Carrier Solution Business
Growth Strategy
– Network Infrastructure Business toward NGN -

March 7,2007

Botaro Hirosaki, Ph.D.

Executive Vice President

NEC Corporation

1. **Approach to NGN and IT / NW Solution Business**

2. Out Commitment toward NGN

   - NEC's Carrier Business Network Growth Strategy -

U can change.

Shift to All Digital / All IP

Band-free · **Media-free** · **Protocol-free** · **Location-free**

NGN

Network Providers

New Revenue Sources → **Fixed Carriers**

More New Services → **Mobile Carriers**

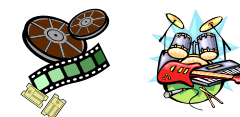### Service Providers

Google
YouTube™
skype

Broadcasters

Terrestrial / Satellite

Cable TVs

Contents Providers

Borderless Service Creation Environment

Network Equipment Vendors

Internet
CISCO

Telecom Gears
Alcatel·Lucent
ERICSSON — TAKING YOU FORWARD
Fixed   **Mobile**

IT Vendors

Microsoft
IBM
intel

CPE Vendors

Standardization

IETF
ITU
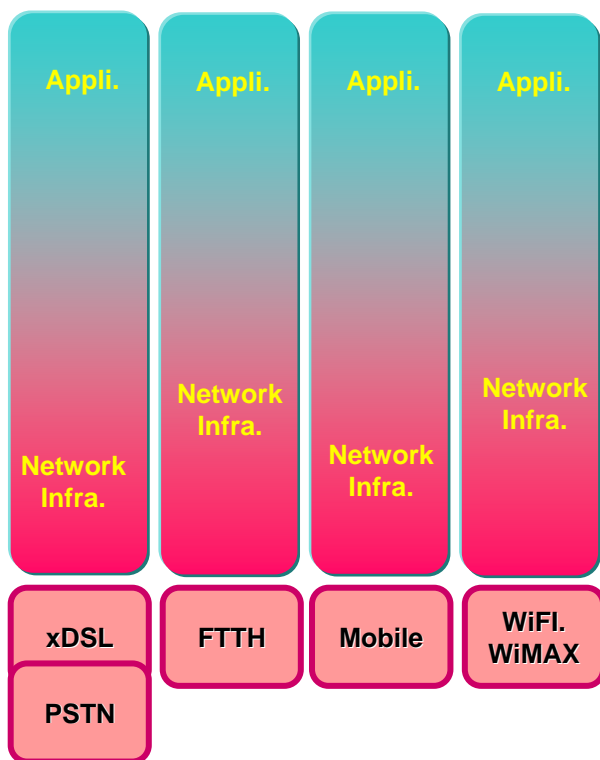3GPP — A GLOBAL INITIATIVE
ETSI
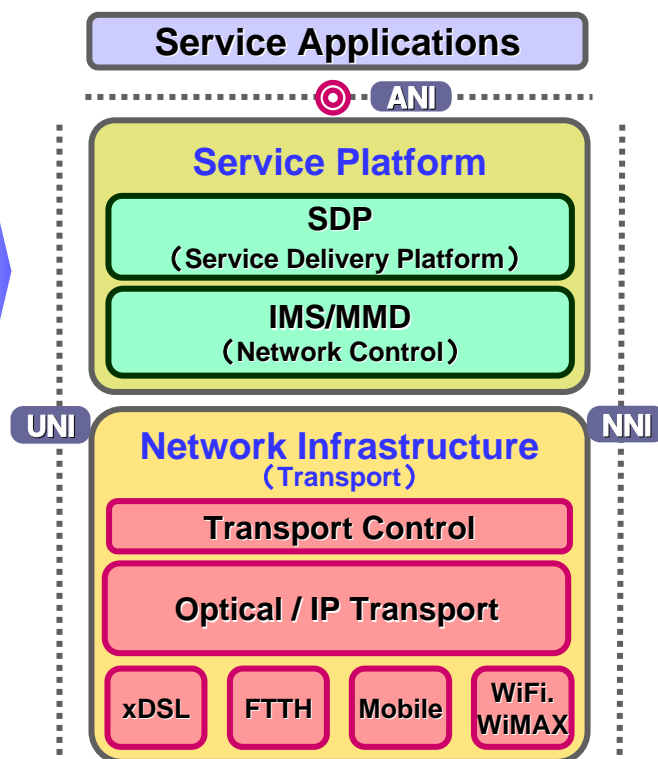tispan

What is NGN?

NGN：Flexibility for new business model creation

◆ **All IP** ： **Two-layer structure (Transport & Service)**

◆ **Open Interface Points** ： **ANI-UNI-NNI**

― Traditional ―

Appli.	Appli.	Appli.	Appli.
Network Infra.	Network Infra.	Network Infra.	Network Infra.
xDSL	FTTH	Mobile	WiFI. WiMAX
PSTN			

― NGN ―

Service Applications

◎ ANI

Service Platform

SDP
（Service Delivery Platform）

IMS/MMD
（Network Control）

UNI   NNI

Network Infrastructure
（Transport）

Transport Control

Optical / IP Transport

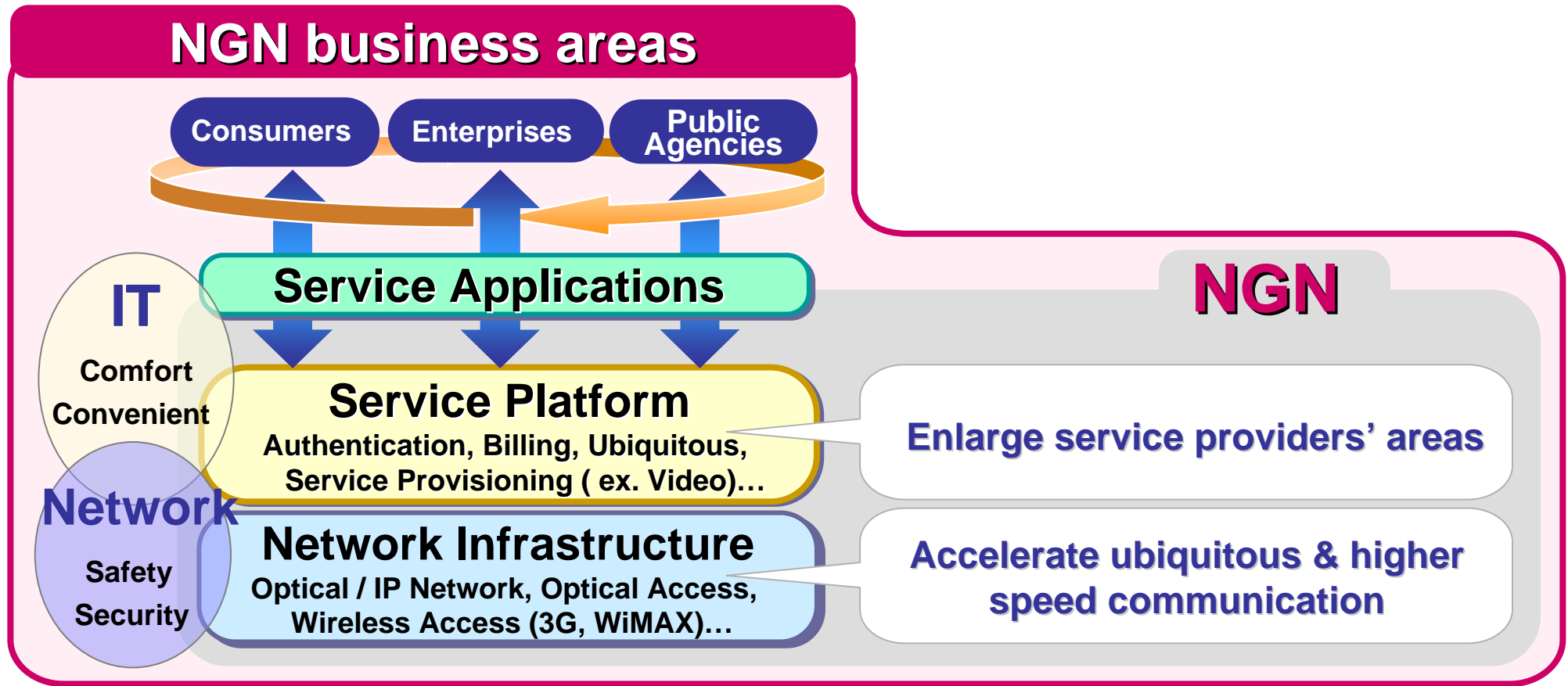| xDSL	FTTH	Mobile	WiFi. WiMAX

NGN vs. Internet

NGN

- Security & quality assurance provided by Network operators
- Efficient service creation by ANI
- Inter-network connection by NNI
- Seamless service provisioning to users by UNI
- Network management/control function (QoS, SLA)

Internet

- User's own risk
- Best-effort
- Autonomy-based (No central administration)
- Ease of use

- SDP： Service Delivery Platform
- IMS： IP Multimedia Subsystem
- MMD： Multimedia Domain
- ANI： Application Network Interface
- UNI： User Network Interface
- NNI： Network-Network Interface

NGN business areas

Consumers · **Enterprises** · **Public Agencies**

IT

Comfort
Convenient

Network

Safety
Security

Service Applications

Service Platform
Authentication, Billing, Ubiquitous, Service Provisioning (ex. Video)…

Network Infrastructure
Optical / IP Network, Optical Access, Wireless Access (3G, WiMAX)…

NGN

Enlarge service providers' areas

Accelerate ubiquitous & higher speed communication

NGN : Enabler of New Business Creation

◆ **As a leading company of both IT & NW industries, NEC will support your business innovation in all layers**
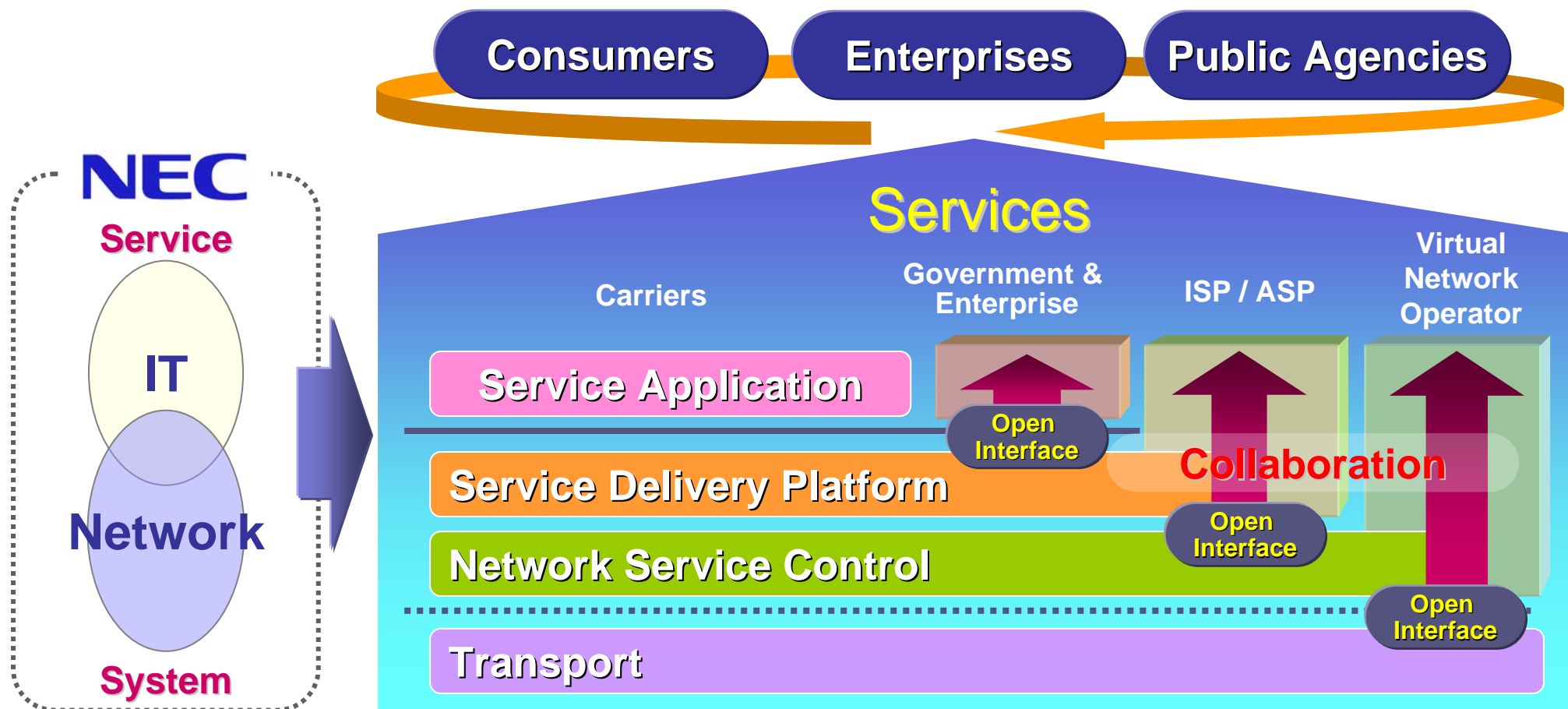
1. Approach to NGN and IT / NW Solution Business

2. Out Commitment toward NGN

   - NEC's Carrier Business Network Growth Strategy -

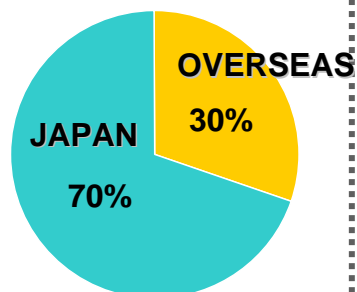U can change.

Outline of NEC Carrier Network Business

Sales

- Carrier Network sales-

¥ 992.9Bil

Network Systems
- Enterprise network
- **Carrier Network （70%）**

March,2006

-Sales by Market-

- OVERSEAS 30%
- JAPAN 70%

Resources

▶ **Employees** ：About 10,000

▶ **Subsidiaries (** Carrier Network Business **)**
- Japan ：12
- Overseas ：27

Business Areas

NEC

Service Applications

◎

Service Platform
- SDP (Service Delivery Platform)
- IMS/MMD (Network Control)

Network Infrastructure
- Transport Control
- Optical / IP Transport
- Access (Mobile、WiFi, WiMAX, xDSL, FTTH)

Enterprise Network	CPE

Carrier Network Biz. Business Area

Carrier Network Business Environment

◆ **Japan** ：
Expectations for further investment toward NGN deployment

◆ **Overseas** ：
Steady growth of emerging market , Recovery of advanced market

Japanese market size

（¥1Bil）

CAGR:3%
（'06～'09）

Demand for new services expected grow

NGN
30-40%

2,000
1,500
1,000
500
0

'05　'06　'07　'08　'09

Estimated by NEC

Overseas market size

（¥ 1Trillion）

CAGR:5%
（'06～'09）

Service Platform

Network Infrastructure

20
15
10
5
0

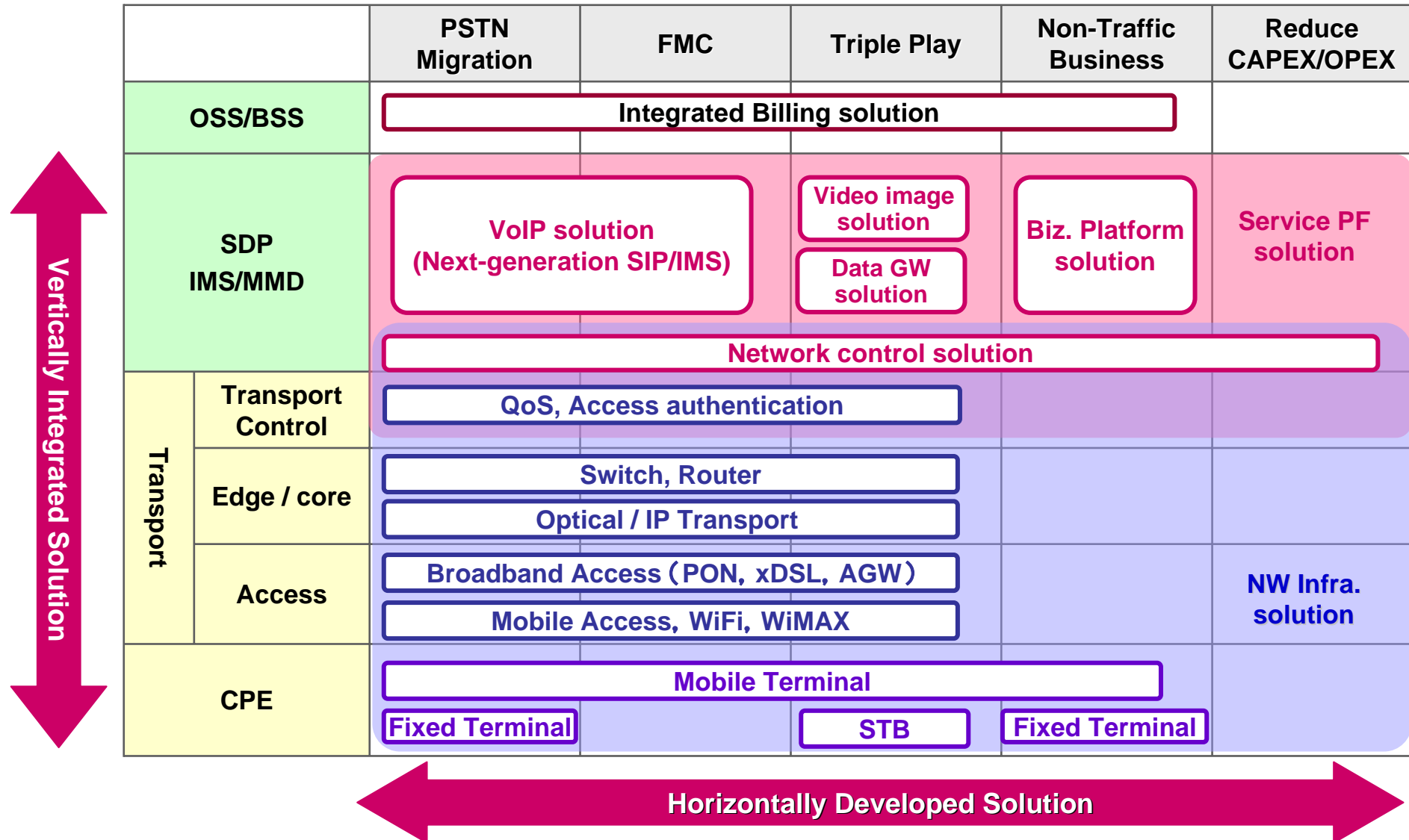'05　'06　'07　'08　'09
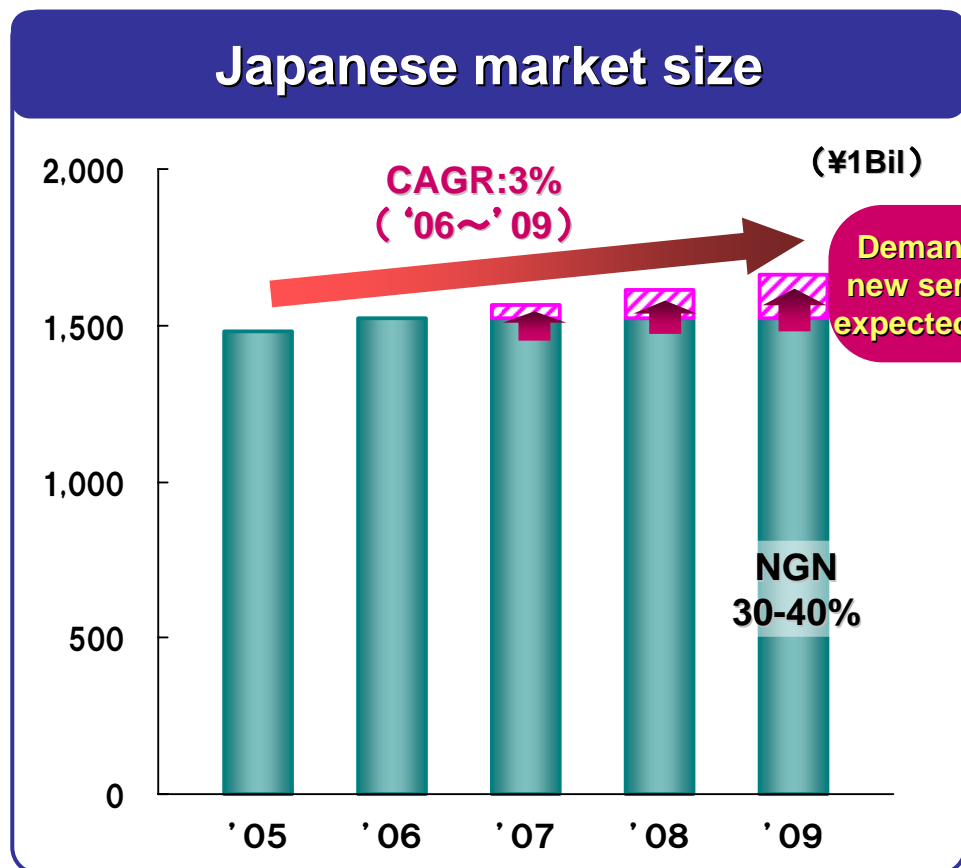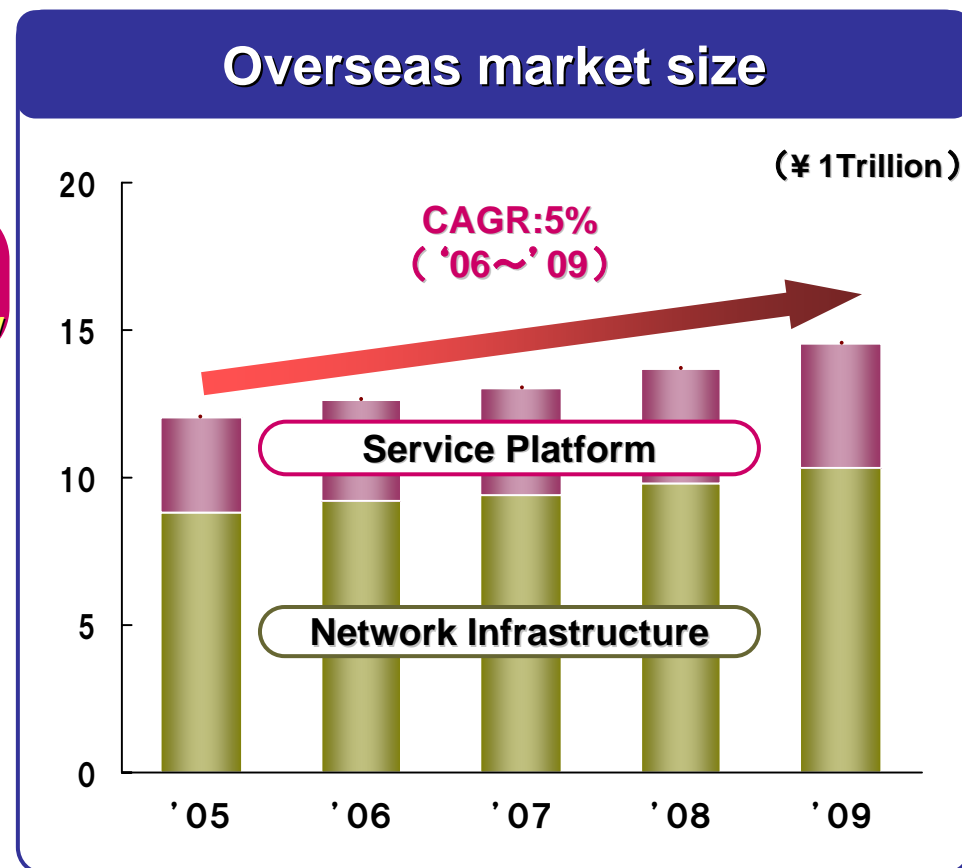
Estimated by NEC

Driving Force of Business Growth in NGN era

NEC's Advantages

◆ **Capability of end-to-end solution supply**

- From infrastructure to applications
  "Full-layer & Full-line" solution lineup
- NO.1 Position in Japan , the most NGN-advanced country

◆ **Expertise & Experiences in service platform layer**

- Higher capability of development

- Abundant records

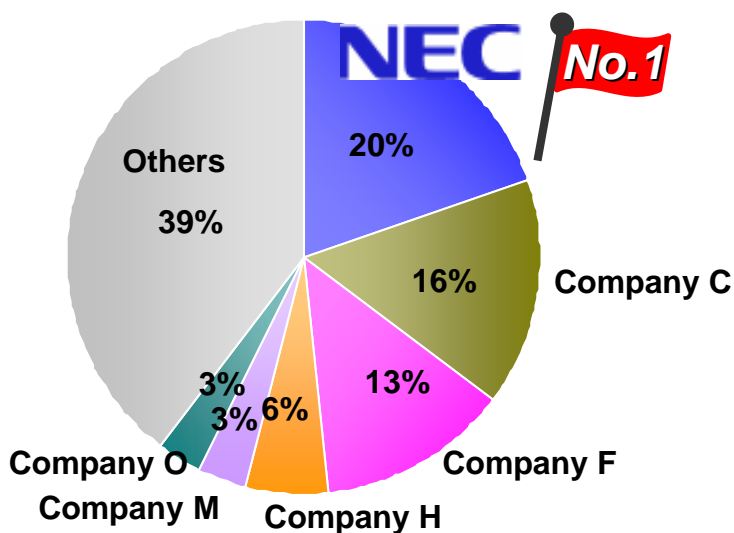◆ **Technology innovation towards NGN**

◆ **Footprints in overseas market**

Advantage of NEC : "Full-layer & Full-line" Solution Lineup

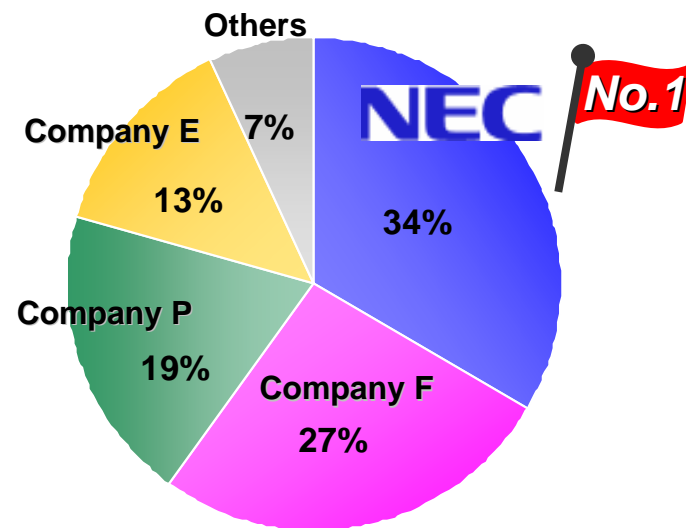## Total Solution lineup from Transport to Services

	PSTN Migration	FMC	Triple Play	Non-Traffic Business	Reduce CAPEX/OPEX
OSS/BSS	Integrated Billing solution				
SDP IMS/MMD	VoIP solution (Next-generation SIP/IMS)		Video image solution / Data GW solution	Biz. Platform solution	Service PF solution
	Network control solution				
Transport — Transport Control	QoS, Access authentication				
Transport — Edge / core	Switch, Router / Optical / IP Transport				
Transport — Access	Broadband Access（PON，xDSL，AGW）/ Mobile Access, WiFi, WiMAX				NW Infra. solution
CPE	Mobile Terminal				
	Fixed Terminal		STB	Fixed Terminal	

Vertically Integrated Solution

Horizontally Developed Solution

Advantage of NEC : NO.1 Position in Japan

Market share[*] of Wire-line equipment in Japan

- NEC: 20% — No.1
- Company C: 16%
- Company F: 13%
- Company H: 6%
- Company M: 3%
- Company O: 3%
- Others: 39%

Market share[**] of WCDMA base station in Japan

- NEC: 34% — No.1
- Company F: 27%
- Company P: 19%
- Company E: 13%
- Others: 7%

Network equipment

- Optical transmission equipment
- Networking Equipments
  (ex. Router, Switch, Broadband Access ...)
- VoIP equipments (For carriers, enterprises...)
- VPN / Security equipment

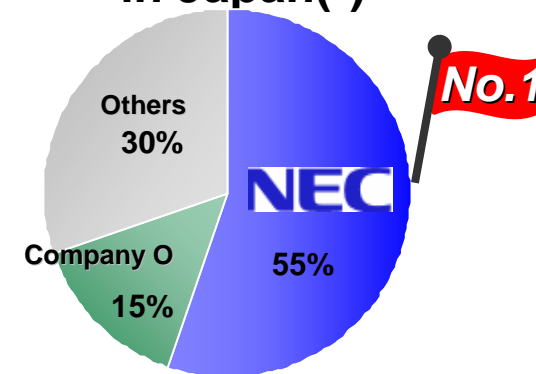(*)   Fuji Chimera Research Institute, 2006

(**)   MCA, 2006

Expertise & Experiences in Service Platform Development

◆ **Outstanding System Integration Capability realizing Carrier-Grade Service**

- Abundant "Know-How" accumulated through the supply of universal service systems (Switching equipment)
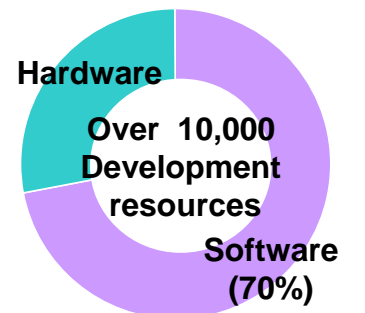
- Application to NW-software development

◆ **Massive software development power**

- NW Vendors < NEC
  (Utilization of IT Solution Software Resources)

- IT Vendors < NEC
  (Abundant experiences in NW-Biz)

Market Share for Softswitch in Japan(*)

No.1

NEC

Others 30%

Company O 15%

55%

(*)Fuji Chimera Research Institute, 2006

Hardware

Over 10,000 Development resources

Software (70%)

Development resource (as of FY2006, incl. partners)

NEC

+

IT Solution Biz. SW development resource

U can change.

Network product created through Technology Innovation

Service Application

Service Platform

SDP
(Service Delivery Platform)

IMS/MMD
(Network Control)

Network Infrastructure

Transport Control

Optical / IP Transport

Mobile | WiFI. WiMAX | xDSL | FTTH

Carrier-grade Software Development :"NC9000/7000/5000 Series"
- ►**Field-proven by major operators**
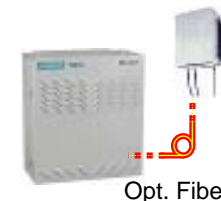- ►**High-reliability (99.9999%)**
- ►**aTCA, UNIX -based**

High-end optical transmission technology : "DWDM4200 Series"
- ►**40Gbs , Maximum 80 wavelengths**
- ►**Supporting GMPLS, optical cross-connect**

Radio/Optical Convergence technology :"WCDMA base station"
- ►**Field-proven by major mobile operators**
- ►**Antenna extension by optical fiber**

Opt. Fiber

Application of Carrier-grade IP technology :"Router/ Switch"
- ►**IP technologies developed over switching-circuit equipment**
- ►**Collaboration with Juniper , Alaxala**

Enterprise IT/NW system

- Middleware for "Voice over IP Network"
- VoIP security
- Mobile E-ticket platform

Service Platform

- Service Integration Environment
- Multi-media Push to Talk
- High-quality Multicast Broadcasting System
- Quality Degradation Analysis for Large-scale Networks
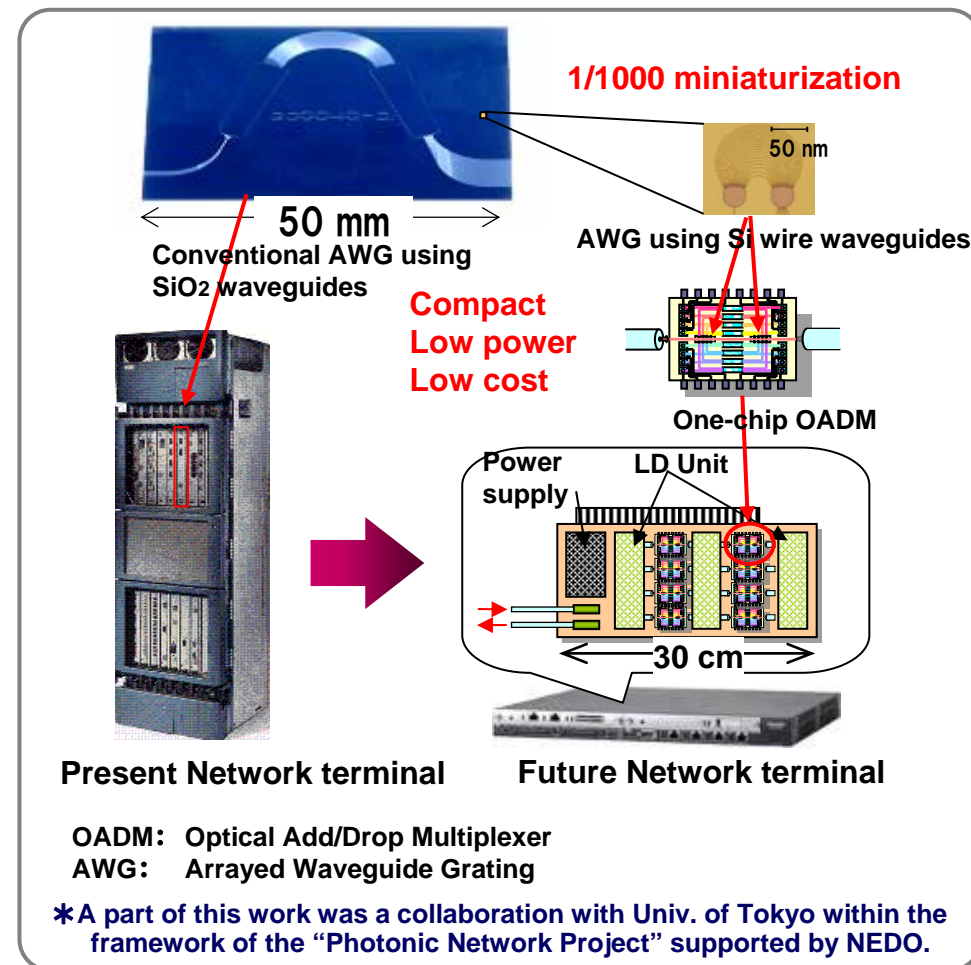- Data Mining for Fault Symptom Prediction

Transport

- 40Gb/s DWDM Long-haul Transport System
- Optical IP Network Control System
- Photonic Integrated Circuits with Si Photonics
- 10Gbps High Performance Security Platform
- Quantum Cryptography Network

Terminals

- Multicore Processor
- Highly Functional Bioplastics

- Photonic Integrated Circuits with Si Photonics -

Miniaturizing and integrating optical devices by combining micro-photonics and Si nanofabrication technology

1/1000 miniaturization

50 nm

50 mm

Conventional AWG using SiO2 waveguides

AWG using Si wire waveguides

Compact Low power Low cost

One-chip OADM

Power supply   **LD Unit**

30 cm

Present Network terminal   **Future Network terminal**

OADM： Optical Add/Drop Multiplexer
AWG： Arrayed Waveguide Grating

＊A part of this work was a collaboration with Univ. of Tokyo within the framework of the "Photonic Network Project" supported by NEDO.

Advantage of NEC : Footprints in Overseas Market

Supply record of NEC's Network equipments (# of countries)

- ◆ **MW radio (trunk)**   **150**
- ◆ **MW radio (PASOLINK)**   **123**
- ◆ **Optical Transmission**   **105**
- ◆ **Switching**   **71**
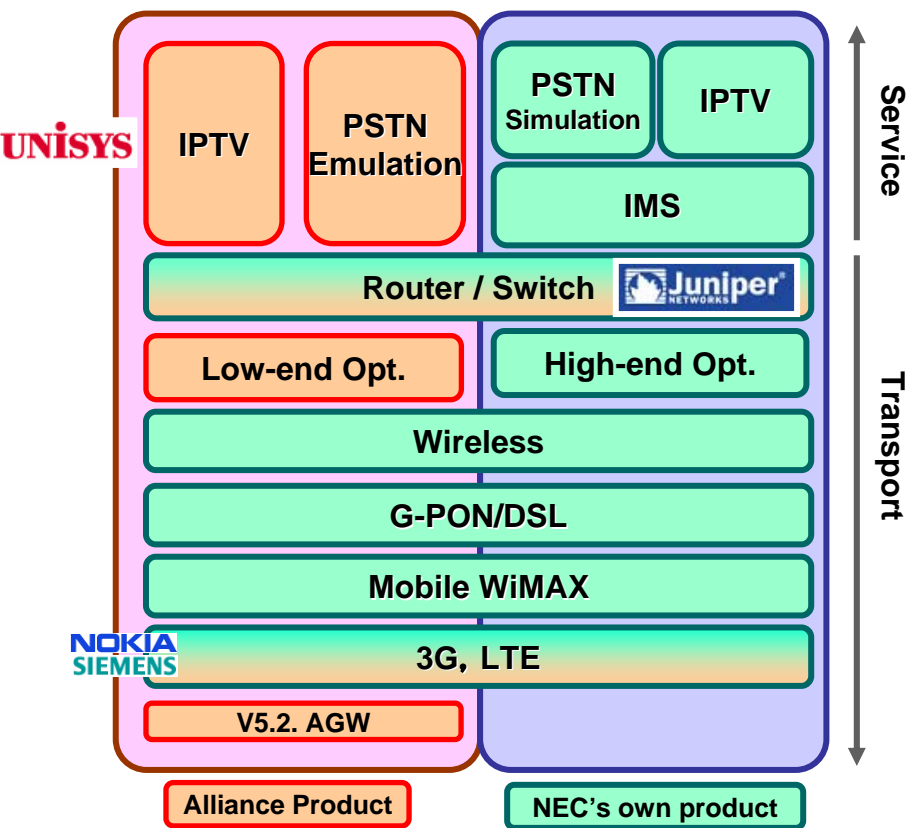- ◆ **WCDMA**   **30**
- ◆ **i-mode Service**   **9**

- ◆ **World-wide customer bases**
- ◆ **Solution lineup fully conforming to global specifications**
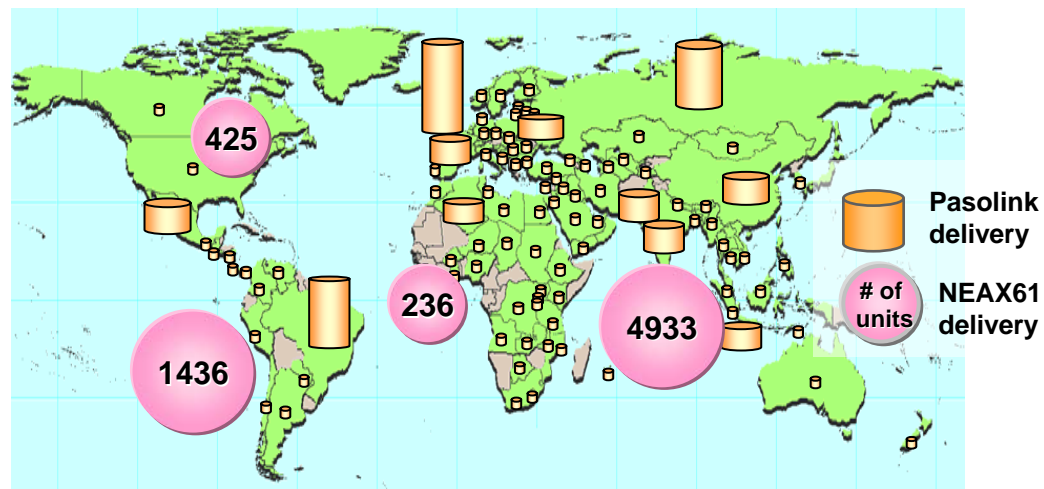
Advanced market

Emerging market
(e.g. BRICs)

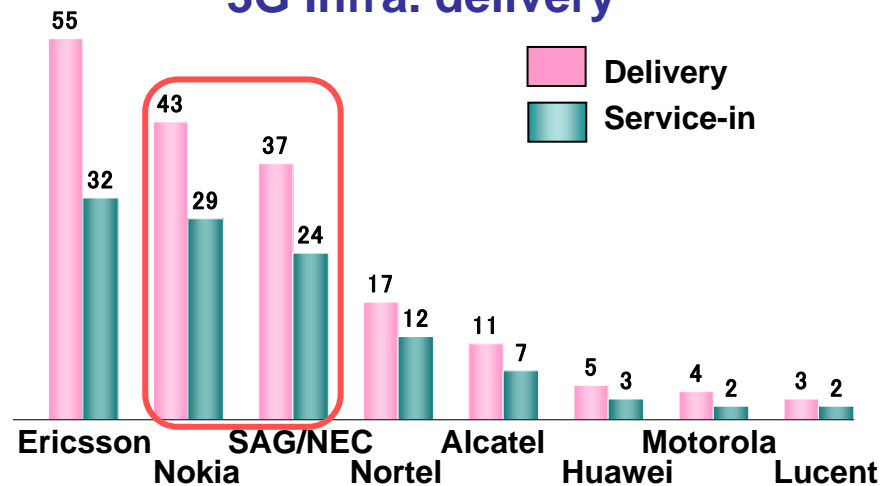# NEC's Activities toward NGN (Overseas Market)

Alliance with partners

Overseas market ← → Japanese market

Pre-/Non-IMS market (Low-end)	IMS based market (High-end)

UNISYS

		PSTN Simulation	IPTV	
IPTV	PSTN Emulation	IMS		Service

Router / Switch **Juniper** NETWORKS	

Low-end Opt.	High-end Opt.

Wireless		Transport
G-PON/DSL		
Mobile WiMAX		

NOKIA SIEMENS

3G, LTE
V5.2. AGW

Alliance Product | NEC's own product

Global Customer Bases
- NEAX61/ Pasolink -

425
236
4933
1436

Pasolink delivery

# of units → NEAX61 delivery

3G Infra. delivery

■ Delivery
■ Service-in

	Ericsson	Nokia	SAG/NEC	Nortel	Alcatel	Huawei	Motorola	Lucent
Delivery	55	43	37	17	11	5	4	3
Service-in	32	29	24	12	7	3	2	2

Mid-Term Business Vision
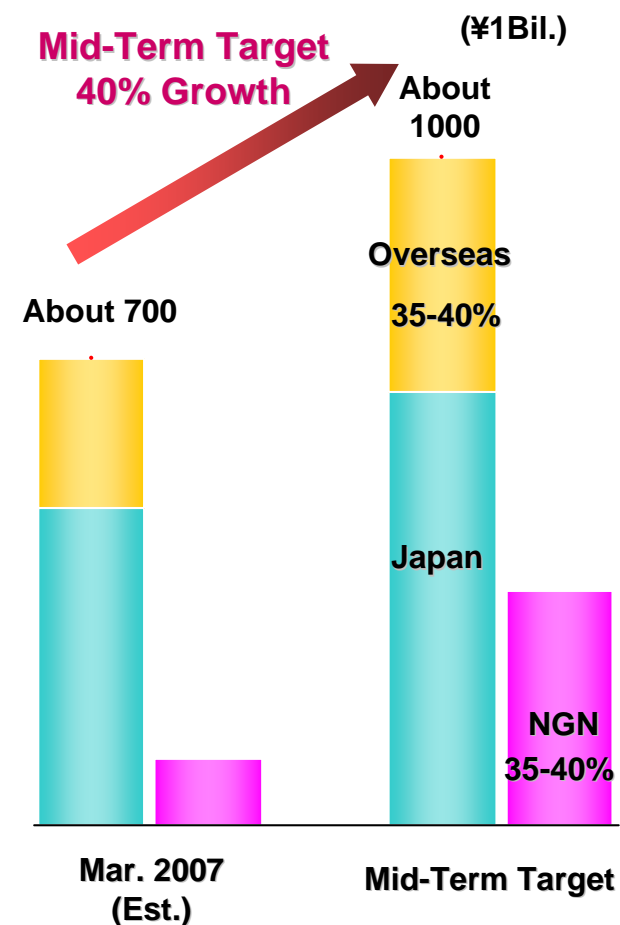
We would like to be …

◆ **Global Major Player in NGN market**

  • Best partner for Global Major Carriers

  • Global top supplier of NGN products

◆ **Strong Biz. Entity through "Empowered by Innovation"**

  • Software-oriented Biz. model

  • Product development with common platform

  • Establishment of global operations structure and cultivation of global major customers
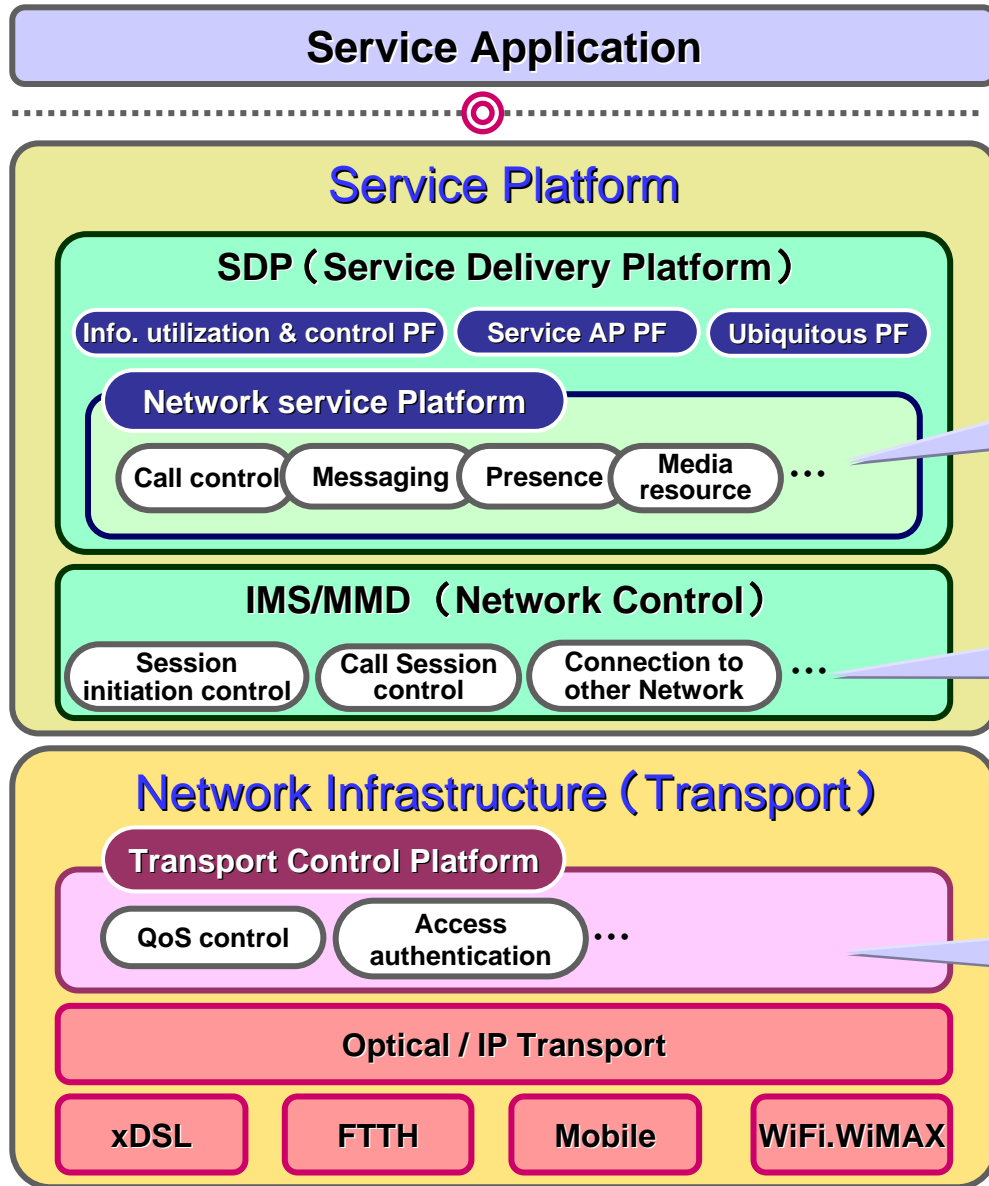
  • Strategic Alliance

Carrier Network business Sales

(¥1Bil.)

Mid-Term Target 40% Growth

About 1000

About 700

Overseas 35-40%

Japan

NGN 35-40%

Mar. 2007 (Est.)

Mid-Term Target

U can change.

NGN Transport Product Roadmap

Feature expansion for further market competitiveness

			FY Mar.08	FY Mar.09	FY Mar.10	
Optical Transport	DW4200 UN5000	ROADM	40G	WXC	GMPLS	100G
		MSP		RPR	GMPLS	Multi RPR, Hybrid SW
Router / Switch	CX2600 Alaxala Juniper	SAS	CES,PON / E-OAM	MPLS / PBB,PBT	WDM	Multicast — L7 — 100G
		Edge	Ring	SBC	IPsec	interworking with Mobile
		Core		I-BGF	interworking with SAS — interworking wuth IMS	
Media Processing	CX8000	MG	MGW	SBC	Traffic control	
		MRF		Voice/Video IVR	Voice Authentication /synthesis	Broadband Video delivery
		Handler		HA	IPsec	Load balancer
Broadband Access	AM3110	MSAN	DSL/GPON/POTS	WiMAX		λ PON/10GbE
		FTTH (Terminal)	ONU	HGW/three wavelengths		
		VDSL (Terminal)	HGW	VDSL2+	Multicast	
FWA	Pasolink		Optical Interface/MUX	Router function		Opt/IP Interface
Mobile	WCDMA	CN	MRF		SAE	
		RAN			LTE	
WiMAX			Mobile WiMAX			

U can change.

© NEC Corporation 2007   19

NGN Software Products

Service Application

Service Platform

SDP（Service Delivery Platform）

- Info. utilization & control PF
- Service AP PF
- Ubiquitous PF

Network service Platform

- Call control
- Messaging
- Presence
- Media resource
- …

IMS/MMD （Network Control）

- Session initiation control
- Call Session control
- Connection to other Network
- …

Network Infrastructure（Transport）

Transport Control Platform

- QoS control
- Access authentication
- …

Optical / IP Transport

- xDSL
- FTTH
- Mobile
- WiFi.WiMAX

◆ **Core products toward IT/NW convergence**

◆ **Takes lead in full-layer product portfolio over competitors**

NC7000 Series   Sep.2006

▶ Efficient Service development & operation
▶ Communication service development Know-How embodied over 4types components

NC9000 Series   May 2006

▶ NGN / IMS based SIP Call control function
▶ Highly reliable Mid-ware
▶ GMI (Global MSF Interoperability) test among Asia, Europe and US

NEW

NC5000 Series

▶ Transport control realizing high-quality, safety, reliability
▶ Interworking with NC9000, Decision of control information regarding band assurance & priority control for each services, QoS control to Transport Node

NGN Software Product Roadmap

Expansion of service function in response to market needs

				FY Mar.08	FY Mar.09	FY Mar.10	
SDP	NC7000-CC	Call control	Basic function	Compliance with global Standardization : Service Enabler Expansion（Media-free, Community service, Communication & Broadcast Convergence ） Function / Scalability Improvement			
	NC7000-PR	Presence					
	NC7000-MS	Messaging					
	NC7000-MR	Media Resource					
IMS/ MMD	NC9000-SS	Session Initiation Control (SIP)	Basic function	Compliance with global Standardization : Expansion of Service Application			
	NC9000-SC / PC	Call session Control (S-CSCF/P-CSCF)					
	NC9000-HS / SF	Subscriber control (HSS/SLF)					
Network Control	NC5000-PD	QoS control	Basic function	Compliance with global Standardization : ID control, Security, various menu			
	NC5000NS	Access authentication					

CC： Call Control
PR： Presence
MS： Massaging
MR： Media Resource

SS： SIP Server
SC： S-CSCF
PC： P-CSCF
HS： Home Subscriber Server
SF： Subscription Locator Function

PD： Policy Decision Function
NS： Network Attachment Subsystem

CSCF：Call Session Control Function

U can change.

Progress in Japanese NGN Market

- Current NGN Order Receipt -

		Network Market Size （incl. NGN）	NGN Order Receipt	NEC's products & solutions corresponding to NGN requirements			Competitors
Service Platform	SDP	More than ¥500 Bil.	◎	NC7000 Series			Companies F, H
				Other Service Delivery Platform systems			
	IMS/MMD		◎	NC9000 Series			Companies E, O
				Other Network control Platform systems			
Network Infrastructure	Transport control	Around ¥1Trillion.	○	NC5000 Series			
	Core / Router		◎	Juniper	IP8800 Series		Companies C, F
	Core / Transmission		◎	DW4000 Series	DW4200 Series	UN5000 Series	Companies C, F, H
	Edge		◎	Juniper	IP8800 Series	CX8000 Series	Company F
	Access	¥500-600 Bil.	◎	ME Series (FTTH)	AM Series (DSLAM/MSAN)	CX2600 Series	Companies F,O,H,M,S,P

FY Mar.07
Target NGN Order Receipt = ¥100Bil.

Service Platform (about 40%)

Network Infrastructure (about 60 %)
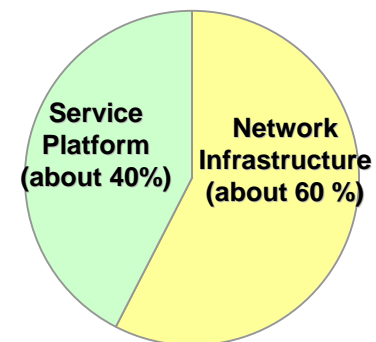
Full exercise of NEC's advantage over IT/NW converged areas

Borderless Market   **Rapid-changes**

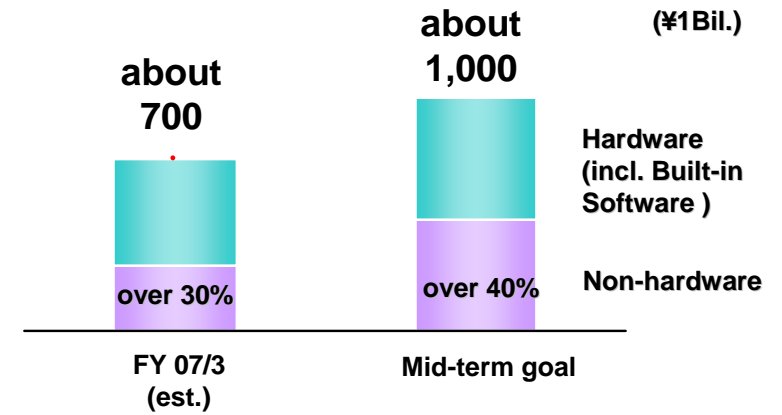**Securing Profit through;**

◆ **Innovation to Software Business Modes**

- **Software as new revenue sources;**
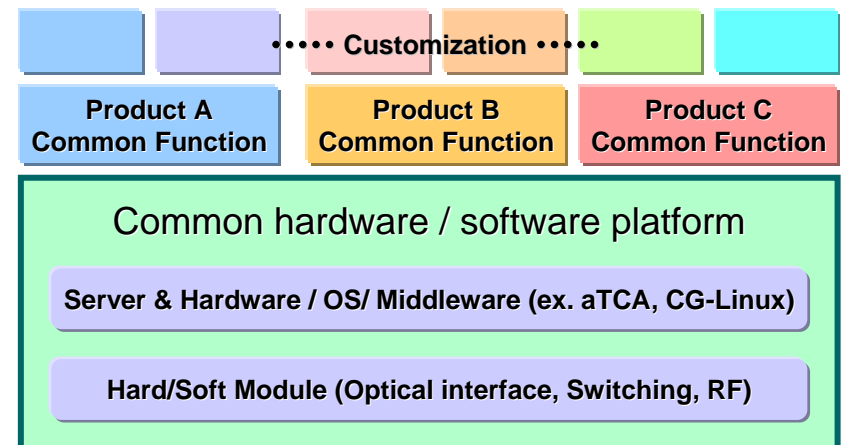 upgrade, licensing, capacity-sales, Know-How, etc.

◆ **Common Platform Strategy**

- **Business Enlargement in Global Market**
- **Minimization of Resource Shortage**

Software sales in Carrier Network business

(¥1Bil.)

about 700

about 1,000

Hardware (incl. Built-in Software)

over 30%   over 40%   Non-hardware

FY 07/3 (est.)   Mid-term goal

- Common Platform Image -

····· Customization ·····

| Product A Common Function | Product B Common Function | Product C Common Function |

Common hardware / software platform

Server & Hardware / OS/ Middleware (ex. aTCA, CG-Linux)

Hard/Soft Module (Optical interface, Switching, RF)

Empowered by Innovation

NEC