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

Next Generation Networks – Service aspects: Service
capabilities and service architecture

Open service environment capabilities for NGN

Recommendation ITU-T Y.2234

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Recommendation ITU-T Y.2234

Open service environment capabilities for NGN

Summary

Recommendation ITU-T Y.2234 describes open service environment (OSE) capabilities for NGN. OSE capabilities are built on NGN release 1 capabilities with the aim to enable enhanced, flexible service creation and provisioning. This framework requires use of standard interfaces to ensure NGN OSE-based service reusability, portability across networks, as well as accessibility by NGN application providers and/or developers. OSE capabilities enable applications development using NGN OSE-based services for exposing the NGN capabilities.

This Recommendation provides service requirements, functional requirements and architecture of open service environment capabilities.

Source

Recommendation ITU-T Y.2234 was approved on 12 September 2008 by ITU-T Study Group 13 (2005-2008) under Recommendation ITU-T A.8 procedure.

Keywords

Next generation networks (NGN), NGN OSE-based service, open service environment, open service environment capabilities, OSE, service-oriented architecture.

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Introduction

The ability to implement new functionalities in current networks may be limited or impossible due to the capabilities of the installed equipment. Software provisioning to implement new functionalities is essentially restricted to equipment vendors, since the existing or current application programming interfaces (APIs) are typically proprietary (i.e., not open) (Recommendation ITU-T Y.2201). NGN enables new capabilities and supports a wide range of emerging services, including services with advanced and complex functionalities. In response to a drive from application providers and/or developers to develop new applications and capabilities accessible via standard interfaces, there is an increasing need for NGN providers to cooperate in the development of standard application network interfaces (ANIs). Furthermore, software reusability and portability is encouraged to facilitate cost-effective development.

The support of an open service environment within NGN aims to provide efficient and flexible capabilities based on the use of standard interfaces to NGN applications, thereby enabling applications to take full advantage of the NGN capabilities.

Some general benefits of an open service environment are as follows (Recommendation ITU-T Y.2201).

- Applications and capabilities can be easily developed by NGN providers as well as by application providers.
- Capabilities can be made portable and/or reusable across networks.
- Standard ANIs can accommodate interactions between NGN entities and applications.

Within an open service environment, each capability is required to function either independently or in conjunction with other capabilities for the realization of applications. Each capability performs all corresponding service functions for the requesting entity. Applications may be provisioned over different networks, so the capabilities must be able to function independently from the underlying network technologies (Recommendation ITU-T Y.2201).

Recommendation ITU-T Y.2234

Open service environment capabilities for NGN

1 Scope

The objective of this Recommendation is to define an open service environment (OSE) framework for NGN. This framework is built on NGN release 1 capabilities [ITU-T Y.2201] with the aim to enable enhanced, flexible service creation and provisioning.

The use of standard interfaces will ensure NGN OSE-based service reusability, portability across networks, as well as accessibility by NGN application providers and/or developers.

This Recommendation provides service requirements, functional requirements and architecture of open service environment 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 M.3060] Recommendation ITU-T M.3060/Y.2401 (2006), *Principles for the Management of Next Generation Networks*.
<<http://web.itu.int/rec/T-REC-M.3060>>
- [ITU-T Y.2012] Recommendation ITU-T Y.2012 (2006), *Functional requirements and architecture of the NGN release 1*.
<<http://web.itu.int/rec/T-REC-Y.2012>>
- [ITU-T Y.2201] Recommendation ITU-T Y.2201 (2007), *NGN release 1 requirements*.
<<http://web.itu.int/rec/T-REC-Y.2201>>
- [ITU-T Y.2701] Recommendation ITU-T Y.2701 (2007), *Security requirements for NGN release 1*.
<<http://web.itu.int/rec/T-REC-Y.2701>>

3 Definitions

3.1 Terms defined elsewhere

This Recommendation uses the following terms defined elsewhere:

3.1.1 application network interface (ANI) [ITU-T Y.2012]: Interface which provides a channel for interactions and exchanges between applications and NGN elements. The ANI offers capabilities and resources needed for the realization of applications.

3.1.2 application programming interface (API) [b-ITU-T I.312]: An API provides a set of interfaces from an application environment to an execution environment. The execution environment provides services to the application environment.

3.2 Terms defined in this Recommendation

This Recommendation defines the following terms:

3.2.1 open service environment capabilities: Capabilities provided by an open service environment to enable enhanced and flexible service creation and provisioning based on the use of standards interfaces.

NOTE – Open service environment capabilities enable services reusability, portability across networks and accessibility by application providers and user applications in NGN.

3.2.2 service chain: A set of coordinated services that occur in a specific sequence.

3.2.3 service composition: Service composition is the capability of creating new services from other existing services.

NOTE – NGN OSE-based services will be used as key building blocks to quickly create a composite service. Service composition can occur in a static or in a dynamic way. While in static composition, composite services are defined in advance, dynamic composition sends the request for service discovery using the service description to find the needed services and composes the services during run time.

3.2.4 service coordination: The ability to manage the relationships and interactions among services to provide a "service chain", as well as among services and applications.

3.2.5 service development support: Service development support provides an environment for service creation, development and maintenance.

3.2.6 service discovery: Service discovery performs a search against all registered services and provides the related service information.

3.2.7 service management: Service management provides the overall service managing functions such as service monitoring, service tracking and unexpected failure control.

3.2.8 service registration: Service registration manages the information about services and maintains the most up-to-date information.

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
ASF&SSF	Application Support Functions and Service Support Functions
AS-FE	Application Support Functional Entity
BPDM	Business Process Definition Metamodel
BPEL	Business Process Execution Language
BPMN	Business Process Modelling Notation
BPRI	Business Process Run-time Interface
BSS	Billing Support System
CAMEL	Customized Application for Mobile network Enhanced Logic
CDL	Choreography Description Language

DPE	Device Profile Evolution
EAI	External Authoring Interface
ebXML	electronic business eXtensible markup language
EDOC	Enterprise Distributed Object Computing
EJB	Enterprise JavaBeans
eTOM	enhanced Telecom Operations Map
FE	Functional Entity
GPM	Global Management Program
GPS	Global Positioning System
HDTV	High Definition Television
IMS	Internet protocol Multimedia Subsystem
IN	Intelligent Network
INAP	Intelligent Network Application Protocol
IP	Internet Protocol
IPTV	Internet Protocol Television
MOF	Meta Object Facility
MTNM	Multi-Technology Network Management
MTOSI	Multi-Technology Operations System Interfaces
NGN	Next Generation Network
NGOSS	New Generation Operations Systems and Software
NNI	Network-to-Network Interface
OSA	Open Service Access
OSE	Open Service Environment
OSPE	Open Mobile Alliance Service Provider Environment
OSS	Operations Support System(s)
OSS/J	Operations Support System through Java initiative
OWSER	Open Mobile Alliance Web Service Enabler
P2P	Peer-to-Peer
PEEM	Policy Evaluation, Enforcement and Management
QoS	Quality of Service
RAS	Reusable Asset Specifications
RIM	Registry Information Model
S-CSC-FE	Serving Call Session Control Functional Entity
SCA	Service Component Architecture
SCF	Service Control Functions
SCP	Service Control Point
SEC_CF	Security Common Function

SID	Shared Information/Data
SOA	Service Oriented Architecture
SOAP	Simple Object Access Protocol
SS-FE	Service Switching Functional Entity
SSF	Service Support Functions
UDDI	Universal Description, Discovery and Integration
UML	Unified Modelling Language
UPMS	Unified Modelling Language Profile and Metamodel for Services
VoD	Video on Demand
WIN	Wireless Intelligent Network
WSDL	Web Services Description Language
WSDM	Web Services Distributed Management
XML	eXtensible Markup Language

5 Conventions

None.

6 Service requirements for open service environment capabilities

This clause describes the service requirements of open service environment capabilities for NGN. The NGN open service environment is required to:

- Provide standard APIs for application providers and/or developers to create and introduce applications quickly and seamlessly.
NOTE – Requirements for the standard APIs specified in this Recommendation are at the control level and they do not address media information such as voice and video.
- Provide service level interoperability among different networks, operating systems and programming languages (e.g., web services are an example of enabling technology for providing service level interoperability).
- Support service independence from NGN providers and manufacturers [ITU-T Y.2201]:
 - Functionalities, operations and management of applications are recommended to be all independent from the underlying NGN providers' technologies and infrastructures.
 - Multi-vendor implementations of NGN open service environment are recommended to be supported.
- Support OSE capabilities based on NGN providers' capabilities. However, OSE capabilities based on application providers' capabilities are not supported in this version of this Recommendation.
- Support location, network and protocol transparency [ITU-T Y.2201]:
 - In a distributed environment, application providers and/or developers are recommended to be able to access NGN OSE-based services from anywhere, regardless of their physical location.
 - NGN open service environment capabilities are recommended to allow services to be technology- and terminal-agnostic.

- Protocol transparency is required to be achieved by providing standard protocol programming interface tools for realizing independent service control processes and shielding complex network technical details to the open service environment [ITU-T Y.2201].
- Provide capabilities for coordinating services among themselves and services with applications.
- Support service discovery capabilities to allow users and their devices to discover the services, applications, and other network information and resources of their interest [ITU-T Y.2201]. In addition, discovery mechanisms for services or components of multiple application providers are recommended to be provided.
- Provide the means to manage the registration of capabilities, services and applications. The technology choice is required to ensure functions for service registration and deregistration, including configuration, activation, publication [ITU-T Y.2201].
- Provide the following service management capabilities:
 - service tracking;
 - update management;
 - auditing;
 - version control;
 - logging, e.g., provide a record of the history of services;
 - access control management;
 - statistical analysis of service registration and utilization.
- Support NGN service reuse by providing service composition capability.
- Support of a service composition language.
- Offer a development support environment which supports construction, trialling, deployment and removal of applications [ITU-T Y.2201].
- Allow interworking with service creation environments and network entities for creation and provisioning of applications and services [ITU-T Y.2201].
- Provide a secure access to the NGN capabilities in alignment with the general NGN security requirements as specified in [ITU-T Y.2201].
- Support policy enforcement capability for resource protection and management, and service personalization.

7 Functional requirements for open service environment capabilities

This clause describes functional requirements specific to the support of NGN open service environment capabilities. OSE capabilities consist of service coordination, service discovery, service registration, service management, service composition, service development support, interworking with service creation environments and policy enforcement.

7.1 Service coordination functional requirements

The NGN service coordination functions are required to:

- Provide coordination of applications and services with capabilities [ITU-T Y.2201].
- Provide the tracking of NGN capabilities or service components from various application providers, and the relationship between these capabilities or service components (adapted from [ITU-T Y.2201]).

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