

**Telecommunications and Internet converged Services and  
Protocols for Advanced Networking (TISPAN);  
IP Multimedia Subsystem (IMS);  
Functional architecture**

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## Foreword

This ETSI Standard (ES) has been produced by ETSI Technical Committee Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN), and is now submitted for the ETSI standards Membership Approval Procedure.

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# 1 Scope

The present document describes the IP Multimedia Subsystem (IMS) core component of the TISPAN NGN functional architecture and its relationships to other subsystems and components.

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## 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.
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### 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 ES 282 001: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); NGN Functional Architecture Release 1".
- [2] ETSI TS 182 006: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); IP Multimedia Subsystem (IMS); Stage 2 description (3GPP TS 23.228 v7.2.0, modified)".
- [3] ETSI TS 123 218: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); IP Multimedia (IM) session handling; IM call model; Stage 2 (3GPP TS 23.218)".
- [4] ETSI ES 282 010: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Charging [Endorsement of 3GPP TS 32.240 v6.3.0, 3GPP TS 32.260 v6.3.0, 3GPP TS 32.297 v6.1.0, 3GPP TS 32.298 v6.1.0 and 3GPP TS 32.299 v6.4.0 modified]".
- [5] ETSI ES 283 024: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); PSTN/ISDN Emulation: H.248 Profile for controlling Trunking Media Gateways in the PSTN/ISDN Emulation Subsystem (PES); Protocol specification".

- [6] ETSI ES 283 027: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Endorsement of the SIP-ISUP Interworking between the IP Multimedia (IM) Core Network (CN) subsystem and Circuit Switched (CS) networks [3GPP TS 29.163 (Release 7), modified]".
- [7] ETSI TS 183 021: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); NGN Release 1; Endorsement of 3GPP TS 29.162 Interworking between IM CN Sub-system and IP networks".
- [8] ETSI EN 301 931: "Intelligent Network (IN); Intelligent Network Capability Set 3 (CS3); Intelligent Network Application Protocol (INAP); Protocol specification".
- [9] ETSI ES 201 915-1: "Open Service Access (OSA); Application Programming Interface (API); Part 1: Overview (Parlay 3)".
- [10] ETSI TS 123 002: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Network architecture (3GPP TS 23.002)".
- [11] ETSI TS 123 278: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Customized Applications for Mobile network Enhanced Logic (CAMEL) Phase 4; Stage 2; IM CN Interworking (3GPP TS 23.278)".
- [12] ETSI TS 129 278: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); customized Applications for Mobile network Enhanced Logic (CAMEL); CAMEL Application Part (CAP) specification for IP Multimedia Subsystems (IMS) (3GPP TS 29.278)".
- [13] IETF RFC 3136 (2001): "The SPIRITS Architecture".
- [14] IETF RFC 3261 (2002): "SIP: Session Initiation Protocol".
- [15] ITU-T Recommendation H.248: "Gateway control protocol".
- [16] ETSI TS 182 009: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); NGN Architecture to support emergency communication from citizen to authority [Endorsed document 3GPP TS 23.167, Release 7]".

## 2.2 Informative references

Not applicable.

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# 3 Definitions and abbreviations

## 3.1 Definitions

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

**IP Multimedia Subsystem:** As defined in TS 123 002 [10].

**NGN IP Multimedia Subsystem:** IMS that supports the provision of SIP-based multimedia services and PSTN/ISDN simulation services to NGN terminals

**User Equipment (UE):** one or more devices allowing a user to access services delivered by TISPAN NGN networks

## 3.2 Abbreviations

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

AF	Application Function
AS	Application Server
ASF	Application Server Function
BCSM	Basic Call State Model
BGF	Border Gateway Function
CAMEL	Customized Application for Mobile Enhanced Logic
CCBS	Call Control on Busy Subscriber
CSCF	Call Session Control Function
E-CSCF	Emergency-Call Session Control Function
IBCF	Intermediate Breakout Control Function
I-BGF	Interconnection-Border Gateway Function
I-CSCF	Interrogating-Call Session Control Function
IM-MGW	IP Multimedia - Media GateWay
IMS	IP Multimedia Subsystem
IN	Intelligent Network
INAP	IN Application Part
IN-SCF	Intelligent Network Switching Control Function
IP-CAN	IP-Connectivity Access Network
ISDN	Integrated Services Digital Network
MGCF	Media Gateway Control Function
MGF	Media Gateway Function
MM	MultiMedia
MRFC	Multimedia Resource Function Controller
MRFP	Multimedia Resource Function Processor
NAPT	Network Address and Port Translation
NASS	Network Attachment SubSystem
NGN	Next Generation Network
OSA	Open Service Access
P-CSCF	Proxy-Call Session Control Function
PDF	Policy Decision Function
PES	PSTN/ISDN Emulation Subsystem
PSTN	Public Switched Telephony Network
RACS	Resource and Admission Control Subsystem
SCF	Switching Control Function
SCIM	Service Capability Interaction Manager
S-CSCF	Serving-Call Session Control Function
SGF	Signalling Gateway Function
SIP	Session Initiation Protocol
SLF	Subscription Locator Function
SPIRITS	Service in the PSTN/IN Requesting InTernet Services
SSF	Service Switching Function
TCAP	Transaction Capabilities Application Part
T-MGF	Trunking-Media Gateway Function
UE	User Equipment
UPSF	User Profile Server Function

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## 4 Overall architecture

The TISPAN NGN functional architecture ES 282 001 [1] is structured according to a service layer and an IP-based transport layer (see figure 1).

The service layer comprises the following components:

- The IP Multimedia Subsystem core component (IMS).
- The PSTN/ISDN Emulation Subsystem (PES).



- Other multimedia subsystems 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.

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 present document further describes the functional architecture of the IP Multimedia Subsystem (IMS) core component.

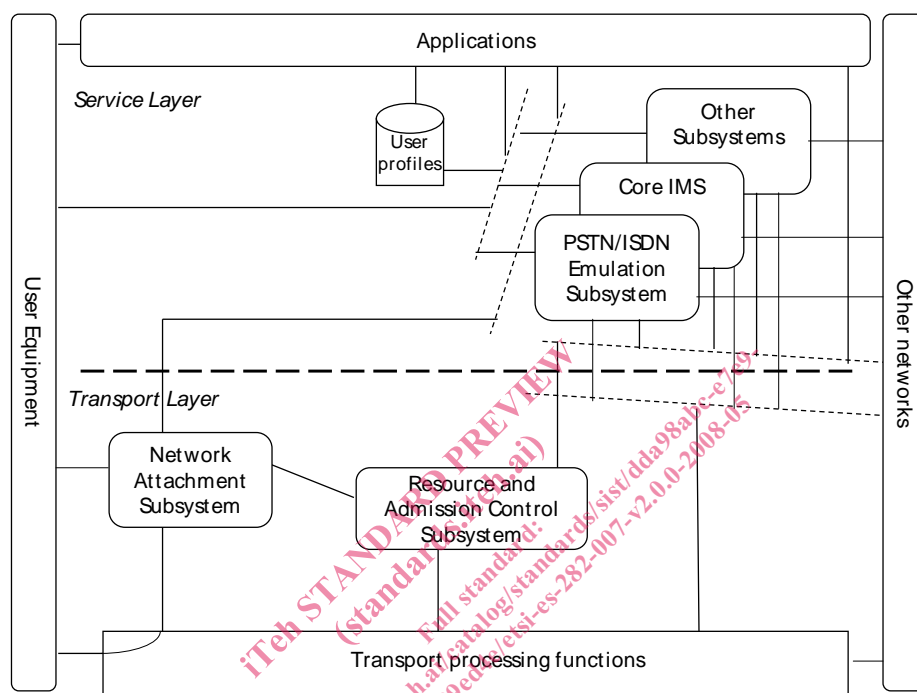


Figure 1: TISPAN NGN overall architecture

## 5 Overview

The NGN IP Multimedia Subsystem (IMS) supports the provision of SIP-based multimedia services to NGN terminals. It also supports the provision of PSTN/ISDN simulation services.

Functional entities of an IMS may be used by an operator in support of transit network scenarios. The routing may be performed, depending on the entity performing the routing, and depending on the traffic case, on signalling information, configuration data, and/or data base lookup.

The NGN IMS, also known as "Core IMS" is a subset of the 3GPP IMS defined in TS 123 002 [10] which is restricted to the session control functionalities. Application Servers (AS) and transport/media related functions such as the Multimedia Resource Function Processor function (MRFP) and the IP Multimedia Gateway Functions (IM-MGW) are considered to be outside the "core IMS".

Although essentially identical to the 3GPP IMS entities, NGN IMS functional entities might exhibit minor variations in behaviour, due to differences in access networks and user equipment. However, the NGN IMS architecture defined in the present document remains compatible with 3GPP-defined IP-connectivity access networks (IP-CAN) and as such can provide services to user equipment connected to both fixed broadband access and 3GPP IP-CANs (see annex A).

Figure 2 illustrates the position of the IMS in the overall NGN architecture. The IMS interfaces the following components:

- User Equipment.
- The Resource and Admission Control Subsystem.
- The Network Attachment Subsystem.
- The PSTN/ISDN.
- The PSTN/ISDN Emulation Subsystem.
- Other multimedia subsystems.
- Charging Functions.
- Network Management Functions.
- Applications and other common architectural elements.

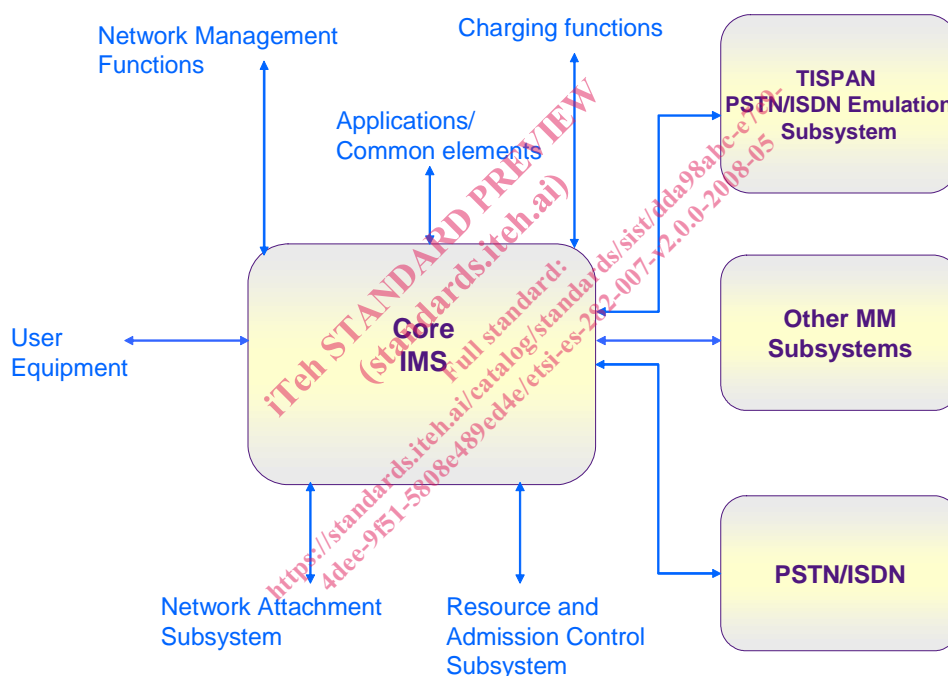


Figure 2: TISPAN IMS and its environment

## 6 Functional entities

Figure 3 provides an overview of the functional entities that compose the NGN IMS, the reference points between them and with components outside the IMS.

Unless stated explicitly, the functional entities identified in this clause are identical to those defined in TS 123 002 [10]. Except when highlighting explicitly a difference, the descriptions provided in the present document are intended to provide tutorial information only and in case of discrepancy with the definitions in TS 123 002 [10], the definitions in TS 123 002 [10] shall take precedence.