

Recommendation

ITU-T Q.3064 (06/2024)

SERIES Q: Switching and signalling, and associated measurements and tests

Signalling requirements and protocols for the NGN –
Network signalling and control functional architecture

Signalling architecture of network intelligence capability enhancement (NICE) in support of awareness capabilities

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Recommendation ITU-T Q.3064

Signalling architecture of network intelligence capability enhancement (NICE) in support of awareness capabilities

Summary

Recommendation ITU-T Q.3064 provides the signalling architecture of network intelligence capability enhancement (NICE) in support of awareness capabilities based on Recommendations ITU-T Y.2301, ITU-T Y.2302 and ITU-T Y.2303. Based on the functional architecture and the awareness functions of NICE, this Recommendation specifies the mapping of reference points to interfaces in the signalling architecture of NICE, especially in support of awareness capabilities. And it also provides the signalling requirements and protocols used for interfaces and the signalling procedures of NICE in support of awareness capabilities.

History*

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FOREWORD

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Recommendation ITU-T Q.3064

Signalling architecture of network intelligence capability enhancement (NICE) in support of awareness capabilities

1 Scope

This Recommendation provides the signalling architecture of NICE in support of awareness capabilities. Based on the functional architecture and the awareness functions of NICE, it introduces the reference points and specifies the mapping of reference points to interfaces in the signalling architecture of NICE especially in support of awareness capabilities. It also provides the signalling requirements and protocols used for interfaces and the signalling procedures of NICE in support of awareness capabilities.

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.2012] Recommendation ITU-T Y.2012 (2010), *Functional requirements and architecture of next generation networks*.
- [ITU-T Y.2301] Recommendation ITU-T Y.2301 (2013), *Network intelligence capability enhancement – Requirements and capabilities*.
- [ITU-T Y.2302] Recommendation ITU-T Y.2302 (2014), *Network intelligence capability enhancement – Functional architecture*.
- [ITU-T Y.2303] Recommendation ITU-T Y.2303 (2015), *Network intelligence capability enhancement – Awareness functional architecture*.

3 Definitions

3.1 Terms defined elsewhere

This Recommendation uses the following terms defined elsewhere:

3.1.1 content [b-ITU-T H.780]: A combination of audio, still image, graphic, video, or data.

NOTE – A variety of formats is classified as the "data" (e.g., text, encoded values, multimedia description language introduced by [ITU-T H.760]).

3.1.2 context [b-ITU-T Y.2002]: The information that can be used to characterize the environment of a user.

NOTE – Context information may include where the user is, what resources (devices, access points, noise level, bandwidth, etc.) are near the user, at what time the user is moving, interaction history between person and objects, etc. According to specific applications, context information can be updated.

3.1.3 context awareness [b-ITU-T Y.2201]: A capability to determine or influence a next action in telecommunication or process by referring to the status of relevant entities, which form a coherent environment as a context.

3.1.4 network intelligence capability enhancement (NICE) [ITU-T Y.2301]: An enhancement for NGNs supporting some intelligence capabilities for the provisioning of services according to requirements of users and application providers. These intelligence capabilities (termed as "NICE capabilities") enable operators to assign and dynamically adjust specific network resources based on the requirements, as well as supporting interfaces for users and applications enabling on-demand resource and service provision.

3.1.5 next generation networks (NGN) [b-ITU-T Y.2001]: A packet-based network able to provide telecommunication services and able to make use of multiple broadband, QoS-enabled transport technologies and in which service-related functions are independent from underlying transport-related technologies. It enables unfettered access for users to networks and to competing service providers and/or services of their choice. It supports generalized mobility which will allow consistent and ubiquitous provision of services to users.

3.2 Terms defined in this Recommendation

None.

4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

ASBR	Autonomous System Boundary Router
ASF	Application Support Function
BGP	Border Gateway Protocol
BGP-LS	Border Gateway Protocol Link-State
CA-FE	Content and context Analysis Functional Entity
CD-FE	Content and context Detection Functional Entity
CPE	Customer Premises Equipment
DSL	Digital Subscriber Line
FE	Functional Entity
HTTP	Hypertext Transfer Protocol
HTTPS	Hypertext Transfer Protocol Secure
ID	Identifier
IGP	Interior Gateway Protocol
IMSI	International Mobile Subscriber Identification
IP	Internet Protocol
JSON	JavaScript Object Notation
MDN	Mobile Directory Number
NFV	Network Function Virtualization
NGN	Next Generation Network
NICE	Network Intelligence Capability Enhancement
OE-FE	Open Environment Functional Entity
PC-FE	Policy Control Functional Entity
PE-FE	Policy Enforcement Functional Entity

QoS	Quality of Service
SAFI	Subsequent Address Family Identifier
SCF	Service Control Function
SC-FE	Service Control Functional Entity
SDN	Software-Defined Networking
SFE	Subfunctional Entity
SLA	Service Level Agreement
SNMP	Simple Network Management Protocol
SUP-FE	Service User Profile Functional Entity
TSE-FE	Traffic Scheduling Enforcement Functional Entity
TS-FE	Traffic Scheduling Functional Entity
URI	Uniform Resource Identifier
URL	Universal Resource Locator

5 Conventions

In this Recommendation:

The word "shall" indicates a requirement which must be strictly followed and from which no deviation is permitted if conformance to this document is to be claimed.

The word "should" indicates a requirement which must be strictly followed and from which no deviation is permitted if conformance to this document is to be claimed.

6 Overview

Emerging and future telecommunication services, together with the introduction of innovative technologies (e.g., SDN, NFV and cloud computing) and new business models, are leading to new requirements for networks, such as dynamic bandwidth control, enhanced mobility, real-time interactivity, high quality and enhanced security. These network development trends require operators to identify the implications of user and service requirements at the network level, and to increase the network efficiency and value through intelligent resource scheduling and network traffic management.

To fulfil these new requirements, ITU-T has already standardized the enhancements to NGN which are termed globally as "network intelligence capability enhancement" (NICE) in [ITU-T Y.2301]. NICE is an enhancement for NGNs which support some intelligence capabilities for the provisioning of services according to the requirements of users and application providers. These intelligence capabilities (termed as "NICE capabilities") enable operators to assign and dynamically adjust specific network resources based on the requirements, as well as support interfaces for users and applications enabling on-demand resource and service provision.

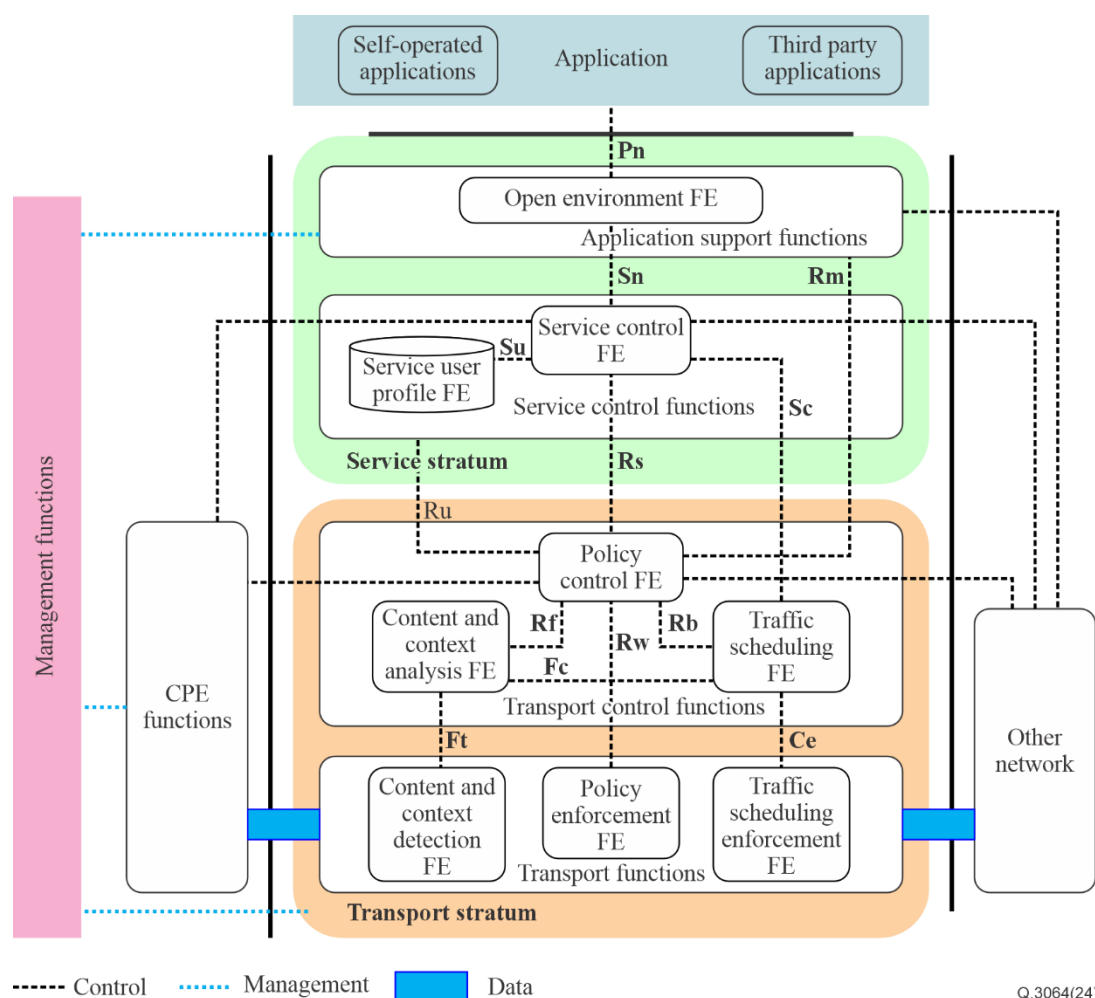


Figure 6-1 – Functional architecture of NICE [ITU-T Y.2302]

Figure 6-1 from [ITU-T Y.2302] shows the functional architecture of NICE. In the service stratum, there are application support functions (ASF) and service control functions (SCF). For supporting self-operated applications and third party applications, the ASFs include an open environment functional entity to provide secure access and capability openness. Service control functions include a service control functional entity (SC-FE) and a service user profile functional entity (SUP-FE).

In the transport stratum, there are transport control functions and transport functions. Transport control functions include a policy control functional entity (PC-FE), a content and context analysis-functional entity (CA-FE) and a traffic scheduling functional entity (TS-FE). In addition to access network functions, edge functions, core transport functions and gateway functions [ITU-T Y.2012], transport functions include a content and context detection functional entity (CD-FE), a policy enforcement functional entity (PE-FE) and a traffic scheduling enforcement functional entity (TSE-FE).