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

Future networks

Functional framework for artificial intelligence- based network service provisioning in future networks including IMT-2020

Recommendation ITU-T Y.3178

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Recommendation ITU-T Y.3178

Functional framework for artificial intelligence-based network service provisioning in future networks including IMT-2020

Summary

Recommendation ITU-T Y.3178 specifies a functional framework for network service provisioning based on artificial intelligence (AI) in future networks, including international mobile telecommunication-2020 (IMT-2020). This Recommendation addresses the following aspects:

- a business role-based model for AI-based network service provisioning;
- high-level requirements for the roles and their interactions from an AI-based operational perspective;
- functional components and their interactions for AI-based operations for network service provisioning.

History

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Recommendation ITU-T Y.3178

Functional framework for artificial intelligence-based network service provisioning in future networks including IMT-2020

1 Scope

This Recommendation specifies a functional framework for network service provisioning based on artificial intelligence (AI) in future networks, including international mobile telecommunication-2020 (IMT-2020). This Recommendation addresses the following aspects:

- a business role-based model for AI-based network service provisioning;
- high-level requirements for the roles and their interactions from an AI-based operational perspective;
- functional components and their interactions for AI-based operations for network service provisioning.

NOTE – AI-based operations of network providers lie outside the scope of 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.3101] Recommendation ITU-T Y.3101 (2018), *Requirements of the IMT-2020 network*.

[ITU-T Y.3172] Recommendation ITU-T Y.3172 (2019), *Architectural framework for machine learning in future networks including IMT-2020*.

3 Definitions

3.1 Terms defined elsewhere

This Recommendation uses the following terms defined elsewhere:

3.1.1 activity [b-ITU-T Y.3502]: A specified pursuit or set of tasks.

3.1.2 functional component [b-ITU-T Y.3502]: A functional building block needed to engage in an activity, backed by an implementation.

3.1.3 machine learning (ML) [ITU-T Y.3172]: Processes that enable computational systems to understand data and gain knowledge from it without necessarily being explicitly programmed.

NOTE 1 – This definition is adapted from [b-ETSI GR ENI 004].

NOTE 2 – Supervised machine learning and unsupervised machine learning are two examples of machine learning types.

3.1.4 machine learning model [ITU-T Y.3172]: Model created by applying machine learning techniques to data to learn from.

NOTE 1 – A machine learning model is used to generate predictions (e.g., regression, classification, clustering) on new (untrained) data.

NOTE 2 – A machine learning model may be encapsulated in a deployable fashion in the form of a software (e.g., virtual machine, container) or hardware component (e.g., IoT device).

NOTE 3 – Machine learning techniques include learning algorithms (e.g., learning the function that maps input data attributes to output data).

3.1.5 machine learning overlay [ITU-T Y.3172]: A loosely coupled deployment model of machine learning functionalities whose integration and management with network functions are standardized.

NOTE – A machine learning overlay aims to minimize interdependencies between machine learning functionalities and network functions using standard interfaces, allowing for the parallel evolution of functionalities of the two.

3.1.6 machine learning pipeline [ITU-T Y.3172]: A set of logical nodes, each with specific functionalities, that can be combined to form a machine learning application in a telecommunication network.

NOTE – The nodes of a machine learning pipeline are entities that are managed in a standard manner and can be hosted in a variety of network functions [b-ITU-T Y.3100].

3.1.7 machine learning underlay network [ITU-T Y.3172]: A telecommunication network and its related network functions which interfaces with corresponding machine learning overlays.

NOTE – An IMT-2020 network is an example of a machine learning underlay network.

3.1.8 network function [b-ITU-T Y.3100]: 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 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.

3.1.9 orchestration [b-ITU-T Y.3100]: 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.

3.1.10 role [b-ITU-T Y.3502]: A set of activities that serves a common purpose.

3.1.11 sub-role [b-ITU-T Y.3502]: A subset of the activities of a given role.

3.2 Terms defined in this Recommendation

None.

4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

AI	Artificial Intelligence
API	Application Programming Interface
E2E	end to end
ICT	Information and Communication Technology
IMT-2020	International Mobile Telecommunication-2020
IoT	Internet of things
LAN	Local Area Network