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

Next Generation Networks – Frameworks and functional
architecture models

Description of capability set 1 of NGN release 1

Recommendation ITU-T Y.2006

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Recommendation ITU-T Y.2006

Description of capability set 1 of NGN release 1

Summary

Recommendation ITU-T Y.2006 provides brief descriptions of capability set 1 of NGN release 1 in terms of the overall requirements and a high-level overview of the functional features to be addressed. The descriptions are from the aspects of environment, capabilities, architecture, and technical specifications.

Source

Recommendation ITU-T Y.2006 was approved on 29 February 2008 by ITU-T Study Group 13 (2005-2008) under Recommendation ITU-T A.8 procedure.

Keywords

Architecture, capabilities, capability set 1, environment, NGN Release 1, technical specifications.

FOREWORD

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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.

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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.

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Introduction

This Recommendation aligns with fundamental ITU-T Recommendations of NGN release 1, such as Supplement 1 to Y.2000 series of ITU-T Recommendations (NGN scope), Recommendation ITU-T Y.2201 (NGN release 1 requirements), Recommendation ITU-T Y.2012 (NGN functional requirements and architecture) and technical specifications according to capability set 1 of NGN release 1. It concentrates on the holistic description of the network framework and protocols that have been standardized in ITU-T.

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Recommendation ITU-T Y.2006

Description of capability set 1 of NGN release 1

1 Scope

ITU-T has adopted a release-based approach for the production of NGN Recommendations, with the scope of each release clearly defined and target deadlines for completion specified. The objective is to aid project management, and to ensure concentration of effort on a smaller set of deliverables to be achieved in a shorter timescale, thus achieving feasible deliverables in a timely manner.

Considering a priority of a market, the concept of capability set that breaks down the release concept is adopted because necessary functional groups exist prior to a target completion date of the Release. Capability set includes requirements, architecture, and signalling aspects necessary to provide specific services. This means the Release concept determines the scope of standardization in ITU and capability set specifies the related Recommendations necessary for specific services.

This Recommendation gives a description of capability set 1 of NGN release 1 of an anticipated series of releases within ITU-T, in terms of the overall requirements and a high-level overview of the functional features to be addressed. Additionally, this Recommendation only lists Recommendations relevant to capability set 1 of NGN release 1, so a substantial specification is included in each original Recommendation.

To fulfil the general objectives and principles of an NGN identified in [ITU-T Y.2001] and [ITU-T Y.2011], this Recommendation focuses on key initial capabilities whilst ensuring that the general and long-term architectural direction of the NGN is maintained to be as flexible as possible to allow future enhancements and releases.

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*.
- [ITU-T Q.1706] Recommendation ITU-T Q.1706/Y.2801 (2006), *Mobility management requirements for NGN*.
- [ITU-T Q.1741.4] Recommendation ITU-T Q.1741.4 (2005), *IMT-2000 references to release 6 of GSM evolved UMTS core network*.
- [ITU-T Q.3300] Recommendation ITU-T Q.3300 (2008), *Architectural framework for the Q.33xx series of Recommendations*.
- [ITU-T Q.3301.1] Recommendation ITU-T Q.3301.1 (2007), *Resource control protocol No. 1 – Protocol at the Rs interface between service control entities and the policy decision physical entity*.

- [ITU-T Q.3302.1] Recommendation ITU-T Q.3302.1 (2007), *Resource control protocol No. 2 – Protocol at the Rp interface between transport resource control physical entities.*
- [ITU-T Q.3303.0] Recommendation ITU-T Q.3303.0 (2007), *Resource control protocol No. 3 – Protocols at the Rw interface between a policy decision physical entity (PD-PE) and a policy enforcement physical entity (PE-PE): Overview.*
- [ITU-T Q.3303.1] Recommendation ITU-T Q.3303.1 (2007), *Resource control protocol No. 3 – Protocol at the interface between a policy decision physical entity (PD-PE) and a policy enforcement physical entity (PE-PE): COPS alternative.*
- [ITU-T Q.3303.2] Recommendation ITU-T Q.3303.2 (2007), *Resource control protocol No. 3 – Protocol at the interface between a policy decision physical entity (PD-PE) and a policy enforcement physical entity (PE-PE) (Rw interface): H.248 alternative.*
- [ITU-T Q.3303.3] Recommendation ITU-T Q.3303.3 (2008), *Resource control protocol No. 3 – Protocols at the Rw interface between a policy decision physical entity (PD-PE) and a policy enforcement physical entity (PE-PE): Diameter.*
- [ITU-T Q.3304.1] Recommendation ITU-T Q.3304.1 (2007), *Resource control protocol No. 4 (rcp4) – Protocols at the Rc interface between a transport resource control physical entity (TRC-PE) and a transport physical entity (T-PE): COPS alternative.*
- [ITU-T Q.3304.2] Recommendation ITU-T Q.3304.2 (2007), *Resource control protocol No. 4 (rcp4) – Protocols at the Rc interface between a transport resource control physical entity (TRC-PE) and a transport physical entity (T-PE): SNMP alternative.*
- [ITU-T Q.3305.1] Recommendation ITU-T Q.3305.1 (2008), *Resource control protocol No. 5 (rcp5) – Protocol at the interface between a transport resource control physical entity (TRC-PE) and a policy decision physical entity (PD-PE) (Rt interface): Diameter-based.*
- [ITU-T Q.3401] Recommendation ITU-T Q.3401 (2007), *NGN NNI signalling profile (protocol set 1).*
- [ITU-T Q.3402] Recommendation ITU-T Q.3402 (2008), *NGN UNI signalling profile (protocol set 1).*
- [ITU-T Y.2001] Recommendation ITU-T Y.2001 (2004), *General overview of NGN.*
- [ITU-T Y.2011] Recommendation ITU-T Y.2011 (2004), *General principles and general reference model for Next Generation Networks.*
- [ITU-T Y.2012] Recommendation ITU-T Y.2012 (2006), *Functional requirements and architecture of the NGN release 1.*
- [ITU-T Y.2014] Recommendation ITU-T Y.2014 (2008), *Network attachment control functions in Next Generation Networks.*
- [ITU-T Y.2021] Recommendation ITU-T Y.2021 (2006), *IMS for Next Generation Networks.*
- [ITU-T Y.2031] Recommendation ITU-T Y.2031 (2006), *PSTN/ISDN emulation architecture.*
- [ITU-T Y.2111] Recommendation ITU-T Y.2111 (2006), *Resource and admission control functions in Next Generation Networks.*
- [ITU-T Y.2201] Recommendation ITU-T Y.2201 (2007), *NGN Release 1 requirements.*

- [ITU-T Y.2262] Recommendation ITU-T Y.2262 (2006), *PSTN/ISDN emulation and simulation*.
- [ITU-T Y.2271] Recommendation ITU-T Y.2271 (2006), *Call server-based PSTN/ISDN emulation*.
- [ITU-T Y.2701] Recommendation ITU-T Y.2701 (2007), *Security requirements for NGN release 1*.

3 Terms and definitions

This Recommendation defines the following terms:

3.1 NGN release: A set of NGN specifications covering a defined capability set of services and capabilities for implementation in a timely manner. A given specification of a given NGN Release can be categorized using three stages: service aspects (Stage 1), functional network aspects (Stage 2) and network implementation aspects (Stage 3). Whilst in principle, all services and capabilities defined in a given capability set of the NGN Release are to be specified to the Stage 3 level to ensure that the release is fully implementable, exceptions can be accepted.

3.2 capability set: A set of NGN capabilities that allows provisioning of services selected from services and capabilities for a given NGN Release to ensure functional consistency.

3.3 release completion: An NGN release is completed as soon as the related NGN Release Description Recommendation has been approved by the ITU-T and all documents referenced in that Recommendation have been approved by the responsible body. In other words, the deadline is a target.

4 Abbreviations

This Recommendation uses the following abbreviations:

GW	Gateway
NACF	Network Attachment Control Functions
NGN	Next Generation Network
NNI	Network Network Interface
OAM	Operation, Administration and Maintenance
PE	Physical Entity
PSTN/ISDN	Public Switched Telephone Network/ Integrated Services Digital Network
QoS	Quality of Service
RACF	Resource and Admission Control Functions
SLA	Service Level Agreement

5 Conventions

None.

6 NGN release 1 environment

The objectives for NGN release 1 are to provide an extensible platform for services, and an overall architecture designed to be extensible, allowing new services to be provided as required. The functions that are supported by NGN release 1 specifications are illustrated in Figure 1. The figure

includes the interfaces between NGN and end-user functions, between NGN and other networks, and between NGN and applications.

More detailed information of NGN R1 environment can be found in:

- NGN release 1 scope [b-ITU-T Y-Sup.1].

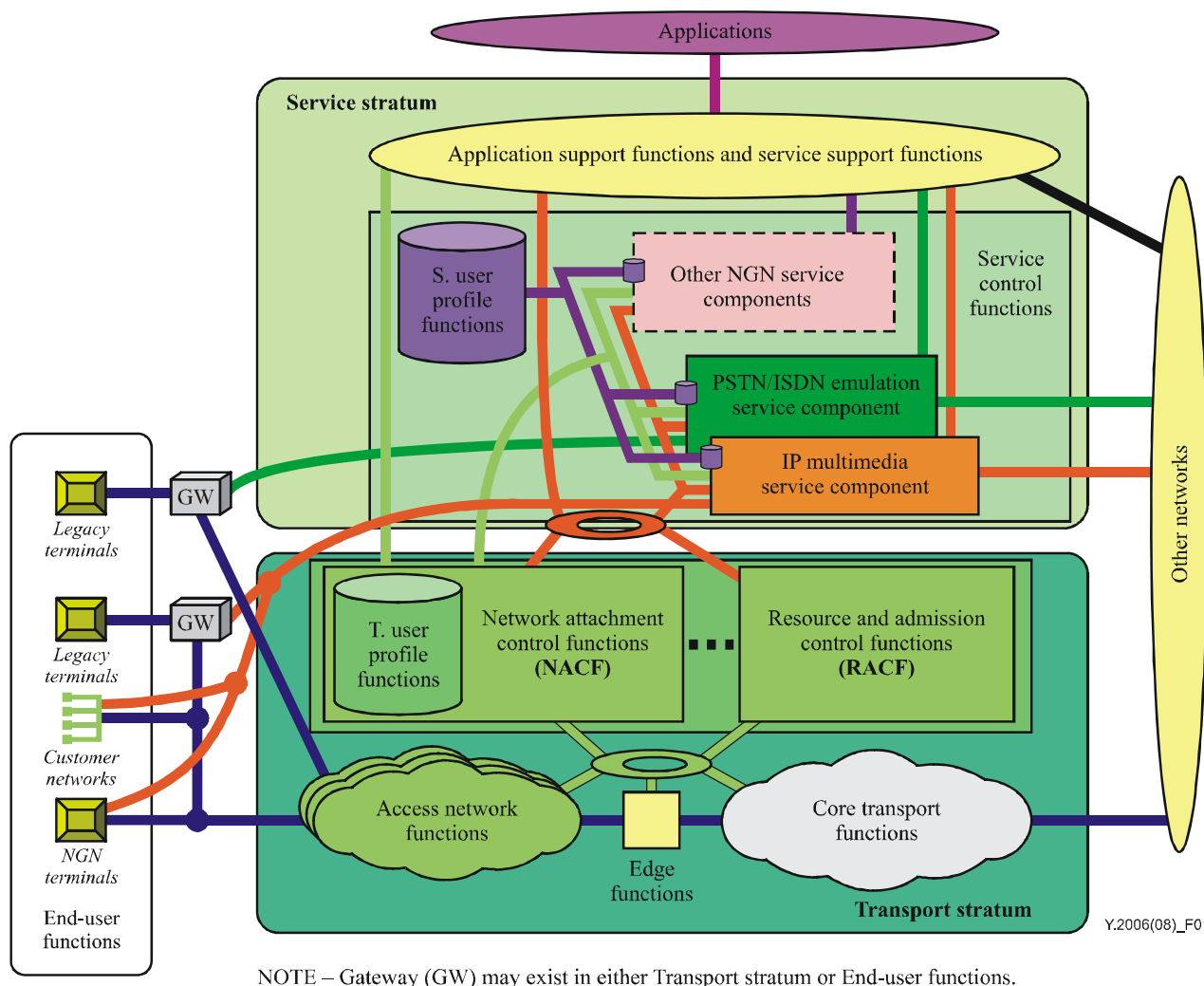


Figure 1 – Transport and service configuration of the NGN

6.1 Transport functions

6.1.1 Access transport functions

The following text is based on the text in reference to clause 4.1.1 of [b-ITU-T Y-Sup.1].
NGN Release 1 supports access transport functions of diverse technologies and capabilities.

6.1.2 NGN core transport functions

The following text is based on the text in reference to clause 4.1.2 of [b-ITU-T Y-Sup.1].
NGN core transport functions provide IP connectivity, at the transport stratum, across the core network.

6.1.3 Network attachment control functions

The following text is based on the text in reference to clause 4.1.3 of [b-ITU-T Y-Sup.1].

The network attachment control functions (NACF) provide registration at the access level and initialization of end-user functions for accessing the NGN services.

6.1.4 Resource and admission control functions

The following text is based on the text in reference to clause 4.1.4 of [b-ITU-T Y-Sup.1].

Application functions supporting different NGN services interact with the resource and admission control functions (RACF) to provide capabilities for the control of NGN transport resources, including QoS control and NAPT/firewall traversal control.

6.2 Network network interfaces (NNIs)

6.2.1 Interconnection and NNIs

The following text is based on the text in reference to clause 4.2.1 of [b-ITU-T Y-Sup.1].

NGN release 1 provides support for services across multiple NGNs. Additionally, the NGN supports access to and from other networks that provide communications, services and content.

6.2.2 NNIs to non-NGNs

The following text is based on the text in reference to clause 4.2.2 of [b-ITU-T Y-Sup.1].

NGN release 1 supports interconnection to any IP-based network that complies with the NGN interconnection protocol suite.

NGN release 1 supports interconnection with the PSTN/ISDN (PLMN) by means of interworking functions that are implemented within the NGN.

It is possible for ITU-T NGN release 1 to connect to 3GPP Release 6 network as defined in [ITU-T Q.1741.4].

6.2.3 NNIs between NGNs

The following text is based on the text in reference to clause 4.2.3 of [b-ITU-T Y-Sup.1].

NGN release 1 allows for the partition of the NGN into separate administrative domains. Interfaces on a trust boundary between domains need to support various functionalities to enable robust, secure, scaleable, billable, QoS-enabled, and service transparent interconnection arrangements between network providers.

6.3 User profile functions

The following text is based on the text in reference to clause 4.3 of [b-ITU-T Y-Sup.1].

NGN Release 1 defines user profile functions, which include transport user profile functions and service user profile functions. This function provides capabilities for managing user profiles and making the user profile information available to other NGN functions.

6.4 End-user functions

The following text is based on the text in reference to clause 4.4 of [b-ITU-T Y-Sup.1].

Implications of specific architectures of customer networks on the NGN are beyond the scope of NGN Release 1.

6.4.1 User equipment

The NGN is expected to support a variety of user equipment.

6.5 NGN release 1 service components

The following text is based on the text in reference to clause 10 of [ITU-T Y.2012].