

Recommendation

ITU-T Y.3681 (04/2025)

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

Big Data

Requirements of human-like networking

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

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Recommendation ITU-T Y.3681

Requirements of human-like networking

Summary

Recommendation ITU-T Y.3681 specifies requirements of human-like networking. The scope of this Recommendation includes general requirements for human-like networking, requirements of the network layer for human-like networking, requirements of the control layer for human-like networking, requirements of the application layer for human-like networking, requirements of the user layer for human-like networking, requirements of the functional planes for human-like networking and security considerations.

History*

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Recommendation ITU-T Y.3681

Requirements of human-like networking

1 Scope

This Recommendation specifies requirements of human-like networking. The scope of this Recommendation includes the following aspects:

- General requirements of human-like networking.
- Requirements of the network layer for human-like networking.
- Requirements of the control layer for human-like networking.
- Requirements of the application layer for human-like networking.
- Requirements of the user layer for human-like networking.
- Requirements of the functional planes for human-like networking.
- Security considerations.

This Recommendation focuses on requirements of human-like networking. Aspects such as framework and architecture specified in [ITU-T Y.3680], are out of 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.2704](#)] Recommendation ITU-T Y.2704 (2010), *Security mechanisms and procedures for NGN*.
- [[ITU-T Y.2770](#)] Recommendation ITU-T Y.2770 (2012), *Requirements for deep packet inspection in next generation networks*.
- [[ITU-T Y.3180](#)] Recommendation ITU-T Y.3180 (2022), *Mechanism of traffic awareness for application-descriptor-agnostic traffic based on machine learning*.
- [[ITU-T Y.3184](#)] Recommendation ITU-T Y.3184 (2023), *Mechanism for intelligent awareness of network status*.
- [[ITU-T Y.3185](#)] Recommendation ITU-T Y.3185 (2023), *Functional architecture for intelligent awareness of network requirements*.
- [[ITU-T Y.3680](#)] Recommendation ITU-T Y.3680 (2022), *Framework of human-like networking*.

3 Definitions

3.1 Terms defined elsewhere

This Recommendation uses the following term defined elsewhere:

3.1.1 human-like networking (HLN) [ITU-T Y.3680]: A set of technologies that enable the network to behave like a human. In other words, human-like networking enables the network to have

the following capabilities: environment awareness and self-awareness, self-learning, and thinking, self-decision, self-operation, self-restructuring, self-optimization and self-protection. Human-like networking is also a kind of emerging network architecture that makes full use of the aforementioned set of technologies and has the features such as self-awareness, self-learning and thinking, self-decision, self-operation, self-restructuring, self-optimization, and self-protection. Human-like networking is a synthesis of artificial intelligence technologies, network awareness technologies, network self-restructuring technologies, and other technologies.

3.2 Terms defined in this Recommendation

None.

4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

API	Application Programming Interface
BSS	Business Support System
HLN	Human-Like Networking
NFV	Network Function Virtualization
NMS	Network Management System
OAM	Operation Administration Maintenance
OS	Operating System
OSS	Operation Support System
QoE	Quality of Experience
QoS	Quality of Service
SDN	Software Defined Networking
SLA	Service Level Agreement
SLI	Service Quality Indicators
SLO	Service Level Objectives
XML	Extensible Markup Language
YANG	Yet Another Next Generation

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 does not need to be present to claim conformance.

The keywords "can optionally" indicate an optional requirement that 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 General requirements for human-like networking

6.1 General functional requirements

As described in [ITU-T Y.3680], human-like networking (HLN) enables the network to have the following capabilities: environment awareness and self-awareness, self-learning and thinking, self-decision, self-operation, self-restructuring, self-optimization, and self-protection. HLN is also a kind of emerging network architecture that makes full use of the aforementioned set of technologies and has features such as self-awareness, self-learning, and thinking, self-decision, self-operation, self-restructuring, self-optimization, and self-protection. HLN is a synthesis of artificial intelligence technologies, network awareness technologies, network self-restructuring technologies, and other technologies.

Based on the features of HLN, HLN supports the following three classes of capability:

- Self-awareness: HLN supports the capability to be aware all relevant information related to the network, the aforementioned information includes network service, network status, network resource, network user requirement, network environment, and so on.
- Self-governance: HLN supports the capability to control and manage the network autonomously under the circumstance that no manual intervention is necessary or available.
- Self-evolution: HLN supports the capability to evolve the network itself so that the network can support real-time network requirements, provide the better network service and improve the network performance.

The general functional requirements of HLN can be classified into the following four aspects:

- Functional requirements related to network self-awareness.
- Functional requirements related to network self-governance.
- Functional requirements related to network self-evolution.
- Functional requirements related to other aspects.

6.1.1 Functional requirements for network self-awareness

HLN functional requirements for network self-awareness are as follows:

- It is required that HLN supports collecting all network-related data, and those data include network traffic, network status, network resource, network service, network user requirement, network environment, and so on.
- It is required that HLN has no negative influence on the performance of the network infrastructure when HLN is collecting necessary data from the network.
- It is required that HLN supports self-awareness capabilities for network topology, network status, network resource, and so on.
- It is required that HLN supports self-awareness capabilities for real-time network topology and real-time network status.
- It is recommended that HLN supports self-awareness capabilities for available real-time network resources.

NOTE 1 – Self-awareness means that HLN can be aware of relevant information itself based on information collected by itself. For example, [ITU-T Y.2770] and [ITU-T Y.3180] describe network service/application awareness, [ITU-T Y.3184] describes network status awareness, and [ITU-T Y.3185] describes network requirement awareness.

- It is required that HLN supports network awareness capabilities for network traffic, network service, network user requirements, network environment, and so on.
- It is required that HLN supports network awareness capabilities for the distribution of real-time network traffic carried in the network.