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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.

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.

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CONTENTS

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.

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.

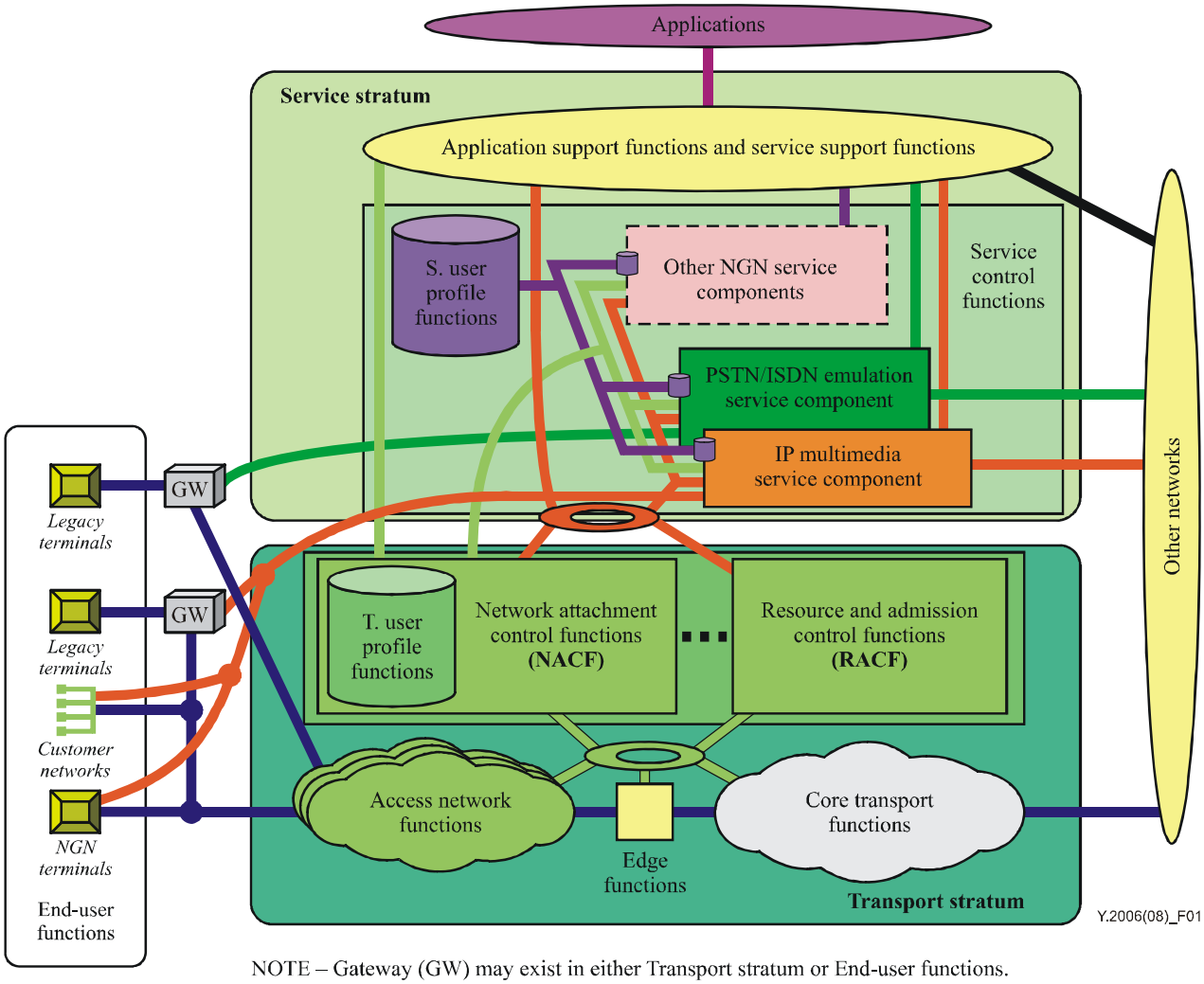
6 NGN release 1 environment

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].



NOTE – Gateway (GW) may exist in either Transport stratum or End-user functions.

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].

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.

6.5.1 IP multimedia service component

The following text is based on the text in reference to clause 10.1.1 of [ITU-T Y.2012].

The IP multimedia service component supports mediated multimedia services. These services may include multimedia session services and some non-session services.

6.5.2 PSTN/ISDN emulation service component

The following text is based on the text in reference to clause 10.1.2 of [ITU-T Y.2012].

The PSTN/ISDN emulation service component enables the support of legacy terminals connected through a gateway to an IP network.

6.5.3 Other NGN service components

These components are out of scope of NGN release 1.

7 Capability set 1 of NGN release 1

The following text is based on the content in reference to clause 1 of [ITU-T Y.2201].

NGN is required to provide at least one level of service that offers capabilities that are the same or better than those provided by circuit-switched networks. More detailed requirements and service-specific requirements can be found in:

– NGN release 1 requirements [ITU-T Y.2201].

The technical specifications of NGN release 1 are selected according to the following criteria as Capability set 1 of NGN Release 1.

- Criterion 1: Requirements and the functional architecture of NGN release 1 are completed.
- Criterion 2: External interfaces such as UNI and NNI are specified.
- Criterion 3: Functions and their interfaces that provide QoS assurance are specified.

Criterion 1 covers stage 1, and criteria 2 and 3 cover stage 3.

Capability set 1 is mainly focused on basic communication services and achieving them.

Capability set 1 of NGN release 1 includes:

1) *Up to stage 3*
   - Environments:
     - Several types of access networks
     - RACF
     - NNI
     - UNI
   - Services:
     - Multimedia services
     - Real-time conversational voice services
     - Point-to-point interactive MM services

- Capabilities:
  - Transport connectivity
  - Codecs
  - Interconnection, interoperability, interworking:
    - Interoperability
    - Interworking with PSTN
- QoS-based resource management
- Management
- Service enablers:
  - Session handling

2) *Up to stage 2*

- Environments:
  - NACF
- Services:
  - PSTN/ISDN emulation service
  - PSTN/ISDN simulation service
  - Public interest service or applications
  - Emergency communication
- Capabilities:
  - Security
  - Mobility management (nomadism)
  - OAM

7.1 Transport connectivity

The following text is based on the text in reference to clause 6.1 of [ITU-T Y.2201].

NGN transport stratum [ITU-T Y.2012] uses the IP protocol for general, ubiquitous, and global public connectivity.

7.2 Communication modes

The following text is based on the text in reference to clause 6.2 of [ITU-T Y.2201].

NGN supports from one-to-one to many-to-many communication modes.

7.3 Codecs

The following text is based on the text in reference to clause 6.4 of [ITU-T Y.2201].

NGN supports end-to-end negotiation of any codec between NGN entities (terminals, network elements) and between the NGN and other networks (including PSTN/ISDN, PLMN and other NGNs).

7.4 Access network and network attachment

The following text is based on the text in reference to clause 6.5 of [ITU-T Y.2201].

NGN supports services and applications independently of access network technologies.

7.5 Interconnection, interoperability and interworking

The following text is based on the text in reference to clause 6.7 of [ITU-T Y.2201].

Interconnection includes connectivity-oriented interconnection and service-oriented interconnection. Interoperability and interworking can enable certain services to be provided across an end-to-end path comprising a single NGN, multiple NGNs, or even a combination of NGN and non-NGN.

7.6 Routing

The following text is based on the text in reference to clause 6.8 of [ITU-T Y.2201].

NGN provides capabilities to select the proper routing paths between the traffic originating endpoint and the traffic receiving endpoint and support routing schemes most suitable for NGN providers.

7.7 Quality of service

The following text is based on the text in reference to clause 6.9 of [ITU-T Y.2201].

NGN supports end-to-end and multiple levels of QoS across different networks of varying infrastructure technologies provided by multiple operators to ensure the required service level for users or applications.

7.8 Identification, authentication and authorization

The following text is based on the text in reference to clause 6.12 of [ITU-T Y.2201].

NGN supports authentication and authorization functions for both the transport and service strata.

7.9 Security

The following text is based on the text in reference to clause 6.13 of [ITU-T Y.2201]. Further information is provided by reference to [ITU-T Y.2701].

NGN supports security features incorporated in existing networks and allows for secure interconnection with other NGNs or non-NGN networks.

7.10 Mobility management

The following text is based on the text in reference to clause 6.14 of [ITU-T Y.2201]. Further information is provided by reference to [ITU-T Q.1706].

Mobility management involves the ability of mobile objects, such as users, terminals and networks, to roam between different networks (NGNs or non-NGNs). In NGN Release 1, two distinct types of mobility are considered: personal mobility and terminal mobility.

7.11 OAM

The following text is based on the text in reference to clause 6.15 of [ITU-T Y.2201].

NGN Release 1 provides OAM functions for both service and transport strata. To offer reliable NGN services that can support the requirements of SLAs, NGN services have their own OAM capabilities.

7.12 Management

The following text is based on the text in reference to clause 6.17 of [ITU-T Y.2201]. Further information is provided by reference to [ITU-T M.3060].

NGN management capabilities support management areas that cover the planning, installation, operations, administration, maintenance, and provisioning of networks and services. The high level goal is to provide survivable and cost-effective networks.

7.13 PSTN/ISDN emulation and simulation

The following text is based on the text in reference to clause 6.22 of [ITU-T Y.2201]. Further information is provided by references to [ITU-T Y.2262], and [ITU-T Y.2271].

For the period of transition from PSTN/ISDN to NGN, NGN provides PSTN/ISDN emulation and PSTN/ISDN simulation capabilities.

7.14 Public interest aspect

The following text is based on the text in reference to clause 6.23 of [ITU-T Y.2201].

NGN provides capabilities for the support of public interest services required by regulations or laws of national or regional administrations and international treaties.

8 NGN release 1 architecture overview

The following text is based on the content in reference to clause 7 of [ITU-T Y.2012].

Along with a new architecture, the next generation network will bring an additional level of complexity beyond that of existing networks. The NGN architecture provided in this Recommendation supports the delivery of services identified in the NGN release 1 scope [b-ITU-T Y-Sup.1], as well as the requirements identified in the NGN release 1 requirements [ITU-T Y.2201].

More detailed architecture and functions can be found in:

– NGN functional requirements and architecture [ITU-T Y.2012].

– IMS for Next Generation Networks [ITU-T Y.2021].

– PSTN/ISDN emulation architecture [ITU-T Y.2031].

8.1 Overview of the NGN architecture

The following text is based on the text in reference to clause 7 of [ITU-T Y.2012].

An overview of the NGN functional architecture that allows the support of Release 1 services is shown in Figure 2. The NGN functions are divided into service stratum functions and transport stratum functions according to [ITU-T Y.2011].

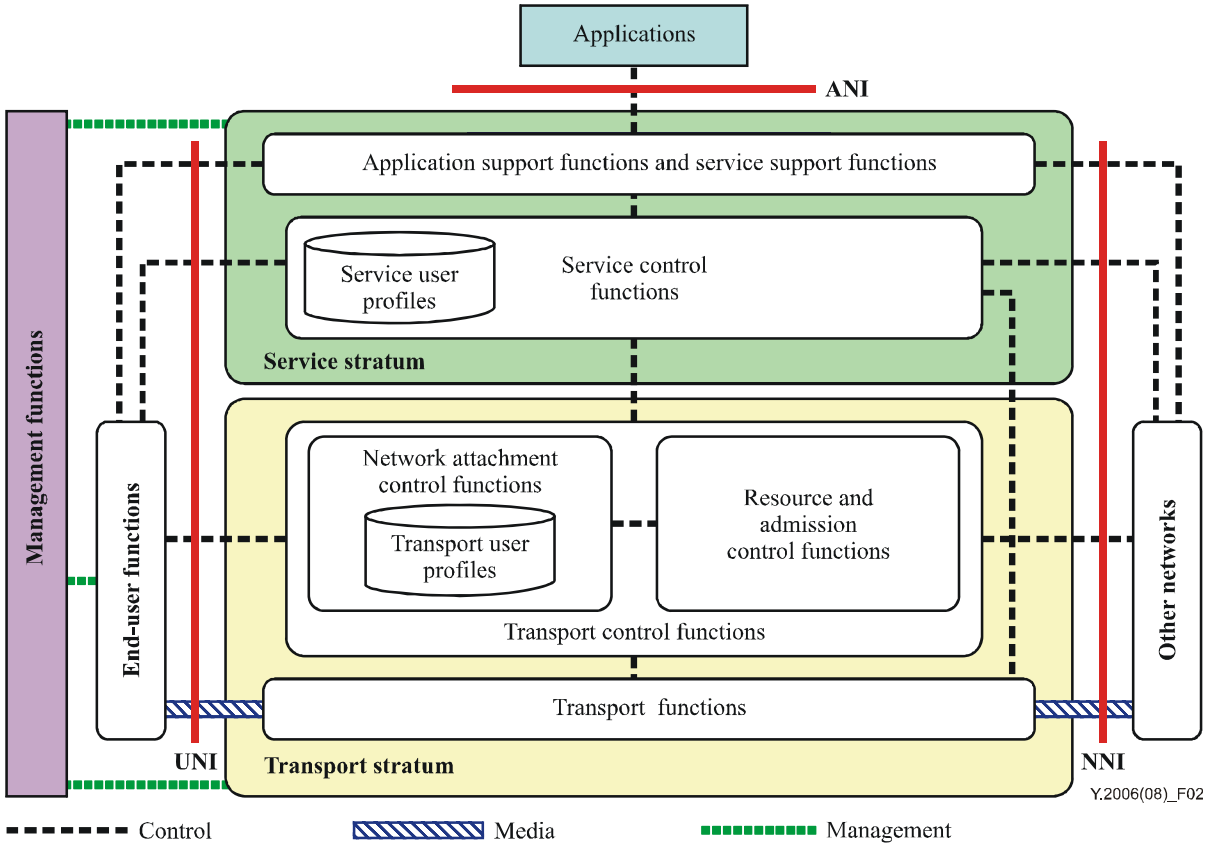


Figure 2 – NGN architecture overview

8.1.1 Transport stratum functions

The following text is based on the text in reference to clause 7.1 of [ITU-T Y.2012].

Transport stratum functions include transport functions and transport control functions, per [ITU-T Y.2011].

8.1.1.1 Transport functions

The following text is based on the text in reference to clause 7.1.1 of [ITU-T Y.2012].

Transport functions provide the connectivity for all components and physically separated functions within the NGN. These functions provide support for the transfer of media information, as well as the transfer of control and management information. Transport functions include the following functions: access network functions, edge functions, core transport functions, gateway functions, and media-handling functions.

8.1.1.2 Transport control functions

The following text is based on the text in reference to clause 7.1.2 of [ITU-T Y.2012].

Transport control functions include resource and admission control functions (RACF) and network attachment control functions (NACF). The detailed aspects of the RACF are specified in [ITU-T Y.2111], while the detailed aspects of the NACF are specified in [ITU-T Y.2014].

8.1.2 Service stratum functions

The following text is based on the text in reference to clause 7.2 of [ITU-T Y.2012].

This abstract representation of the functional grouping in the service stratum includes:

- Service control functions including service user profile functions; and

- Application support functions and service support functions.

8.1.2.1 Service control functions

The following text is based on the text in reference to clause 7.2.1 of [ITU-T Y.2012].

Service control functions include resource control, registration, authentication and authorization functions at the service level for both mediated and non-mediated services, and functions for controlling media resources.

8.1.2.2 Application support functions and service support function

The following text is based on the text in reference to clause 7.2.2 of [ITU-T Y.2012].

Application support functions and service support functions include functions, such as the gateway, registration, authentication and authorization functions at the application level.

8.1.3 End-user functions

The following text is based on the text in reference to clause 7.3 of [ITU-T Y.2012].

No assumptions are made about diverse end-user interfaces and end-user networks that may be connected to the NGN access network.

The end-user functions are out of the scope of NGN Release 1.

8.1.4 Management functions

The following text is based on the text in reference to clause 7.4 of [ITU-T Y.2012].

These functions provide the ability to manage the NGN to provide NGN services with the expected quality, security, and reliability.

9 Technical specifications

This clause describes functions and related technical specifications for capability set 1 of NGN release 1. The architecture is a general service, technology-independent architecture that can be later instantiated in customized architectures that can respond to specific contexts in terms of the services offered and the technologies used.

9.1 External interfaces of NGN

External interfaces of NGN imply UNI, NNI, and ANI. In capability set 1 of NGN release 1, technical specifications of interfaces UNI and NNI are defined.

9.1.1 UNI as per Q.3402

The following text is based on the text in reference to clause 1 of [ITU-T Q.3402].

[ITU-T Q.3402] specifies a service-level profile, i.e., SIP/SDP interface description, between a user and a network, and a transport-level profile, e.g., RTP.

For capability set 1 of NGN release 1 of the NGN UNI profile, this covers voice, video, and data, such as VoIP, multimedia telephony, DTMF, and T.38 fax.

[ITU-T Q.3402] specifies common content for all terminal types, e.g., SIP residential gateway terminal adapter, SIP phone, soft phone/client, and SIP IP PBX.

Detailed aspects of the UNI are specified in [ITU-T Q.3402].

9.1.2 NNI as per Q.3401

The following text is based on the text in reference to clause 1 of [ITU-T Q.3401].

[ITU-T Q.3401] contains a service-level profile, i.e., SIP/SDP interface description, between two network operators (NNI signalling profile), where the two different network operators may support different SIP/SDP profiles (i.e., they differ in terms of SIP extensions, SIP information elements, and SDP lines that are supported). A transport-level profile, e.g., RTP, is described. This is necessary just like the description of the media in the service-level signalling.

Detailed aspects of the NNI are specified in [ITU-T Q.3401].

9.2 RACF-related interfaces

Interfaces related to RACF, which are included in capability set 1 of NGN release 1, are listed in Table 1.

Table 1 – RACF-related interfaces

Reference point in NGN architecture [ITU-T Y.2012]	Related functional entities	Reference point in related function	Stage 3 Recommendation
S-TC2 S-TC3 S-TC4 S-TC5	Service control physical entity (SC-PE) and resource and admission control physical entity (RAC-PE)	Rs	[ITU-T Q.3301.1]
–	Transport resource control physical entities (TRC-PEs)	Rp	[ITU-T Q.3302.1]
TC-T1 TC-T2 TC-T5 TC-T6 TC-T9	Policy decision physical entity (PD-PE) and policy enforcement physical entity (PE-PE)	Rw	[ITU-T Q.3303.0] [ITU-T Q.3303.1] [ITU-T Q.3303.2] [ITU-T Q.3303.3]
TC-T3 TC-T4	Transport resource control physical entity (TRC-PE) and transport physical entity (T-PE)	Rc	[ITU-T Q.3304.1] [ITU-T Q.3304.2]
–	Policy decision physical entity (PD-PE) and transport resource control physical entity (TRC-PE) in access network	Rt	[ITU-T Q.3305.1]

9.2.1 RACF- related interface framework as per Q.3300

The following text is based on the text in reference to clause 1 of [ITU-T Q.3300].

[ITU-T Q.3300] specifies a concrete implementation of the functional architecture defined in [ITU-T Y.2111], including the specification of physical entities involved in resource control signalling, interfaces across which signalling takes place, and the mapping between these entities and interfaces and the corresponding functional entities and reference points in [ITU-T Y.2111].

Detailed aspects of the framework are specified in [ITU-T Q.3300].

9.2.2 Rs interface as per Q.3301.1

The following text is based on the text in reference to clause 1 of [ITU-T Q.3301.1].

[ITU-T Q.3301.1] provides the stage 3 specification of the protocol at the interface between service control entities (SCE) and the policy decision physical entity (PD-PE). Functional requirements and

stage 2 specifications for this interface are contained in clause 8.1 of [ITU-T Y.2111] and in [b-ITU-T Q-Sup.51]. This interface is used to control session-based policy.

Detailed aspects of the interface are specified in [ITU-T Q.3301.1].

9.2.3 Rp interface as per Q.3302.1

The following text is based on the text in reference to clause 1 of [ITU-T Q.3302.1].

[ITU-T Q.3302.1] defines the resource connection initiation protocol (RCIP), for signalling control information between peer TRC-PEs (Rp interface) in a single operator's network. Requirements for the Rp interface are defined in clause 8.6 of [ITU-T Y.2111] and in [b-ITU-T Q-Sup.51].

Detailed aspects of the interface are specified in [ITU-T Q.3302.1].

9.2.4 Rw interface as per series of Q.3303

The following text is based on the text in reference to clause 1 of [ITU-T Q.3303.0].

Interface Rw defines an interface between a policy decision physical entity (PD-PE) and a policy enforcement physical entity (PE-PE), see also [ITU-T Q.3300]. There are multiple signalling alternatives for Rw defined in the protocol-specific Recommendation in the Q.3303.x sub-series, see [ITU-T Q.3303.1], [ITU-T Q.3303.2], and [ITU-T Q.3303.3].

Detailed aspects of the interface are specified in [ITU-T Q.3303.0], [ITU-T Q.3303.1], [ITU-T Q.3303.2], and [ITU-T Q.3303.3].

9.2.5 Rc interface as per series of Q.3304

The following text is based on the text in reference to clause 1 of [ITU-T Q.3304.1].

[ITU-T Q.3304.1] and [ITU-T Q.3304.2] provide the stage 3 specifications of the Rc interface. Functional requirements and the stage 2 specifications of the Rc interface are contained in [ITU-T Y.2111]. The Rc interface is the interface between a transport resource control physical entity (TRC-PE) and a transport physical entity (T-PE).

Detailed aspects of the interface are specified in [ITU-T Q.3304.1] and [ITU-T Q.3304.2].

9.2.6 Rt interface as per Q.3305.1

The following text is based on the text in reference to clause 1 of [ITU-T Q.3305.1].

[ITU-T Q.3305.1] provides the stage 3 specification of the Rt interface. Functional requirements corresponding to this interface are contained in clause 8.5 of [ITU-T Y.2111] and in [b-ITU-T Q-Sup.51]. The Rt interface protocol operates between the policy decision and transport control functional elements of the resource and admission control function (RACF), and is used to control network transport resources required to convey the media flow.

Detailed aspects of the interface are specified in [ITU-T Q.3305.1].

Appendix I

Table of documents related to capability set 1 of NGN release 1

(This appendix does not form an integral part of this Recommendation)

This table includes ITU-T Recommendations and other SDO documents completed as capability set 1 of NGN Release 1 arranged by item. The table of documents related to capability set 1 of NGN Release 1 is shown below.

<table>
<tr><th rowspan="2">Category</th><th rowspan="2">Sub-category</th><th colspan="2" rowspan="2">Items</th><th colspan="3">Release 1</th></tr>
<tr><th>Stage 1</th><th>Stage 2</th><th>Stage 3</th></tr>
<tr><td rowspan="15">Environment</td><td rowspan="13">Access transport network</td><td rowspan="3">xDSL</td><td>ADSL</td><td>[ITU-T Y.2201]</td><td colspan="2">[b-ITU-T G.992.1]
[b-ITU-T G.992.3]
[b-ITU-T G.992.5]</td></tr>
<tr><td>SHDSL</td><td colspan="3">[b-ITU-T G.991.2]</td></tr>
<tr><td>VDSL</td><td colspan="3">[b-ITU-T G.993.1]
[b-ITU-T G.993.2]</td></tr>
<tr><td colspan="2">SDH</td><td>[ITU-T Y.2201]</td><td colspan="2">[b-ITU-T G.707]</td></tr>
<tr><td rowspan="4">Optical access</td><td>Point-to-point</td><td rowspan="4">[ITU-T Y.2201]</td><td colspan="2">[b-802.3ah]</td></tr>
<tr><td>BPON</td><td colspan="2">[b-ITU-T G.983.x]</td></tr>
<tr><td>GPON</td><td colspan="2">[b-ITU-T G.984.x]</td></tr>
<tr><td>EPON</td><td colspan="2">[b-802.3ah]</td></tr>
<tr><td colspan="2">HFC (hybrid fibre coaxial) cable</td><td>[ITU-T Y.2201]</td><td colspan="2">DOCSIS: [b-ITU-T J.112], [b-ITU-T J.122]</td></tr>
<tr><td rowspan="4">LANs</td><td>10Base-T</td><td rowspan="4">[ITU-T Y.2201]</td><td colspan="2">[b-802.3]</td></tr>
<tr><td>Fast Ethernet</td><td colspan="2">[b-802.3u]</td></tr>
<tr><td>Giga Ethernet</td><td colspan="2">[b-802.3z]</td></tr>
<tr><td>10 Giga Ether</td><td colspan="2">[b-802.3ae]</td></tr>
<tr><td colspan="2">Wireless LAN</td><td>[ITU-T Y.2201]</td><td colspan="2">[b-802.11] (WLAN)
[b-802.16] (BWA)</td></tr>
<tr><td>NACF</td><td colspan="2">Network attachment control functions</td><td>[ITU-T Y.2201]</td><td>[ITU-T Y.2012]
[ITU-T Y.2014]
[b-282.004] (NASS)</td><td>[b-183.019]
[b-183.020]
[b-183.034] (e4)
[b-183.035] (e2)</td></tr>
</table>

Category	Sub-category	Items	Release 1		
			Stage 1	**Stage 2**	**Stage 3**
	RACF	Resource and admission control functions	[ITU-T Y.2201]	[ITU-T Y.2012] [ITU-T Y.2111] [b-282.003] (RACS)	[ITU-T Q.3301.1] (Rs) [ITU-T Q.3302.1] (Rp) [ITU-T Q.3303.0] (Rw) [ITU-T Q.3304.1] (Rc) [ITU-T Q.3305.1] (Rt)
	Network node interface	IP-based networks (NGN, Internet, cable network, broadcast network)	[ITU-T Y.2201]	[ITU-T Y.2012]	[ITU-T Q.3401] [b-183.021]
		Circuit-based networks (PLMN, PSTN/ISDN)	[ITU-T Y.2201]	[ITU-T Y.2012]	[b-283.012] (TGCP) [b-283.024] (TGW) [b-283.027] (ISUP) [b-183.022] (MGC)
	User network interface	UNI	[ITU-T Y.2201]	[ITU-T Y.2012]	[ITU-T Q.3402]

Category	Sub-category	Items	Release 1		
			Stage 1	**Stage 2**	**Stage 3**
Services	Multimedia services	Real-time conversational multimedia services	[ITU-T Y.2201]	[ITU-T Y.2012]	[b-283.031] (MRF)
		Instant messaging (IM)	[ITU-T Y.2201]	[ITU-T Y.2012]	[b-SIMPLE] [b-IMPP] [b-183.041] (IM)
		P2P interactive MM services	[b-ITU-T F.703] [b-ITU-T F.724] (VideoTel) [b-ITU-T F.733] (MMconf) [b-ITU-T F.741] (Avdem) [b-ITU-T F.742] (DistL) [b-181.001] (VideoTel)		[b-ITU-T T.140] [b-ITU-T H.323]
	PSTN/ISDN emulation service	PSTN/ISDN emulation service	[ITU-T Y.2201] [ITU-T Y.2262]	[ITU-T Y.2031] [ITU-T Y.2271] [b-282.002] [b-182.012]	[b-283.002]

Category	Sub-category	Items		Release 1		
				Stage 1	**Stage 2**	**Stage 3**
	PSTN/ISDN simulation service	PSTN/ISDN simulation service		[ITU-T Y.2201] [ITU-T Y.2262]	[ITU-T Y.2012] [ITU-T Y.2021] [b-282.007] (IMS)	[b-183.010] [b-183.023] (XML) [b-183.007] (OIP) [b-183.008] (TIP) [b-183.006] (MWI) [b-183.004] (Cdiv) [b-183.005] (CONF) [b-183.011] (ACR-CB) [b-183.016] (MCID) [b-183.029] (ECT)
	Public interest service or applications	Emergency communication	Individual to authority	[ITU-T Y.2201] [b-ITU-T Y.2205]	[b-ITU-T Y.2171] [b-ITU-T Y.2172] [b-ITU-T Y.2205]	
			TDR, ETS	[ITU-T Y.2201] [b-ITU-T Y.1271] [b-ITU-T E.106] [b-ITU-T E.107]		

Category	Sub-category	Items		Release 1		
				Stage 1	**Stage 2**	**Stage 3**
Capabilities	Capabilities	Transport-Connectivity		[ITU-T Y.2201]	[ITU-T Y.2012]	[b-183.018] (la)
		Codecs	Audio codec	[ITU-T Y.2201]		[b-ITU-T G.711] AMR [b-ITU-T G.729] Wideband: [b-ITU-T G.722], [b-ITU-T G.722.2], [b-ITU-T G.729.1]
			Video codec	[ITU-T Y.2201]		[b-ITU-T H.263] [b-ITU-T H.264]
		QoS-based resource management	General	[ITU-T Y.2201]	[ITU-T Y.2111] [b-ITU-T Y.1291]	
			Service level	[b-ITU-T G.1000] [b-ITU-T G.1010]	[b-ITU-T Y.1541] [b-ITU-T Y.2171]	
		Security		[ITU-T Y.2701]		
		Mobility management		[ITU-T Q.1706] (nomadism)	[b-ITU-T Q.1707] (nomadism)	
		OAM		[ITU-T Y.2201]	[b-ITU-T Y.1710] [b-ITU-T Y.1730] [b-ITU-T I.610]	[b-ITU-T Y.1711] [b-ITU-T Y.1731] [b-ITU-T I.610]

Category	Sub-category	Items		Release 1		
				Stage 1	**Stage 2**	**Stage 3**
		Service enablers	Session handling	[ITU-T Y.2201]	[ITU-T Y.2012] [ITU-T Y.2021] [b-282.007] (IMS)	[b-283.003]

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