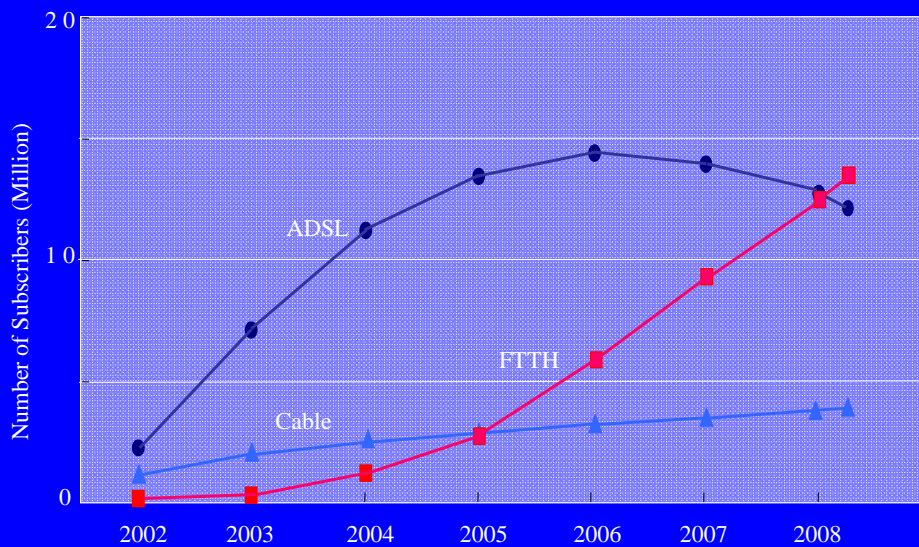


IEEE Distinguished Lecturer Program
Boston, MA, October 29, 2008

Trends of NGN and Its Issues

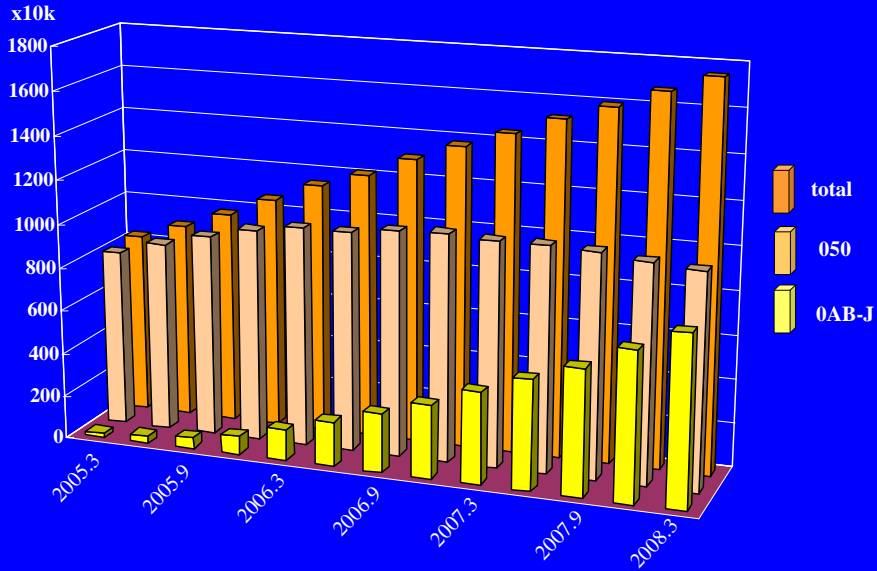
Koichi Asatani
Kogakuin University

Broadband Access in Japan



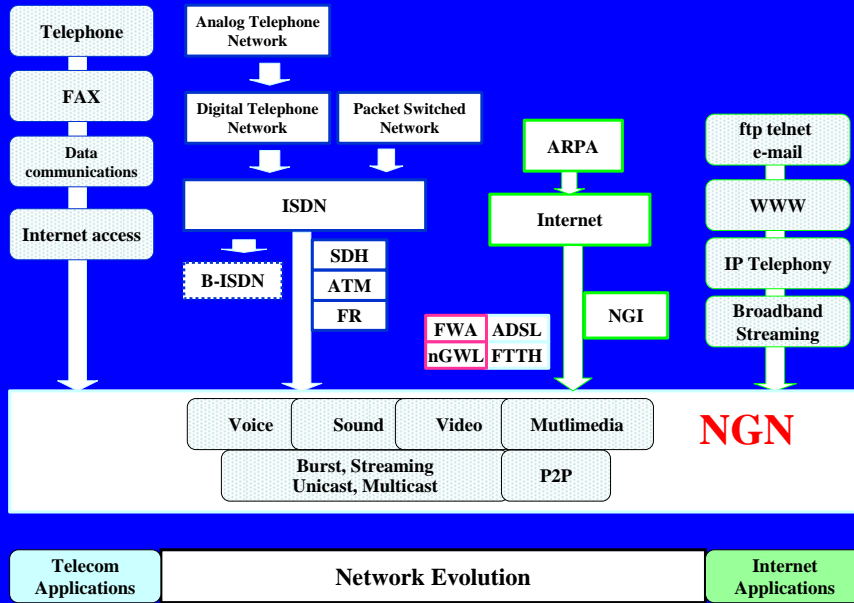
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IP Telephone Subscriber Number Growth



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Evolution in Networks and Applications



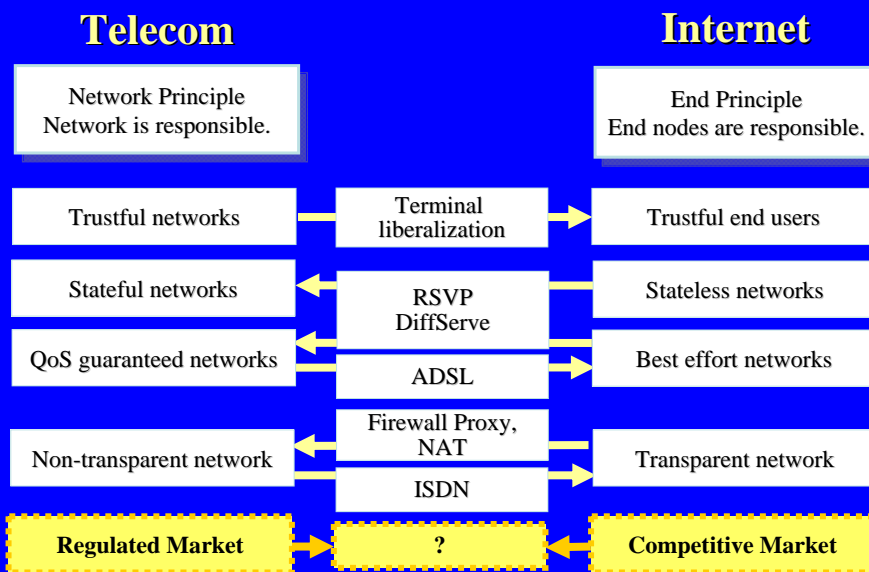
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Pros & Cons

	Telecom	Internet
PROS	Guaranteed QoS High Security High Dependability	Flexible Bandwidth Low cost
CONS	Fixed Bandwidth High Cost	Best Effort type of QoS Low Security Low Dependability Spams & Malware

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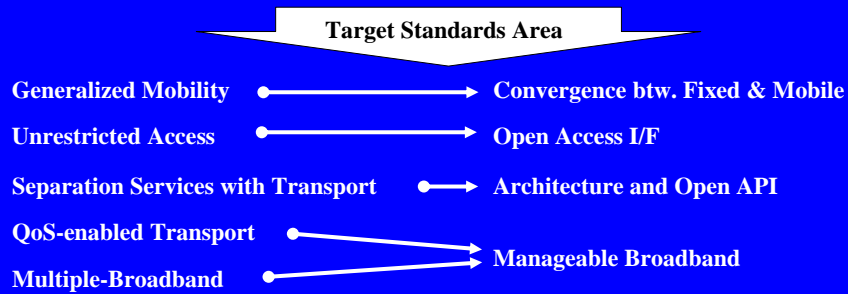
Network Principles and Convergence



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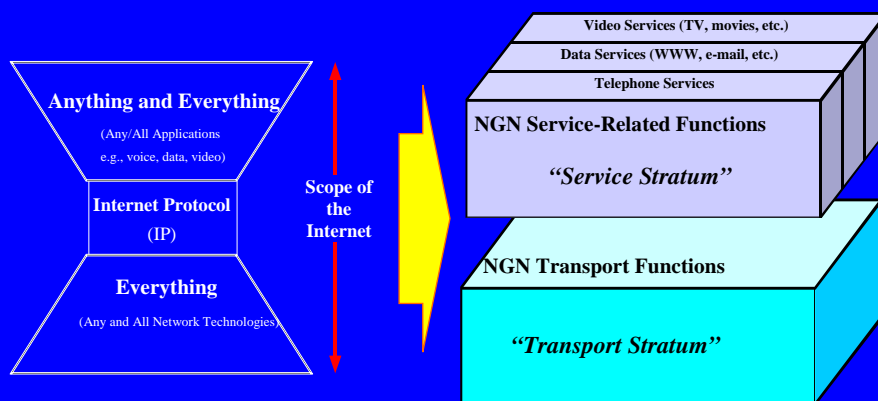
Definition & Features of NGN

- Packet-based network providing telecommunication services
- Making use of multiple broadband, QoS-enabled transport technologies
- Service-related functions independent from underlying transport-related technologies
- Providing unfettered access for users to networks and to competing service providers and/or services of their choice.
- Supporting generalized mobility, allowing consistent and ubiquitous provision of services to users.



Source: Rec.Y.2001
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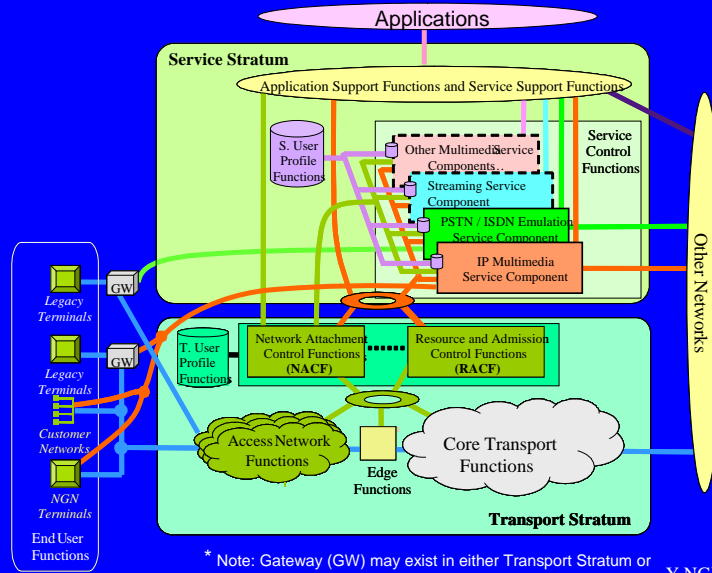
Next Generation Networks -Principles-



Source: ITU-T Recommendation Y.2011 —
General principles and general reference model for next generation networks

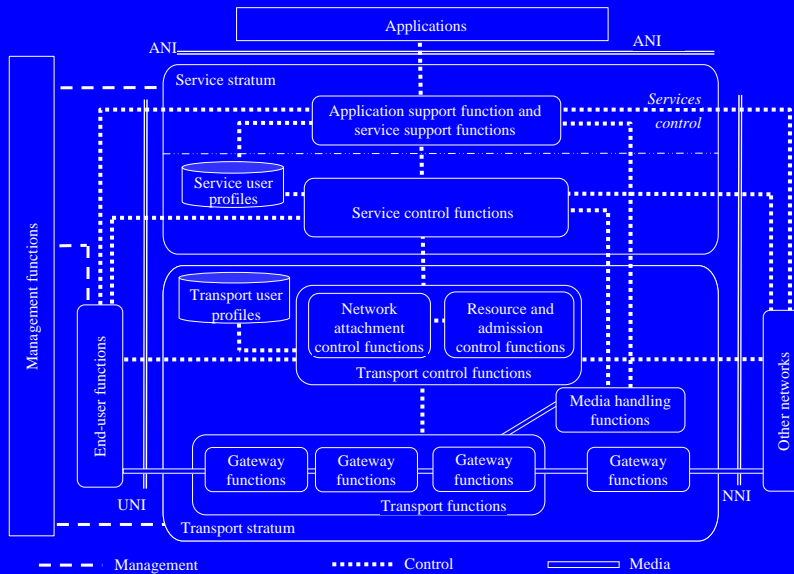
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NGN Transport and Service Configuration



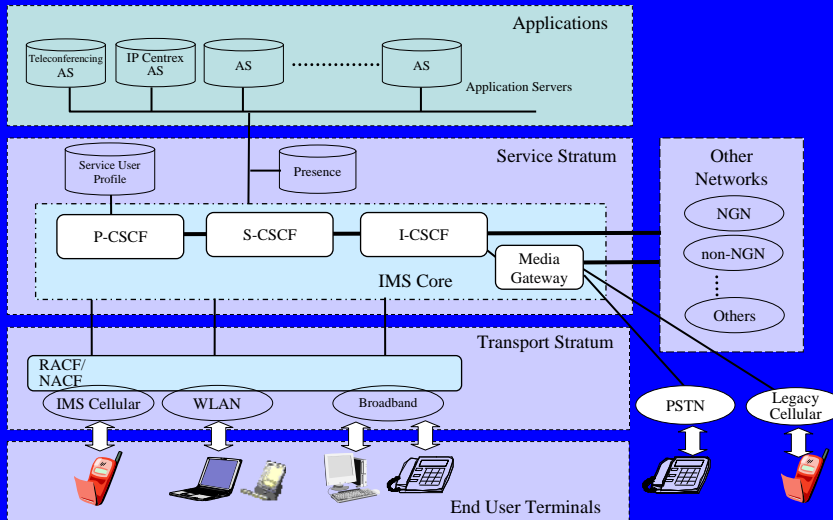
Y. NGN-FRA Figure 8 - Koichi Asatani 2008

NGN architecture overview



Source: Fig. 7.1/ITU-T Rec. Y.2013 and Fig. 1/ITU-T Rec. Y.2401/M.3060 Koichi Asatani 2008

IMS-based NGN Configuration Example

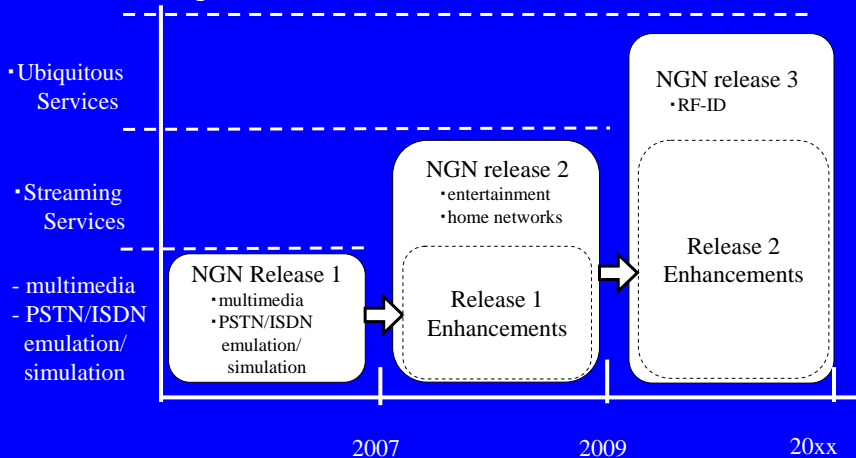


IMS : IP Multimedia Subsystems CSCF : Call Session Control Function
 S-CSCF : Serving-CSCF I-CSCF: Interrogating-CSCF P-CSCF : Proxy-CSCF
 RACF: Resource and Admission Function, PSTN: Public Switched Telephone Network

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NGN Standardization Release Approach

Services & Capabilities



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NGN Release 1 Service Capabilities(1/2)

Service Type	Outline
Multimedia Service	Real-time conversational voice services (interworking with PSTN and cellular networks)
	Real-time text
	Presence and general notification services
	Messaging service
	Push to talk
	Point-to-Point interactive multimedia services (video telephony)
	Collaborative interactive communication services
	Content delivery services
	Push-based services
	Broadcast/multicast services
	Hosted and transit services for enterprises (e.g., IP Centrex)
	Information services (e.g., highway monitoring)
	VPN services
	3GPP release 6 and 3GPP2 release A OSA-based services
PSTN/ISDN Emulation	Same or better PSTN/ISDN service
PSTN/ISDN Simulation	PSTN/ISDN like service

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NGN Release 1 Service Capabilities(2/2)

Service Type	Outline
Internet Access	Legacy Internet Access
Other Services	VPN
	Data retrieval (e.g., tele-software)
	Data Communications (e.g., file transfer, Web browsing)
	On-Line applications (e.g., On-line marketing, e-commerce)
	Sensor network service
	Remote Control/tele-action (e.g., Home application control, telemetry, alarming)
	OTN (Over-the-Network) device management
Public Interests	Lawful interception
	Malicious communication identification
	Emergency telecommunication
	User identifier presentation and privacy
	Network or service provider selection
	Support of users with disabilities
	Number portability
	Service unbundling
	Unsolicited bulk telecommunications protection

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NTT's NGN Services

Service		Content
Optical Broadband service (FLET'S Hikari Next service)		Service for Residential Users (single family house)
		Service for Residential Users (apartment house)
		Service for Business users
Optical Telephony service (Hikari Denwa and Hikari Denwa Office Type)	QoS Guaranteed	Hikari Telephony (Standard QoS, High QoS: 7kHz)
		Business Telephony
		Video Telephony
VPN service (FLET'S VPN Gate service)	QoS Guaranteed	VPN (Center-to-end, CUG) To be provided
	Best Effort	VPN (Center-to-End, CUG)
Content Delivery Service (FLET'S Cast service)	QoS Guaranteed	Unicast
		Multicast
	Best Effort	Unicast
		Multicast
Ethernet over NGN (Business Ether Wide service)		Ethernet

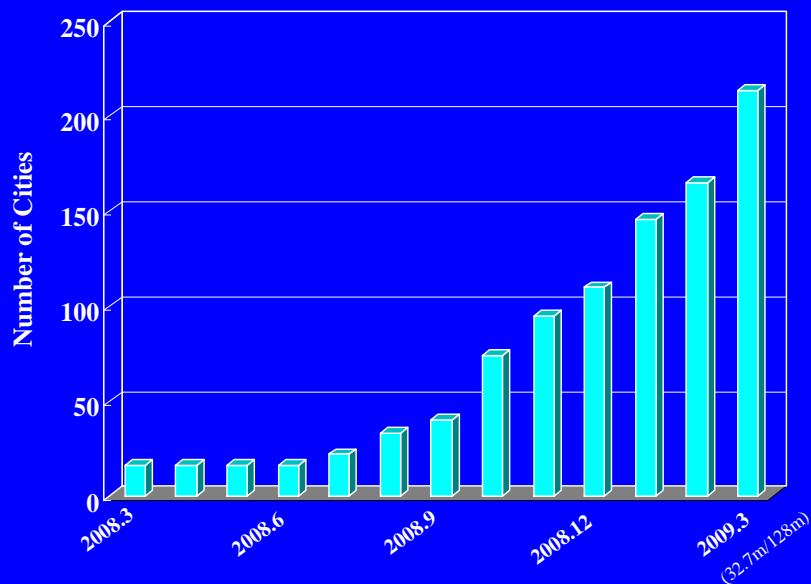
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NGN Telephony Protocol

Layer	Session Control	Media Control	Others
Application	SIP SDP	RTP RTCP G.722 (voice) H.264(video)	HTTP
Presentation			
Session			
Transport	UDP	UDP/TCP	
Network	IPv4/ICMPv4	IPv6/ICMPv6	
Data Link	ARP		
	IEE802.3-2005 MAC		
Physical	100Base-TX/10BaseTx		

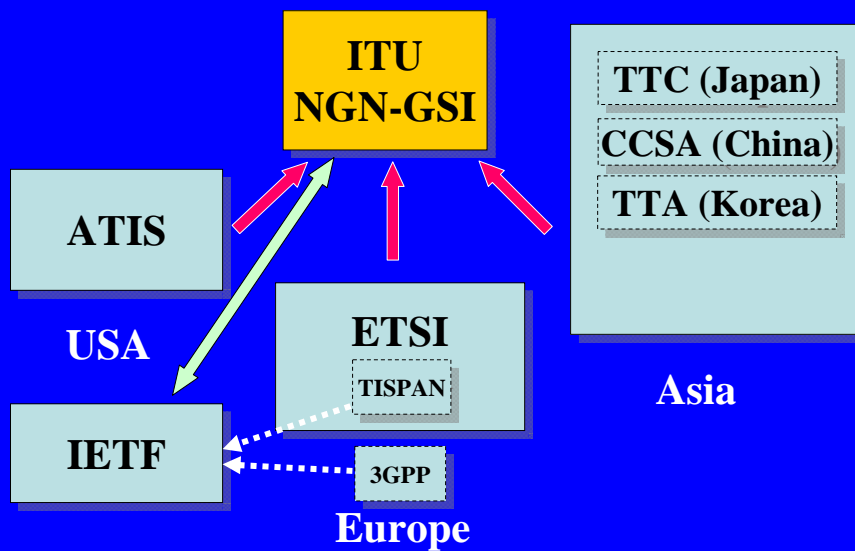
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NGN Service Areas



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NGN-related Standardization Organizations



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Next Generation IP Network Forum

Next Generation IP Network Forum

Chair: Prof. Tadao Saito (University of Tokyo)

Technology Group

Chair: Prof. Shigeki Goto
(Waseda University)

R&D and Standardization Group

Chair: Prof. Koichi Asatani
(Kogakuin University)

IP Terminal Group

Chair: Prof. Hitoshi Aizawa (University of Tokyo)

Planning and Promotion Group

Chair: Dr. Yuichi Matsushima (NICT)

Applications Promotion Group

Chair: Prof. Jiro Kokuryo (Keio University)

Strategic Planning WG

Home Networks WG

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Evolution and Convergence

Broadcast

Telecom
(Circuit Switched)

Internet
(IP)



Broadcast

(IP?)

NGN

(IP)

NGN

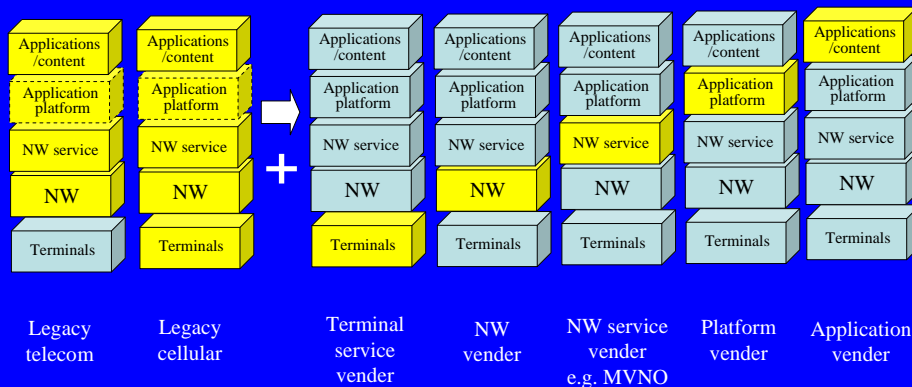
(IP)

Internet

(IP)

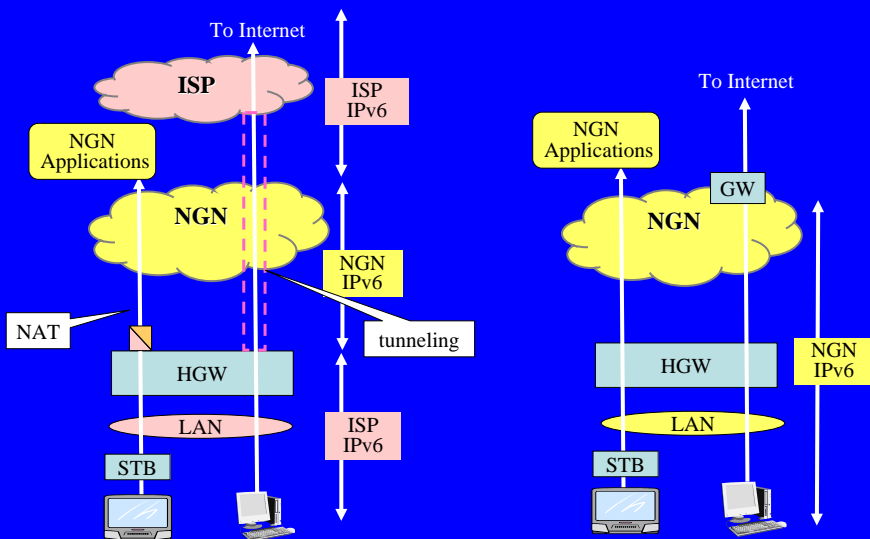
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New Business Models



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IPv6 Multi-prefix



HGW: Home Gateway, GW: Gateway, STB: Set top box

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Issues

- **Evolution and Convergence**
 - Harmonic FMC
- **New Business Models**
 - Service Creator Involvement
 - NGN as a service platform
- **Regulation**
 - Communication vs. Broadcast
- **Global Standards**
 - Global collaboration
- **Multi-prefix in IPv6 :**
 - Confliction between NGN IPv6 address and ISPs' IPv6 address both of which are assigned to the same terminal.

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Thank you!