context of IMT-2020, the capabilities that provide services and applications to end users regardless of the fixed or mobile access technologies being used and independently of the users' location.

3.2.4 fronthaul: A network path between centralized radio controllers and remote radio units of a base station function.

3.2.5 functional entity: (Based on the definition given in [ITU-T Y.2012]) An entity that comprises an indivisible set of specific capabilities. Functional entities are logical concepts, while groupings of functional entities are used to describe practical, physical implementations.

3.2.6 IMT-2020: (Based on [ITU-R M.2083-0]) Systems, system components, and related aspects that support to provide far more enhanced capabilities than those described in [b-ITU-R M.1645].

NOTE – [b-ITU-R M.1645] defines the framework and overall objectives of the future development of IMT-2000 and systems beyond IMT-2000 for the radio access network.

3.2.7 management: In the context of IMT-2020, the processes aiming at fulfilment, assurance, and billing of services, network functions, and resources in both physical and virtual infrastructure including compute, storage, and network resources.

3.2.8 network function: In the context of IMT-2020, a processing function in a network.

NOTE 1 – Network functions include but are not limited to network node functionalities, e.g., session management, mobility management and transport functions, whose functional behaviour and interfaces are defined.

NOTE 2 – Network functions can be implemented on a dedicated hardware or as virtualized software functions.

NOTE 3 – Network functions are not regarded as resources, but rather any network functions can be instantiated using the resources.

3.2.9 network slice: A logical network that provides specific network capabilities and network characteristics.

NOTE 1 – Network slices enable the creation of customized networks to provide flexible solutions for different market scenarios which have diverse requirements, with respect to functionalities, performance and resource allocation.

NOTE 2 – A network slice may have the ability to expose its capabilities.

NOTE 3 – The behaviour of a network slice is realized via network slice instance(s).

3.2.10 network slice blueprint: A complete description of the structure, configuration and work flows on how to create and control a network slice instance during its life cycle.

NOTE – A network slice template can be used synonymously with a network slice blueprint.

3.2.11 network slice instance: An instance of network slice, which is created based on a network slice blueprint.

NOTE 1 – A network slice instance is composed of a set of managed run-time network functions, and physical/logical/virtual resources to run these network functions, forming a complete instantiated logical network to meet certain network characteristics required by the service instance(s).

NOTE 2 – A network slice instance may also be shared across multiple service instances provided by the network operator. A network slice instance may be composed of none, one or more sub-network slice instances which may be shared with another network slice instance.

3.2.12 network softwarization: An overall approach for designing, implementing, deploying, managing and maintaining network equipment and/or network components by software programming.

NOTE – Network softwarization exploits the nature of software such as flexibility and rapidity all along the lifecycle of network equipment and/or components, for the sake of creating conditions that enable the re-design of network and services architectures, the optimization of costs and processes, self-management and bring added values in network infrastructures.

3.2.13 orchestration: In the context of IMT-2020, the processes aiming at the automated arrangement, coordination, instantiation and use of network functions and resources for both physical and virtual infrastructures by optimization criteria.

3.2.14 orchestrator: In the context of IMT-2020, an entity that fulfils orchestration functions.

3.2.15 PDU session: In the context of IMT-2020, an association between a user equipment (UE) and a data network that provides a protocol data unit (PDU) connectivity service.

NOTE – The type of the association includes IP type, non-IP type and Ethernet type.

3.2.16 physical resource: A physical asset for computation, storage and/or networking.

NOTE – Components, systems and equipment can be regarded as physical resources.

3.2.17 service instance: An instance of a service that is realized within a network slice.

NOTE 1 – A service may be represented by one or more service instances.

NOTE 2 – A service instance may be provided by the network slice operator or a third party.

3.2.18 third party (3rd party): In the context of IMT-2020, with respect to a given network operator and network end-users, an entity which consumes network capabilities and/or provides applications and/or services.

NOTE 1 – An example of 3rd party, a virtual network operator (VNO) may use capabilities exposed by a network operator, e.g., to manage specific network slices. Another example of 3rd party, a service and/or application provider (e.g., an over the top (OTT) player) may provide applications and/or services to enhance the network capabilities.

NOTE 2 – Network end-users are not regarded as 3rd parties.

4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

IMT	International Mobile Telecommunications
NGN	Next Generation Network
PDU	Protocol Data Unit
OTT	Over The Top
RAT	Radio Access Technologies
UE	User Equipment
VNO	Virtual Network Operator

5 Conventions

None.

Bibliography

- [b-ITU-R M.1645] Recommendation ITU-R M.1645 (2003), *Framework and overall objectives of the future development of IMT-2000 and systems beyond IMT-2000*.
- [b-FG IMT2020-Gap] ITU-T TD 208 (PLEN/13) (2015), *Report on Standards Gap Analysis*.
<http://www.itu.int/en/ITU-T/focusgroups/imt-2020/Pages/default.aspx>

SERIES OF ITU-T RECOMMENDATIONS

Series A	Organization of the work of ITU-T
Series D	Tariff and accounting principles and international telecommunication/ICT economic and policy issues
Series E	Overall network operation, telephone service, service operation and human factors
Series F	Non-telephone telecommunication services
Series G	Transmission systems and media, digital systems and networks
Series H	Audiovisual and multimedia systems
Series I	Integrated services digital network
Series J	Cable networks and transmission of television, sound programme and other multimedia signals
Series K	Protection against interference
Series L	Environment and ICTs, climate change, e-waste, energy efficiency; construction, installation and protection of cables and other elements of outside plant
Series M	Telecommunication management, including TMN and network maintenance
Series N	Maintenance: international sound programme and television transmission circuits
Series O	Specifications of measuring equipment
Series P	Telephone transmission quality, telephone installations, local line networks
Series Q	Switching and signalling, and associated measurements and tests
Series R	Telegraph transmission
Series S	Telegraph services terminal equipment
Series T	Terminals for telematic services
Series U	Telegraph switching
Series V	Data communication over the telephone network
Series X	Data networks, open system communications and security
Series Y	Global information infrastructure, Internet protocol aspects, next-generation networks, Internet of Things and smart cities
Series Z	Languages and general software aspects for telecommunication systems