

International Telecommunication Union

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

Y.2031

(09/2006)

SERIES Y: GLOBAL INFORMATION
INFRASTRUCTURE, INTERNET PROTOCOL ASPECTS
AND NEXT-GENERATION NETWORKS

Next Generation Networks – Frameworks and functional
architecture models

PSTN/ISDN emulation architecture

ITU-T Recommendation Y.2031



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ITU-T Recommendation Y.2031

PSTN/ISDN emulation architecture

Summary

This Recommendation describes the functional architecture, interworking with other components, and reference point requirements of the PSTN/ISDN emulation service component (NGN component of the service stratum) including call server based approach and IMS-based approach.

Source

ITU-T Recommendation Y.2031 was approved on 13 September 2006 by ITU-T Study Group 13 (2005-2008) under the ITU-T Recommendation A.8 procedure.

FOREWORD

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ITU-T Recommendation Y.2031

PSTN/ISDN emulation architecture

1 Scope

This Recommendation describes the functional architecture, interworking with other components, and reference point requirements of the PSTN/ISDN emulation service component including call server based approach and IMS-based approach.

Administrations may require operators and service providers to take into account national regulatory and national policy requirements in implementing this Recommendation.

2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

- [ITU-T H.248.1] ITU-T Recommendation H.248.1 (2005), *Gateway control protocol: Version 3*.
- [ITU-T Q.512] ITU-T Recommendation Q.512 (1995), *Digital exchange interfaces for subscriber access*.
- [ITU-T Q.1214] ITU-T Recommendation Q.1214 (1995), *Distributed functional plane for intelligent network CS-1*.
- [ITU-T Y.2012] ITU-T Recommendation Y.2012 (2006), *Functional requirements and architecture of the NGN*.
- [ITU-T Y.2111] ITU-T Recommendation Y.2111 (2006), *Resource and admission control functions in Next Generation Networks*.

3 Definitions

This Recommendation uses or defines the following terms:

3.1 access gateway: A unit that allows end users with various accesses (e.g., PSTN, ISDN, V5.x) connection to the packet node of NGN.

NOTE – The AG may be embedded in an access node, which serves also other access interfaces (e.g., xDSL, LAN). Such access nodes are also known as multi-service access nodes (MSAN).

3.2 access media gateway: A unit that provides interworking between the packet-based transport used in the NGN and analogue lines or ISDN access.

3.3 call server: The core element of a CS-based PSTN/ISDN emulation component, which is responsible for call control, media resource control, call routing, user profile and subscriber authentication, authorization and accounting. Depending on its role, the behaviour of the call server may be different. In these cases the role of call server is identified for example as "Access call server", "Breakout call server", "IMS call server", "Routing call server" or "Gateway call server".

3.4 functional entity: An entity that comprises an indivisible set of specific functions. Functional entities are logical concepts, while groupings of functional entities are used to describe practical, physical implementations.

3.5 functional architecture: A set of functional entities and the reference points between them used to describe the structure of an NGN. These functional entities are separated by reference points, and thus, they define the distribution of functions.

NOTE – The functional entities can be used to describe a set of reference configurations. These reference configurations identify which reference points are visible at the boundaries of equipment implementations and between administrative domains.

3.6 media gateway: The media gateway (MG) converts media provided in one type of network to the format required in another type of network. For example, a MG could terminate bearer channels from a switched circuit network (e.g., DS0s) and media streams from a packet network (e.g., RTP streams in an IP network). This gateway may be capable of processing audio, video and multimedia conferencing alone or in any combination, and will be capable of full duplex media translations. The MG may also play audio/video messages and perform other interactive voice response (IVR) functions, or may perform media conferencing. In this Recommendation, media gateway refers both to access gateways and residential gateways.

3.7 media gateway controller: Controls the parts of the call state that pertain to connection control for media channels in a media gateway.

3.8 reference point: A conceptual point at the conjunction of two non-overlapping functional entities that can be used to identify the type of information passing between these functional entities.

NOTE – A reference point may correspond to one or more physical interfaces between pieces of equipment.

3.9 residential gateway: A unit that interworks PSTN/ISDN user equipments to a packet network. A residential gateway is located at the customer premises.

3.10 voice over IP gateway: A SIP-based gateway that connects legacy terminals to the NGN. When connecting analogue lines, the voice over IP gateway includes at least an analogue telephone adaptor (ATA). A voice over IP gateway (VGW) plays the role of an IMS UE with regard to the P-CSCF.

4 Abbreviations

This Recommendation uses the following abbreviations:

ABG-FE	Access Border Gateway Functional Entity
AGCF	Access Gateway Control Function
AMG	Access Media Gateway
AMG-FE	Access Media Gateway Functional Entity
APL-GW-FE	Application Gateway Functional Entity
AS	Application Server
AS-FE	Application Server Functional Entity
BGCF	Breakout Gateway Control Function
CCF	Call Control Function
CS	Call Server
CSCF	Call Session Control Function
CS-PES	Call Server based PSTN/ISDN Emulation Service component
FE	Functional Entity
IBC-FE	Interconnection Border Gateway Control Functional Entity

IBG-FE	Interconnection Border Gateway Functional Entity
I-CSCF	Interrogating CSCF
IFN	IMS for Next Generation Networks
IMS	IP Multimedia Service component
IMS-PES	IMS based PSTN/ISDN Emulation Service component
IN	Intelligent Network
IP	Internet Protocol
ISDN	Integrated Services Digital Network
MGCF	Media Gateway Control Function
MRCF	Media Resource Control Function
MRP-FE	Media Resource Process Functional Entity
NACF	Network Attachment Control Function
NGN	Next Generation Network
NNI	Network-to-Network Interface
NSIW-FE	Network Signalling Interworking Functional Entity
OSA	Open Service Architecture
P-CSCF	Proxy CSCF
PES	PSTN/ISDN Emulation Service component
PSTN	Public Switched Telephone Network
RACF	Resource and Admission Control Function
RF	Routing Function
SAA-FE	Service Authentication and Authorization Functional Entity
SCP	Service Control Point
S-CSCF	Serving CSCF
S-CSC-FE	Serving Call Session Control Functional Entity
SG	Signalling Gateway
SG-FE	Signalling Gateway Functional Entity
SIF	Signalling Interworking Function
SIP	Session Initiation Protocol
SL-FE	Subscription Locator Functional Entity
SPF	Service Provider Function
SS7	Signalling System No. 7
SSF	Service Switching Function
SUP-FE	Service User Profile Functional Entity
TMG	Trunking Media Gateway
TMG-FE	Trunking Media Gateway Functional Entity
VGW	Voice over IP Gateway

5 PSTN/ISDN emulation in NGN

As shown in Figure 5-1, PSTN/ISDN emulation, as one of the service components of NGN, provides PSTN/ISDN basic and supplementary services, and coexists with the IP multimedia service component, the streaming service component, and other service components.

PSTN/ISDN emulation, as one of the service components of NGN, interworks with the existing network and other service components. It provides the emulation of PSTN/ISDN services for legacy terminal connected via residential gateways and access gateways to the NGN.

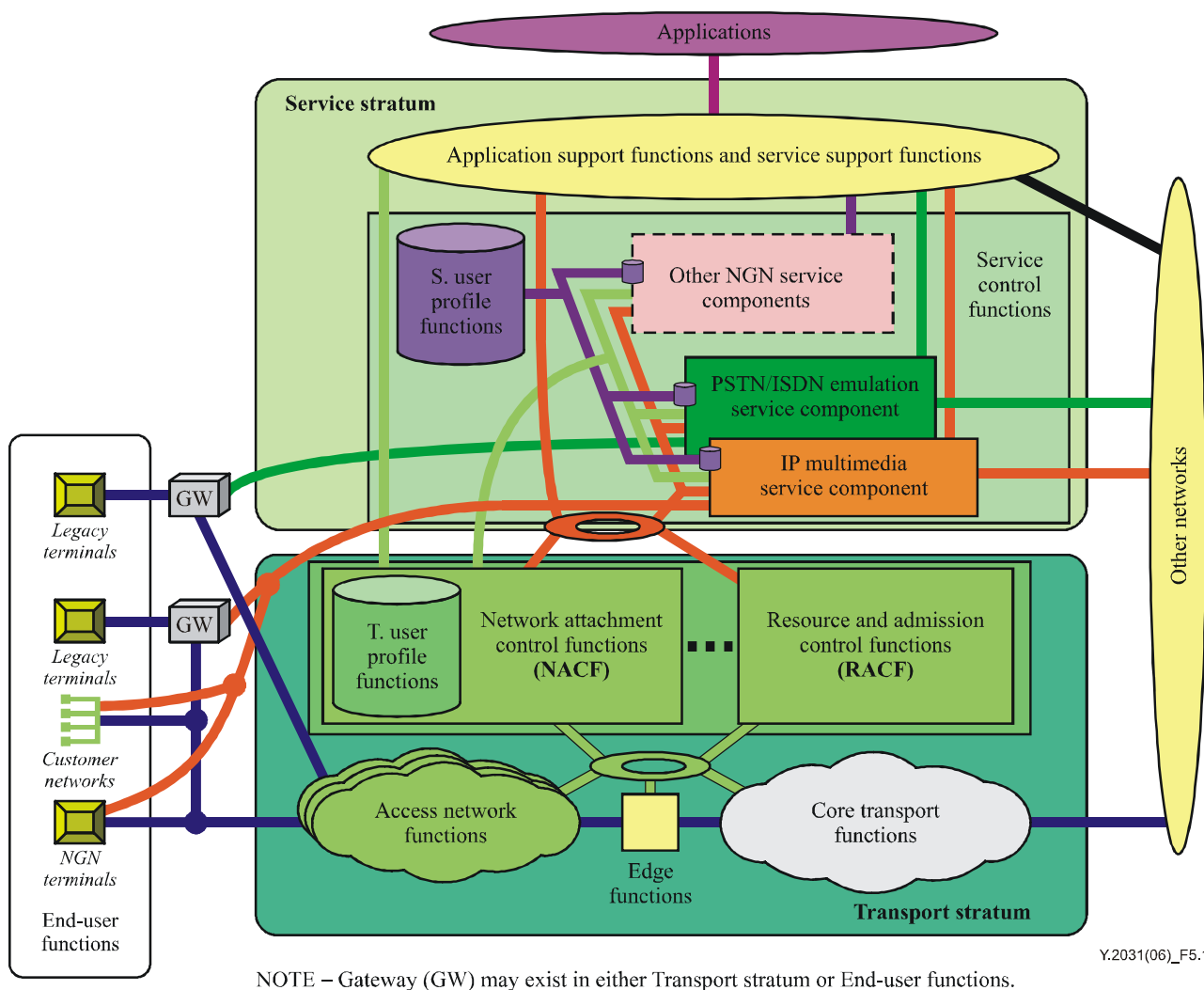


Figure 5-1 – PSTN/ISDN emulation in NGN

There are two solutions for PSTN/ISDN emulation service component, which are known as call server based emulation and IMS-based emulation. The two solutions are suitable for different network situations, but can provide equal emulation services.

6 Call server based PSTN/ISDN emulation functional architecture

This clause describes a functional architecture for CS-based PSTN/ISDN emulation. Figure 6-1 provides a detailed view of the functional entities and reference points that make up this architecture and shows their relationship with other service components of NGN architecture.