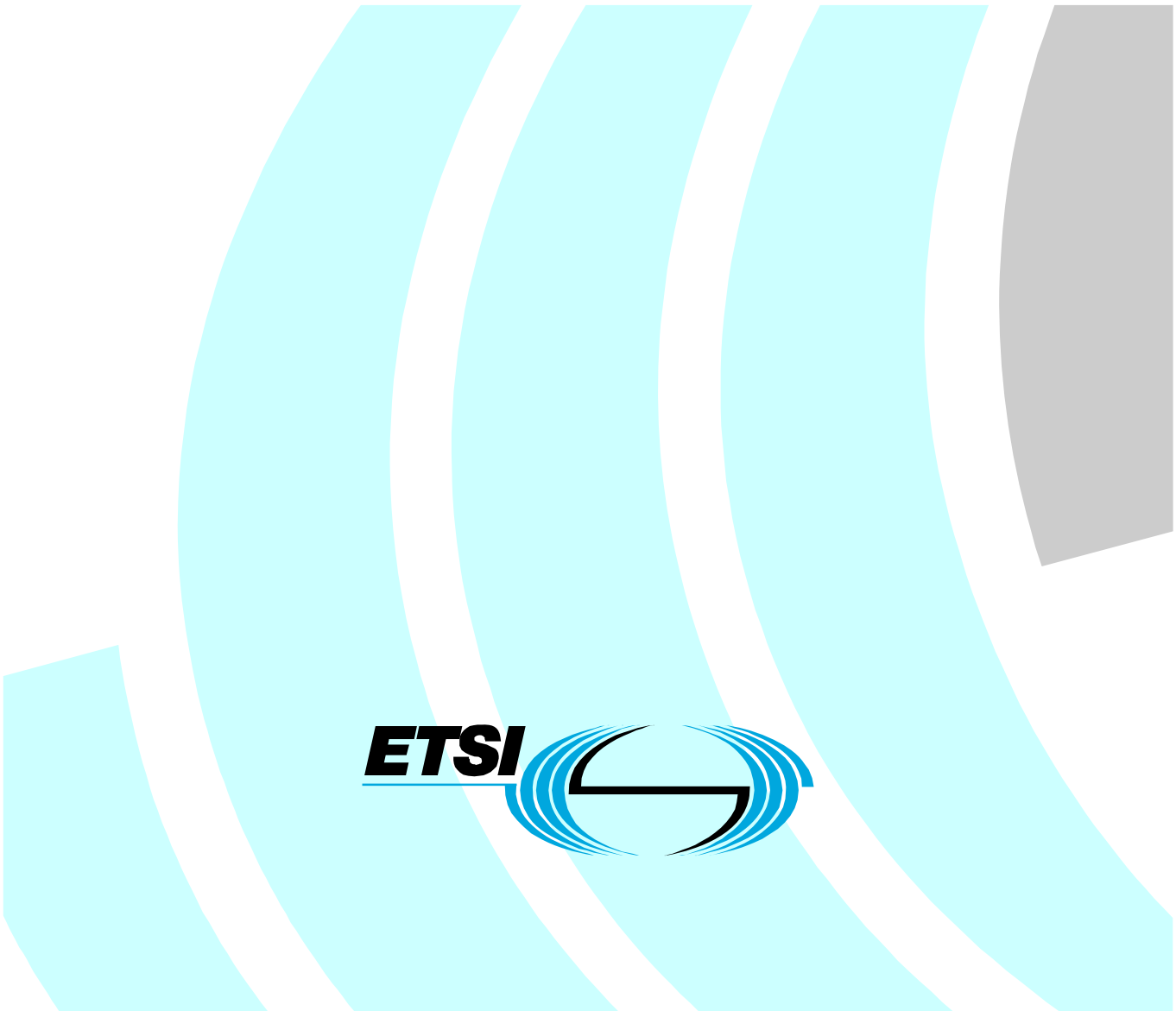
ETSI TS 181 005 V2.4.1 (2007-11)

Technical Specification

Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Service and Capability Requirements



Reference
RTS/TISPAN-01040-NGN-R2

Keywords
provider, service, user

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
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Foreword

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

The present document describes the Service and Capability Requirements of TISPAN NGN Release 2.

Introduction

The present document specifies the requirements that need to be fulfilled by NGN technical specifications to provide services in an NGN.

The present document considers two service sets: IP Multimedia Services and PSTN/ISDN Emulation services. Each of these service sets has its own clause, which is further divided into clauses providing clear and precise requirements for each of these two service sets. Further clauses provide generic network requirements to support service deployment and interoperability.

The present document provides generic requirements on networks from a service point of view. Specific details of individual services and capabilities are provided in other documents.

1 Scope

The present document specifies network requirements in terms of service-related capabilities for TISPAN NGN. The present document places requirements for all TISPAN NGN subsystems.

The present document provides generic requirements for services and interoperability in TISPAN NGN in terms of the capabilities for a network or networks.

Requirements on service-related subsystems provide sufficient details for architecture, networking requirements and protocols to be specified. Requirements on service independent subsystems are contained within the service-related subsystem requirements.

Specific service requirements may be contained in other documents, as identified in the present document, and by other documents referencing the present document.

The present document does not define services, only capabilities and requirements. The present document does not place requirements on terminals or other customer-owned equipment. The present document specifies the service-related requirements that are used to determine the network architecture, requirements and control protocols for a network interface to a customer environment.

NOTE: The present document uses the term "NGN" only in the context of TISPAN.

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 TS 122 340: "Universal Mobile Telecommunications System (UMTS); IP Multimedia Subsystem (IMS) messaging; Stage 1 (3GPP TS 22.340)".

[2] ETSI TS 122 141: "Universal Mobile Telecommunications System (UMTS); Presence service; Stage 1 (3GPP TS 22.141 version 7.0.0 Release 7)".

[3] ETSI TS 102 424: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Requirements of the NGN network to support Emergency Communication from Citizen to Authority".

[4] ETSI TS 188 003: "Telecommunications and Internet Converged Services and Protocols for Advanced Networking (TISPAN); OSS requirements; OSS definition of requirements and priorities for further network management specifications for NGN".

[5] IETF RFC 3966: "The tel URI for Telephone Numbers".

[6] IETF RFC 3261: "SIP: Session Initiation Protocol".

[7] ETSI TS 187 001: " Telecommunications and Internet Converged Services and Protocols for Advanced Networking (TISPAN); NGN SECurity (SEC); Requirements".

[8] ETSI TS 122 115: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Service aspects; Charging and billing (3GPP TS 22.115)".

[9] ETSI TS 122 228: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Service requirements for the Internet Protocol (IP) multimedia core network subsystem (IMS); Stage 1 (3GPP TS 22.228 version 7.3.0 Release 7)".

[10] ITU-T Recommendation G.722: "7 kHz Audio Coding within 64 Kbit/s".

[11] ETSI TS 126 171: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Speech codec speech processing functions; Adaptive Multi-Rate - Wideband (AMR-WB) speech codec; General description (3GPP TS 26.171 Release 7)".

[12] ITU-T Recommendation G.729.1: G.729 based Embedded Variable bit-rate coder: An 8-32 Kbit/s scalable wideband coder bitstream interoperable with G.729.

[13] 3GPP2 C.S0014-C (Version 1.0): "Software Distribution for Enhanced Variable Rate 2 Codec (EVRC), Speech Service Options 3, 68, and 3 70, Specification", December 2006 (C.R0014-C v1.0).

[14] ETSI TS 122 101: "Universal Mobile Telecommunications System (UMTS); Service aspects; Service principles (3GPP TS 22.101 Release 7)".

[15] ETSI TS 181 018: " Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Requirements for QoS in a NGN".

2.2 Informative references

[16] ETSI TR 180 000: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); NGN Terminology".

[17] ETSI TS 187 005: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); NGN Lawful Interception; Lawful interception functional entities, information flow and reference points".

[18] IETF RFC 2486: "The Network Access Identifier".

[19] ETSI TS 122 173: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); IP Multimedia Core Network Subsystem (IMS) Multimedia Telephony Service and supplementary services; Stage 1 (3GPP TS 22.173 version 7.4.0)".

[20] 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 version 7.9.0 Release 7)".

[21] ETSI TS 123 003: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Numbering, addressing and identification (3GPP TS 23.003 version 7.5.0 Release 7)".

[22] ETSI TS 181 002: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Multimedia Telephony with PSTN/ISDN simulation services".

[23] ETSI TS 181 001: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Videotelephony over NGN; Stage 1 service description".

[24] ETSI ETS 300 059: "Integrated Services Digital Network (ISDN); Subaddressing (SUB) supplementary service; Service Description".

[25] ETSI ETS 300 284: "Integrated Services Digital Network (ISDN); User-to-User Signalling (UUS) supplementary service; Service description".

[26] ETSI TR 181 015: "Telecommunications and Internet Converged Services and Protocols for Advanced Networking (TISPAN); Requirements for Customized Originating and Terminating Multimedia Information Presentation (COMIP/CTMIP) and Customized Originating and Terminating Multimedia Information Filtering (COMIF/CTMIF) Requirements Analysis".

[27] ITU-T Recommendation G.711: "Pulse code modulation (PCM) of voice frequencies".

[28] ITU-T Recommendation H.263: "Video coding for low bit rate communication".

[29] ITU-T Recommendation H.264: "Advanced video coding for generic audiovisual services".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the definitions given in TS 122 228 [9] and TR 180 000 [16] apply:

- IP multimedia application (see TS 122 228 [9]);
- IP multimedia service (see TS 122 228 [9]);
- IP multimedia session: (see TS 122 228 [9]);
- IP Multimedia Core Network Subsystem (IM CN Subsystem) (see TS 122 228 [9]);
- nomadism (see TR 180 000 [16]);
- portability (see TR 180 000 [16]).

application Provider: NGN operator role that offers NGN applications to the Customers making use of the services capabilities provided by the NGN Service Provider. It can perform user authentication at the application level

black list: list of identity information whom parties are identified as with malicious information. This list is managed by the user or the service provider

NGN operator role: activity or set of activities performed by a telecom operator played in the context of a NGN deployment scenario. Each activity may denote different types of roles, e.g., business role or technical role, depending on the nature of the services or tasks performed in each scenario. Independently of the numbers and types of roles identified for the players in these deployment scenarios, the following rules apply:

- a telecom operator player is composed by one or more roles;
- each of these roles must be considered as either a business role, a technical role or both;
- at least one role must be considered as a business role within an administrative domain.

NGN Core Network Provider (NCNP): NGN operator role that relies in infrastructure supported by different types of high-speed technology, e. g. ATM, SDH, others, and aggregates traffic between edge nodes located in different access networks, or between an edge node located in an access network and an external network, e.g. PSTN, or other IP network types. The NCNP is also responsible for core resource management, gating, QoS control and traffic control, between the core network border entities, e.g. C-BGF and I-BGF, according to the transport control service requested by the NGN Connectivity Provider. The NCNP is also responsible for policy enforcement and NAT related handling

NGN Connectivity Provider (NCP): NGN operator role that provides connectivity between the user and one or multiple Core Transport Networks. The NCP provides a connectivity service to users and therefore owns the commercial relationship with them and the subscriber access profile data (e.g. user authentication credentials, set of allowed QoS-enabled applications). The NCP is also responsible for performing admission control decisions as well as guaranteeing and monitoring the agreed QoS and security characteristics of traffic to and from a particular user

NGN Access Network Provider (NANP): NGN operator role that aggregates traffic between multiple last mile access networks and one or multiple NGN Connectivity Providers. The NANP is also responsible for resource management, gating and traffic control between the User Equipment and the IP edge as appropriate, according to the transport control service requested by the NGN Connectivity Provider. The NANP holds the subscriber access profile (e.g. ADSL line QoS profile, NCP associated with a physical ADSL line, etc.) as well as policy and configuration data associated with the NGN connectivity provider. The NANP does not own subscriber access profile information

NGN Service Provider (NSP): NGN operator role that offers NGN based services which share a consistent set of policies and common technologies. The NSP provides common functionalities e.g. user service authentication and identification, service control, charging, etc. Several Application Providers can use the same NSP to deliver applications to the Customers

unknown party: party who is unknown by the other party (e.g. not in his Address Book), different from "anonymous")

3.2 Abbreviations

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

ACR	Anonymous Communications Rejection service requirements
AMR	Adaptive Multi-Rate
AN	Access Network
CDR	Charging Data Record
CLIP	Calling Line Identification Presentation
CN	Core Network
CoIx	Connectivity-oriented Interconnection
COMIF	Customized Originating Multimedia Information Filtering
COMIP	Customized Originating Multimedia Information Presentation
CPE	Customer Premsise Equipment
CS	Circuit Switched
CTMIF	Customized Terminating Multimedia Information Filtering
CTMIP	Customized Terminating Multimedia Information Presentation
DSL	Digital Subscriber Line
ECN	Electronic Communication Network
HW	Hardware
IM	IP Multimedia
IMS	IP Multimedia Subsystem
IP	Internet Protocol
IPCAN	IP-Connectivity Access Network
IPv4	Internet Protocol version 4
IPv6	Internet Protocol version 6
ISDN	Integrated Services Digital Network
ISIM	IMS Subscriber Identity Module
ISP	Internet Service Provider
LI	Lawful Interception
MCID	Malicious Communication Identity service requirements
NAI	Network Access Identifier
NASS	Network Attachment Subsystem

NAT	Network Address Translation
NB	NarrowBand
NGN	Next Generation Network
PBX	Private Branch eXchange
PES	PSTN/ISDN Emulation Subsystem
PLMN	Public Land Mobile Network
PSTN	Public Switched Telephone Network
QoS	Quality of Service
RACS	Resource and Admission Control Subsystem
SLA	Service Level Agreements
SoIx	Service-oriented Interconnection
SP	Service Provider
SUB	Subaddressing
TDM	Time Division Multiplexing
UE	User Equipment
URI	Uniform Resource Identifier
UUI	User-to-User Information
UUS	User-to-User Signalling
VPN	Virtual Private Network
WB	WideBand

4 Capabilities for the support of IP Multimedia Services

This clause covers the requirements of the IP Multimedia services supported by the NGN IMS.

4.1 Business models

As specified in clause E.4.1.

4.2 Service requirements

4.2.1 General services requirements

As specified in clause E.4.3.1.

4.2.2 Handling of sessions

As specified in clauses E.4.3.2 and F.4.3.2.1.4.

4.2.3 PSTN/ISDN simulation service

As specified in clause E.4.3.3.

4.2.4 IMS messaging

The capabilities to support immediate messaging and session based messaging shall be as described in TS 122 340 [1].

4.2.5 Presence service

The capabilities to support Presence Service shall be as described in TS 122 141 [2].

4.2.6 Location service

As specified in clause F.4.3.6.

4.2.7 Video telephony service

As specified in clause E.4.3.7.

4.2.8 Communication diversion service

As specified in clause E.4.3.8.

4.2.9 Subaddressing (SUB)

As specified in clause F.4.3.9.

4.2.10 User-to-User Signalling (UUS)

As specified in clause F.4.3.10.

4.2.11 Customized multimedia information services

As specified in clause F.4.3.11.

4.3 Mobility

4.3.1 Mobility in TISPAN NGN

As specified in clause E.4.4.1.

4.3.2 Voice call continuity

The requirements for voice call continuity in TS 122 101 [14] clause 21 applies for TISPAN NGN networks.

4.4 Numbering, naming and addressing

As specified in clause E.4.5.

4.5 Terminal requirements

The present document does not specify terminal requirements. However, NGN terminals (not precluding network adaptors) that comply with the NGN IMS UNI interface offered by the network shall be supported by the NGN.

The NGN IMS UNI interface is not required to support 3GPP mobile terminals in Release 1.

It is a service provider option to support a 3GPP IPCAN for a user to access the NGN IMS. The NGN IMS shall support 3GPP mobile terminals connected via the 3GPP IPCAN.

Terminal developers guidelines are provided in annex B.

4.6 Regulatory service requirements

As specified in clause E.4.7.

4.7 Access network requirements

Any access to the NGN core shall provide IP connectivity, i.e. allow transport of IP packets between end user equipment and the NGN core.

Solutions for access to the NGN core shall support the assignment of IP addresses to the end user equipment by the access network. These addresses may not be routable in the public Internet.

Solutions for access to the NGN core shall not require changes to existing access technology infrastructure. All solutions for access to the NGN core shall support the presence of NAT and firewalls in the access network environment. Impacts on access networks shall be minimized.

An NGN deployment shall not inhibit user access to the Internet and other IP networks through existing mechanisms, e.g. ISP offering of internet access to DSL users.

4.8 Customer networks

4.8.1 General

Access from a customer network to the NGN core shall provide IP connectivity, i.e. allow for transport of IP packets from the end user equipment.

Solutions for access from a customer network to the NGN shall be able to cope with the assignment of IP addresses to the end user equipment by the customer network. These addresses may not be routable in the public Internet.

Solutions for access from a customer network to the NGN shall not require technological changes to existing customer network technologies.

Solutions for access from a customer network to the NGN shall have minimal impact on existing customer network deployments.

The diagnostic operations on the Customer Network by an operator shall be performed in accordance with rules protecting the user's privacy.

4.8.2 Home and small office networks

Solutions for access from a Home and Small Office network to the NGN shall be able to cope with NAT and firewalls in the home/small office environment.

Solutions for access from a Home and Small Office network to the NGN shall support the following configurations:

- Direct connectivity and interaction between the individual terminals and the NGN.
- Indirect connectivity and interaction between the individual terminals and the NGN (e.g. via IP PBXs).

4.8.3 Corporate networks

Solutions for access from a corporate network to the NGN shall be able to cope with NAT and firewalls in the corporate environment.

Solutions for access from a Corporate network to the NGN shall support the following configurations:

- Direct connectivity and interaction between the individual terminals and the NGN (e.g. to support Ipcentrex configurations).
- Indirect connectivity and interaction between the individual terminals and the NGN (e.g. via IP PBXs).

A mechanism shall be available in the network to provide information, if the PSTN/ISDN resources are not available.

4.9 Interworking

As specified in clause E.4.10.

4.10 Quality of Service (QoS)

The NGN shall support the following:

- A wide range of QoS-enabled services.
- Dynamic negotiation of QoS parameters between service and access providers based on an SLA.
- Terminals that are not capable to indicate QoS requirements as part of the service request. Terminals that are capable shall also be supported.
- QoS provisioning within the access segment. QoS in the core transport network is considered to be achieved by other means that are out of the scope of NGN Release 1 (e.g. Overprovision).
- The provisioning of QoS for application traffic where upstream and downstream flows have specific QoS requirements.
- An architecture that supports bandwidth reservation.
- QoS mechanisms to allow efficient use of access resource.
- In addition other specific QoS requirements are contained in [15].

4.11 Security requirements

4.11.1 General

As specified in clause E.4.12.1 except as follows:

- The Access Network shall provide access connectivity to a user entitled to use the resources of the Access Network.
- The NGN shall support independent verification by IMS and Access Network of the previous two requirements.

4.11.2 NGN security

As specified in clause E.4.12.2.

4.11.3 Network domain security

As specified in clause E.4.12.3.

4.12 Charging and accounting

As specified in clauses E.4.13 and F.4.13.

4.13 Roles within an NGN

To provide services to the users, different roles could be identified within an NGN both at the service layer and at the transport layer. Figure 1 represents all the roles identified.

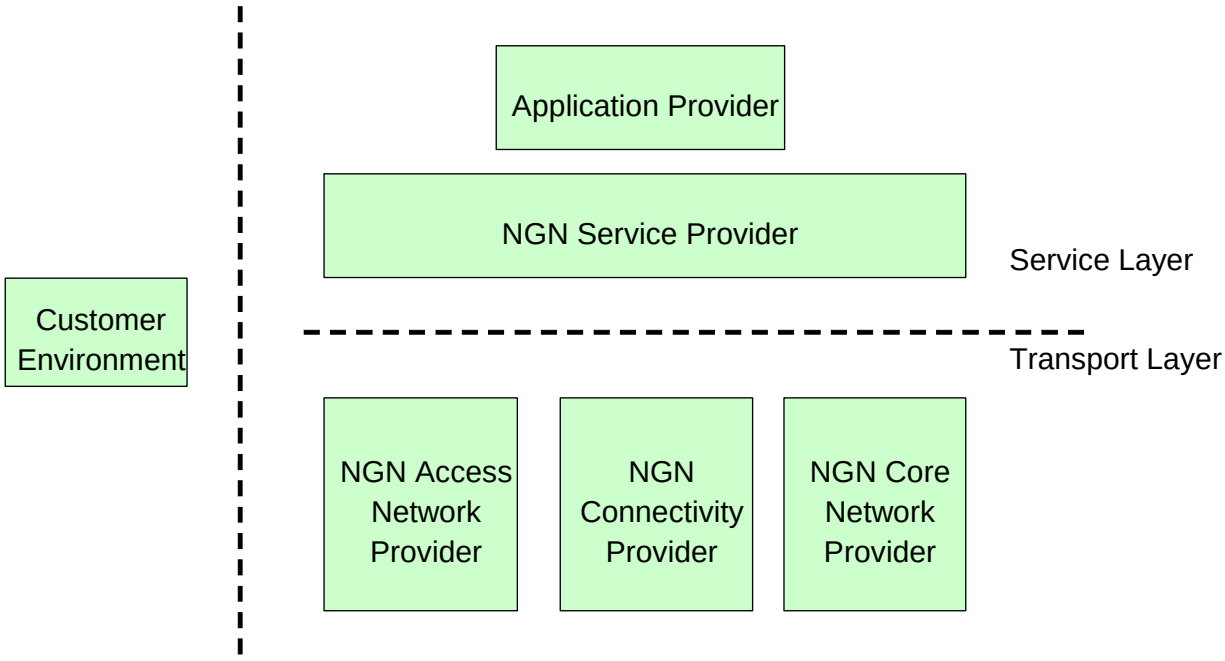

Figure 1

At the service layer 2 different roles may be identified: the NGN Service Provider and the Application Provider. The NGN service Provider provides services directly to the Customers, the Application Provider can provide more complex value added applications to the Customers, using capabilities of the NGN Service Provider.

At the transport layer 3 different roles may be identified: NGN Access Network Provider, NGN Connectivity Provider and NGN Core Network Provider. Each role owns both Functional Control elements (e.g. parts of RACS or NASS) and transfer functions (e.g. AN, IP edge, xBGF, etc.). It is not within the scope of the present document specify the architectural elements belonging to the different roles.

In addition to have a complete picture, a Customer environment shall be identified.

These roles are technical roles: different roles can be played at the same time by a single Telecom Operator defining in a such way a variety of business roles.

5 PSTN/ISDN emulation service

5.1 Business models

The business model envisaged for PSTN/ISDN Emulation Service is the replacement (in whole or part) of an existing PSTN/ISDN network based on TDM with an Emulation based on IP technology. An alternative business model is the provision of PSTN/ISDN service over connections derived from broadband service, which compete with the existing or Emulated PSTN. Both business models may co-exist in the same market place.

A NGN service provider shall be capable of connecting to other service provider via:

- an interconnect model where bi-lateral Service Level Agreements (SLA) are established between two service providers;
- an interconnect model where intermediate network(s) can provide interconnect on behalf of multiple service providers (and may be based on a single Service Level Agreement between the SP and their intermediate service provider).

A single NGN service provider shall be able to choose to support either of the interconnect models, or both of the interconnect models simultaneously.

5.2 Service requirements

The NGN shall support PSTN /ISDN emulation that provides the user with an identical experience to that of the existing PSTN/ISDN.

The NGN shall support the ability for a service operator to emulate one or more of their PSTN/ISDN services.

The NGN shall support service capability definitions inherited from existing PSTN/ISDN specification. The service descriptions of the existing services for any particular network are outside the scope of the present document.

It is an objective that the user shall be unaware of a change from legacy PSTN/ISDN to PSTN/ISDN emulation for those services that are emulated. For each emulated service, the service capability definitions are inherited from existing PSTN/ISDN specifications. Specific service requirements related to PSTN/ISDN Emulation are described in the following clauses.

An automatic re-routing (cranckback) mechanism for handling of the communications blocked due to unavailability of PSTN/ISDN resources shall be provided by the network.

5.3 Mobility

There is no requirement to support mobility or a nomadic capability for PSTN/ISDN Emulation. There are no additional mobility requirements.

This does not prevent the existence of user nomadism where it is implicit in the chosen business model nor does it require that nomadism be actively prevented.

5.4 Numbering, naming and addressing

The users of PSTN/ISDN Emulation will be allocated numbers (or number ranges) in the appropriate E.164 number space allocated by the national numbering authority. The nature of this E.164 number will vary from operator to operator and from country to country. The design shall permit the use of both geographical and non-geographical E.164 numbers.

There is no requirement to support the use of non-E.164 names within PSTN/ISDN Emulation but the use of non-E.164 names is not precluded.

PSTN/ISDN emulation places no new requirements to support number portability.

5.5 Terminal requirements

The NGN shall support terminals that use existing PSTN/ISDN interfaces.

Whilst the NGN has no role in standardizing terminals it is recognized that a key aspect of the PSTN/ISDN emulation subsystem is the ability to enable PSTN/ISDN replacement whilst maintaining all the existing services in the network.

NOTE: More advanced terminals may use the PSTN/ISDN emulation subsystem to provide identical PSTN/ISDN services to the user. Such advanced terminals may or may not be able to access additional services not related to PSTN/ISDN emulation but the functions of such terminals are not subject to standardization within the Release 1 of NGN.

5.6 Regulatory service requirements

5.6.1 Lawful Intercept service requirements

All implementations of PSTN/ISDN Emulation shall provide the ability to provide Lawful Interception in accordance with national requirements. Where possible the packet interception handover interfaces should be made available to authorities to avoid the ability of targets to maintain covert channels not monitored by TDM handover interfaces. Packet handover is most important for derived service where the packet stream is not under direct control of the provider of the Electronic Communication Network.

The capabilities to support Lawful Intercept for Emulation shall be as described in TS 187 005 [17].

5.6.2 Emergency service requirements

The capabilities to support the Emergency Service shall be as described in TS 102 424 [3].

5.6.3 Malicious Communication Identity service requirements (MCID)

MCID is a service which is expected to be provided in the context of the European Telecoms Privacy Directive or equivalent regulations in other jurisdictions. The service is required for all speech calls irrespective of which network originated the call. It is normally provided following a request from the customer concerned and may be subject to authorization.

The served user may be provided with the capability of explicitly declare a call as malicious.

5.6.4 Anonymous Communications Rejection service requirements (ACR)

The service capability definition for this service is inherited from existing PSTN/ISDN specifications and no new requirements are identified.

5.7 Access networks

5.7.1 Wireline access

The deployment of an NGN supporting PSTN/ISDN emulation may support existing access methods and access network technologies. The PSTN/ISDN User-Network Interface shall not be affected.

5.8 Customer networks

5.8.1 Home and small office networks

In the case of PSTN/ISDN Emulation used to replace an existing analogue or TDM network these are handled in the same way as the network which is being replaced or substituted.

Where the business model involves derived voice the customer will present lines to either an Access Gateway or a Residential Gateway as appropriate. In some cases there will be a terminal that offers service in an alternative manner but that is not within the scope of the present document.

A Residential Gateway may be situated within a Customer Access Gateway or on the customer network side of it. The Customer Access Gateway may use any suitable access technology.

In addition where existing Primary Rate ISDN or equivalent services are provided the PSTN/ISDN Emulation may support them. The actual signalling systems and methods of presentation supported are a national matter, supported by the list of designated standards published by the European Commission.

5.8.2 Corporate networks

Within the context of the PSTN/ISDN Emulation Corporate Networks may continue to be supported. The actual signalling systems and methods of presentation supported are a national matter supported by the list of designated standards published by the European Commission. This support may extend to the provision of VPN services using signalling systems and methods of presentation which are provided on a national basis and those that rely on European Standards.

5.9 Interworking

5.9.1 Interworking with legacy PSTN/ISDN

PSTN/ISDN emulation shall provide interfaces to PSTN/ISDN networks.

The NGN shall support the ability for the interconnection between two PSTN/ISDN and/or emulation networks to remain unchanged from the legacy case.

PSTN/ISDN Emulation shall provide a high level of interoperability with the services in the PSTN/ISDN being emulated. The degree to which service interoperability is provided is a matter for operators of Public Electronic Communications Networks and, in some cases, national regulators.

A mechanism shall be available in the network to provide information, if the PSTN/ISDN resources are not available.

5.9.2 Interworking with PSTN/ISDN emulation

PSTN/ISDN Emulation shall provide a high level of interoperability with the services in other Emulated PSTN/ISDN networks. The degree to which service interoperability is provided is a matter for operators of Public Electronic Communications Networks and, in some cases, national regulators.

5.9.3 Interworking with PLMN

5.9.3.1 Interworking with IMS based PLMN

Inter-working with the part of a PLMN that is based on an IMS shall be as described for inter-working with a NGN IMS network.

5.9.3.2 Interworking with PLMN - CS Domain

Inter-working with the circuit switched part of a PLMN shall be as described above for Inter-working with a PSTN/ISDN network.

5.9.4 Interworking with packet cable network

Inter-working with the Packet Cable network shall be as described for Inter-working with a legacy PSTN/ISDN network or as described for Inter-working with an emulated PSTN/ISDN network.

The choice of method is at the discretion of the operators concerned or as directed by a regulatory authority.

5.9.5 Interworking with NGN IMS network

Refer to clause E.4.10.2.

5.9.6 Interworking with other networks

Inter-working with non-IMS and non-TDM network is the same as for inter-working with:

i) A TDM based PSTN/ISDN as described above; or

ii) Another PSTN/ISDN Emulation as described above.

The choice of method is at the discretion of the operators concerned or as directed by a regulatory authority.

5.10 Quality of Service (QoS)

The PSTN/ISDN Emulation shall provide QoS transmission facilities to enable the same end-to-end performance requirements of the PSTN to be met. This includes any reservation of bit rate through the Access transport and also includes any transcoding facilities that may be needed.

5.11 Security requirements

A PSTN/ISDN Emulation shall meet the security requirements placed on a national PSTN/ISDN network. Where appropriate, requirements and mechanisms may vary to take account of the underlying NGN and IP technology.

5.12 Charging and accounting

The requirements and mechanisms for charging are a national matter.

6 Codecs services

The following requirements apply to audio and video codecs support within the network.

6.1 General

It is the responsibility of entities at the rim of the NGN (e.g. NGN-TE) and Network equipment originating and terminating the NGN IP media flows, to negotiate and select a common codec for each "end-to-end" media session. Therefore the NGN shall allow end-to-end negotiation of any codec between NGN entities (terminal, network elements).

6.2 Audio codec

In order to enable interworking between the NGN and other networks (including the PSTN, mobile networks and other NGNs) the NGN must be capable of receiving and presenting G.711 coded speech when interconnected with another network. When a packetization size is not selected by codec negotiation between terminals and/or network elements or agreed by bilateral arrangement, a speech packetization size of 10 ms samples should be used for G.711 coded speech; this is recommended as an optimum value balancing end-to-end delay with network utilization. It is recognized that there may be network constraints which require that a higher value is agreed by bilateral arrangement; in such cases a value of 20 ms is recommended.

NOTE 1: Where a packetization size is selected by codec negotiation between terminals and/or network elements the present document places no requirements on the value to be selected.

NOTE 2: The above does not put any requirement about the codecs to be supported by terminals nor does it mandate that NGN networks shall support audio transcoding between any arbitrary codec to ITU-T Recommendation G.711 [27].

In addition, support for the following audio codecs is recommended:

- AMR: in order to support 3GPP terminals and to facilitate the interwork with 3GPP network.
- G.729A: in order to facilitate the interwork with existing VoIP networks and support existing VoIP terminals.
- EVRC/EVRC-B: in order to support 3GPP2 terminals and to facilitate interworking with 3GPP2 networks.

6.3 Wideband codecs

6.3.1 General

Clause 6.1 shall take precedence over this clause, to reduce transcoding and improve both wideband interoperability and end to end quality.

Wideband audio is an optional capability that may be supported by:

- entities at the rim of the NGN (e.g. NGN-TE) which have a wideband audio ability;
- Network equipment originating and terminating the NGN IP media flows with wideband audio content.

Terminals providing wideband audio capabilities shall also have NB capability and comply with clause 6.2.

Network equipment providing wideband audio capabilities shall also have NB capability and comply with clause 6.2.

Audio transcoding may be performed to provide end-to-end service interoperability, but should be avoided wherever possible.

6.3.2 WB codecs in terminals

Terminals originating and terminating end to end IP media flows in NGN, supporting wideband audio should provide one or more of the following wideband codecs:

- ITU-T Recommendation G.722 [10].

NOTE 1: Required for DECT NG user equipment, used in some VoIP and/or legacy user equipment.

- AMR-WB/G.722.2 [11].

NOTE 2: Required for 3GPP user equipment and/or user equipment with mobility according to 3GPP access.

- ITU-T Recommendation G.729.1 [12].

NOTE 3: Used in some DECT NG user equipment, some VoIP and/or legacy user equipment.

- EVRC-WB [13].

NOTE 4: Required for 3GPP2 user equipment and/or user equipment with mobility according to 3GPP2 access

NOTE 5: Terminals may provide any other codecs in addition to the above list.

NOTE 6: Exceptionally, terminals providing one or more wideband codecs none of which are in the above list (e.g. existing/legacy terminals) should be permitted in NGN. Such terminals may experience limited wideband audio interoperability.

6.3.3 WB codecs in networks

Network equipment originating and terminating end to end NGN IP media flows, supporting wideband audio should provide the following wideband codecs:

- ITU-T Recommendation G.722 [10].

NOTE 1: To support DECT NG user equipment, some VoIP and/ or legacy user equipment and/or interworking to other networks.

- AMR-WB/G.722.2 [11]

NOTE 2: To support 3GPP user equipment, user equipment with mobility according to 3GPP access and/or interworking to 3GPP networks.

- ITU-T Recommendation G.729.1 [12].

NOTE 3: Where required to support DECT NG user equipment, VoIP and/or legacy user equipment and/or interworking to some VoIP and legacy networks.

- EVRC-WB [13].

NOTE 4: Where required to support 3GPP2 user equipment, user equipment with mobility according to 3GPP2 access and/or interworking to 3GPP2 networks.

6.3 Video codec

In order to enable the interworking for video communication services between an NGN Network and other Networks the support of the H.263 profile 0 and H.264 baseline profile codecs is recommended.

NOTE: The above does not put any requirement about the codecs to be supported by terminals nor does it mandate that NGN networks shall support video transcoding between any arbitrary codec and ITU-T Recommendations H.263 [28] or H.264 [29].

7 Network attachment requirements

The user network profile contains user access authentication data and information related to the required network access configuration.

The NGN shall support the re-configuration of services available to the user when the user is nomadic and accesses their services from a location other than the subscribed-to location. Services may be dependent on any or all of: the user device, the access network and arrangements (e.g. roaming agreements) between the Application provider and the access network provider. The access network shall allocate resources in accordance to the services to be provided.

In access roaming scenarios, those access networks that provide access to NGN services shall be able to authenticate/authorize access to the network based on information retrieved from the access networks where the user is subscribed to.

To guarantee the interoperability of roaming services, the NGN access network attachment procedures shall support access network authentication based on a standardized method for identifying users at access network level (e.g. the NAI mechanism specified in RFC 2486 [18]).

NAI based user authentication shall be supported.

NASS shall support the capability to receive indications from control, transport or application subsystems that are interested to register to certain NASS events.

The notification related to such an event will then be conditionally propagated to the subsystems that have registered.

NOTE: Backwards compatibility must be kept, meaning that this capability is not applicable to IMS and PES.

8 CPE configuration

The NGN shall be able to provide configuration parameters and obtain operational status of the CPE. This includes the ability to provide SW upgrade, service configuration, collect operational status.

9 Network management

Network Management requirements shall be as described in TS 188 003 [4].

10 Control of processing overload

The NGN shall have mechanisms available to control overload that:

1) automatically maximize effective throughput (i.e. admitted service requests/sec) at an overloaded resource;

2) achieve this throughout the duration of an overload event, and irrespective of the overloaded resource's capacity or of the number of sources of overload;

3) are configurable by the service provider so that, under processing overload, a high proportion of response times at overloaded resources are low enough so as not to cause customers to prematurely abandon service requests;

4) should be possible to be applied within a service provider's NGN, and between different service providers' NGNs;

5) should be possible to be applied within an NGN subsystem (e.g. IMS, PSTN/ISDN emulation) and between different NGN subsystems.

NOTE: As a general rule, an NGN's call, session and command processing resources can experience prolonged processing overload under the appropriate circumstances (e.g. partial, or full, server failure, high rates of incoming service requests). Consequently, it needs to be equipped with some form of overload detection and control (including expansive controls such as load balancing and resource replication), in order to keep response times just low enough under such processing overload to preclude customers abandoning their service requests prematurely.

11 IP addressing

The Operator of an NGN infrastructure may base the implementation on IPv4 only, IPv6 only or both. The choice is an operator option.

NOTE 1: It should be recognized that a mixture of IPv4 and IPv6 within a single operator domain can cause problems for service delivery.

NGN operators may support customer equipment using IPv4 only, IPv6 only or both at an IP-based User-Network Interface. The choice is an operator option.

NOTE 2: It is assumed that IPv6 based customer equipment can also support IPv4 at the User-Network Interface.

12 NGN interconnection

12.1 General

The interconnection of Next Generation Networks may be grouped in:

- Service-oriented Interconnection (SoIx).

The physical and logical linking of NGN domains that allows carriers and service providers to offer services over NGN (i.e. IMS and PES) platforms with control, signalling (i.e. session-based), which provides defined levels of interoperability. This does apply for carrier-grade voice and/or multimedia services over IP interconnection. The level of interoperability depends e.g. on services, Quality of Service, security.

- Connectivity-oriented Interconnection (CoIx).

The physical and logical linking of carriers and service providers based on simple IP connectivity irrespective of the levels of interoperability. For example, an IP interconnection of this type is not aware of the specific end-to-end service and, as a consequence, service-specific network performance, QoS and security requirements are not necessarily assured. This definition does not exclude that some services may provide a defined level of interoperability. However, only SoIx fully satisfies NGN interoperability requirements.

NGN shall support CoIx interconnections.

NGN shall support SoIx interconnections.

NOTE: IPTV interconnections are not covered by SoIx and CoIx.

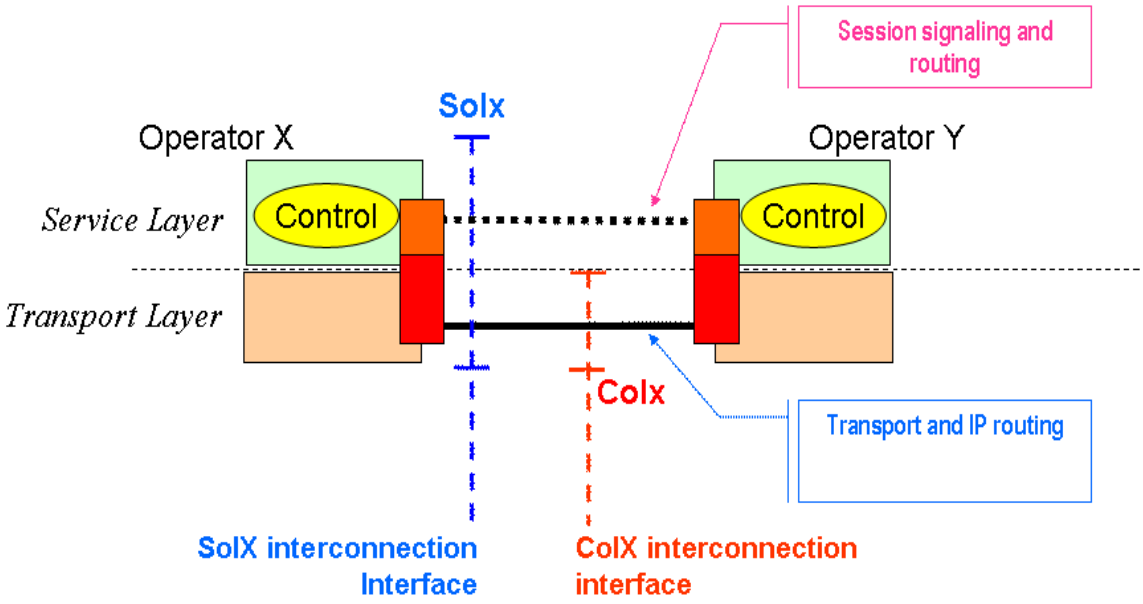

Figure 2

Figure 2 describes the SoIx and CoIx interconnection and NGN strata involved.

The CoIx interconnection includes only the transport stratum and is independent of any service stratum functionalities.

The SoIx interconnection includes both service and transport strata, deployment scenarios include both direct and indirect interconnection for the media path between the two NGNs.

12.2 Requirements for SoIx interconnection

The following requirements for SoIx interconnections shall be addressed:

Signalling:

- Support of service identification.
- Support of service interoperability.

Codec:

- Codec support and codec usage as specified in clause 6 of the present document.

Routing:

- Support of routing based on service.

Security

Support of:

- Lawful interception.
- Support of appropriate privacy.
- Support of authorization.

- Support of authentication and access control.
- Support of communications and data security (including integrity and confidentiality).
- Support of DoS protection.

Charging and accounting:

- Support of CDR generation.
- Support of detailed service accounting reporting.

Resource, QoS and SLA:

- Support of required resource allocation.
- Support of admission control.
- Support of address and port translation functionalities.
- Support of policy control.
- Support of load balancing.
- Support of availability and reliability.
- support of QoS reporting.

12.3 SoIx interconnection between IMS platforms

The interconnection link between two Carriers/Service Providers shall be "aware" of specific NGN services. It may be a physical or a logical link which carries both data and signalling bearers. The Point of Interconnection shall be a standardized interface.

The Resource Control shall control the resources on the interconnection link in order to deal with different services data and signalling bearer characteristics.

Over-provisioned resources on the interconnection link may be inefficient in terms of total interconnection link bandwidth usage.

Security and accounting features shall be taken in account.

In case of Transit scenario, the operators and/or service providers shall guarantee the end-to-end interoperability of services over the SoIx Interconnection in a standardized way.

12.4 SoIx interconnection between IMS and other IP platforms

The interconnection link shall be "aware" of specific NGN service carriers (dimensioned to carry both data and signalling bearer).

The interconnection link between the two Carriers/SPs shall be defined similar to the previous scenario.

The service interoperability and the service interworking shall be ensured in a standardized way.

Over-provisioned resources between the two Carrier/SP domains may satisfy some QoS and Service Level Agreements (SLA) requirements.

NOTE: Over-provisioning will not guarantee any improvements on the base of traffic growth, even if the resource allocation control will be implemented on both platforms.

In the case of Transit scenario the Carriers/SPs can guarantee the service end-to-end interoperability.

Interworking shall take in account both signalling, security and/or accounting features.

13 IPTV

13.1 General

To be provided.

13.2 Service-related requirements

To be provided.

13.3. Network capabilities

To be provided.

14 Transport stratum

Void.

Annex A (informative): Basic communication cases for IMS networks

This informative annex is part of Common IMS and needs to be transferred to 3GPP.

A basic communication case can be described on a per IMS domain basis by stating the IMS domain entry point and an exit point for the communication as shown in figure A.1.

The following general types of entry/exit point can be identified for NGN Release 1:

- Access (for communication to from NGN terminals).
- Interconnect to non-IMS network.
- Interconnect to other IMS domain.
- Internal network resource (e.g. a conference bridge for conferencing services).

As a general rule a NGN shall support the following basic communication cases on a per NGN network basis.

Table A.1

From (entry point)	To (exit point)			
	Access Network	**Interconnect to other IMS domain 1**	**Interconnect to non-IMS network**	**Internal Network Resource**
Access Network	Required	Required	Required	Required
Interconnect to other IMS domain 1	Required			Required
Interconnect to non-IMS network	Required		Required	Required
Internal Network Resource	Required			

It is not precluded that other, more complex communication cases may be provided by service level concatenation of basic communication cases, e.g. by means of call diversion services.

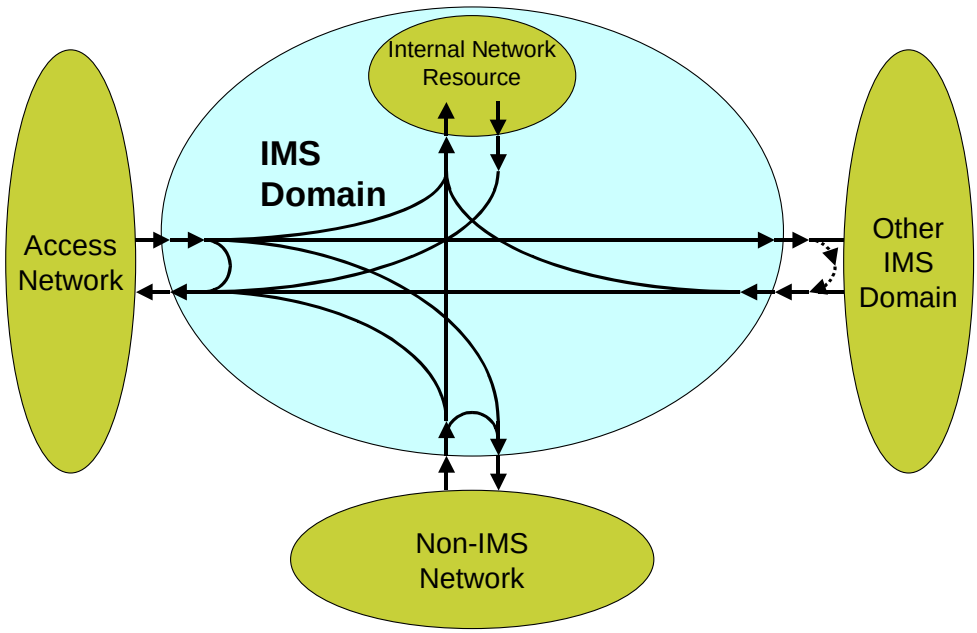

Figure A.1: Graphical representation of supported basic communication cases

Annex B (informative): Guidance for terminal implementation

The first two paragraphs are part of Common IMS and need to be transferred to 3GPP.

For a terminal to attach to the TISPAN NGN IMS Subsystem it should be capable of using an ISIM to authenticate to the NGN IMS.

However, this does not preclude the use of non-ISIM capable terminals, if access using an ISIM application in another device is supported. Authentication based on line authentication (as in clause 4.11) if applicable to the access is also supported.

Software upgrades may be required e.g. for security purposes, as well as minor HW upgrades, e.g. chip card reader.

Solutions for access to the NGN core shall support existing terminals (e.g. personal computers). The client software should be deployable making use of download techniques but should not impact the current operating system.

Annex C (informative): Void

Annex D (informative): Void

Annex E (normative): Release 7 parts of Common IMS

This annex contains candidate text to be replaced with the suggested references to 3GPP specifications. There may be also suggestions what needs to be changed if not all text of a clause cannot be replaced by one or more references. When agreed this text replaces the corresponding clauses in the main body.

E.1 Void

E.2 Void

E.3 Void

E.4 Capabilities for the support of IP Multimedia Services

This clause covers the requirements of the IP Multimedia services supported by the 3GPP IMS (TS 122 228 Release 7).

E.4.1 Business models

The IMS supports business agreements between the access network operator and the network operator providing IMS services (IMS operator).

The IMS shall be able to offer services to users that are attached to access networks owned by another operator.

The service offering may be restricted by the capabilities of the access network and the business agreement between the access network operator and the IMS operator.

The IMS shall support at least the following operator's business domain relationships:

a) Access network to IMS relationships

a.1) Access network and the IMS network it connects to, belong to the same operator as shown in figure E.1.

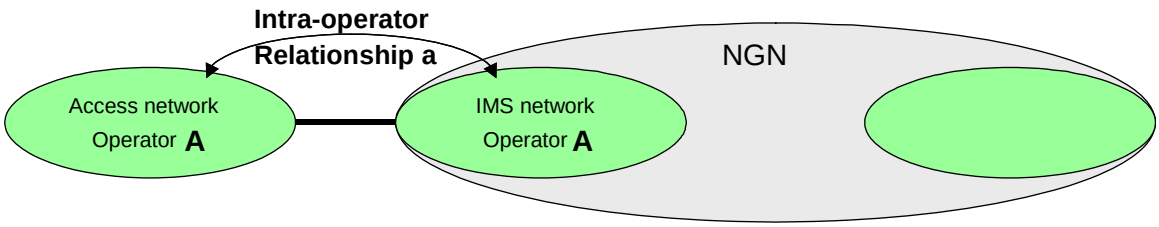

Figure E.1

a.2) Access network and the IMS network it connects to, belong to different operators having an interconnection agreement as shown in figure E.2.

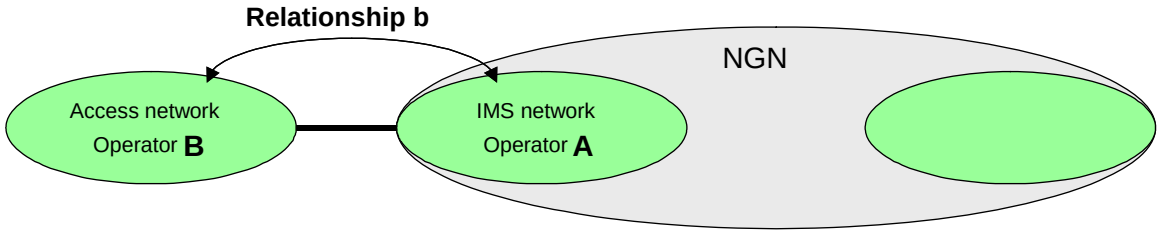

Figure E.2

b) IMS level relationships

b.1) The IMS network (e.g. 3GPP or NGN) to which the access network connects and the Home IMS network (e.g. NGN or 3GPP) which provides the IMS services belong to different operators as shown in figure E.3.

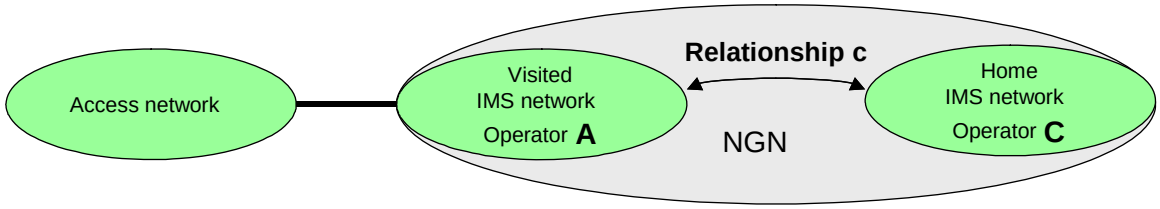

Figure E.3

b.2) The IMS network (e.g. 3GPP or NGN) to which the access network connects and the Home IMS network (e.g. NGN or 3GPP) which provides the IMS services are the same as shown in figure E.4.

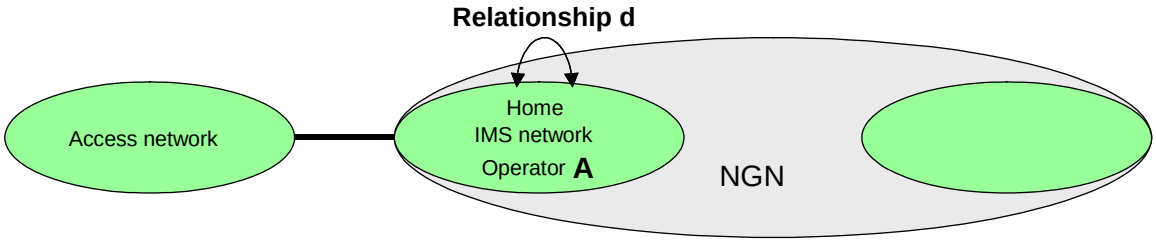

Figure E.4

b.3) The IMS network (e.g. 3GPP or NGN) to which the access network connects and the Home IMS network (e.g. NGN or 3GPP) which provides the IMS services belong to the same operator as shown in figure E.5.

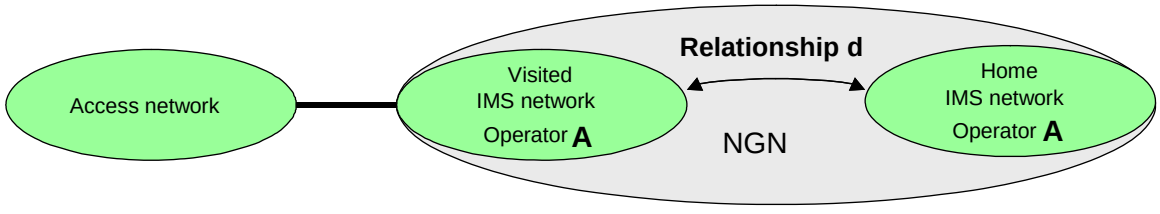

Figure E.5

A IMS operator shall be capable of connecting to other network operators via:

- an interconnect model where bi-lateral Service Level Agreements are established between two operators;
- an interconnect model where intermediate network(s) can provide interconnect on behalf of multiple operators (and may be based on a single Service Level Agreement between the operators and their intermediate network provider).

A single IMS operator shall be able to choose to support either of the interconnect models, or both of the interconnect models simultaneously.

E.4.2 Void

E.4.3 Service requirements

E.4.3.1 General services requirements

See TS 122 228 [9].

The principle of access independence, as defined by the business models described above, shall be supported.

It is desirable that an operator should be able to offer services to their subscribers regardless of how they obtain an IP connection through an access network as long as there is a business (roaming) agreement between access operator and IMS operator.

IP multimedia sessions shall be able to support a variety of different media types.

Within each IP multimedia session, one or more IP multimedia applications shall be supported.

The network shall provide the capability for the user to invoke one or more IP multimedia sessions. Where more than one application is supported within a multimedia session by the network, the user may activate concurrent IP multimedia applications within each IP multimedia session.

The network shall store information about the state (e.g. attached/non-attached) of a user's access connection, whether the user is roaming or not. According to policies this information may be provided to applications.

The network shall have the capability to hold user location information, whether the user is roaming or not. According to policies this information may be provided to applications.

The network shall deliver additional information (e.g. Picture, Video, text), provided by the user, to the parties involved, during any phase of the communication. The additional information may not be related to any media flow.

E.4.3.2 Handling of sessions

See TS 122 228 [9].

E.4.3.2.1 Handling of session establishment

An automatic re-routing (cranckback) mechanism for handling of the communications blocked due to unavailability of PSTN/ISDN resources shall be provided by the network.

E.4.3.2.1.1 Presentation of session originator identity

The network shall present the identity of the session originator (as in clause 4.5). The network shall suppress the presentation of the identity when requested by the session originator.

NOTE: The requirements for support of emergency communications may over-ride the user request for suppression.

Multiple identities should be supported within the same subscription. Personal service profiles per each identity within the same subscription should be supported.

E.4.3.2.1.2 Negotiation of an incoming session

Interaction with the user profile shall be supported, and additionally direct interaction with the user may be required. Refer to clause E.4.3.2.4 for further details on capability negotiation on an incoming IP multimedia session.

E.4.3.2.1.3 Accepting or rejecting an incoming session

The network shall support the capability for the user to accept, reject, ignore or re-direct an incoming IP multimedia session.

E.4.3.2.1.4 Void

E.4.3.2.2 Handling of an ongoing session

E.4.3.2.2.1 User modification of media in an ongoing session

The user shall be able to negotiate the addition or deletion of media components of IP multimedia applications during an IP multimedia session. Refer to clause E.4.3.2.4 for further details on capability negotiation during an IP multimedia session.

E.4.3.2.2.2 Presentation of identity of session terminator

The network shall support the capability to present to the session originator the identity (as in clause 4.5) of the session terminator. The network shall suppress the presentation of the identity when requested by the session terminator.

NOTE: The requirements for support of emergency communications may over-ride the user request for suppression.

E.4.3.2.3 Handling end of session

If there are one or two participants in the IP multimedia session, the network shall end an IP multimedia session at any time during the session, when requested by any of the IP multimedia session users. The network may end an IP multimedia session at any time during the session (e.g. in failure conditions).

If there are more than two participants in the IP multimedia session the network may end an IP multimedia session at any time during the session, when requested by any of the IP multimedia session users. The network may end an IP multimedia session at any time during the session (e.g. in failure conditions).

E.4.3.2.4 Capability negotiation

The network shall provide the capability for IP multimedia applications (whether it is an application of a user or the network) to negotiate their capabilities by identifying and selecting the available media components, QoS, etc. of IP multimedia sessions. The network shall support the capability for negotiation to take place on invocation, acceptance and during an ongoing IP multimedia session (e.g. following a change in UE capabilities, change in media types, etc.). The user, network, or an application on behalf of the user or network may initiate capability negotiation.

In order to support user preferences for IP multimedia applications, the capability negotiation shall take into account the information in the user profile whenever applicable. This includes the capability to route the IP multimedia session to a specific UE, when multiple UEs share the same IMS service subscription.

E.4.3.2.5 Redirecting of IP Multimedia sessions

The network shall support the capability for the user, or the network on behalf of the user, to identify an alternative destination for an IP multimedia session or individual media of an IP multimedia session. The originating entity, terminating entity or the network on their behalf, may initiate redirection to alternative destinations. It shall be possible for redirection to be initiated at various stages of an IP Multimedia session. For example:

- Prior to the initial request of an IP Multimedia session.
- During the initial request for an IP Multimedia session.

- During the establishment of an IP Multimedia session.
- While the IP Multimedia session is ongoing.

Redirection can be applied for all Multimedia sessions unconditionally or it can be caused by any of a set list of events or conditions. Typical causes could be:

- Identity of the originator.
- Location or presence of the originator or terminator.
- If the terminator is already in a session.
- If the terminator is unreachable or unavailable in some other way.
- If the terminator does not respond.
- After a specified alerting interval.
- User's preference on routing for specific IP Multimedia session based on the capabilities of multiple UEs sharing the same IMS service subscription.
- Time of day.

E.4.3.2.6 User busy

E.4.3.2.6.1 User determined user busy

The network shall support the capability of a user to reject an incoming IP multimedia session with an indication of "user busy". This indication may be used by the network as a trigger for certain services e.g. Call Forwarding on Busy. If the session rejection is propagated back to the originator, the "user busy" indication must be provided as the cause of the rejection.

The conditions for user determined "user busy" include:

- the session is offered to a single contact that rejects with a "user busy" indication; or
- the session is offered to multiple contacts with a single public identity, and one contact rejects with a "user busy" indication on behalf of the set of contacts; or
- the session is offered to multiple contacts; and
  - none of the contacts progress the session; and
  - one or more of the contacts rejects with a "user busy" indication.

NOTE: A contact is e.g. a terminal, a UE, or some other kind of equipment in the user premises.

E.4.3.2.6.2 Network determined user busy

The capability of network determined user busy is a network option.

The network may determine busy conditions at the time an incoming IP multimedia session is about to be offered.

The conditions for network determined user busy are identified, on a per subscription basis, based on the availability of limited resources assigned to the terminating user, or due to other information such as presence.

The conditions for network determined "user busy" include:

- the maximum number of total communications permitted has been reached;
- the maximum number of simultaneous media streams supported at the given subscriber's interface(s) has been reached;
- the maximum bandwidth supported at the given subscriber's interface(s) has been reached.

- subscriber making himself "busy" in a subscriber profile, involved in the incoming multimedia session.

The network determined user busy condition may be used to trigger certain services (e.g. Call Forwarding on Busy), or reject the session, or both. If the session rejection is propagated back to the originator, a "user busy" indication must be provided as the cause of the rejection.

In addition, a further condition, "approaching network determined user busy" that is related to the Network determined user busy condition, may be provided. This condition may be used to trigger certain services. However, this condition is not a busy condition and shall not cause a "user busy" indication being sent towards the session originator.

The conditions for approaching network determined user busy are identified, on a per subscription basis, based on the availability of limited resources assigned to the terminating user.

The conditions for approaching network determined user busy include:

- a pre-determined number, or less, of communications are available (i.e. the maximum number of communications minus the current number); or
- a pre-determined number, or less, of simultaneous media streams available (i.e. the maximum number of simultaneous media streams minus the current number); or
- a certain limit in the bandwidth used at the given subscriber's interface(s) has been reached.

E.4.3.2.7 Service re-configuration

To allow rich service offerings by networks without overloading the terminals and clients, user centric networking service capability may be offered. With the intelligence in the network, the services can be downloaded and used only when they are requested.

E.4.3.2.7.1 General requirement

As a service provider/network option the IMS may support the re-configuration of services available to the user when the users access its services from a location other than the home (subscribed-to) location.

The services may be dependent on the access network and arrangements between the Application provider and the access network provider including roaming cases.

The network shall be able to determine the capability of a user device based on the capability announced by the end user device before offering its services/applications to the end user.

The network shall be able to announce one or more of the network services and applications to the user device based on the user device capability and the requirements of one or more network services and applications supported by the network

The network shall accept the customized service profile requested by the end user after successful authentication/authorization of the user, and update the subscription database accordingly for billing/charging purposes and for future record of the user preferences.

The lifetime of a service client downloaded on a user device shall be agreed between the user and the network before the download. The service provider/network provider shall be able to determine the lifetime.

Basic services shall be supported permanently on the user device (e.g. voice services).

E.4.3.2.7.2 Service reconfiguration when roaming

When roaming into a new network, the service client(s) may be overwritten by new applicable version depending on the capability of the network and the offered service in that network.

E.4.3.3 PSTN/ISDN simulation service

This clause is part of Common IMS.

The IMS shall provide the capability for a service operator to simulate one or more PSTN/ISDN services. PSTN/ISDN simulation that provides the user with an experience that may or may not differ to an existing PSTN/ISDN experience. The way in which PSTN/ISDN services are delivered shall not impact on the delivery of new IMS services.

The specific requirements for the PSTN/ISDN simulation service are described in TS 181 002 [22].

E.4.3.4 Void

E.4.3.5 Void

E.4.3.6 Void

E.4.3.7 Video telephony service

See TS 122 101 [14], TS 122 173 [19] and TS 122 228 [9].

The capabilities to support a video telephony service are described in TS 181 001 [23].

E.4.3.8 Communication diversion service

See TS 122 173 [19].

The Communication Diversion Service shall be enhanced to allow user-controlled notification of communication diversions to the diverting user**.** The network shall provide the user with the subscription option to control which notifications the user wants to receive and to control the rate at which notifications about the communication diversions the users wants to receive.

E.4.3.8.1 Communication Diversion Notification

The network shall provide as a subscription option the notification capabilities to the served user. The user may control the rate (how frequent) and the content of the communication diversion notification in a standardized format

In order to set criteria for the notification to the user, the network shall accept parameter from the user, e.g.:

- the identity of the caller (only if there is a match then information about this specific Communication Diversion will be notified to the diverting user);
- identity of the diverting-user (only if there is a match then information about this specific Communication Diversion will be notified to the diverting user);
- identity of diverted-to-party (only if there is a match then information about this specific Communication Diversion will be notified to the diverting user);
- time range of diversion (this specifies a time-range, within which all Communication Diversions would be notified to the diverting user. If present, then any communication diversion outside of this time-range shall not be notified to the diverting user);
- reason of diversion (the diverting user can select that only those communication diversions which match the herein specified reason be notified).

For triggering the notification to the user, the network shall accept parameters from the user, e.g.:

- time (this specifies a time at which notifications of communication diversion are sent to the user. It may be specified within an interval-format to allow regular triggering of notifications of communication diversions which took place in that time-interval. If absent, it indicates that notifications are sent immediately when the communication diversion takes place);
- presence status (this specifies a presence state of the user, within which the user expects to receive notifications about communication diversions. If absent, it indicates that notifications are sent immediately irrespective of user's availability information).

The communication diversion notification from the network to the user may include, e.g.:

- identity of the caller (this information provides information to the diverting user for identifying those communication diversions happening for this calling user's identity;
- information of diverting-user (this is required when the diverting user has multiple user identities and is interested in knowing for which specific user identity was the communication diversion triggered);
- information of the diverted-to-target (the user identity of the diverted-to user, to whom the communication is being diverted, would be informed to the diverting user);
- time of diversion (the time of the communication diversion would be informed to the diverting user. This helps the diverting user to identify and verify if indeed the communication diversions are expected at those times);
- reason for diversion (provides the diverting user information to ascertain that indeed the reason for diversion is as per his expectations);
- communication diversion rule (this information identifies the communication diversion rule of Release 1which was set by the user, and executed to result in the communication diversion, which is being notified to the user).

If the user has not subscribed to the communication diversion notification capability or the network does not provide the subscription option to the user, the diversion notification capability of the communication diversion service of Release 1 shall apply.

E.4.3.9 Void

E.4.3.10 Void

E.4.3.11 Void

E.4.4 Mobility

E.4.4.1 Mobility in TISPAN NGN

See TS 122 101 [14] and TS 122 228 [9].

The IMS shall support terminal portability as defined in TR 180 000 [16].

The IMS shall support nomadism, as defined in TR 180 000 [16], and described below.

The IMS shall support the capability for a user to change to a different device or devices connected to one or more access networks to gain access to their services.

The IMS shall support the capability of the user to change network access point whilst moving.

NOTE 1: Where the access network technologies are identical and owned by the same access network operator, session continuity or handover may be supported if the technology allows. Where session continuity or handover is not supported, the user's service session is completely stopped.

NOTE 2: Where the access network technologies are not identical, session continuity or handover need not be supported.

The IMS home network and visited network shall support the capability of providing services from the IMS home network to a user connected to the visited network. This is shown by figure E.3 under b.1) within clause E.4.1.

Services should be able to be reconfigured so as to be suitable for the target network and target device. The service shall be reconfigured at the time the user first accesses the service from a new location.

For particular services, mobility shall not interfere with the provision of all information required by the service (e.g. geographic location information).

E.4.5 Numbering, naming and addressing

See TS 123 228 [20] clauses 4.3 and 7.5.1, and TS 123 003 [21].

The IMS shall provide the capability to uniquely identify each user. This Identity Information shall include at least the asserted public identity. This identity information is verified.

Both telecom and Internet numbering and addressing schemes shall be supported as public identities. IP multimedia communication establishment (both originating and terminating) depending on originator shall be able to be based on E.164/tel URI (see RFC 3966 [5]) or SIP URI (see RFC 3261[6]). It shall be possible to assign several public identities for one subscription.

NOTE: Numbering and addressing schemes other than E.164/tel URI or SIP URI are not precluded from later releases.

Public identities shall be administered by the network operator and shall not be changeable by the user.

The network operator shall guarantee the authenticity of a public identity presented for an incoming session to a user where the communication is wholly across trusted network. This is equivalent to the situation for CLIP with today's telephony networks.

The IMS is not required to support the generation of overlap signalling. Interworking Requirements (as in clause E.4.10.1) require options for conversion.

It shall be possible for a service to identify and interact with a specific UE even when multiple UEs share the same single Public User Identity. A UE shall be capable to identify and interact with a specific UE even when multiple UEs share the same single public user identity, except when the UE supports only limited capabilities and thus is unable to become engaged in a service that requires such functionality. Examples include a telemetry-only capable UE that only supports the capabilities for point-to-point communication.

E.4.6 Void

E.4.7 Regulatory service requirements

See TS 122 101 [14] and TS 122 228 [9].

E.4.7.1 Lawful Intercept

The capabilities to support Lawful Intercept shall be as described in TS 187 005 [17].

E.4.7.2 Emergency service

The capabilities to support the Emergency Service shall be as described in TS 102 424 [3].

E.4.7.3 Identifying malicious communications

The IMS shall support the capability for a user to identify a communication as malicious. This service may be available to a user only after subscription. Once the user has indicated to the network that the communication is malicious, the IMS shall register at least the following information:

- Terminating Identity Information;
- Originator Identity Information;
- Local Time and Date of the invocation in the network serving the terminating entity;

The information shall not be available to the terminating entity nor the originating entity. The information shall be under the control of the network operator.

The user may identify the communication as malicious during the alerting phase, during an ongoing communication, or for a limited period after the communication has ceased.

E.4.7.4 Anonymous communications rejection

A session is considered anonymous when a user receiving an incoming session cannot identify the originator.

Anonymous communications rejection provides the capability for network, on behalf of the user, to reject incoming sessions from users who have restricted the presentation of their originating identity.

The IMS shall support the capability to be able to reject all terminating sessions when the originating entity cannot be identified, i.e. the asserted originating identity is marked "presentation restricted" or "presentation restricted by network".

E.4.8 Void

E.4.9 Void

E.4.10 Interworking

See TS 122 228, clause 8 [9].

E.4.10.1 Interworking with legacy PSTN/ISDN

The IMS shall support interworking with the legacy PSTN/ISDN network.

The IMS interworking with the legacy PSTN/ISDN network shall not impact the IMS subsystem or the PSTN/ISDN network. The IMS network shall support the capability for limited interoperability with an existing PSDN/ISDN.

The IMS shall support the interoperability of PSTN/ISDN like services with PSTN/ISDN Supplementary Services and vice versa. The scope of this interworking may result in a limited service capability.

E.4.10.1.1 Overlap Signalling

Support for overlap signalling in the IMS is as an operator option limited to the interworking with legacy PSTN/ISDN networks that use overlap signalling.

IMS Networks that interconnect to legacy PSTN/ISDN networks that do not implement overlap signalling are not required to support the feature.

For these requirements, PSTN/ISDN networks that convert overlap signalling (received from other PSTN/ISDN networks) to en-bloc, are considered to be a network that does not support overlap signalling.

The IMS shall interoperate to legacy PSTN/ISDN networks that supply overlap signalling. The following requirements shall be taken into account:

- Conversion of overlap signalling to en-bloc shall take place within the IMS domain (without change to the legacy PSTN/ISDN).
- Impact on the IMS shall be minimized.
- A network option shall be provided to enable conversion to be performed using either:
  - a simple solution (digit counting, simple look-up, or end-of-digit timer, etc.);
  - complete solution - which shall minimize the post-dialling delay (may require an iterative look-up solution).

NOTE: Overlap signalling support should not be linked to E.164 numbering schemes.

The IMS is not required to support the generation of overlap signalling.

The IMS is not required to support overlap signalling from terminals and customer networks.

E.4.10.2 Interworking with PSTN/ISDN emulation

The IMS shall support interworking with the PSTN/ISDN Emulation subsystem.

The IMS shall support the capability for limited interoperability with an emulation subsystem.

The IMS shall provide at least the same level of interoperability with an emulation subsystem as achieved with legacy PSTN/ISDN networks.

Support for overlap signalling between the IMS and PSTN/ISDN Emulation is dependent on the network options for conversion.

E.4.10.3 Interworking with PLMN

E.4.10.3.1 Interworking with IMS based PLMN

The IMS shall interwork with an IMS based PLMN without impacting either the IMS or the IMS-based PLMN.

E.4.10.3.2 Interworking with PLMN - CS Domain

The IMS networks shall provide interfaces to PLMN - CS Domain networks.

The IMS shall support interworking with the PLMN - CS Domain network.

The IMS interworking with the legacy PLMN - CS Domain network shall not impact the IMS subsystem or the PLMN - CS Domain network. The IMS network shall support the capability for limited interoperability with an existing PLMN - CS Domain.

The IMS shall support the interoperability of PSTN/ISDN like services with PSTN/ISDN Supplementary Services and vice versa. The scope of this interworking may result in a limited service capability.

A mechanism shall be available in the network to provide information, if the PSTN/ISDN resources are not available.

E.4.10.4 Interworking with packet cable network

The IMS shall support interworking with Packet Cable networks.

The IMS interworking with the Packet Cable network shall not impact the IMS subsystem or the Packet Cable network. The IMS network shall support the capability for limited interoperability with an existing Packet Cable Network.

E.4.10.5 Interworking with other IMS network

A TISPAN-compliant IMS shall interwork with other IMS based networks without impacting the TISPAN IMS.

E.4.10.6 Interworking with other networks

The IMS shall support interworking with non-IMS and non-TDM multimedia networks. The interworking with non-IMS and non-TDM multimedia networks shall not impact the IMS.

E.4.11 Void

E.4.12 Security Requirements

See TS 122 101, clause 20 [14].

E.4.12.1 General

The IMS shall provide sufficient security services and mechanisms to meet the service requirements given in the proceeding clauses. The security threat & risk analysis gives the rationale for qualifying what is to be understood as "sufficient security".

The IMS subsystem shall provide services, including connectivity, to a user entitled to use the resources of the IMS and the IMS subsystem.

However, to facilitate the early deployment of NGN, two special legacy scenarios, permit the verification to be linked. These two special deployment scenarios are:

a) IMS authentication is linked to access line authentication (no nomadism).

b) IMS authentication is linked to access authentication for IP Connectivity (limited nomadism can be provided).

Both scenarios A and B shall allow UEs to perform access independent authentication to the IMS.

E.4.12.2 IMS security

Detailed Security Requirements shall be as contained in TS 187 001 [7].

E.4.12.3 Network domain security

The detailed requirements for network domain security are contained in TS 187 001 [7].

E.4.13 Charging and accounting

Charging and accounting in IMS will be based on the collection of information from appropriate entities in the form of Charging Data Records (CDRs). The requirements for charging and accounting shall be as contained in TS 122 115 [8].

In addition to off-line charging, also on-line charging requirements are applicable.

Annex F (informative): Release 8 parts of Common IMS

This annex contains candidate text to be removed from the document and submitted as company contributions to 3GPP as requirements to Release 8. There may be also suggestions what needs to be changed if not all text of a clause cannot be contributed as such to 3GPP.

F.1 Void

F.2 Void

F.3 Void

F.4 Capabilities for the support of IP Multimedia Services

This clause covers the requirements of the IP Multimedia services to be supported by the 3GPP IMS (TS 122 228 [9] Release 8).

F.4.1 Void

F.4.2 Void

F.4.3 Service requirements

F.4.3.1 Void

F.4.3.2 Handling of sessions

F.4.3.2.1 Handling of session establishment

F.4.3.2.1.1 Void

F.4.3.2.1.2 Void

F.4.3.2.1.3 Void

F.4.3.2.1.4 Presentation of multimedia information

As network option, presentation of multimedia information services may be provided. In this case:

- The network shall support the capabilities to present customized multimedia information to the originating and terminating parties (as in clause F.4.3.11.1).
- The network shall support the capabilities to suppress the presentation of customized multimedia information when requested by the originating or terminating party (as in clause F.4.3.11.2).

F.4.3.2.2 Void

F.4.3.2.3 Void

F.4.3.2.4 Void

F.4.3.2.5 Void

F.4.3.2.6 Void

F.4.3.2.7 Void

F.4.3.3 Location Service

The IMS location service shall provide a mechanism that may offer network asserted location information to applications. The provision of location information to applications shall depend on policies and user preferences.

The network asserted location mechanism shall identify the physical access through which user connectivity is granted.

The network asserted location mechanism shall locate individual users that have authenticated with the access network.

The IMS access network shall provide location information to the IMS. Location information provided by the IMS access network to the IMS shall include network asserted location information.

The actual location information may take various forms (e.g. network location, geographical coordinates, post mail address, etc.), depending on agreements between the access and IMS providers and on user preferences regarding the requested privacy of their location.

The network may be provided with a terminal equipment location information.

F.4.3.4 Void

F.4.3.5 Void

F.4.3.6 Subaddressing (SUB)

Where public telecommunication numbers are used, the NGN may support the Subaddressing (SUB) service that allows the called (served) user to expand his addressing capacity beyond the one given by the public telecommunication number. See also ETS 300 059 [24].

NOTE: Subaddressing is needed for interoperability with legacy users. Subaddressing is needed when services for at least one of the users are provided from either a legacy ISDN network or PSTN/ISDN Emulation. The IMS itself does not support a Subaddressing service, but supports mechanisms for the use of Subaddresses as an integral part of IMS.

The NGN may support the interoperability of Subaddressing with the PSTN/ISDN and vice versa.

F.4.3.7 User-to-User Signalling (UUS)

The NGN may support the User-to-User Signalling (UUS) service that enables a calling party to send and/or receive a limited amount of User-to-User-Information (UUI) to/from a called party in association with a communication. See also ETS 300 284 [25].

NOTE: UUS is needed for interoperability with legacy users. UUS is needed when services for at least one of the users are provided from either a legacy ISDN network or PSTN/ISDN Emulation.

The NGN may support the interoperability of User-to-User Signalling services with the PSTN/ISDN and vice versa.

Only UUS service 1 with an implicit request is supported.

F.4.3.8 Customized multimedia information services

F.4.3.8.1 Customized multimedia information presentation service

The customized multimedia information services (COMIP/CTMIP and COMIF/CTMIF) are studied in TR 181 015 [26].

Multimedia information presentation service is able to present multimedia information:

- to the terminating party. This service is the Customized Originating Multimedia Information Presentation service (COMIP);
- to the originating party. This service is the Customized Terminating Multimedia Information Presentation service (CTMIP).

The network shall provide the capability for the user (both the originating and terminating party) to:

- Receive multimedia information provided by the network or via service platform during the communication establishment.
- Replace the default alerting and ringing tone by respectively the multimedia information of CTMIP and the multimedia information of COMIP.
- Send multimedia information to the other party via service platform or send the multimedia information per call basis instantaneously.
- Choose multimedia information presented to her/his during communication establishment between information provided by her/himself or information provided by another party. By default, multimedia information provided by her/himself is the one to be presented to her/himself.
- Distinguish information provided via service platform and information provided by the network.
- Allow the subscriber and/or the service provider to customize his/her multimedia information presentation based on several rules (according to party identity, anonymous, external list, validity, media, presence status, etc). If the user has activated the service but there is no customized multimedia information provided or he/she has chosen the default alerting or ringing tone, then the service shall fall back to the normal network behaviour.
- Dynamically select the content of the COMIP/CTMIP services taking into account information available in the network, e.g. originating and/or terminating party's location and/or presence information.
- Send an indication to the multimedia information presentation service which multimedia information to play to the other party (e.g. when the terminating party is notified about an incoming communication, the terminating party can send an indication to the CTMIP service which CTMIP to play to the originating party).
- Receive at least certified information of this other party (e.g. the other party's identity or other).

The network may also provide the capabilities for the user (both the originating and terminating party):

- In case of the user who receives multimedia information, to be enabled to copy the multimedia information if permitted (by taking in account DRM issues).
- To stop multimedia information presentation service when it is playing. If the originating or the terminating party has stopped the CTMIP, this one is replaced by the default alerting tone. If the terminating or the originating party has stopped the COMIP, this one is replaced by the default ringing tone.
- To replace multimedia information by other multimedia information when it is playing.
- To continue to receive multimedia information presentation services after communication establishment.

F.4.3.8.2 Customized multimedia information filtering service

Customized Multimedia information filtering service shall allow the user to filter multimedia information:

- If the user is the terminating party, this service is the Customized Originating Multimedia Information Filtering service (COMIF).
- If the user is the originating party, this service is the Customized Terminating Multimedia Information Filtering service (CTMIF).

The network should provide the capability for the user who receives multimedia information (both the originating and terminating party) to reject during communication establishment presentation of multimedia information provided by another party according to some rules:

- Reject all multimedia information presentation, unconditionally.
- Reject multimedia information presentation for unknown parties and accept all known parties.
- Reject multimedia information presentation for parties identified as with malicious information in a black list and accept all others.
- Request the user if he/she wants to reject multimedia information only for unknown parties and accept multimedia information presentation all others (default).
- Request the user what to do each time (e.g. to present multimedia information, to reject the multimedia information, etc.).

F.4.4 Void

F.4.5 Void

F.4.6 Void

F.4.7 Void

F.4.8 Void

F.4.9 Void

F.4.10 Void

F.4.11 Void

F.4.12 Void

F.4.13 Charging and accounting

See TS 122 115 [8].

As a new feature, the real-time transfer of tariff information in interworking scenarios shall be supported in TISPAN, in order to support value added services that are billed by the caller's operator, e.g. Premium rate services (0900) or hotlines. Such services often appear as 3rd party services where the tariff information resides in the called network and the caller's operator does not have this information.

This tariff information must be submitted by the external provider in realtime, so that the caller's operator is capable:

- providing Advice of Charge (AoC) information to the caller;
- recording the imported tariff information.

The transferred tariff information is not used for actual charging.

The following interworking scenarios must support this feature:

- Interworking between two TISPAN NGNs.
- Interworking between a TISPAN IMS and PSTN/ISDN.
- Interworking between a TISPAN IMS and a PES.

NOTE: In order to support offline charging for third party services where the tariff information resides in the called network and the caller's operator needs to bill the end user for that service, the service-hosting network needs to provide appropriate charging information to the caller's operator in a secure way, independently from the realtime transfer of charging information for AoC purposes.

For the Interconnection scenarios, the following charging requirements are applicable:

1) All the charging and accounting information shall be collected as closest as possible to the interconnection point.

2) A session or a service instance shall be uniquely identified within a network domain to allow a correct accounting and charging.

3) The identities of the originating network and of the destination network shall be unique and transported at signalling layer.

History

Document history		
V1.1.1	March 2006	Publication
V2.4.1	November 2007	Publication