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*Technical Specification*

## **Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Business trunking; Architecture and functional description**

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**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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# Contents

Intellectual Property Rights .....	6
Foreword.....	6
1 Scope .....	7
2 References .....	7
2.1 Normative references .....	7
2.2 Informative references.....	9
3 Definitions and abbreviations.....	9
3.1 Definitions.....	9
3.2 Abbreviations .....	9
4 Overview .....	10
4.1 General principles.....	10
4.2 Access network interconnection.....	10
4.3 Service level layer interconnection .....	11
5 Functional architecture .....	11
5.1 General .....	11
5.2 Subscription based business trunking.....	12
5.2.1 General.....	12
5.2.2 Used functional entities at the service layer.....	12
5.2.3 Used reference points at the service layer.....	12
5.2.4 Used functional entities at the transport layer.....	12
5.2.5 Used reference points at the transport layer.....	13
5.3 Peering-based business trunking .....	13
5.3.1 General.....	13
5.3.2 Used functional entities at the service layer.....	13
5.3.3 Used reference points at the service layer.....	13
5.3.4 Used functional entities at the transport layer.....	14
5.3.5 Used reference points at the transport layer.....	14
5.4 Session-level virtual leased line .....	14
5.4.1 General.....	14
5.4.2 Used functional entities at the service layer.....	14
5.4.3 Used reference points at the service layer.....	14
5.4.4 Used functional entities at the transport layer.....	15
5.4.5 Used reference points at the transport layer.....	15
5.5 Support for roaming NGCN user .....	15
5.5.1 General.....	15
5.5.2 Used functional entities at the service layer.....	15
5.5.3 Used reference points at the service layer.....	15
5.5.4 Used functional entities at the transport layer.....	16
5.5.5 Used reference points at the transport layer.....	16
5.6 Support for roaming NGN user .....	16
6 Procedures .....	16
6.1 Subscription based business trunking.....	16
6.1.1 Introduction.....	16
6.1.2 Identification.....	16
6.1.3 Registration.....	17
6.1.4 Requests originating from an NGCN user entering NGN.....	17
6.1.4.1 General .....	17
6.1.4.2 NGCN not trusted by NGN.....	18
6.1.4.3 NGCN trusted by NGN .....	18
6.1.5 Requests terminating to an NGCN user leaving NGN.....	19
6.1.5.1 General .....	19
6.1.5.2 NGCN not trusted by NGN.....	19
6.1.5.3 NGCN trusted by NGN .....	20

6.1.6	Business trunking applications .....	20
6.1.6.1	General .....	20
6.1.6.2	Routeing capabilities .....	20
6.1.6.2.1	Overview .....	20
6.1.6.2.2	Break-in .....	20
6.1.6.2.3	Break-out .....	20
6.1.6.2.4	Bulk rerouting.....	20
6.1.6.3	Communication admission control.....	21
6.1.6.4	Anonymous communication rejection.....	21
6.1.6.5	Communication barring .....	21
6.1.7	Signalling transparency.....	21
6.1.8	Involvement of functions on the media path.....	21
6.1.9	Handling of the P-Access-Network-Info header.....	22
6.1.10	Emergency calls .....	22
6.1.11	Charging .....	22
6.1.12	Advice of Charge .....	22
6.1.13	NAT traversal .....	23
6.1.14	Private network traffic .....	23
6.2	Peering-based business trunking .....	23
6.2.1	Introduction.....	23
6.2.2	Identification.....	23
6.2.3	Registration.....	23
6.2.4	Requests originating from an NGCN user entering NGN.....	24
6.2.4.1	General .....	24
6.2.4.2	NGCN not trusted by NGN.....	24
6.2.4.3	NGCN trusted by NGN.....	24
6.2.5	Requests terminating to an NGCN user leaving NGN.....	24
6.2.5.1	General .....	24
6.2.5.2	NGCN not trusted by NGN.....	25
6.2.5.3	NGCN trusted by NGN.....	25
6.2.6	Business trunking application.....	25
6.2.7	Signalling transparency.....	25
6.2.8	Involvement of functions on the media path.....	25
6.2.9	Handling of the P-Access-Network-Info header.....	25
6.2.10	Emergency calls .....	26
6.2.11	Charging .....	26
6.2.12	Advice of Charge .....	26
6.2.13	NAT traversal .....	26
6.2.14	Private network traffic .....	26
6.3	Session-level virtual leased line between NGCN sites.....	27
6.3.1	Introduction.....	27
6.3.2	Identification.....	27
6.3.3	Registration.....	27
6.3.4	Session originating from a NGCN user entering NGN.....	27
6.3.4.1	General .....	27
6.3.4.2	NGCN not trusted by NGN.....	27
6.3.4.3	NGCN trusted by NGN.....	27
6.3.5	Session terminating to an NGCN user leaving NGN.....	27
6.3.5.1	General .....	27
6.3.5.2	NGCN not trusted by NGN.....	27
6.3.5.3	NGCN trusted by NGN.....	27
6.3.6	Business trunking applications .....	27
6.3.7	Signalling transparency.....	28
6.3.8	Involvement of functions on the media path.....	28
6.3.9	Handing of the P-Access-Network-Info header.....	28
6.3.10	Emergency calls .....	28
6.3.11	Charging .....	28
6.3.12	Advice of Charge .....	28
6.3.13	NAT traversal .....	28
6.3.14	Private network traffic .....	28
6.4	NGCN user roaming into NGN public network.....	28
6.4.1	Introduction.....	28

6.4.2	Identification.....	28
6.4.3	Registration.....	29
6.4.4	Requests originating from an NGCN user roaming in NGN .....	29
6.4.5	Requests terminating on an NGCN user roaming in NGN .....	29
6.4.6	Business trunking applications .....	29
6.4.7	Signalling transparency.....	29
6.4.8	Involvement of functions on the media path.....	29
6.4.9	Handing of the P-Access-Network-Info header.....	30
6.4.10	Emergency calls.....	30
6.4.11	Charging .....	30
6.4.12	Advice of Charge.....	30
6.4.13	NAT traversal .....	30
6.4.14	Private network traffic .....	30
7	Use of transport functions .....	30
7.1	Use of transport control sublayer .....	30
7.1.1	Use of NASS.....	30
7.1.2	Use of RACS .....	31
7.2	Use of transport processing functions .....	31
8	Security.....	31
9	Management.....	31
<b>Annex A (informative):</b>	<b>Example signalling flows of business trunking and roaming arrangements.....</b>	<b>32</b>
A.1	Scope of signalling flows .....	32
A.2	Introduction .....	32
A.3	Signalling flows for registration.....	32
A.3.1	Introduction .....	32
A.3.2	Registration of a roaming NGCN UE visiting an NGN/IMS with which the NGCN has a direct roaming agreement .....	32
A.3.2.1	General.....	32
A.3.2.2	Signalling flow for registration of a roaming NGCN UE visiting an NGN/IMS with which the NGCN has a direct roaming agreement.....	33
A.3.2.3	Overview of routing decisions .....	39
A.4	Signalling flows for call origination.....	40
A.5	Signalling flows for call termination.....	40
<b>Annex B (informative):</b>	<b>Service Level Agreement (SLA) considerations.....</b>	<b>41</b>
<b>Annex C (informative):</b>	<b>Bibliography.....</b>	<b>42</b>
History .....		43

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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).

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# 1 Scope

The present document provides architecture and functional requirements for business trunking for the Next Generation Network.

The present document also specifies the protocol requirements for the NGCN to attach to the NGN (in particular the IM CN subsystem) and also any protocol requirements relation to application servers provided in support of business trunking.

Business trunking is a set of NGN capabilities that may be applied to communications between Next Generation Corporate Networks (NGCN) using the NGN as a transit.

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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 TS 181 019: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Business Communication Requirements".
- [2] ETSI ES 282 001: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); NGN Functional Architecture Release 1".
- [3] ETSI ES 282 004: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); NGN Functional Architecture; Network Attachment Sub-System (NASS)".
- [4] ETSI ES 282 007: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); IP Multimedia Subsystem (IMS); Functional architecture".

- [5] ETSI ES 283 003: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); IP Multimedia Call Control Protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP) Stage 3 [3GPP TS 24.229 [Release 7], modified]".
- [6] 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]".
- [7] ETSI TS 182 023: "Telecommunications and Internet Converged Services and Protocols for Advanced Networking (TISPAN); Core and Enterprise NGN Interaction Scenarios and Architectural Requirements".
- [8] ETSI TS 183 011: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); PSTN/ISDN simulation services: Anonymous Communication Rejection (ACR) and Communication Barring (CB); Protocol specification".
- [9] ETSI TS 183 019: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Network Attachment; User-Network Interface Protocol Definitions".
- [10] ETSI TS 183 028: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Common Basic Communication procedures; Protocol specification".
- [11] ETSI ES 283 035: "Telecommunications and Internet Converged Services and Protocols for Advanced Networks (TISPAN); Network Attachment Sub-System (NASS); e2 interface based on the DIAMETER protocol".
- [12] ETSI TS 183 047: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); NGN IMS Supplementary Services; Advice Of Charge (AOC)".
- [13] ETSI TS 183 058: "Telecommunications and Internet Converged Services and Protocols for Advanced Networking (TISPAN); SIP Transfer of IP Multimedia Service Tariff Information; Protocol specification".
- [14] ETSI TS 183 065: "Telecommunications and Internet converged Services and Protocols for Advanced Networks(TISPAN); Customer Network Gateway Configuration Function; e3 Interface based upon CWMP".
- [15] ETSI TS 185 003: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Customer Network Gateway Architecture and Reference Points".
- [16] ETSI TS 187 003 (Release 2): "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); NGN Security; Security Architecture".
- [17] 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)".
- [18] ETSI TS 124 229: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Internet Protocol (IP) multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); Stage 3 (3GPP TS 24.229)".
- [19] ETSI TS 133 203: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); 3G security; Access security for IP-based services (3GPP TS 33.203)".
- [20] ECMA TR/NGCN-Identity: "Next Generation Corporate Networks (NGCN) - Identification and routing".



- [21] IETF RFC 3261 (June 2002): "SIP: Session Initiation Protocol".
- [22] IETF RFC 3324 (November 2002): "Short Term Requirements for Network Asserted Identity".
- [23] IETF RFC 3325 (November 2002): "Private Extensions to the Session Initiation Protocol (SIP) for Asserted Identity within Trusted Networks".
- [24] IETF RFC 5031 (January 2008): "A Uniform Resource Name (URN) for Emergency and Other Well-Known Services".

## 2.2 Informative references

The following referenced documents are not essential to the use of the present document but they assist the user with regard to a particular subject area. For non-specific references, the latest version of the referenced document (including any amendments) applies.

- [i.1] draft-ietf-sip-location-conveyance-10 (February 2008): "Session Initiation Protocol Location Conveyance".
- [i.2] draft-vanelburg-sipping-private-network-indication-01 (February 2008): "Requirements for explicit private network indication".
- [i.3] ETSI TS 123 003: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Numbering, addressing and identification (3GPP TS 23.003)".
- [i.4] 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)".

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## 3 Definitions and abbreviations

### 3.1 Definitions

For the purposes of the present document, the terms and definitions given in TS 181 019 [1], ES 282 004 [3], TS 123 228 [17], TS 123 003 [i.3] and TS 123 218 [i.4] apply:

### 3.2 Abbreviations

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

AS	Application Server
B2BUA	Back-to-Back User Agent
CNG	Customer Network Gateway
CNGCF	Customer Network Gateway Control Function
CSCF	Call Session Control Function
DNS	Domain Name System
DSL	Digital Subscriber Line
I-CSCF	Interrogating CSCF
IP	Internet Protocol
IP-CAN	IP Connectivity Access Network
LAN	Local Area Network
NASS	Network Attachment SubSystem
NGCN	Next Generation Corporate Network
NGN	Next Generation Network
P-CSCF	Proxy CSCF
S-CSCF	Serving-CSCF
SIP	Session Initiation Protocol
SLA	Service Level Agreement

UE	User Equipment
UPSF	User Profile Server Function
URI	Uniform Resource Identifier

## 4 Overview

### 4.1 General principles

Business trunking refers to an architecture where corporate networks appear to the NGN as an NGCN. Although the interface between an NGCN and an NGN is IP-based, this does not preclude the existence of non-IP-based elements within the NGCN but not visible to the NGN. The NGCN appears to the NGN as a black box.

### 4.2 Access network interconnection

NGCN sites may be connected to any IP-CAN valid for TISPAN NGN using a Customer Network Gateway (CNG), as defined in ES 282 001 [2] or connected to an NGN core network via an edge router of the enterprise.

Connection to an IP-CAN includes the case where the NGCN site incorporates a CNG as defined in TS 185 003 [15], connected to a DSL-based access network (figure 4.1) as well as the case where the NGCN site comprises a corporate LAN with one or more edge routers playing the role of a CNG connected to access nodes in the operator's access network (figure 4.2).

NOTE 1: Use of the "SIP Proxy/B2BUA" function within the CNG, as defined in TS 185 003 [15], is not applicable to the present release of this technical specification.

NOTE 2: Within an NGCN site, the CNG functionality may be collocated with an NGCN host or a stand-alone equipment unit.

Towards an access network, the NGCN site acts as a UE. For further details see clause 7.

Towards the IM CN subsystem, the entry point / exit point entity is dependent on the approach adopted and is described further in clause 6.

An NGCN connects a multiplicity of endpoints to the network, each of which may be an IP device or a legacy phone. The NGN does not need to have any knowledge on the individual endpoints connected to the NGCN.

With the subscription based approach, for each NGCN site, the UPSF stores a single public user identity and a single associated user profile enabling triggering of network-based services beyond those provided by the NGCN itself. A set of telephone numbers and/or SIP URIs are also associated with each NGCN site. The former could be expressed in the form of number ranges and the latter using wildcards in the user or host part.

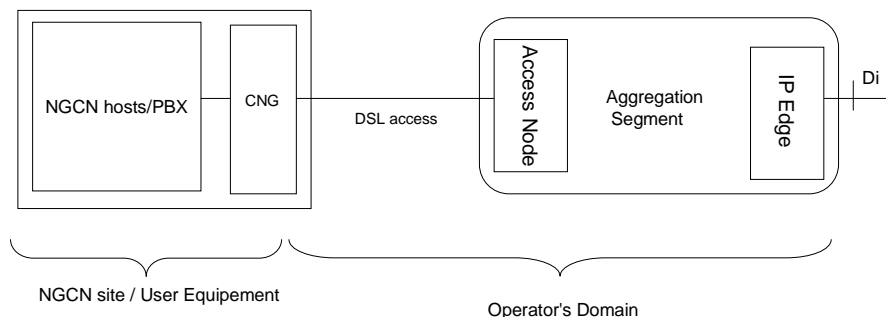
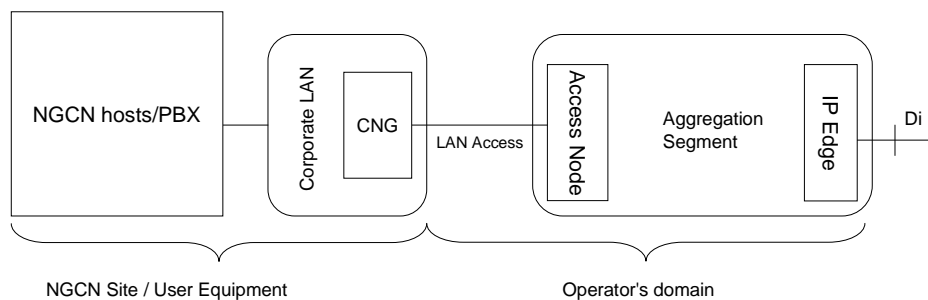


Figure 4.1: DSL access



**Figure 4.2: Corporate LAN access**

Identifiers based on private numbers shall be handled in accordance with ECMA-TR/NGCN-Identity [20].

### 4.3 Service level layer interconnection

The service level layer interconnection makes use of IMS. Two main interconnection arrangements are provided:

- Interconnection of the NGN and NGCN where the entry point to the IMS is the P-CSCF. This is known as the subscription-based approach. This is represented by scenario 5 in clause 8.3 of ES 182 023 [7]. In this case each site of the NGCN has a service subscription to the IMS, with an appropriate entry in the UPSF. An AS is used to provide business trunking applications, e.g. those defined in TS 181 019 [1] clause 4.4. If such capabilities are not required, then the AS is not included in any request processing. The service level capabilities of this scenario are described further in clause 6.1.
- Interconnection of the NGN and NGCN where the entry point to the IMS is the IBCF. This is known as the peering-based approach. This is represented by scenario 6 in clause 8.4 of ES 182 023 [7]. In this case there is no subscription to the IMS. However, the absence of a UPSF entry does not preclude the NGN to host enterprise specific data by other means. The service level capabilities of this scenario are described further in clause 6.2.

The second of these scenarios is called the peering-based approach due to the similarity of the scenario to the mechanism by which the IMS in two NGNs interconnection. For both cases, apart from the registration requirements of the subscription-based approach, the SIP entry point in the NGCN need provide no more functionality than a SIP proxy.

In neither case do the private extensions behind the NGCN need their own service subscription within the NGN, since they are owned and managed by the NGCN. The private extensions register with the NGCN, and the NGCN provides the individual services to the private extensions.

An architecturally similar case to the peering-based approach is represented by scenario 3 in clause 7.1 of ES 182 023 [7]. In this case, SIP requests at one entry point are always routed to the same exit point, and no business trunking applications are provided. The service level capabilities of this scenario are described further in clause 6.3 of the present document. This scenario carries private network traffic only.

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## 5 Functional architecture

### 5.1 General

The architectural split of the service layer and transport layer (used in the description below) is defined in ES 282 001 [2].

## 5.2 Subscription based business trunking

### 5.2.1 General

This describes the architectural requirements for the connection of an Next Generation Corporate Network site (NGCN site) to the NGN using the P-CSCF as an entry point at the service layer.

Clause 8.3 of ES 182 023 [7] shows the arrangement of the involved functional entities.

### 5.2.2 Used functional entities at the service layer

The main functional entities from the IMS service layer as specified in ES 282 007 [4] that are used to realise subscription-based business trunking arrangements are as follows:

- P-CSCF;
- S-CSCF;
- AS (in case a business trunking application is required);
- UPSF.

NOTE: The above list includes only those entities where specific functionality is applied to realise business communication in this scenario. Entities which otherwise transport, but apply no special processing, e.g. I-CSCF, are not listed.

A description of specific procedures executed to provide subscription-based business trunking can be found in clause 6.1.

### 5.2.3 Used reference points at the service layer

The main reference points from the IMS service layer as specified in ES 282 007 [4] that are used to realise subscription-based business trunking arrangements are as follows:

- Gm (this reference point forms the point of interconnection between the NGCN site and the NGN at the service layer);
- Mw;
- Cx;
- ISC (in case a business trunking application is required);
- Sh (in case a business trunking application is required);
- e2;
- Gq'.

NOTE: The above list includes only those interfaces where specific protocol is applied to realise business communication in this scenario.

### 5.2.4 Used functional entities at the transport layer

The main functional entities from the transport layer as specified in ES 282 007 [4] that are used to realise subscription-based business trunking arrangements are as follows:

- BGF (whether an I-BGF or a C-BGF performs this function requires further study).

NOTE: The above list includes only those entities where specific functionality is applied to realise business communication in this scenario. Entities which otherwise transport, but apply no special processing, e.g. I-CSCF, are not listed.