

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

Q.3745

(04/2020)

SERIES Q: SWITCHING AND SIGNALLING, AND
ASSOCIATED MEASUREMENTS AND TESTS

Signalling requirements and protocols for SDN – Network
signalling and signalling requirements for services

Protocol for time constraint Internet of things- based applications over software-defined networking

Recommendation ITU-T Q.3745

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Protocol for time constraint Internet of things-based applications over software-defined networking

Summary

Traffic generated by smart devices is becoming a significant part of the Internet. Smart devices require mobility and guaranteed quality of service (QoS) that needs to be managed. Potentially, software-defined networking- (SDN-) and network function virtualization- (NFV-) based technologies (IMT-2020) will be used for managing all types of services and therefore, SDN is to be tasked to manage these kinds of demands as well.

A significant number of the available Internet services require the exact value of network parameters such as latency, jitter, round trip time (RTT) and bandwidth. Using SDN capabilities for managing network parameters, will give a possibility to implement new services such as a tactile Internet, augmented reality, e-health applications.

In this regard, the protocol is proposed to ensure the transfer of the network performance requirements requested by an IoT server for IoT applications in SDN- and NFV-based networks in International Mobile Telecommunications-2020 (IMT-2020). This protocol is to be used for interconnection between the IoT server and the orchestrator application layer (management application (MA)).

History

Edition	Recommendation	Approval	Study Group	Unique ID*
1.0	ITU-T Q.3745	2020-04-29	11	11.1002/1000/14244

Keywords

IoT, NFV, SDN.

* 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

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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

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Protocol for time constraint Internet of things-based applications over software-defined networking

1 Scope

This Recommendation describes the protocol for providing network performance requirements requested by an IoT server for IoT applications in software-defined networking- (SDN-) and network function virtualization- (NFV-) based networks in International Mobile Telecommunications-2020 (IMT-2020). This protocol defines a set of application-level interface conventions between the IoT server and the orchestrator application layer (management application (MA)). High-level architecture, functions and message formats are addressed 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-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 term defined elsewhere:

3.1.1 application [b-ITU-T Y.2091]: A structured set of capabilities, which provide value-added functionality supported by one or more services, which may be supported by an API interface.

3.1.2 device [b-ITU-T Y.2060]: With regard to the Internet of things, this a piece of equipment with the mandatory capabilities of communication and the optional capabilities of sensing, actuation, data capture, data storage and data processing.

3.1.3 future network (FN) [b-ITU-T Y.3001]: A network able to provide services, capabilities, and facilities difficult to provide using existing network technologies. A future network is either:

- a) a new component network or an enhanced version of an existing one, or
- b) a heterogeneous collection of new component networks or of new and existing component networks that is operated as a single network.

3.1.4 gateway [b-ITU-T Y.4101]: A unit in the Internet of things which interconnects the devices with the communication networks. It performs the necessary translation between the protocols used in the communication networks and those used by devices.

3.1.5 Internet of things (IoT) [b-ITU-T Y.2060]: A global infrastructure for the information society, enabling advanced services by interconnecting (physical and virtual) things based on existing and evolving interoperable information and communication technologies.

3.1.6 software-defined networking [b-ITU-T Y.3300]: A set of technologies 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.

3.1.7 thing [b-ITU-T Y.2060]: With regard to the Internet of things, this is an object of the physical world (physical things) or the information world (virtual thing), which is capable of being identified and integrated into communication networks.

3.2 Terms defined in this Recommendation

None.

4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

AAA	Authentication, Authorization, Accounting
API	Application Programming Interface
BLS	Battery Level Status
BSS	Business Support System
b2b	business to business
CoAP	Constrained Application Protocol
DPI	Deep Packet Inspection
e2e	end to end
FN	Future Network
HTTP	Hypertext Transfer Protocol
IMS	Internet protocol Multimedia Subsystem
IMT-2020	International Mobile Telecommunications-2020
IoT	Internet of Things
JSON	JavaScript Object Notation
LAN	Local Area Network
MA	Management Application
MQTT	Message Queue Telemetry Transport
NFV	Network Function Virtualization
NGN	Next Generation Network
OSS	Operation Support System
QoS	Quality of Service
REST	Representational State Transfer
RTT	Round Trip Time
SDN	Software-Defined Networking
VM	Virtual Machine
WAN	Wide Area Network