



Overview and Status of NGN Standardization Activities

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- 1. Outline of NGN**
- 2. Key Technologies of NGN**
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Achievement of NGN standard activities

- ETSI
 - TISPAN project was established in 09/2003 and developed more than 60 NGN specifications by 02/2006.
- ITU-T
 - NGN workshop was held in 07/2003 to sense industry's demand.
 - NGN-JRG and the following FGNGN reported the results as a series of framework specifications in 12/2005.
 - SG13, which leads NGN study, examined the results from FGNGN and initiated approval process of 13 draft Recommendations in 07/2006.
 - Framework documents of NGN Release 1 are available now.
 - Whole set of Release 1 documents will be ready by around the beginning of 2008.

Definition and Features of NGN (Rec. Y.2001)

Definition of NGN (Rec. Y.2001)

An NGN is a packet-based network able to provide telecommunication services and make use of **multiple broadband, QoS-enabled transport technologies**. In an NGN, **service-related functions are independent from underlying transport-related technologies**. It enables **unfettered access for users to networks, competing service providers, and/or services of their choice**. It supports **generalized mobility**, which will allow consistent and ubiquitous provision of services to users.

Expected features

- A QoS enabled packet-based network
- Multiple broadband access
- Conceptual independence of services from transport
- Generalized mobility

Target Standards Area

- Unified IP transport
- QoS architecture and signalling
- xDSL, Optical, and Wireless LAN, for example
- Identification of functionalities and their interactions to provide bearer services together
- Enable convergence between fixed and mobile

NGN release 1 services

NGN release 1 is now mainly studying how to achieve session-oriented services (Multimedia services, PSTN/ISDN emulation/simulation services).

	Type of Services	Notes
<u>1</u>	Multimedia Services	• Real-time conversational voice services • Messaging services, such as IM, SMS and MMS, for example. • Presence and general notification services • 3GPP Release 6 and 3GPP2 Release A OSA-based services • Push-to-talk over NGN (PoN) • Point-to-point interactive multimedia services, e.g., real-time video • Collaborative interactive communication services, e.g., file sharing, e-learning • Content delivery services • Push-based services • Broadcast services • Hosted and transit services for enterprises (IP centrex, for example.) • Information services • Location-based services
<u>2</u>	PSTN/ISDN emulation services	• PSTN/ISDN service capabilities and interfaces using adaptation to an IP infrastructure
<u>3</u>	PSTN/ISDN simulation services	• PSTN/ISDN-like service capabilities using session control over IP interfaces and infrastructure

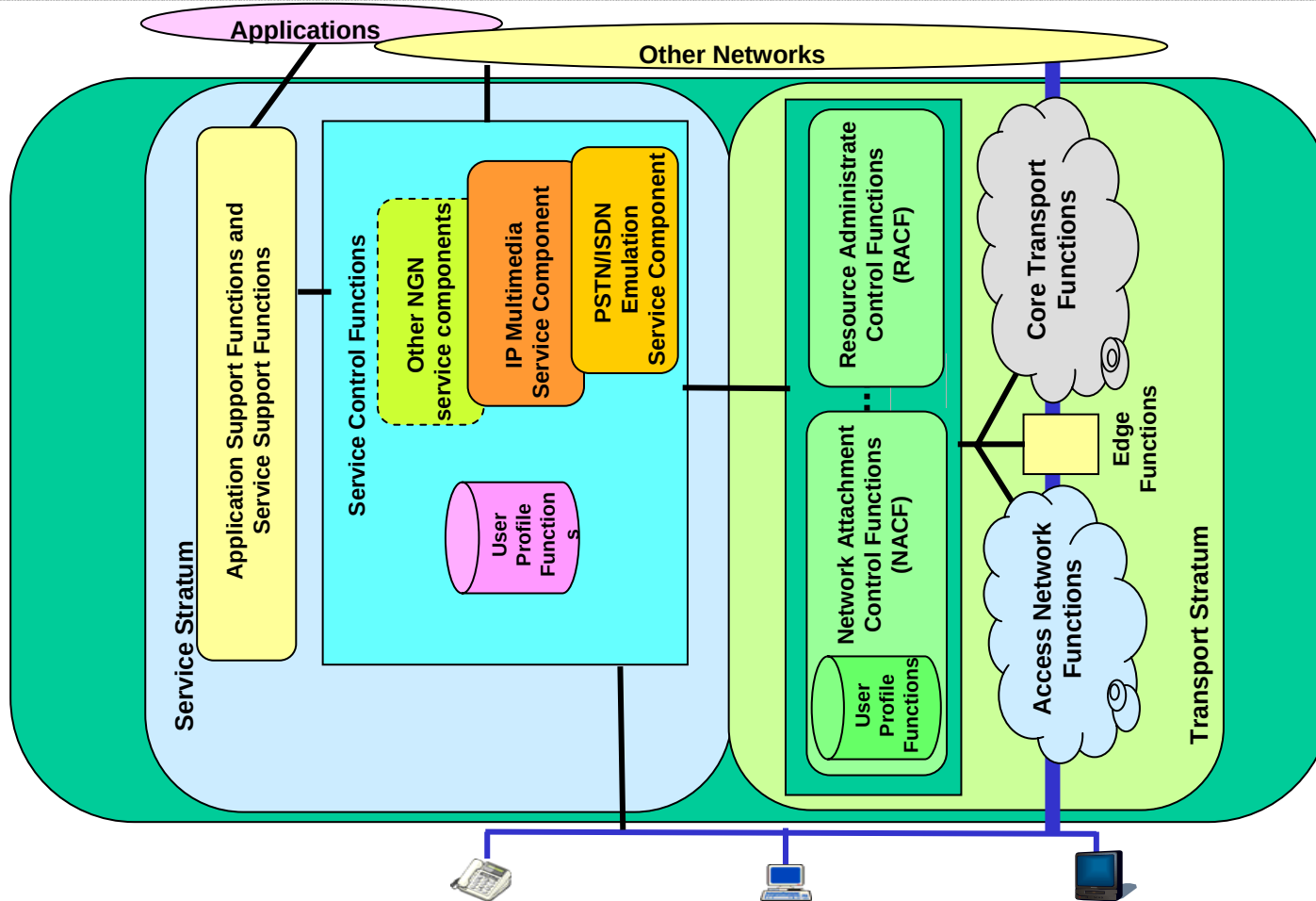
NGN release 1 services

	Type of Services	Notes
4	Data communication services	• Virtual private network (VPN) services • Existing data services, such as data file transfer, electronic mailbox and web browsing • Data retrieval services, such as tele-software • Online services (online sales for consumers, e-commerce, online procurement for commercials) • Sensor network services • Remote control/tele-action services, such as home appliance control, telemetry, alarms, monitor service
<u>5</u>	Public interest aspects	• Emergency communications including support of early warning • Support for users with disabilities • Lawful interception • Network or service provider selection • Prevention of unsolicited bulk telecommunications • Malicious communication identification • User identifier presentation and privacy

Note: Support for Internet access through the NGN core network, which includes end to end transparency, peer to peer applications and some other Internet services, is in the scope of the NGN, but not required in Rel. 1 (i.e., in Release 1, actions by the RACF or other NGN functions may impact Internet connectivity that traverses the NGN).

Outline of NGN ITU-T NGN release 1

In release 1, bearer services are provided by a service stratum and a transport stratum in combination.



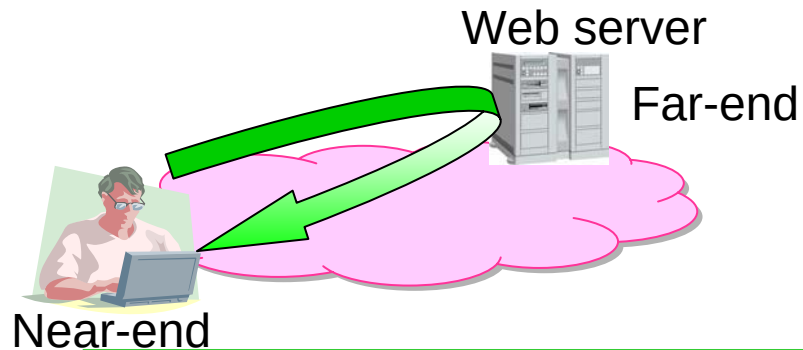
※ This fig. is taken from ITU-T Recommendation Y.2012

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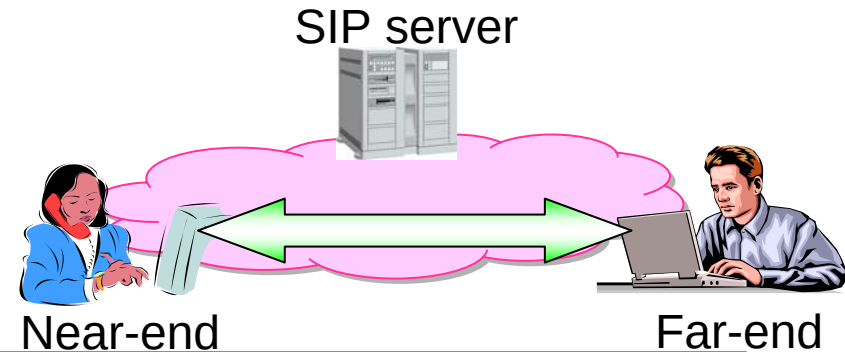
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SIP: Unique features of interactive end-to-end communication

Web browsing

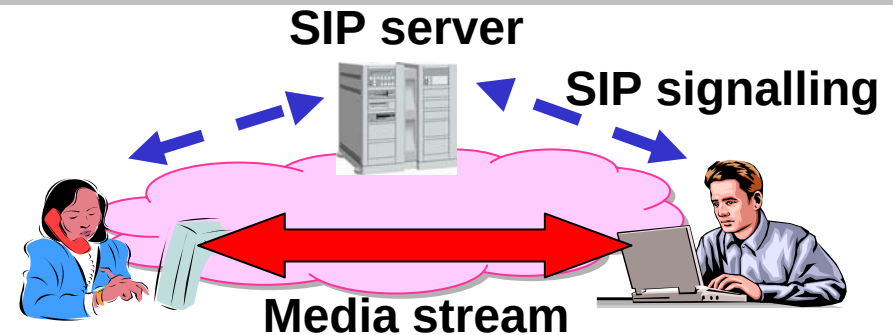


Interactive communication (e.g., IP telephony)



Web browsing characteristics	Communication characteristics	Interactive communication characteristics
Web server	Far-end	General public
Fixed and easy to know	Far-end IP address	Fluid and difficult to know in advance
User always originates communication	Communication initiation	User may be invited to communication
Near end selects from options provided by far end	Application to be used	Room for negotiation, e.g., codec type
Always available	Far end availability	Availability is uncertain

SIP: Support for end-to-end communication

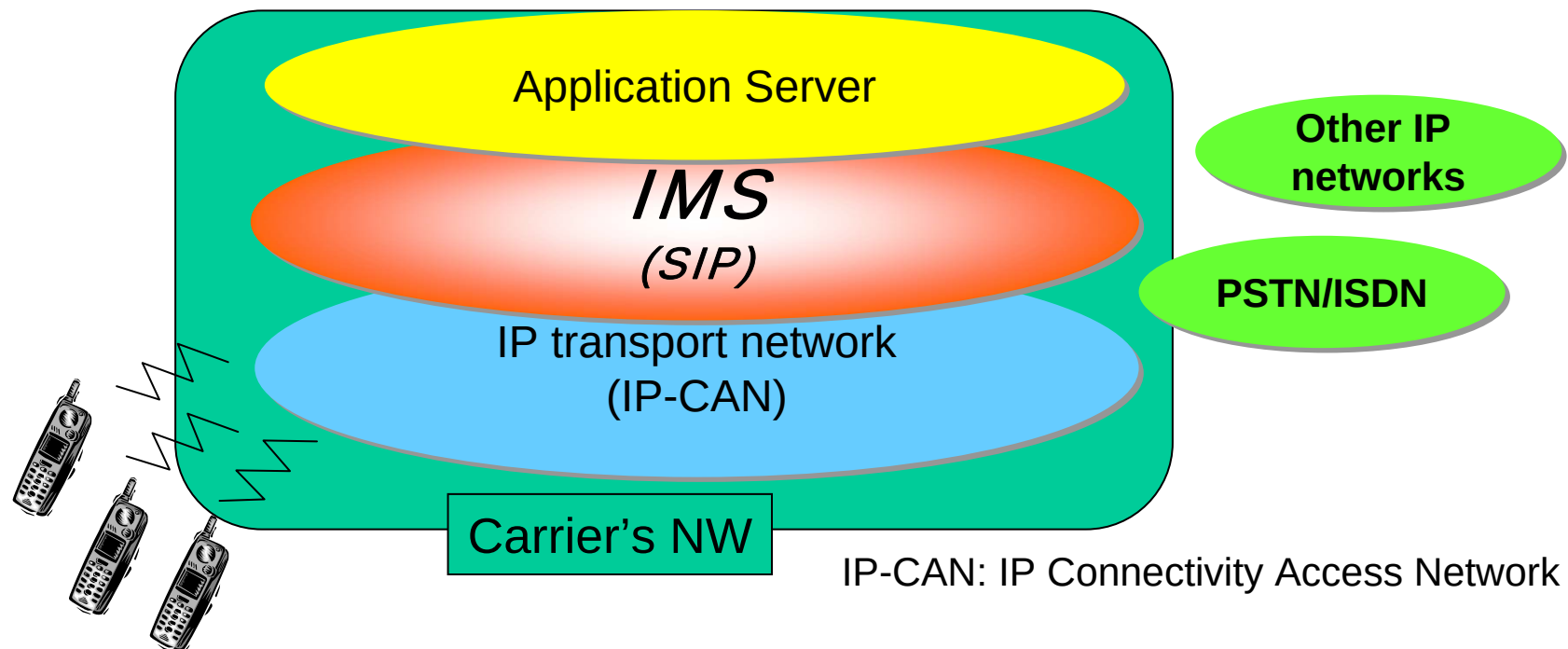


Communication characteristics	Interactive communication	Functions achieved by session control (SIP)
Far-end	General public	• Identification with unique user name (URI) • Registration to prepare for receiving a session (REGISTER) • User authentication to validate the user
Far-end IP address	Fluid and difficult to know in advance	
Communication initiation	User may be invited to communication	• Support of session initiation (INVITE) and termination (BYE)
Application to be used	Room for negotiation, e.g., codec	• Negotiation of communication means (offer and answer by SDP)
Far-end availability	Uncertain	• Proxy on behalf of user, providing alternate method • Presence to inform users about availability in advance • Instant messaging

IMS: What is IMS (IP Multimedia Subsystem)?

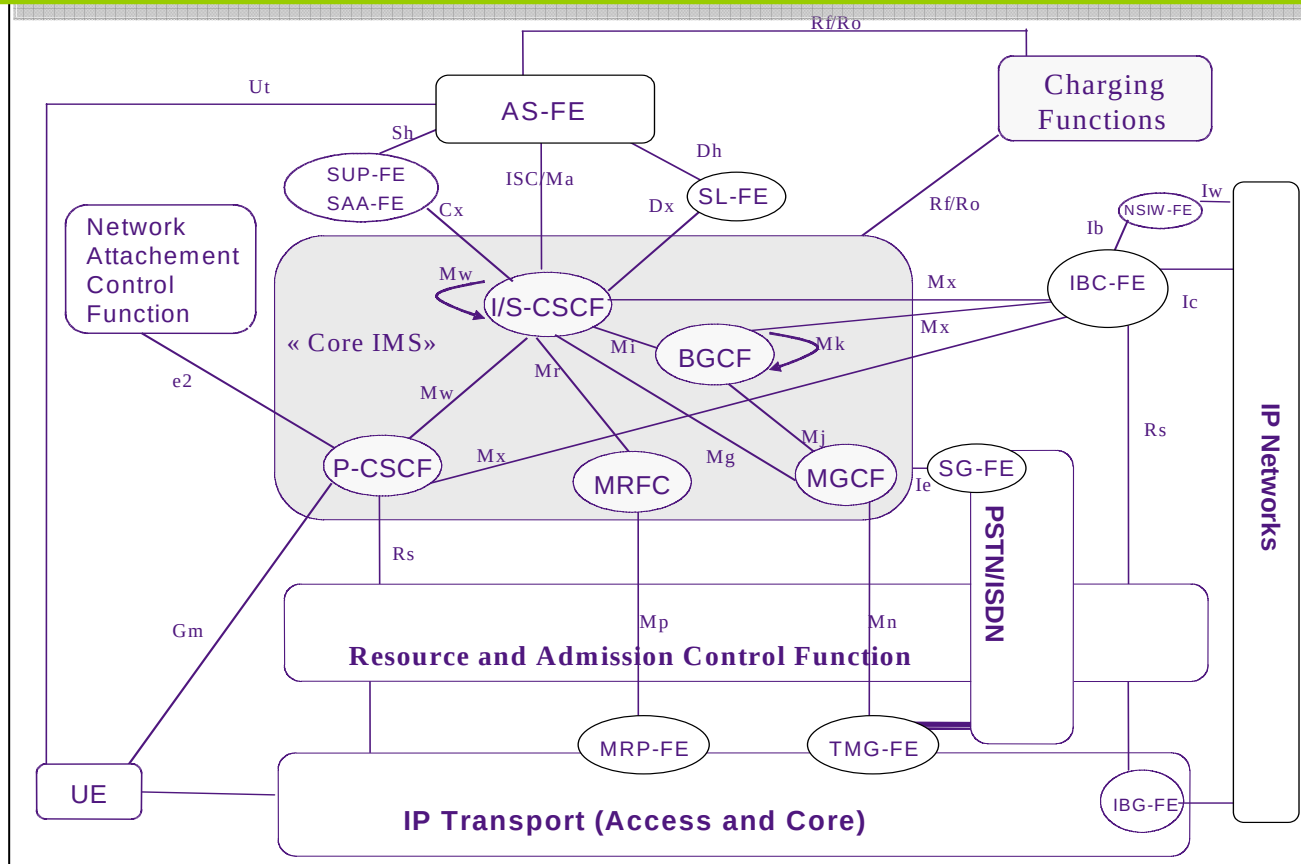
The IMS is a subsystem providing call processing and a variety of multimedia services over an IP-based packet-switching domain.

- Provides voice, video, presence, messaging, conferencing, and other services
- **Profiling complies with IETF standardized session control (SIP).**
- Independent of access network
- Application service platform is outside the scope of IMS



NGNs Based on IMS (Rec. Y.2021)

- Architecture centers on SIP proxy-equivalent Call Session Control Functions (**CSCFs**).
- Employs a technical **separation model** that decouples media processing elements and their controlling elements.



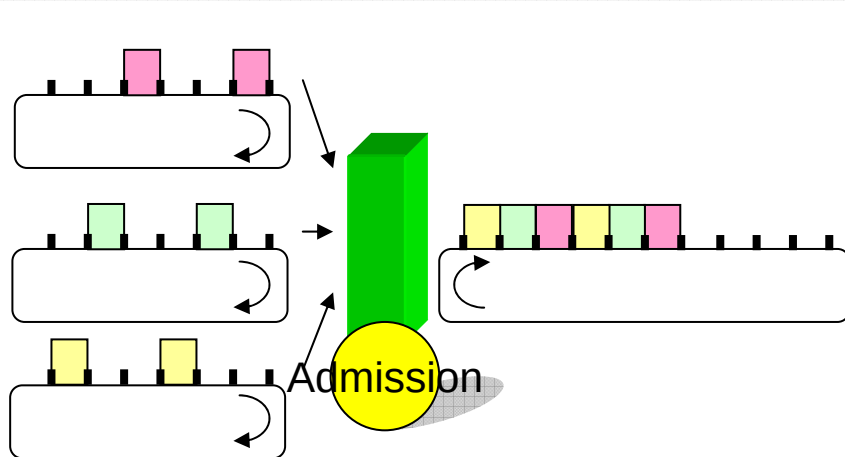
AS: Application Server
 BGCF: Breakout Gateway Control Function
 CSCF: Serving CSCF
 HSS: Home Subscriber Server
 IP-CAN: IP-Connectivity Access Network
 ISC: IMS Service Control Interface
 MGCF: Media Gateway Control Function
 MGW: Media Gateway
 MRFC: Multimedia Resource Function Controller
 MRFP: Multimedia Resource Function Processor
 P-CSCF: Proxy CSCF
 SLF: Subscription Locator Function

Functional entities of IMS

P-CSCF	Proxy Call Session Control Function
I-CSCF	Interrogating Call Session Control Function
S-CSCF	Serving Call Session Control Function
HSS	Home Subscriber Server
SLF	Subscription Locator Function
MRFC	Multimedia Resource Function Controller
MRFP	Multimedia Resource Function Processor
BGCF	Breakout Gateway Control Function
MGCF	Media Gateway Control Function
IMS-MGW	IMS-Media Gateway
AS	Application Server
SEG	Security Gateway
PDF	Policy Decision Function

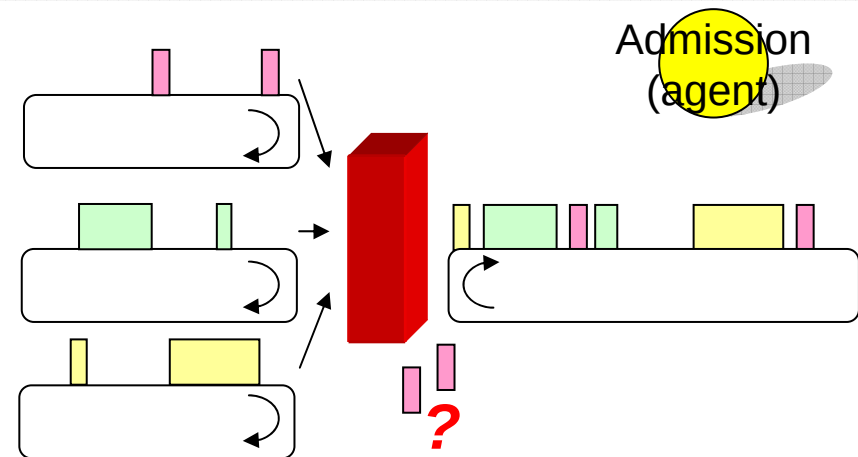
RACF: Control of QoS equivalent to PSTN

Stable quality is assured by limiting the proportion of voice traffic carried. To achieve this, admission control that collaborates with SIP is needed in addition to priority transport (Diffserve) of voice packets.



Conventional circuit switching (PSTN)

Unless timeslots are available,
no communication is set up.



IP packet switching

There is no clear
admission control.

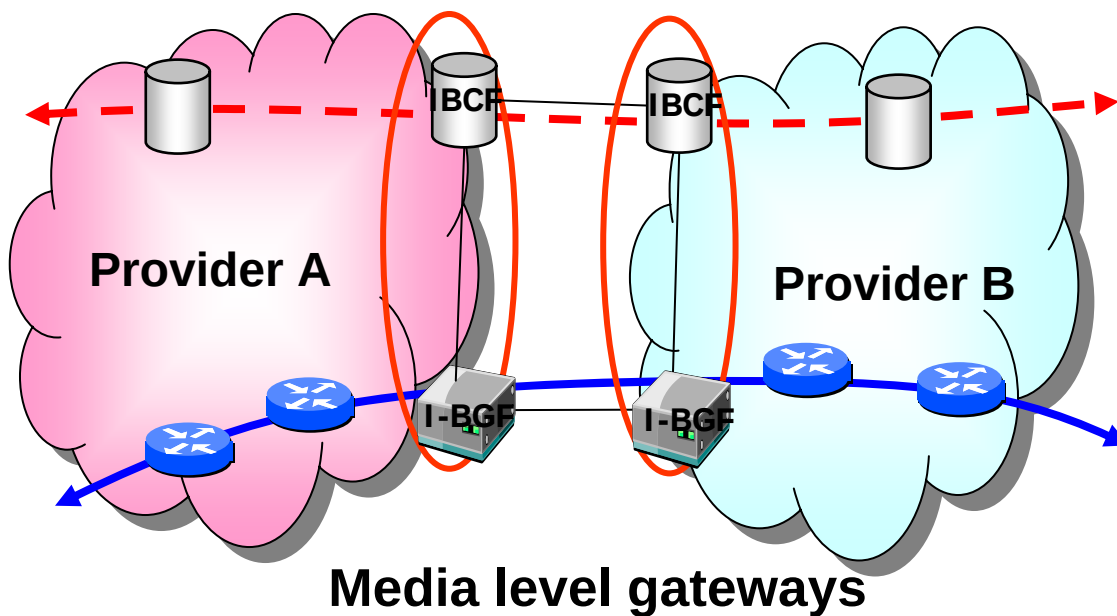


RACF (Resource and Admission Control Functions)

S/BC: Session Border Controller (Supplement to Y.2012)

S/BC allows reliable interworking between different providers.

Signalling path gateways



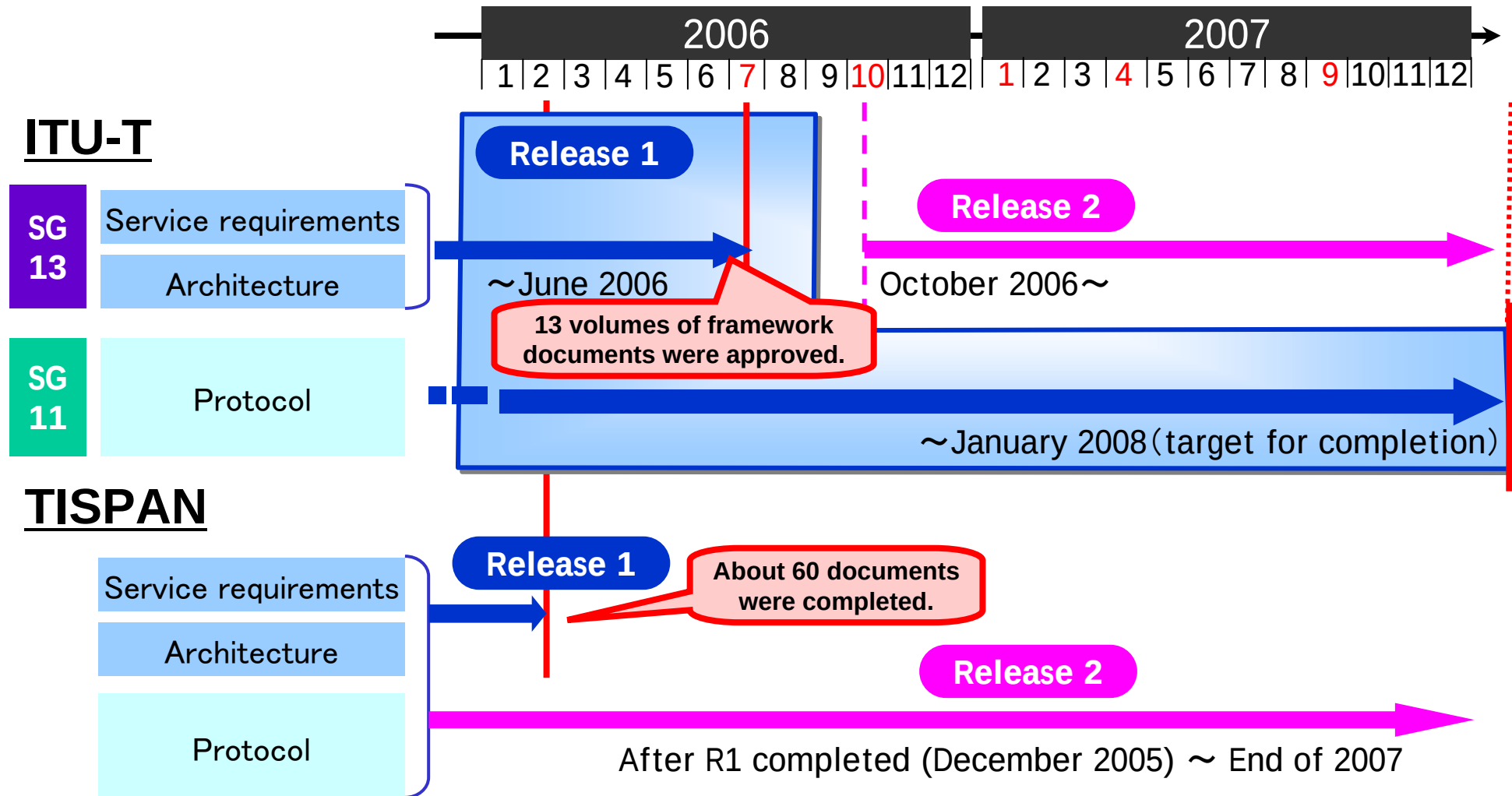
Examples of functions

1. Support for differentiated QoS
 - Packet-rate limiting
 - Validation of priority setting
 - Performance monitoring
2. Protection of network
 - NAT and firewall control
 - Hiding topology in signalling
3. Additional service features
 - IPv4/v6 translation
 - Codec translation
4. Billing and accounting
 - Packet-number counting

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Schedule of standardization on NGN



Major items for release 2 (under consideration)

The following items in addition to detail specifications of release 1 will be studied from a framework.

1. Full-mobility
2. IPTV including multicast
3. Future-packet-based network
4. High-speed wireless access
5. Single sign on
6. modeling and architecture user's home networks
7. Network Management

Major NGN Recommendations

	category	Recommendation	Publication	Short title
1	Outline	Y.2001	Dec/2004	General overview including definition
2		Y.2011	Oct/2004	Principles and general reference model
3	Scope of release 1	Supplement 1 to Y.2000 series	Jul/2006	NGN Release 1 scope
4		Y.2091	Mar/2007	Terminology
5		Y.2201	Apl/2007	NGN Release 1 Requirements
6	Architecture	Y.2012	Sep/2006	Functional Requirements and Architecture
7		Supplement 1 to Y.2012	Jul/2006	Session/Border Control Functions
8		Y.2013	Dec/2006	Converged services framework: functional requirements and architecture
9		Y.2021	Sep/2006	IMS for Next Generation Networks
10		Y.2031	Sep/2006	PSTN/ISDN Emulation Architecture
11	Traffic control	Y.2111	Sep/2006	Resource and Admission Control Functions
12		Y.2171	Sep/2006	Admission control priority levels in NGN
13	Evolution from PSTN/ISDN	Y.2261	Sep/2006	PSTN/ISDN evolution to NGN
14		Y.2262	Dec/2006	PSTN/ISDN emulation and simulation
15		Y.2271	Sep/2006	Call-Server-based PSTN/ISDN Emulation
16	Management	Y.2401/M.3060	May/2006	Principles for the Management of the NGN
17	Future packet-based network	Y.2061	Dec/2006	Fundamental characteristics and requirements of future packet-based networks
18		Y.2611	Dec/2006	High level architecture of future packet-based networks
19	Security	Y.2701	Apl/2007	Security Requirements
20	Mobility	Y.2801/Q.1706	Nov/2006	Mobility management requirements for NGN
21	Specification of OCAF	Y.2901	Dec/2006	The carrier grade open environment reference model
22		Y.2902	Dec/2006	Carrier grade open environment components
23	Resource control protocol	Q.3301.1	Mar/2007	Resource control protocol at Rs interface
24		Q.3302.1	Mar/2007	Resource control protocol at Rp interface
25	Signaling Profile	Q.3401	Mar/2007	NGN NNI Signalling Profile