

ETSI TS 185 003 V2.3.1 (2009-06)

Technical Specification

Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Customer Network Gateway (CNG) Architecture and Reference Points

iTeh STANDARD PREVIEW
(standards.iteh.ai)

Full standard:
<https://standards.iteh.ai/catalog/standards/sist/b79-a641b-287e-4eca-9f76-a55f19461e7a/etsi-ts-185-003-v2.3.1-2009-06>



Reference

 RTS/TISPAN-05023-NGN-R2

Keywords

 architecture, gateway, IMS, interface, network

ETSI

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

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

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

Important notice

Individual copies of the present document can be downloaded from:

<http://www.etsi.org>

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

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

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

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

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

Copyright Notification

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

© European Telecommunications Standards Institute 2009.
All rights reserved.

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

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

LTE[™] is a Trade Mark of ETSI currently being registered

for the benefit of its Members and of the 3GPP Organizational Partners.

GSM[®] and the GSM logo are Trade Marks registered and owned by the GSM Association.

Contents

Intellectual Property Rights	5
Foreword.....	5
Introduction	5
1 Scope	6
2 References	6
2.1 Normative references	6
2.2 Informative references.....	7
3 Definitions and abbreviations.....	8
3.1 Definitions.....	8
3.2 Abbreviations	8
4 The CNG Architecture	9
4.1 Introduction	9
4.2 CPN and NGN side requirements.....	10
4.2.1 Analogue phone connected to the NGN through a CNG	10
4.2.2 IMS Customer Network Device connected to the NGN through a CNG.....	11
4.2.3 SIP-non IMS Customer Network Device connected to the NGN through a CNG	12
4.3 CNG functions.....	13
4.3.1 The transfer level functions	13
4.3.1.1 CNG-NFF: CNG-NAPT and Firewall Function	13
4.3.2 The transport level functions	13
4.3.2.1 CNG-CSMF: CNG-Communication Services Media Function	13
4.3.2.2 CNG-IPTVF: CNG-IPTV Function	13
4.3.3 The CNG Network Attachment Subsystem entities (CNG-NASS)	13
4.3.3.1 CNG-CMF: CNG-Configuration and Management Function.....	13
4.3.3.2 CNG-AtF: CNG-Attachment Function	14
4.3.3.3 CNG-PCF: CNG-Policy Control Function.....	14
4.3.3.4 CNG-AuF: CNG-Authentication Function.....	14
4.3.3.5 CNG-LF: CNG-Location Function	14
4.3.4 The CNG-Resource and Admission Control Functional entities (C-RACF)	14
4.3.4.1 CNG-ACF: CNG-Admission Control Function	14
4.3.5 The CNG-Service-related Functional entities (CNG-SF)	15
4.3.5.1 VGCF: Voice Gateway Control Function	15
4.3.5.2 CNG-SIP Proxy B2BUA Function	15
4.3.5.3 CNG-PPF: CNG-Plug and Play Function	15
4.3.5.4 CNG-UIF: CNG-User Interface Function.....	16
4.3.5.5 ISIM module	16
5 The CNG Reference points	17
5.1 CND side Reference points	17
5.1.1 Network attachment reference points	17
5.1.1.1 e_1 reference point	17
5.1.1.2 e_3 reference point	17
5.1.1.3 a_u reference point.....	18
5.1.2 Transport level reference points.....	18
5.1.2.1 D_j reference point.....	18
5.1.2.2 D_j' reference point.....	18
5.1.3 Service-related reference points.....	18
5.1.3.1 G_m reference point	18
5.1.3.2 u reference point.....	18
5.1.3.3 C reference point	19
5.2 NGN side Reference points	19
5.2.1 Network attachment reference points	19

5.2.1.1	e ₁ reference point.....	19
5.2.1.2	e ₃ reference point.....	19
5.2.2	Service-related reference points.....	19
5.2.2.1	G _m reference point.....	19
5.2.2.2	U _t reference point.....	20
6	The CNG Data Model	20
7	Information flows	20
7.1	Attachment flows	21
7.2	Configuration and management flows.....	21
7.3	Signalling flows.....	22
7.3.1	CND attachment and local/IMS registration.....	22
7.3.2	Outgoing call	24
7.3.2.1	SIP non-IMS CND	24
7.3.2.2	IMS CND	25
7.3.3	Internal call	25
7.3.4	Admission Control.....	26
7.4	Remote Access flows	28
7.4.1	Remote Access Connection Set-up.....	28
7.4.2	Download of content using HTTP	29
7.4.3	Upload of content using HTTP.....	30
Annex A (informative):	Bibliography.....	32
Annex B (informative):	Change History	33
History		34

iTeh STANDARD PREVIEW
 (standards.iteh.ai)
 Full standard:
<https://standards.iteh.ai/catalog/standards/sist/b79-a641b-287e-4eca-9f76-a55f19461e7a/etsi-ts-185-003-v2.3.1-2009-06>

Intellectual Property Rights

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

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

Foreword

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

Introduction

The present document defines Release 2 of an anticipated series of releases of TISPAN NGN. Release 2 extends the capabilities of Release 1, enhances some Release 1 capabilities and provides some new services. The TISPAN NGN is described in terms of the content capabilities and this release (Release 2) is defined by the documentation set and the features that these support.

The general objective of Release 2 is to extend Release 1 through enhancements and new services. The present document focuses on additional capabilities and services and continues to enable an NGN to be a flexible platform allowing future enhancements and releases. The TISPAN NGN is specified using a release mechanism. The present document provides an overview of the capabilities in the second release. No assumptions should be made about future releases.

Throughout the present document, references to NGN are assumed to be references to TISPAN NGN unless otherwise indicated.

1 Scope

The present document provides an overview of Customer Network Gateway (CNG) functional architecture and reference points and the way it interacts with an NGN, as described in ETSI TISPAN Release 1 and Release 2 standards (see ES 282 001 [1]).

The present document describes architectural building blocks to be included in the CNG to support the interworking with an NGN, both at the transfer, transport and service layers. It also defines the reference points between the CNG internal architectural blocks involved and a CND.

The WG5 does not address the layer 1 issues, as such studies refer to the AT&TM Group.

2 References

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

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

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

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

2.1 Normative references

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

- [1] ETSI ES 282 001: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); NGN Functional Architecture".
- [2] ETSI ES 282 003: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Resource and Admission Control Sub-System (RACS): Functional Architecture".
- [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 TS 182 012: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); IMS-based PSTN/ISDN Emulation Sub-system (PES); Functional architecture".
- [7] ETSI TS 183 019: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Network Attachment; User-Network Interface Protocol Definitions".
- [8] IETF RFC 3261: "SIP: Session Initiation Protocol".
- [9] ETSI TS 131 103: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Characteristics of the IP Multimedia Services Identity Module (ISIM) application (3GPP TS 31.103)".
- [10] IETF RFC 2131: "Dynamic Host Configuration Protocol".
- [11] 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 version 8.2.0 Release 8)".
- [12] ETSI TS 185 006: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Customer Devices architecture and Reference Points".
- [13] ETSI TS 185 009: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Architecture and reference points of a customer network device for IMS based IPTV services".
- [14] IETF RFC 2617: "HTTP Authentication: Basic and Digest Access Authentication".

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] ETSI TR 185 007: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Analysis of protocols for customer networks connected to TISPAN NGN".
- [i.2] ETSI TR 185 004: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); High level customer network architectures".
- [i.3] Broadband Forum TR-069: "CPE WAN Management Protocol".
- [i.4] Broadband Forum TR-098: "Data Model for TR-069".
- [i.5] Broadband Forum TR-104: "Provisioning Parameters for VoIP CPE".
- [i.6] ETSI TS 185 005: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Services requirements and capabilities for customer networks connected to TISPAN NGN".
- [i.7] ETSI TR 180 001: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); NGN Release 1; Release definition".

3 Definitions and abbreviations

3.1 Definitions

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

CPN Device: device that is physically installed in the CPN allowing user access to network services; this can be a Customer Network Gateway with gateway functionalities towards the NGN, or a Customer Network Device being the end user terminal

Customer Network Device (CND): CPN device enabling the final user to have direct access to services through a specific user interface

NOTE: CNDs can be dedicated to the internet, conversational and audio-video services. But they could be also Consumer Electronics equipment and other devices which may have nothing to do with these premium services (e.g. services performing a content sharing within a CPN, typically between a PC and a music system).

Customer Network Gateway (CNG): CPN device acting as a gateway between the CPN and the NGN

NOTE: CNG is able to perform networking functions from physical connection to bridging and routing capabilities (L1 to L3), but also possibly implementing functions related to the service support (up to L7).

Customer Premises Network (CPN): in-house network composed by customer network gateway, customer network devices, network segments, network adapters and nodes

NOTE: Network segments are physical wired or wireless connections between customer premises network elements; network adapters are elements performing a L1/L2 conversion between different network segments; nodes are network adapters with L3 routing capabilities.

IMS CND: CND whose external behaviour complies with the IMS specifications

NOTE: See [1], [2], [3], [4] and [5].

"Multiple" Play Services (can be: double, triple, quadruple etc.): delivery by a single service provider of different types of concurrent services to one or multiple users within the same CPN

NOTE: Services can be categorized in the following way: data (e.g. Web browsing, best effort traffic etc.), person(s) to person(s) communication, entertainment.

Non-IMS SIP IETF CND: SIP-based CND whose external behaviour conforms to RFC 3261 [8] but do not fully conform to the IMS specifications

Many scenarios are expected to provide one service from a service provider to a customer device (case of multiple service providers, one or several CNG, etc.). They are presented within the TR 185 004 [i.2] and TS 185 005 [i.6].

3.2 Abbreviations

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

ACS	Auto-Configuration Server
AKA	Authentication and Key Agreement
ALG	Application Layer Gateway
A-MGF	Access-Media Gateway Function
ARF	Access Relay Function
B2BUA	Back-to-Back User Agent
BC	Broadcast Content
CLF	Connectivity session Location and repository Function
CND	Customer Network Device
CNG	Customer Network Gateway
CNG-ACF	CNG-Admission Control Function
CNG-AtF	CNG-Attachment Function

CNG-AuF	CNG-Authentication Function
CNGCF	CNG Configuration Function
CNG-CMF	CNG-Configuration and Maintenance Function
CNG-CSMF	CNG- Communication Services Media Function
CNG-LF	CNG-Location Function
CNG-NFF	CNG-NAPT and Firewall Function
CNG-PCF	CNG-Policy Control Function
CNG-PPF	CNG-Plug and Play Function
CNG-UIF	CNG-User Reference point Function
CoD	Content on Demand
CPN	Customer Premises Network
DHCP	Dynamic Host Configuration Protocol

NOTE: <http://www.ietf.org/rfc/rfc3235.txt?number=2131>

DLNA	Digital Living Network Alliance
EF	Elementary Files
ETH	ETHERnet
IGMP	Internet Group Multicast Protocol
IMPU	IMS Public identity
IMS	IP Multimedia Subsystem
IP	Internet Protocol
IPTV	IP TeleVision
ISIM	IMS Subscriber Identity Module
MGC	Media Gateway Controller
NACF	Network Access Configuration Function
NAPT	Network Address and Port Translation

NOTE: <http://www.ietf.org/rfc/rfc3235.txt?number=3235>

NASS	Network Attachment Subsystem
NAT	Network Address Translation
NDN	Next Generation Network
P-CSCF	Proxy Call Session Control Function
PLT	Power-Line Telecommunication
RADA	Remote Access Discovery Agent
RATA	Remote Access Transport Agent
RTSP	Real Time Streaming Protocol
SDP	Session Data Protocol
SIP	Session Initiation Protocol
SSID	Service Set Identifier
UE	User Equipment
UICC	Universal Integrated Circuit Card
VGCF	Voice Gateway Control Function
VoIP	Voice over IP

4 The CNG Architecture

4.1 Introduction

The following clauses present the functional entities for the CNG. Examples of Customer Network Devices may be connected to the CNG:

- Analogue phones connected through the CNG to the NGN network.
- IMS Customer Network Devices connected through a CNG to the NGN network [5].
- Non IMS SIP IETF Customer Network Devices [7].
- ISDN Customer Network Devices through the CNG to the NGN network.

Different types of Customer Network Devices may be involved in Intra CPN communication through a CNG.

The list of Customer Network Devices which are likely to be connected to the CNG is provided by the TS 185 006 [12].

The general overview of the CPN Architecture is provided by the TR 185 004 [i.2]. The CNG functional entities are described in the following parts of the document, as well as the reference points between each function.

4.2 CPN and NGN side requirements

The list of the CNG requirements is provided by the TS 185 005 [i.6]. specification for Service requirements and capabilities for customer networks connected to TISPAN NGN.

4.2.1 Analogue phone connected to the NGN through a CNG

In this case, the CNG includes all the CPN functionalities necessary to fulfill a service between the analogue phone and the NGN, as shown in figure 1.

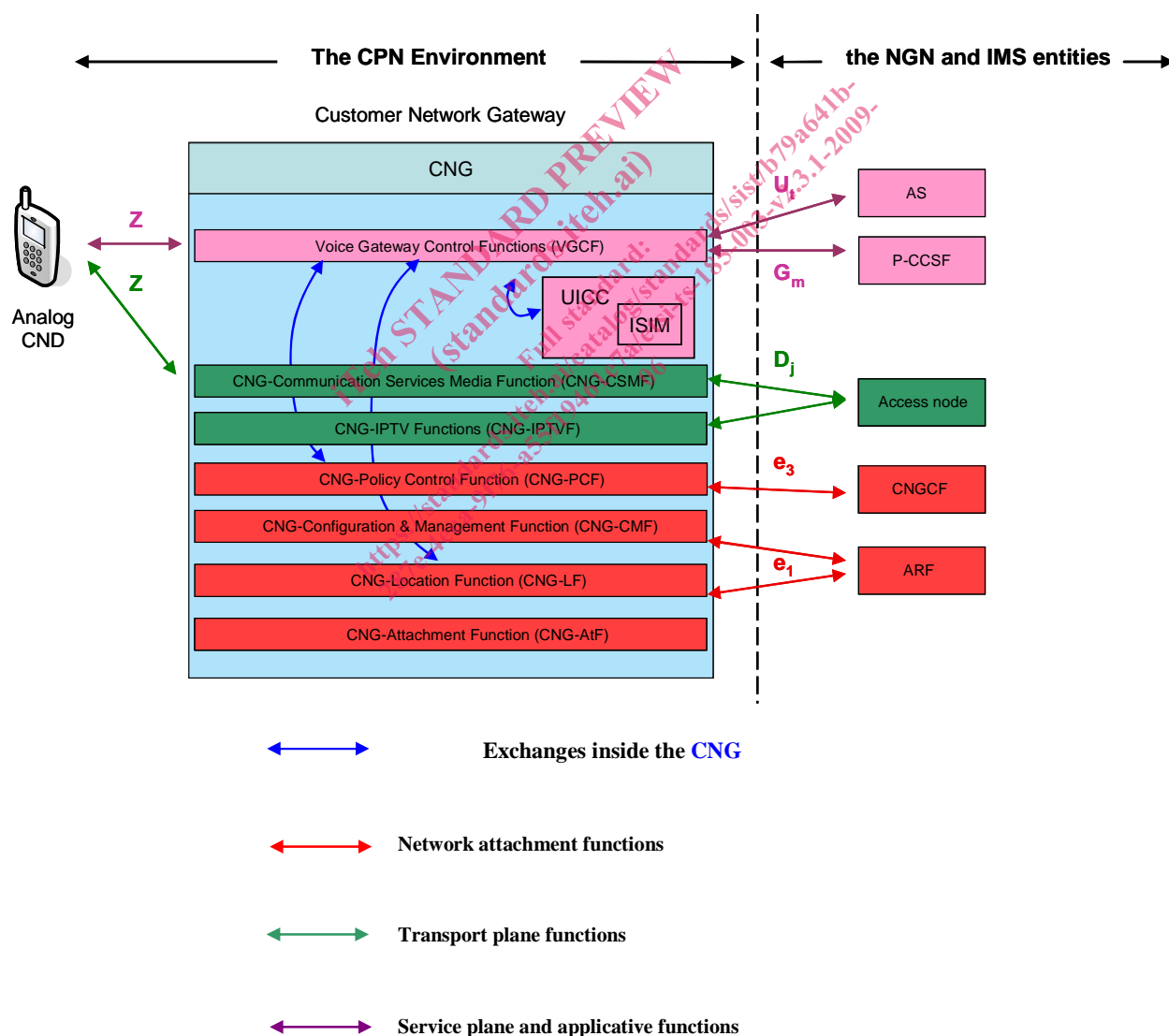
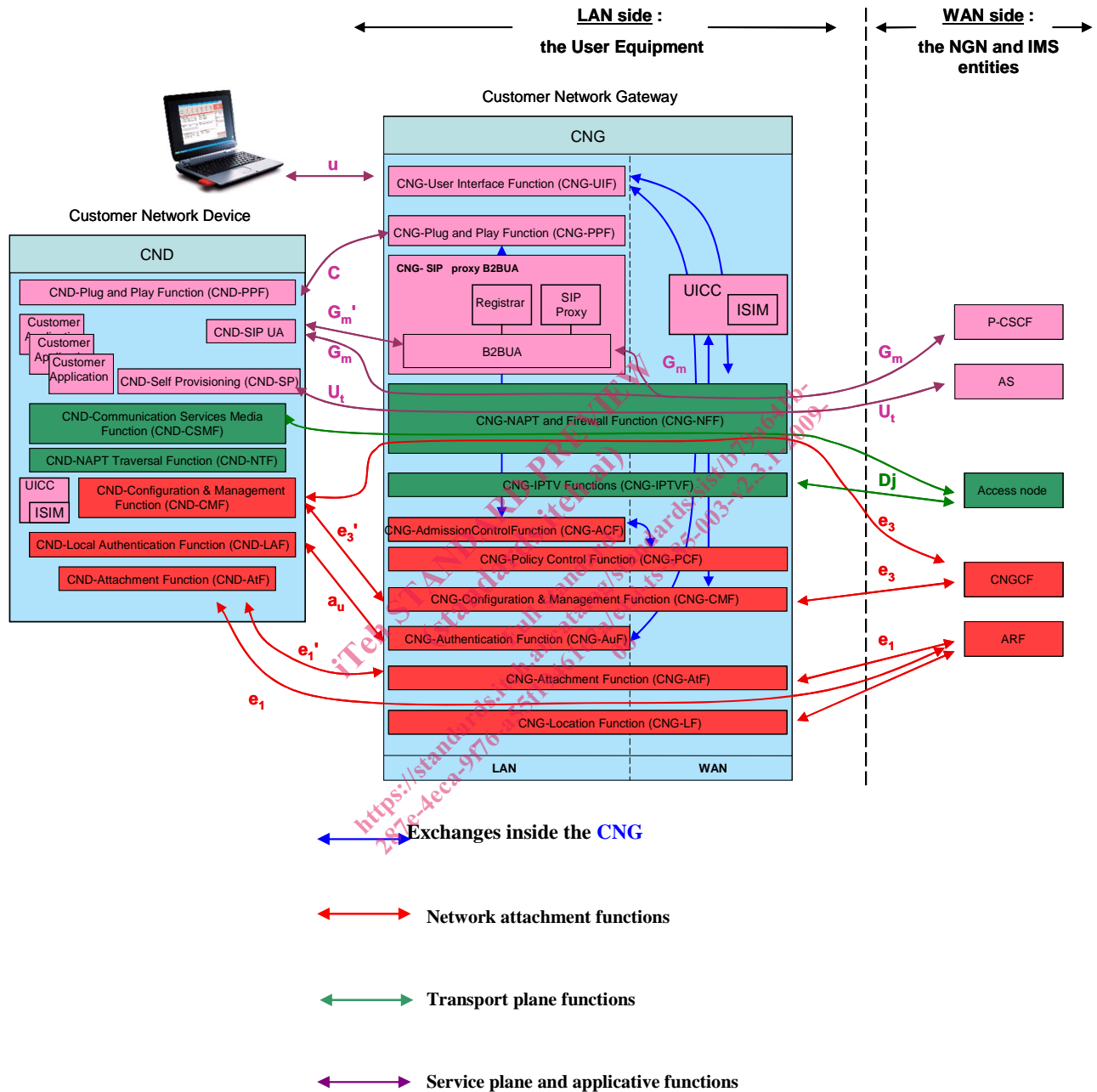


Figure 1: Analogue phone connected to the NGN-IMS network through a CNG

4.2.2 IMS Customer Network Device connected to the NGN through a CNG

In this case, the Customer Network Device includes all the CPN functionalities necessary to fulfill a service between itself and the NGN-IMS network, as shown in figure 2:



NOTE: The IMS CND functions are described within TS 185 006 [12] dedicated to Customer Network Devices.

Figure 2: IMS Customer Network Device connected to the NGN-IMS network through a CNG