



INTERNATIONAL TELECOMMUNICATION UNION

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

Y.2020

(05/2011)

SERIES Y: GLOBAL INFORMATION
INFRASTRUCTURE, INTERNET PROTOCOL ASPECTS
AND NEXT-GENERATION NETWORKS

Next Generation Networks – Frameworks and functional
architecture models

Open service environment functional architecture for NGN

CAUTION !

PREPUBLISHED RECOMMENDATION

This prepublication is an unedited version of a recently approved Recommendation. It will be replaced by the published version after editing. Therefore, there will be differences between this prepublication and the published version.

FOREWORD

The International Telecommunication Union (ITU) is the United Nations specialized agency in the field of telecommunications, information and communication technologies (ICTs). The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of ITU. ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

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

In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

Compliance with this Recommendation is voluntary. However, the Recommendation may contain certain mandatory provisions (to ensure, e.g., interoperability or applicability) and compliance with the Recommendation is achieved when all of these mandatory provisions are met. The words "shall" or some other obligatory language such as "must" and the negative equivalents are used to express requirements. The use of such words does not suggest that compliance with the Recommendation is required of any party.

INTELLECTUAL PROPERTY RIGHTS

ITU draws attention to the possibility that the practice or implementation of this Recommendation may involve the use of a claimed Intellectual Property Right. ITU takes no position concerning the evidence, validity or applicability of claimed Intellectual Property Rights, whether asserted by ITU members or others outside of the Recommendation development process.

As of the date of approval of this Recommendation, ITU [had/had not] received notice of intellectual property, protected by patents, which may be required to implement this Recommendation. However, implementers are cautioned that this may not represent the latest information and are therefore strongly urged to consult the TSB patent database at <http://www.itu.int/ITU-T/ipr/>.

© ITU 2011

All rights reserved. No part of this publication may be reproduced, by any means whatsoever, without the prior written permission of ITU.

ITU-T Recommendation Y.2020

Open service environment functional architecture for NGN

Summary

This Recommendation describes the functional architecture of the open service environment (OSE) for NGN. The OSE functional architecture is based on the capabilities described in ITU-T Recommendation Y.2234 to enable enhanced flexible service creation and provisioning.

Keywords

Functional architecture, functional entities, open service environment, OSE, NGN, Next Generation Networks, reference points

Table of Contents

1.	Scope	5
2.	References.....	5
3.	Definitions	5
3.1.	Terms defined elsewhere	5
3.2.	Terms defined in this Recommendation	7
4.	Abbreviations and acronyms	7
5.	Conventions	7
6.	OSE capabilities in NGN.....	8
7.	OSE architecture.....	9
7.1.	OSE positioning within the NGN	9
7.2.	OSE functional architecture.....	11
7.2.1.	Service coordination functional entity (SCR-FE).....	12
7.2.1.1.	Selection functions.....	13
7.2.1.2.	Tracking and notifying information functions.....	13
7.2.2.	Service discovery functional entity (SD-FE).....	14
7.2.3.	Service registration functional entity (SR-FE)	15
7.2.4.	Service management functional entity (SM-FE).....	16
7.2.4.1.	Service monitoring functions.....	17
7.2.4.2.	QoS information management functions	17
7.2.4.3.	Version management functions.....	17
7.2.4.4.	Notification service functions	17
7.2.4.5.	Failure detection and recovery functions.....	17
7.2.4.6.	Service tracking management functions	17
7.2.4.7.	Service substitution functions	18
7.2.4.8.	Service access control functions	18
7.2.4.9.	Statistical analysis functions	18

7.2.4.10. Auditing functions	18
7.2.4.11. Registered service management functions.....	18
7.2.5. Service composition functional entity (SCM-FE)	18
7.2.5.1. Composite logic execution functions.....	19
7.2.5.1.1. Composition language	19
7.2.6. Service development support functional entity (SDS-FE)	20
7.2.6.1. Service life cycle management functions	20
7.2.6.2. Service creation support functions.....	20
7.2.6.3. Service tracking functions.....	21
7.2.7. Interworking with service creation environments functional entity (IWSCE-FE).....	21
7.2.8. Service policy enforcement functional entity (SPE-FE)	21
7.2.8.1. Policy execution functions.....	22
7.2.9. Reference points	22
7.2.9.1. Reference points internal to the OSE.....	22
7.2.9.2. Reference points between OSE and other ASF&SSF.....	23
7.2.9.3. Reference points between OSE and end-user functions	24
7.2.9.4. Reference points between OSE and applications.....	24
8. Security considerations	24
Appendix I.....	25
Appendix II	26

Introduction

According to the NGN requirements and capabilities [ITU-T Y.2201], open service environment (OSE) capabilities stem from the general characteristics of the NGN in supporting and establishing an environment for enhanced, flexible and open service creation and provisioning within the service stratum.

[ITU-T Y.2201] describes the high-level requirements of NGN while [ITU-T Y.2234] describes service requirements, functional requirements and service architecture of open service environment (OSE) capabilities.

This Recommendation provides the OSE functional architecture including description of the functional entities and the related reference points.

1

ITU-T Recommendation Y.2020

Open service environment functional architecture for NGN

1. Scope

This Recommendation describes functional architecture for open service environment (OSE) for next generation network (NGN).

This Recommendation is based on the service requirements, functional requirements and service architecture of OSE capabilities as described in [ITU-T Y.2234]. To support OSE capabilities, this Recommendation provides extensions to the functional entities and reference points defined and described in [ITU-T Y.2012].

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] ITU-T Recommendation Y.2012 (2010), *Functional requirements and architecture of the NGN*
- [ITU-T Y.2201] ITU-T Recommendation Y.2201 (2009), *Requirements and capabilities of ITU-T NGN*
- [ITU-T Y.2234] ITU-T Recommendation Y.2234 (2008), *Open service environment capabilities for NGN*
- [ITU-T Y.2240] ITU-T Recommendation Y.2240 (2011), *Requirements and capabilities for NGN service integration and delivery environment*
- [ITU-T Y.2701] ITU-T Recommendation Y.2701 (2007), *Security requirements for NGN release 1*
- [ITU-T Y.2702] ITU-T Recommendation Y.2702 (2008), *Authentication and authorization requirements for NGN release 1*

3. Definitions

3.1. Terms defined elsewhere

This Recommendation uses the following terms defined elsewhere:

3.1.1 application [b-ITU-T Y.101]: A structured set of capabilities, which provide value-added functionality supported by one or more services

3.1.2 application provider [ITU-T Y.2012]: a general reference to a provider that offers applications to the customers making use of the services capabilities provided by the NGN.

3.1.3 functional architecture [ITU-T Y.2012]: A set of functional entities and the reference points between them used to describe the structure of an NGN. These functional entities are separated by reference points, and thus, they define the distribution of functions.

NOTE: The functional entities can be used to describe a set of reference configurations. These reference configurations identify which reference points are visible at the boundaries of equipment implementations and between administrative domains.

3.1.4 functional entity [ITU-T Y.2012]: An entity that comprises an indivisible set of specific functions. Functional entities are logical concepts, while groupings of functional entities are used to describe practical, physical implementations.

3.1.5 network operator [ITU-T Y.2012]: An operator that manages a telecommunications network. A network operator may be a Service Provider and vice versa. A Network Operator may or may not provide particular telecommunications services.

3.1.6 NGN service stratum [b-ITU-T Y.2011]: That part of the NGN which provides the user functions that transfer service related data and the functions that control and manage service resources and network services to enable user services and applications (see also sub-clause 7.1 of [ITU T Y.2011]).

3.1.7 NGN transport stratum [b-ITU-T Y.2011]: That part of the NGN which provides the user functions that transfer data and the functions that control and manage transport resources to carry such data between terminating entities (see also sub-clause 7.1 of [ITU-T Y.2011]).

3.1.8 reference point [ITU-T Y.2012]: A conceptual point at the conjunction of two non-overlapping functional entities that can be used to identify the type of information passing between these functional entities.

NOTE – A reference point may correspond to one or more physical interfaces between pieces of equipment.

3.1.9 service [b-ITU-T Y.2091]: A set of functions and facilities offered to a user by a provider.

3.1.10 service chain [ITU-T Y.2234]: A set of coordinated services that occur in a specific sequence.

3.1.11 service composition [ITU-T Y.2234]: service composition is the capability of creating new services from other existing services.

3.1.12 service coordination [ITU-T Y.2234]: The ability to manage the relationships and interactions among services to provide a “service chain” as well as among services and applications.

3.1.13 service development support [ITU-T Y.2234]: service development support provides an environment for service creation, development, and maintenance.

3.1.14 service discovery [ITU-T Y.2234]: service discovery performs a search against all registered services and provides the related service information.

3.1.15 service environment capabilities [ITU-T Y.2234]: Capabilities provided by open service environment to enable enhanced and flexible service creation and provisioning based on the use of standards interfaces.

3.1.16 service management [ITU-T Y.2234]: service management provides the overall service managing functions such as service monitoring, service tracking and unexpected failure control.

3.1.17 service provider [ITU-T Y.2012]: A general reference to an operator that provides telecommunication services to customers and other users either on a tariff or contract basis. A

service provider may or may not operate a network. A service provider may or may not be a customer of another service provider.

3.2. Terms defined in this Recommendation

None.

4. Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

ANI	Application Network Interface
API	Application Programming Interface
APL-GW-FE	Application Gateway Functional Entity
APL-SCM-FE	Application Service Coordination Manager Functional Entity
ASF	Application Support Functions
AS-FE	Application Support Functional Entity
ASF&SSF	Application Support Functions and Service Support Functions
FE	Functional Entity
IdM	Identity Management
IN	Intelligent Network
IWSCE-FE	InterWorking with Service Creation Environments Functional Entity
NGN	Next Generation Network
NGN-SIDE	NGN Service Integration and Delivery Environment
NNI	Network-Network Interface
OSE	Open Service Environment
SPE-FE	Service Policy Enforcement Functional Entity
SCM-FE	Service CoMposition Functional Entity
SCR-FE	Service CooRdination Functional Entity
SD-FE	Service Discovery Functional Entity
SDS-FE	Service Development Support Functional Entity
SM-FE	Service Management Functional Entity
SNI	Service Network Interface
SR-FE	Service Registration Functional Entity
SSF	Service Support Functions
SS-FE	Service Switching Functional Entity
QoS	Quality of Service
XACML	eXtensible Access Control Markup Language

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 the specification.

In this Recommendation,

- The term "NGN operator" is used to refer to a network operator (as defined in sub-clause 3.1.4) that manages one or more NGN (s). A NGN operator can also be a service provider (as defined in sub-clause 3.1.16). Note also that the term "NGN provider" when used in this Recommendation is equivalent to the term "NGN operator".

6. OSE capabilities in NGN

Open service environment provides capabilities to enable flexible and agile service creation, execution and management based on the use of standards interfaces. The use of standard interfaces will ensure NGN OSE based service reusability and portability across networks, as well as accessibility by application providers and/or developers [ITU-T Y.2234].

OSE capabilities have the following characteristics:

- Flexible development of applications and capabilities by NGN providers, application providers, and other service providers;
- Exposure of capabilities via standard application network interfaces (ANI) as defined in [ITU-T Y.2012];
- Portability and re-usability of capabilities across networks (and from other network to NGN or from NGN to other network);
- Leveraging new capabilities enabled by technologies from non-NGN environments

Figure 6-1 shows the role of open service environment capabilities in NGN.