



SLOVENSKI STANDARD
SIST ES 282 001 V2.0.0:2008
01-julij-2008

Zlite telekomunikacijske in internetne storitve ter protokoli za napredno omreženje (TISPAN) - Funkcijska arhitektura omrežja NGN

Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN) - NGN Functional Architecture

iTeh STANDARD PREVIEW
(standards.iteh.ai)

Ta slovenski standard je istoveten z: **ES 282 001 Version 2.0.0**
<https://standards.iteh.ai/catalog/standards/sist/0c8ba16f-8da2-4962-a05d-c3229c07850f/sist-es-282-001-v2-0-0-2008>

ICS:

33.040.01	Telekomunikacijski sistemi na splošno	Telecommunication systems in general
33.080	Digitalno omrežje z integriranimi storitvami (ISDN)	Integrated Services Digital Network (ISDN)

SIST ES 282 001 V2.0.0:2008

en

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST ES 282 001 V2.0.0:2008](https://standards.iteh.ai/catalog/standards/sist/6e8ba16f-8da2-4962-a65d-c3229c07850f/sist-es-282-001-v2-0-0-2008)

<https://standards.iteh.ai/catalog/standards/sist/6e8ba16f-8da2-4962-a65d-c3229c07850f/sist-es-282-001-v2-0-0-2008>

ETSI ES 282 001 V2.0.0 (2008-03)

ETSI Standard

Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); NGN Functional Architecture

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST ES 282 001 V2.0.0:2008](https://standards.iteh.ai/catalog/standards/sist/6e8ba16f-8da2-4962-a65d-c3229c07850f/sist-es-282-001-v2-0-0-2008)

<https://standards.iteh.ai/catalog/standards/sist/6e8ba16f-8da2-4962-a65d-c3229c07850f/sist-es-282-001-v2-0-0-2008>



Reference

RES/TISPAN-02046-NGN-R2

Keywords

architecture, functional

ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST ES 282 001 V2.0.0:2008

<https://standards.iteh.ai/catalog/standards/sist/6e8ba16f-8da2-4962-a65d-c3229c078402/sist-es-282-001-v2-0-0-2008>

Important notice

Individual copies of the present document can be downloaded from:

<http://www.etsi.org>

The present document may be made available in more than one electronic version or in print. In any case of existing or perceived difference in contents between such versions, the reference version is the Portable Document Format (PDF). In case of dispute, the reference shall be the printing on ETSI printers of the PDF version kept on a specific network drive within ETSI Secretariat.

Users of the present document should be aware that the document may be subject to revision or change of status. Information on the current status of this and other ETSI documents is available at

<http://portal.etsi.org/tb/status/status.asp>

If you find errors in the present document, please send your comment to one of the following services:

http://portal.etsi.org/chaicor/ETSI_support.asp

Copyright Notification

No part may be reproduced except as authorized by written permission.
The copyright and the foregoing restriction extend to reproduction in all media.

© European Telecommunications Standards Institute 2008.
All rights reserved.

DECT™, **PLUGTESTS™**, **UMTS™**, **TIPHON™**, the TIPHON logo and the ETSI logo are Trade Marks of ETSI registered for the benefit of its Members.

3GPP™ is a Trade Mark of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners.

Contents

Intellectual Property Rights	5
Foreword.....	5
1 Scope	6
2 References	6
2.1 Normative references	6
3 Definitions and abbreviations.....	7
3.1 Definitions	7
3.2 Abbreviations	7
4 Overall architecture	9
5 Transport layer	10
5.1 Transport control sublayer.....	11
5.1.1 Network Attachment Subsystem (NASS).....	11
5.1.2 Resource and Admission Control Subsystem (RACS)	12
5.2 Transport processing functions.....	12
5.2.1 Border Gateway Function (BGF).....	13
5.2.1A Resource Control Enforcement Function (RCEF)	14
5.2.2 Void	14
5.2.3 Access Relay Function (ARF)	14
5.2.4 Media Gateway Function (MGF).....	15
5.2.5 Media Resource Function Processor (MRFP)	15
5.2.6 Signalling Gateway Function (SGF).....	15
5.2.7 Access Management Function (AMF).....	15
5.2.8 Basic Transport Function (BTF).....	15
5.2.8.1 Elementary Forwarding Function (EFF).....	16
5.2.8.2 Elementary Control Function (ECF).....	16
6 Service Layer Model	16
6.1 The "Core" IP Multimedia Subsystem (IMS).....	16
6.2 The PSTN/ISDN Emulation subsystem (PES).....	17
6.3 The IPTV Subsystem.....	17
6.4 Void.....	17
6.5 Common components.....	17
6.5.1 User Profile Server Function (UPSF)	18
6.5.2 Subscription Locator Function (SLF)	18
6.5.3 Application Server Function (ASF)	18
6.5.4 Void	18
6.5.5 Interworking Function (IWF)	18
6A Charging and Data Collection Functions	19
7 NGN Interconnection	19
7.1 General	19
7.2 Interconnection reference points and functions	19
7.2.1 Interconnection at the transport layer	19
7.2.1.1 Transport processing sublayer.....	19
7.2.1.2 NASS	20
7.2.1.3 RACS	20
7.2.2 Interconnection at the Service Layer	21
7.3 NGN Interconnection types	22
7.3.1 SoIx in the NGN Architecture	22
7.3.2 CoIx in the NGN Architecture.....	23
7.3.3 PSTN Interconnection types	24
7.3.4 NGN Direct and Indirect interconnection modes.....	25
8 User Equipment (UE).....	28

8.1	Overview	28
8.2	Authentication	28
8.3	Reference points	29
8.3.1	Reference points to the core IMS	29
8.3.2	Reference points to the PSTN/ISDN Emulation subsystem	29
8.3.3	Reference points with applications	30
8.3.4	Reference points with the NASS	30
8.3.5	Reference points with the RACS	30
8.3.6	Reference points with transport processing functions.....	30
8.3.7	Reference points with access media gateway functions.....	30
Annex A (informative): Example of physical configuration for xDSL access.....		31
Annex B (informative): Transport architecture for multicast		32
B.1	Introduction	32
B.2	Multicast Functions in Transport Plane.....	32
History		34

iTeh STANDARD PREVIEW (standards.iteh.ai)

SIST ES 282 001 V2.0.0:2008

<https://standards.iteh.ai/catalog/standards/sist/6e8ba16f-8da2-4962-a65d-c3229c07850f/sist-es-282-001-v2-0-0-2008>

Intellectual Property Rights

IPRs essential or potentially essential to the present document may have been declared to ETSI. The information pertaining to these essential IPRs, if any, is publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: "*Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards*", which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (<http://webapp.etsi.org/IPR/home.asp>).

Pursuant to the ETSI IPR Policy, no investigation, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

Foreword

This ETSI Standard (ES) has been produced by ETSI Technical Committee Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN).

iTeh STANDARD PREVIEW (standards.iteh.ai)

[SIST ES 282 001 V2.0.0:2008](https://standards.iteh.ai/catalog/standards/sist/6e8ba16f-8da2-4962-a65d-c3229c07850f/sist-es-282-001-v2-0-0-2008)

<https://standards.iteh.ai/catalog/standards/sist/6e8ba16f-8da2-4962-a65d-c3229c07850f/sist-es-282-001-v2-0-0-2008>

1 Scope

The present document describes the overall TISPAN NGN functional architecture, its subsystems and the relationships between them.

2 References

References are either specific (identified by date of publication and/or edition number or version number) or non-specific.

- For a specific reference, subsequent revisions do not apply.
- Non-specific reference may be made only to a complete document or a part thereof and only in the following cases:
 - if it is accepted that it will be possible to use all future changes of the referenced document for the purposes of the referring document;
 - for informative references.

Referenced documents which are not found to be publicly available in the expected location might be found at <http://docbox.etsi.org/Reference>.

For online referenced documents, information sufficient to identify and locate the source shall be provided. Preferably, the primary source of the referenced document should be cited, in order to ensure traceability. Furthermore, the reference should, as far as possible, remain valid for the expected life of the document. The reference shall include the method of access to the referenced document and the full network address, with the same punctuation and use of upper case and lower case letters.

NOTE: While any hyperlinks included in this clause were valid at the time of publication ETSI cannot guarantee their long term validity.

2.1 Normative references

The following referenced documents are indispensable for the application of the present document. For dated references, only the edition cited applies. For non-specific references, the latest edition of the referenced document (including any amendments) applies.

- [1] ETSI TS 102 144: "Services and Protocols for Advanced Networks (SPAN); MTP/SCCP/SSCOP and SIGTRAN (Transport of SS7 over IP); Stream Control Transmission Protocol (SCTP) [Endorsement of RFC 2960 and RFC 3309, modified]".
- [2] ITU-T Recommendation Y.2011: "General principles and general reference model for next generation networks".
- [3] ETSI TS 123 002: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Network architecture (3GPP TS 23.002 version 7.3.1)".
- [4] ETSI TS 123 228: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); IP Multimedia Subsystem (IMS); Stage 2 (3GPP TS 23.228)".
- [5] ETSI ES 282 004: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); NGN Functional Architecture; Network Attachment Sub-System (NASS)".
- [6] ETSI ES 282 003: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Resource and Admission Control Sub-system (RACS); Functional Architecture".

- [7] ETSI ES 282 007: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); IP Multimedia Subsystem (IMS); Functional architecture".
- [8] ETSI ES 282 002: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); PSTN/ISDN Emulation Sub-system (PES); Functional architecture".
- [9] ETSI TS 182 012: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); IMS-based PSTN/ISDN Emulation Subsystem; Functional architecture".
- [10] ETSI TS 182 027: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); IPTV Architecture; IPTV functions supported by the IMS subsystem".
- [11] ETSI TS 182 028: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); IPTV Architecture; Dedicated subsystem for IPTV functions".
- [12] ETSI TS 185 003: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); TISPAN CNG Architecture and Interfaces and Reference Points;".
- [13] ETSI TS 185 006: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); TISPAN Customer Devices architecture and interfaces".
- [14] ETSI TS 181 006: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Direct Communication Service in NGN; Service Description [Endorsement of OMA-ERELD-PoC-V1]".
- [15] ITU-T Recommendation G.8010: "Architecture of Ethernet layer networks".

iTech STANDARD PREVIEW
(standards.iteh.ai)

3 Definitions and abbreviations

<https://standards.iteh.ai/catalog/standards/sist/6e8ba16f-8da2-4962-a65d-c3229c07850f/sist-es-282-001-v2-0-0-2008>

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply:

access network: collection of network entities and interfaces that provide the underlying IP transport connectivity between end user devices and NGN entities

core network: portion of the delivery system composed of networks, systems equipment and infrastructures, connecting the service providers to the access network

functional entity: entity that comprises a specific set of functions at a given location

NOTE: Functional entities are logical concepts, grouping of functional entities are used to describe practical physical realizations.

user equipment: one or more devices allowing a user to access services delivered by TISPAN NGN networks

NOTE: This includes devices when under user control commonly referred to as IAD, ATA, RGW, TE, etc., UE does not include network controlled entities such as network terminations and access gateways.

3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

3GPP	Third Generation Project Partnership
A-MGF	Access Media Gateway Function
AN	Access Node
ARF	Access Relay Function

AS	Application Server
ASF	Application Server Function
ATA	Analogue Terminal Adaptor
AUC	AUthentication Centre
BGF	Border Gateway Function
BGW	Border GateWay
BNG	Broadband Network Gateway
BRAS	Broadband Remote Access Server
BTF	Basic Transport Function
C-BGF	Core Border Gateway Function
CND	Customer Network Device
CNG	Customer Network Gateway
CPN	Customer Premises Network
CSCF	Call Session Control Function
DHCP	Dynamic Host Configuration Protocol
DSLAM	Digital Subscriber Line Access Multiplexer
ENUM	tElephone NUmber Mapping
ECF	Elementary Control Function
EFF	Elementary Forwarding Function
HLR	Home Location Register
HSS	Home Subscriber Server
IAD	Integrated Access Device
IBCF	Interconnection Border Control Function
I-BGF	Interconnection-Border Gateway Function
I-CSCF	Interrogating-Call Session Control Function
IGMP	Internet Group Management Protocol
IMS	IP Multimedia Subsystem
IMS-MGW	IMS-Media Gateway
IP	Internet Protocol
ISDN	Integrated Services Digital Network
IVR	Interactive Voice Response
IWF	InterWorking Function
MGCF	Media Gateway Control Function
MGF	Media Gateway Function
MLD	Multicast Listener Discovery
MRFP	Multimedia Resource Function Processor
MTP	Message Transfer Part
NAPT	Network Address and Port Translation
NAPT-PT	NAPT and Protocol Translation
NASS	Network Attachment SubSystem
NGN	Next Generation Network
OSA	Open Service Access
PES	PSTN/ISDN Emulation Subsystem
PIM	Protocol Independent Multicast
PPP	Point-to-Point Protocol
PSTN	Public Switched Telephony Network
RACS	Resource and Admission Control Subsystem
RADIUS	Remote Access Dial In User Service
RCEF	Resource Control Enforcement Function
RGW	Residential GateWay
R-MGF	Residential Media Gateway Function
SCCP	Signalling Connection Control Part
SCTP	Stream Control Transmission Protocol
SGCF	Signalling Gateway Control Function
SGF	Signalling Gateway Function
SGW	Signalling GateWay
SLF	Subscription Locator Function
TDM	Time Division Multiplexing
TE	Terminal Equipment
TGCF	Trunking GateWay Function
TGW	Trunking GateWay
T-MGF	Trunking-Media Gateway Function

UE	User Equipment
UPSF	User Profile Server Function

4 Overall architecture

The NGN functional architecture described in the present document complies with the ITU-T general reference model for next generation networks [2] and is structured according to a service layer and an IP-based transport layer.

The service layer comprises the following components:

- the core IP Multimedia Subsystem (IMS);
- the PSTN/ISDN Emulation Subsystem (PES);
- other multimedia subsystems (e.g. IPTV Dedicated Subsystem) and applications;
- common components (i.e. used by several subsystems) such as those required for accessing applications, charging functions, user profile management, security management, routing data bases (e.g. ENUM), etc.

This subsystem-oriented architecture enables the addition of new subsystems over the time to cover new demands and service classes. It also provides the ability to import (and adapt) subsystems defined by other standardization bodies.

IP-connectivity is provided to NGN user equipment by the transport layer, under the control of the network attachment subsystem (NASS) and the resource and admission control subsystem (RACS). These subsystems hide the transport technology used in access and core networks below the IP layer.

The architecture described in the present document and related subsystems specifications, is a functional architecture. Each subsystem is specified as a set of functional entities and related interfaces. As a result implementers may choose to combine functional entities where this makes sense in the context of the business models, services and capabilities being supported. Where functional entities are combined the interface between them is internal, is hidden and un-testable.

Figure 1 provides an overview of the NGN architecture. An example of realization of this functional architecture, with an xDSL-based access network is provided in annex A.

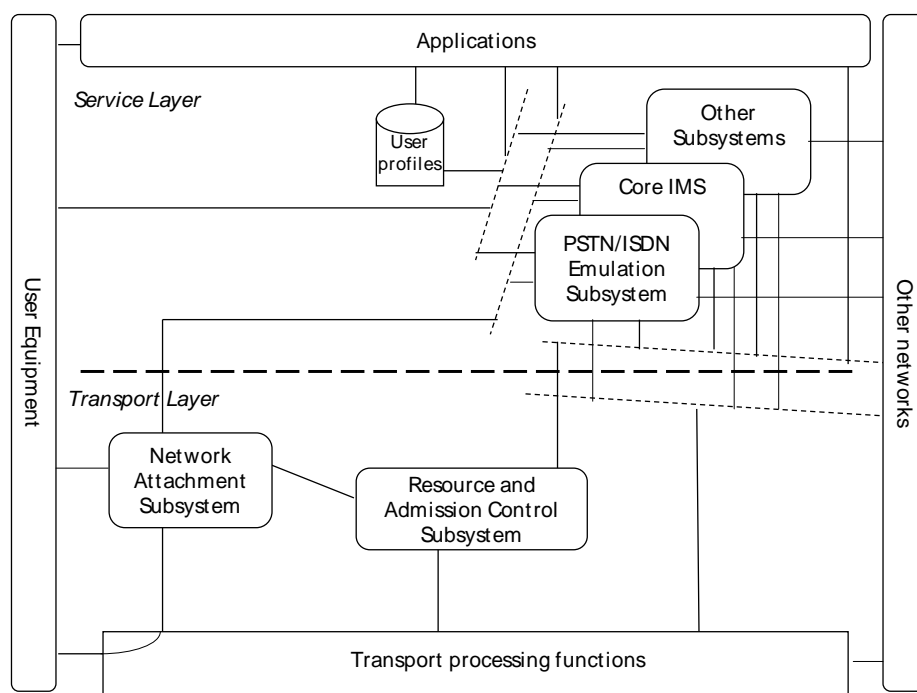


Figure 1: TISPAN NGN overall architecture

The functional entities that make up a subsystem may be distributed over network/service provider domains (see figure 2). The network attachment subsystem may be distributed between a visited and a home network. Service-layer subsystems that support nomadism may also be distributed between a visited and a home network.

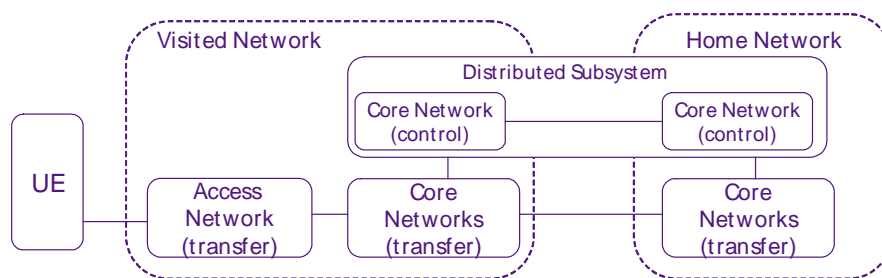


Figure 2: Distributed subsystems

This architecture supports the service capabilities and requirements identified in TS 181 006 [14].

An access network comprises an access segment and an aggregation segment (figure 2a). The access segment (also known as "last mile segment" stretches from the customer premises to the first network node (also known as the "access node"). The aggregation segment comprises the transport network elements enabling one or more access nodes to be connected to a core network through an IP Edge Router, at the Di reference point.

NOTE: In configurations where the access segment uses the DSL technology, the aggregation segment generally uses ATM or Giga Ethernet. The IP Edge is known as a Broadband Remote Access Server (BRAS) or Broadband Network Gateway (BNG).

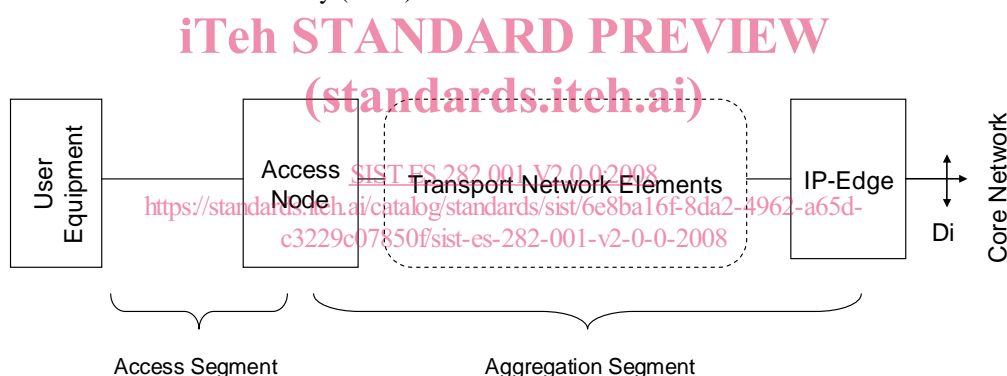


Figure 2a: Access and aggregation segments

5 Transport layer

The transport layer comprises a transport control sublayer on top of transport processing functions in the access and core networks. Equivalent functionality in the User Equipment is defined in clause 8.

The transport control sublayer is further divided in two subsystems:

- the Network Attachment Subsystem (NASS);
- the Resource and Admission Control Subsystem (RACS).