

Recommendation

ITU-T Y.3164 (09/2024)

SERIES Y: Global information infrastructure, Internet protocol aspects, next-generation networks, Internet of Things and smart cities

Future networks

Requirements of joint development and operation for IMT-2020 networks and beyond

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Recommendation ITU-T Y.3164

Requirements of joint development and operation for IMT-2020 networks and beyond

Summary

Recommendation ITU-T Y.3164 specifies the requirements of joint development and operation for international mobile telecommunications for 2020 (IMT-2020) networks and beyond.

Network softwarization introduces the requirements of fast update, iteration and delivery of networks. By establishing a general joint development and operation pipeline tailored to communication operations management between network operators and network software providers, it becomes possible to achieve continuous delivery, integration, testing, and deployment of related software systems.

History*

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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.

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Recommendation ITU-T Y.3164

Requirements of joint development and operation for IMT-2020 networks and beyond

1 Scope

This Recommendation specifies the requirements of joint development and operation for IMT-2020 and beyond.

The scope of this Recommendation includes:

- Process requirements of joint development and operation;
- Component requirements of joint development and operation;
- Component interface requirements of joint development and operation;
- Template requirements of joint development and operation;
- Use cases of joint development and operation.

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.

None.

3 Definitions

3.1 Terms defined elsewhere

This Recommendation uses the following terms defined elsewhere:

3.1.1 continuous integration [b-ITU-T Y.3525]: A software engineering approach of merging CSN: cloud service developers' working copies to a shared mainline at any time.

NOTE – In the continuous integration, each integration is verified by the automated building, including compiling, release, automated testing, and deployment, in order to as early as possible to find the integration errors.

3.1.2 continuous delivery [b-ITU-T Y.3525]: A software engineering approach in which the CSN: cloud service developers produce software in short cycles, ensuring that the software can be reliably released at any time.

NOTE – Continuous delivery does not mean that each change of the software needs to be deployed in the product environment as soon as possible but means that each change is verified to be deployed at any time.

3.1.3 continuous operation [b-ITU-T Y.3525]: The management processes associated with cloud service management to deliver the right set of services with the high quality and competitive costs for the cloud service customer (CSC) in a sustainable way.

3.2 Terms defined in this Recommendation

This Recommendation defines the following term:

3.2.1 joint development and operation: A collective term for a set of processes, methods and systems established across organizations based on development and operation to facilitate joint development, technology operations, and quality assurance across organizations.

4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

CD	Continuous Delivery
CI	Continuous Integration
DA	Disciplined Agile
EMS	Element Management System
FCAPS	Fault, Configuration, Accounting, Performance and Security
IMT	International Mobile Telecommunications for 2020
IT	Information Technology
MANO	Management and Orchestration
NF	Network Function
NFV	Network Functions Virtualization
NMS	Network Management System
OMC	Operation and Maintenance Center
QA	Quality Assurance
SUT	System Under Test
TMS	Test Management System
VNF	Virtualized Network Function
VNFC	Virtualized Network Function Component

5 Conventions

In this Recommendation:

The keywords "is required to" indicate a requirement which must be strictly followed and from which no deviation is permitted, if conformance to this Recommendation is to be claimed.

The keywords "is recommended" indicate a requirement which is recommended but which is not absolutely required. Thus, this requirement need not be present to claim conformance.

The keywords "can optionally" indicate an optional requirement which is permissible, without implying any sense of being recommended. This term is not intended to imply that the vendor's implementation must provide the option, and the feature can be optionally enabled by the network operator/service provider. Rather, it means the vendor may optionally provide the feature and still claim conformance with this Recommendation.

6 Introduction

6.1 Overview

Network softwarization is an overall approach for designing, implementing, deploying, managing and maintaining network equipment and components through software. It leverages the natures of

software, such as flexibility and rapidity, across the entire lifecycle of network equipment and components. This approach aims to create conditions that enable the redesign of network and services architectures, optimize costs and processes, enable self-management and add values to network infrastructures.

With the large-scale deployment of 5G networks worldwide, the planning, maintenance and evolution of network infrastructures have become software-centric and require collaboration across different organizations. Network softwarization brings forward the requirements of fast update, iteration and delivery of networks. Each network software provider may have its own development and operation pipeline to ensure the quality of research and develop products. Operators also have their own internal standards and process requirements for the verification, deployment and operation of network software. Therefore, it is necessary to specify the requirements of joint development and operation for telecommunication industry.

Joint development and operation is a collective term for a set of processes, methods and systems established across organizations based on development and operation to facilitate joint development, technology operations, and quality assurance across organizations.

In this Recommendation, requirements of joint development and operation for international mobile telecommunications for 2020 (IMT-2020) and beyond will be specified.

The roles or actors of joint development and operation are described in Table 1.

Table 1 – Entities of joint development and operation in telecommunication industry

Entity	Description
Network Software Provider	An organization that provides network software which can be used by other roles or actors.
Network Operator	An organization that uses, operates, or provides services based on some network software.

In the joint development and operation process, the number of organizations involved can vary depending on the environment in which the process is executed. Even with just the network software provider and the network operator organizations the following variations are possible:

- Case I: The network software provider and the network operator are the same organization.
- Case II: There is one network software provider and one network operator.
- Case III: There are several network software providers and there is one network operator.
- Case IV: There is one network software provider and there are several network operators.
- Case V: There are several network software providers and there are several network operators.

This Recommendation only describes requirements for the general process, component, interface and templates of cross-organizations joint development and operation, specifically for Case II and Case III.

6.2 Impacts on IMT-2020 and beyond

As telecommunication networks transition to IMT-2020, a series of technical evolutions are occurring including, but not limited to, the software and hardware of telecommunication networks. Network virtualization and softwarization are some of the main technical features of IMT-2020. In order to achieve agile delivery and operation of software network, it is necessary to adopt concepts from agile development and operation of information technology (IT) systems, across different organizations.

All above, operators have to move beyond traditional operation and maintenance models and explore the further study and application of cross-organizational development and operation, i.e., joint