

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

Y.3015

(04/2016)

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

Future networks

Functional architecture of network virtualization for future networks

Recommendation ITU-T Y.3015

ITU-T

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Recommendation ITU-T Y.3015

Functional architecture of network virtualization for future networks

Summary

Recommendation ITU-T Y.3015 describes the functional architecture of network virtualization for future networks, covering the specification of user roles, resources and LINPs, functions and their mutual relations, and reference points. An implementation example is also provided.

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History

Edition	Recommendation	Approval	Study Group	Unique ID*
1.0	ITU-T Y.3015	2016-04-06	13	11.1002/1000/12712

Keywords

Functional architecture, LINP, network virtualization.

* 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>.

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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.

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Recommendation ITU-T Y.3015

Functional architecture of network virtualization for future networks

1 Scope

This Recommendation describes the functional architecture of network virtualization, which enables management and control of logically isolated network partitions (LINPs) over shared physical networks and supports programmability of services on LINPs. It covers the specification of user roles, resources and LINPs, functions and their mutual relations, and reference points.

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.3001] Recommendation ITU-T Y.3001 (2011), *Future networks: Objectives and design goals*.

[ITU-T Y.3011] Recommendation ITU-T Y.3011 (2012), *Framework of network virtualization for future networks*.

[ITU-T Y.3012] Recommendation ITU-T Y.3012 (2014), *Requirements of network virtualization for future networks*.

3 Definitions

3.1 Terms defined elsewhere

This Recommendation uses the following terms defined elsewhere:

3.1.1 LINP operator [ITU-T Y.3012]: A network operator that creates, programs, configures, manages, and terminates network services on a given LINP.

3.1.2 logically isolated network partition (LINP) [ITU-T Y.3011]: A network that is composed of multiple virtual resources which is isolated from other LINPs.

3.1.3 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.

3.2 Terms defined in this Recommendation

None.

4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

API Application Programming Interface

ASIC Application-Specific Integrated Circuit

FPGA	Field-Programmable Gate Array
GRE	Generic Routing Encapsulation
ID	Identifier
IP	Internet Protocol
LINP	Logically Isolated Network Partition
LMI	LINP Management Interface
NFV	Network Functions Virtualization
NNI	Network-to-Network Interface
OS	Operating System
PRI	Programmer-to-Redirector Interface
QoS	Quality of Service
SDN	Software-Defined Networking
SMI	Service Management Interface
UNI	User-to-Network Interface
VLAN	Virtual Local Area Network
VM	Virtual Machine
VMI	Virtual resource Management Interface
VNF	Virtualized Network Function
XML-RPC	Extensible Markup Language-Remote Procedure Call

5 Conventions

None.

6 Overview of functional architecture

This clause provides an overview of the functional architecture of network virtualization. Figure 1 shows the components of the architecture classified into the following four categories: user roles, resources, functions, and reference points.

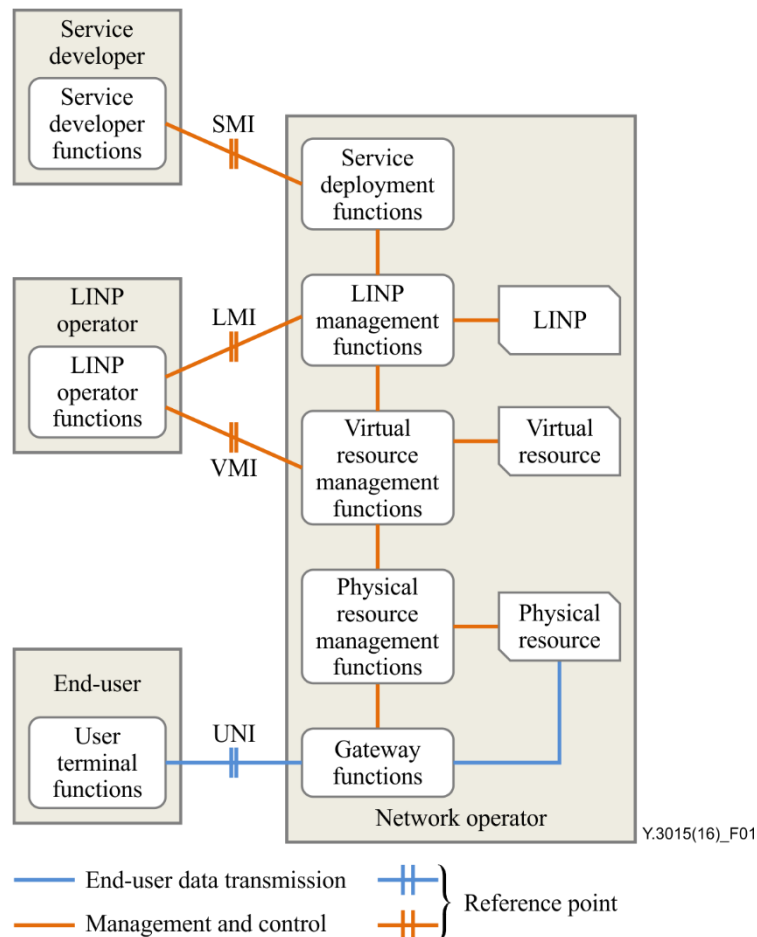


Figure 1 – User roles, resources, functions, and reference points in the functional architecture of network virtualization

A resource is either a physical or a virtual component of a virtual network that executes specific functionality and is represented with specific attributes. Three types of resources are introduced in the functional architectures: physical resource, virtual resource, and LINP. All the three types of resources are managed with corresponding management functions, which are usually implemented in management systems.

NOTE 1 – In Figure 1, end-user data transmission is represented with the blue lines and management and control with the orange lines, as shown in the legend of symbols. Note that the blue lines are applied only to physical resources and functions that manage them. This way of representation makes it clear for which purpose each reference point is specified. For example, the user-to-network interface (UNI) reference point is specified for end-user data transmission, whereas the virtual resource management interface (VMI) is specified for management and control. The same representation is applied throughout this document. See clause 18 for more information about the reference points.

User roles are classified into one of the following four types: end-user, network operator, LINP operator, and service developer. When LINP federation is performed, another type of role, LINP exchanger, may be involved. These user roles are distinguished logically. Different types of user roles could be played by the same party.

Each user role executes certain functions for the purpose of fulfilling its own responsibilities. When functions of one user role need to access those of another, the accesses are done via reference points.

NOTE 2 – [b-ITU-T Y.3502] describes the reference architecture of cloud computing using two different views, i.e. the user view and the functional view. In [b-ITU-T Y.3502], parties and roles appear in the user view and functions in the functional view. The functional architecture presented in the present Recommendation can be understood as a combination of the two views in the context of [b-ITU-T Y.3502].