Launching an NGN commercial service - NTT's approach -

December 16, 2008

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- Issues facing telecom carriers
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Issues facing telecom carriers

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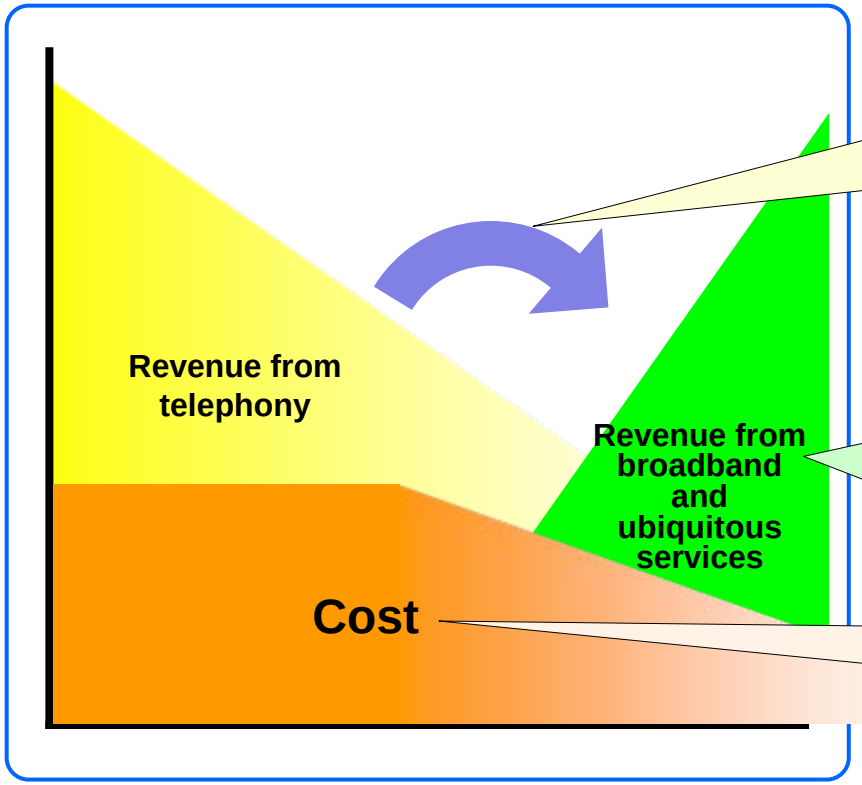
Issues facing all telecom carriers are migration to IP, promotion of broadband services, and creation of new telecom businesses. Carriers are investing in the NGN as a solution to these issues.



- Promote broadband & ubiquitous services like FMC and triple play
  → **Revenue shift** from telephony

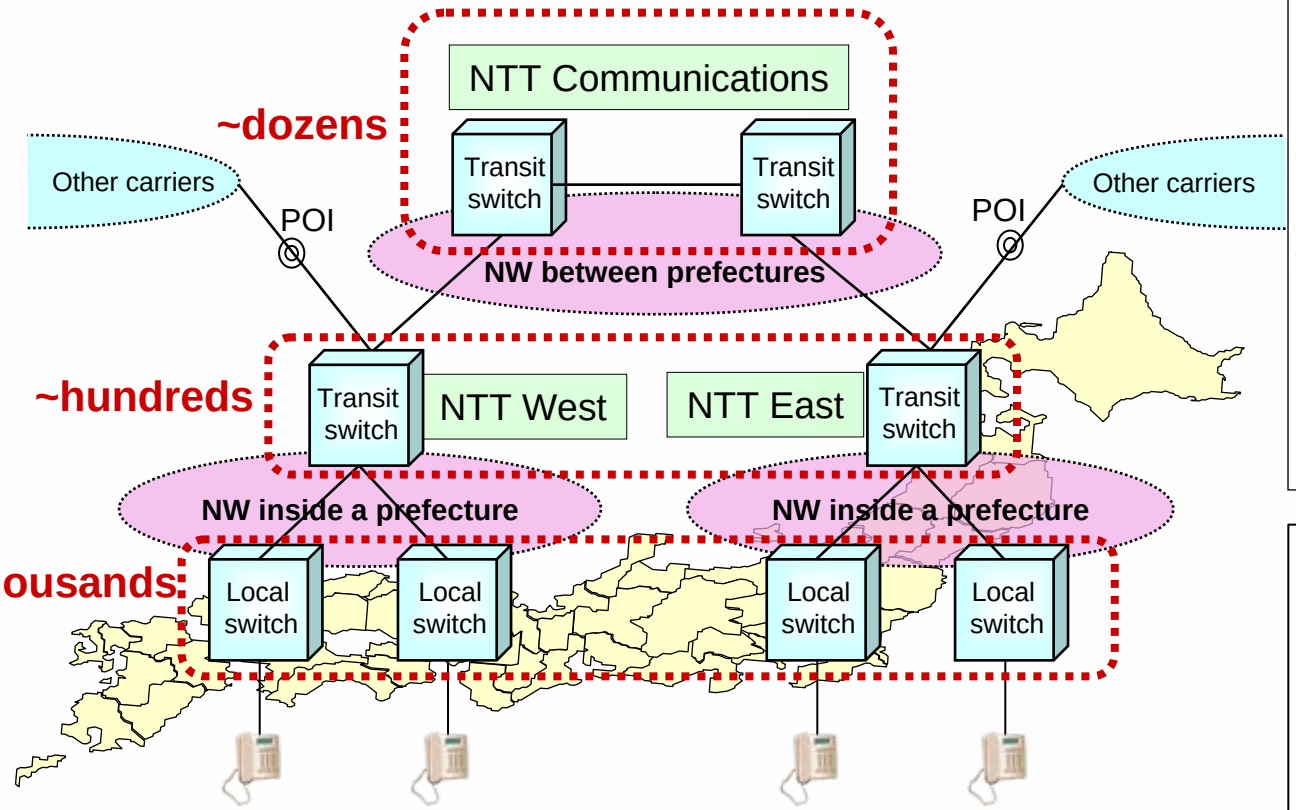
- Collaborate with various service players in creating new businesses
  → **Expand telecoms market**

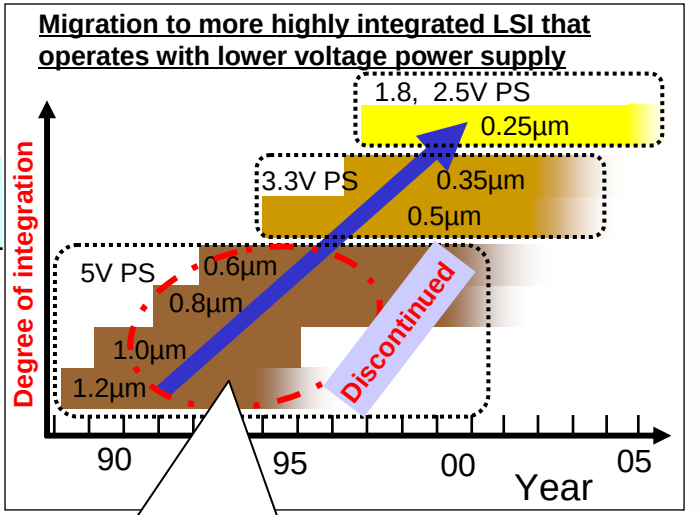
- Migrate telephone network to IP
  → Reduce **CapEx and OpEx**

The status of Japan's telecommunications market

The lifetime of NTT's PSTN facilities

NTT's PSTN consists of about thousands switches.
Although a then-state-of-art switching system was developed around 10 years ago, the rapid progress in technology since then has resulted in the discontinuation of production of some components used in the system. Currently, we are trying to prolong the lifetime of the switches by re-establishing sources for such components.





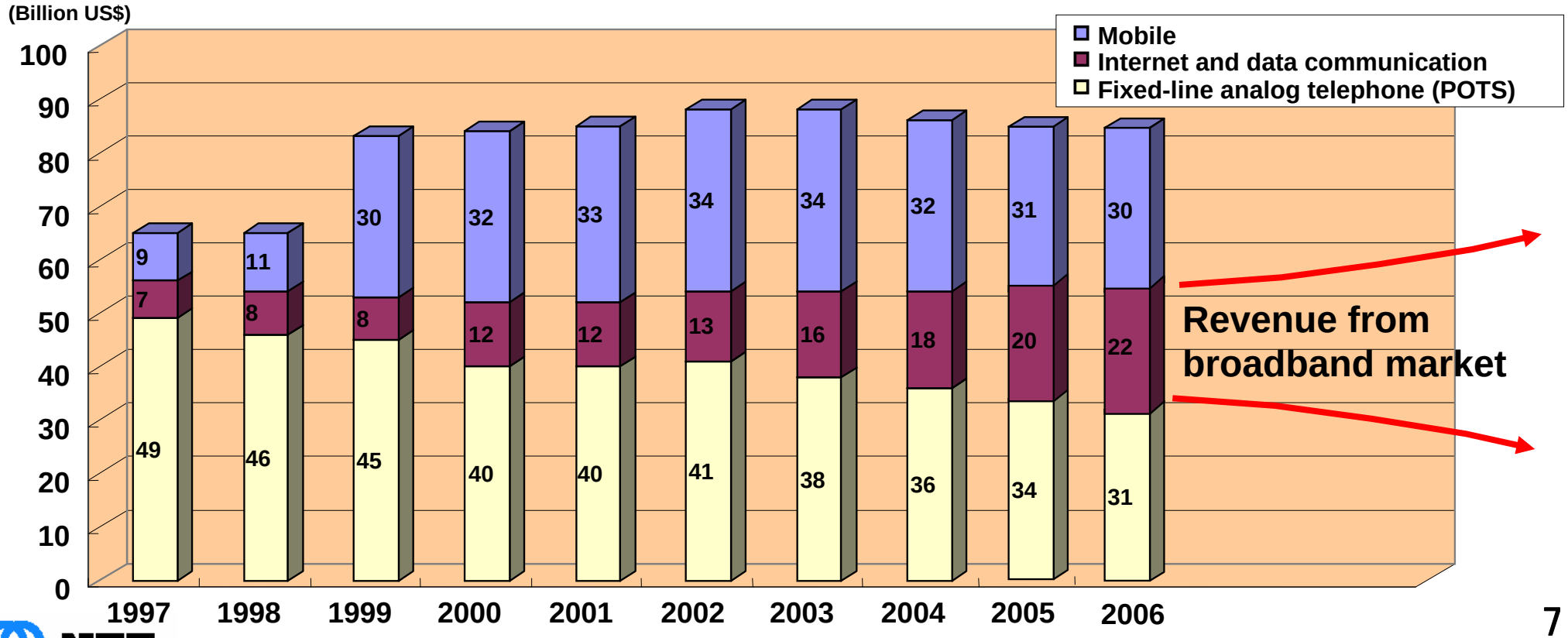
NS8000
(developed around 10 years ago)

The revenue structure of the NTT Group

Revenue from traditional networks, such as the PSTN, is falling. This fall has not yet been made up for by revenue from broadband businesses.

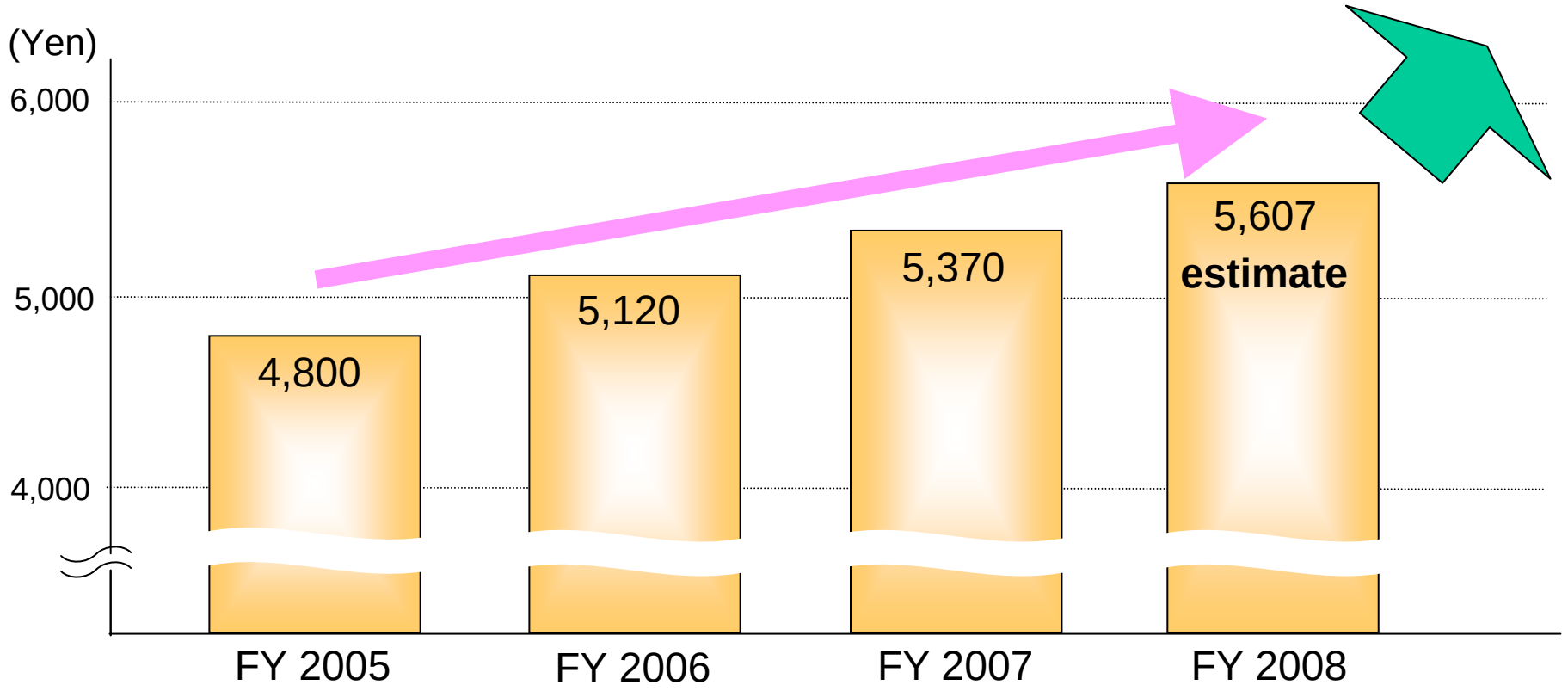
It is necessary to change the revenue structure by expanding revenue from Broadband services provided on the NGN.

Consolidated revenue of NTT Group



Increase in ARPU of broadband services

- The bundled service of FTTH records a higher ARPU than POTS service.
- Since FTTH services can incorporate video delivery & other supplementary services, the ARPU is increasing gradually.
- It is urgent to raise ARPU further to strengthen our financial basis.



Promotion of optical access by the u-Japan Strategy

The Japanese government's "u-Japan" plan proposes the full development of broadband infrastructure by installing optical fiber networks nationwide.

Proposed status of broadband networks in 2010

Proposed on Aug. 11, 2006

1. 100% broadband network

The projected status of a 100% broadband network, through which broadband services are made available to all communities, is as follows:

(1) Overall, a variety of wireline and wireless technologies will be seamlessly linked, and broadband service based on one or more of these technologies will be available nationwide.

(2) In areas where cost-effective investment is difficult, broadband infrastructure will be built taking both investment efficiency and the needs of communities into account. Specifically, the following will be used in addition to ADSL and cable modems:

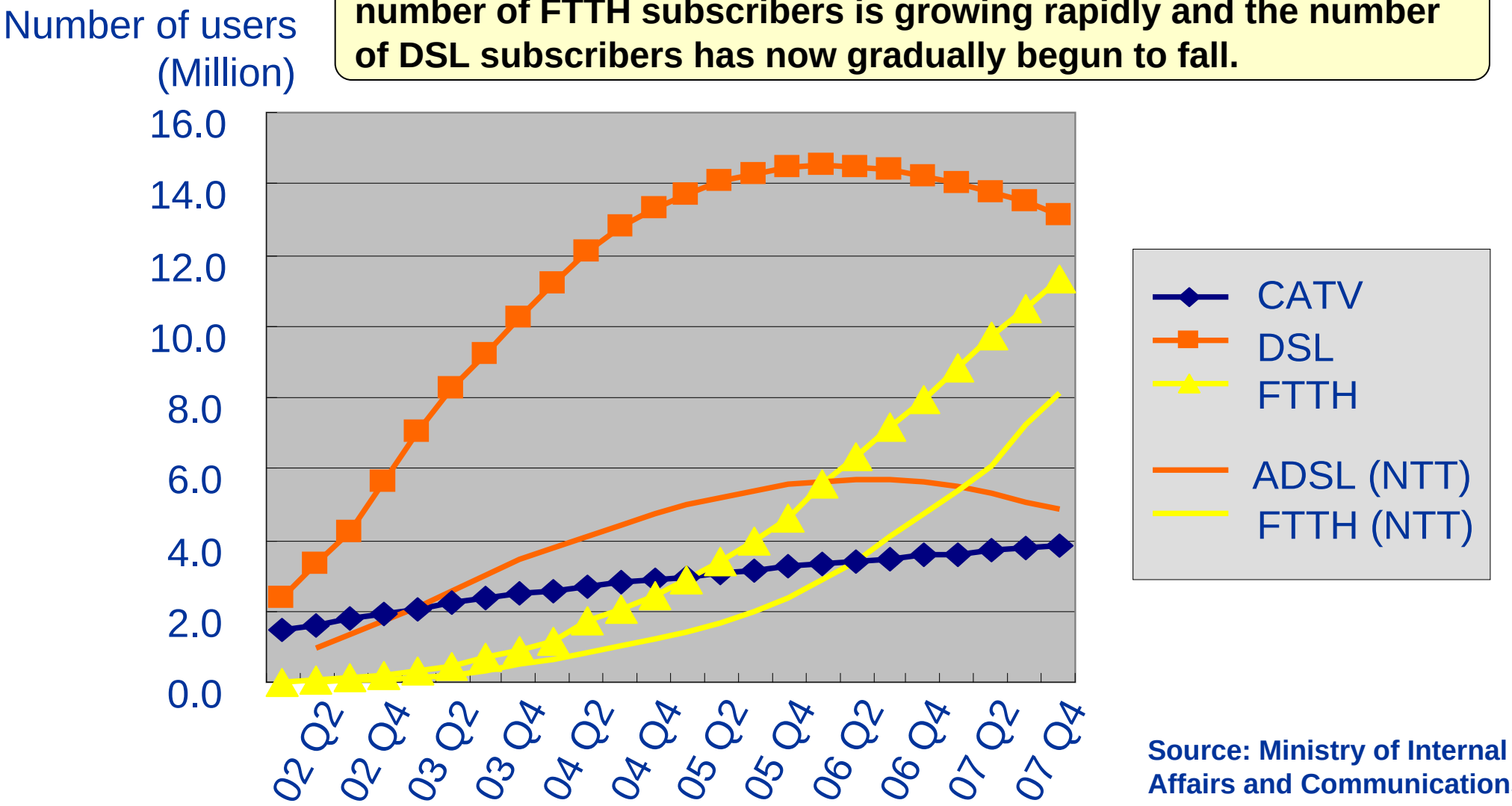
(a) Wireless broadband using wireless LAN and other technologies;

(b) Integrated broadband, in which "wireless and ADSL/VDSL", "optical fiber and infrared transmission", or "optical fiber and ADSL (in so-called Fiber To The RT (FTTR))" are integrated.

(3) Of these varieties of broadband service, super-high-speed broadband access, mostly based on FTTH, will cover 90% of households nationwide.

Dramatic increase in the number of FTTH subscribers

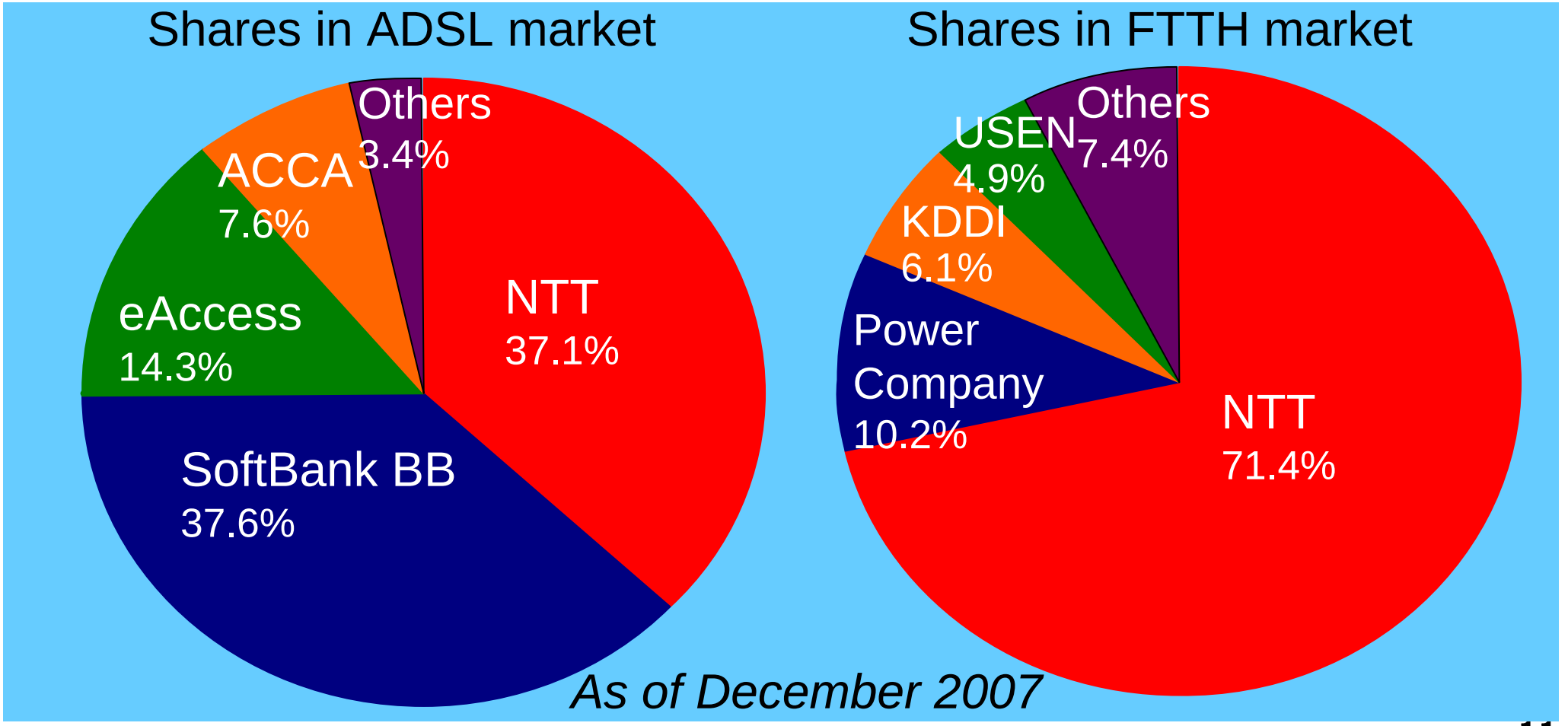
Optical access is being promoted so aggressively that the number of FTTH subscribers is growing rapidly and the number of DSL subscribers has now gradually begun to fall.



Source: Ministry of Internal Affairs and Communications

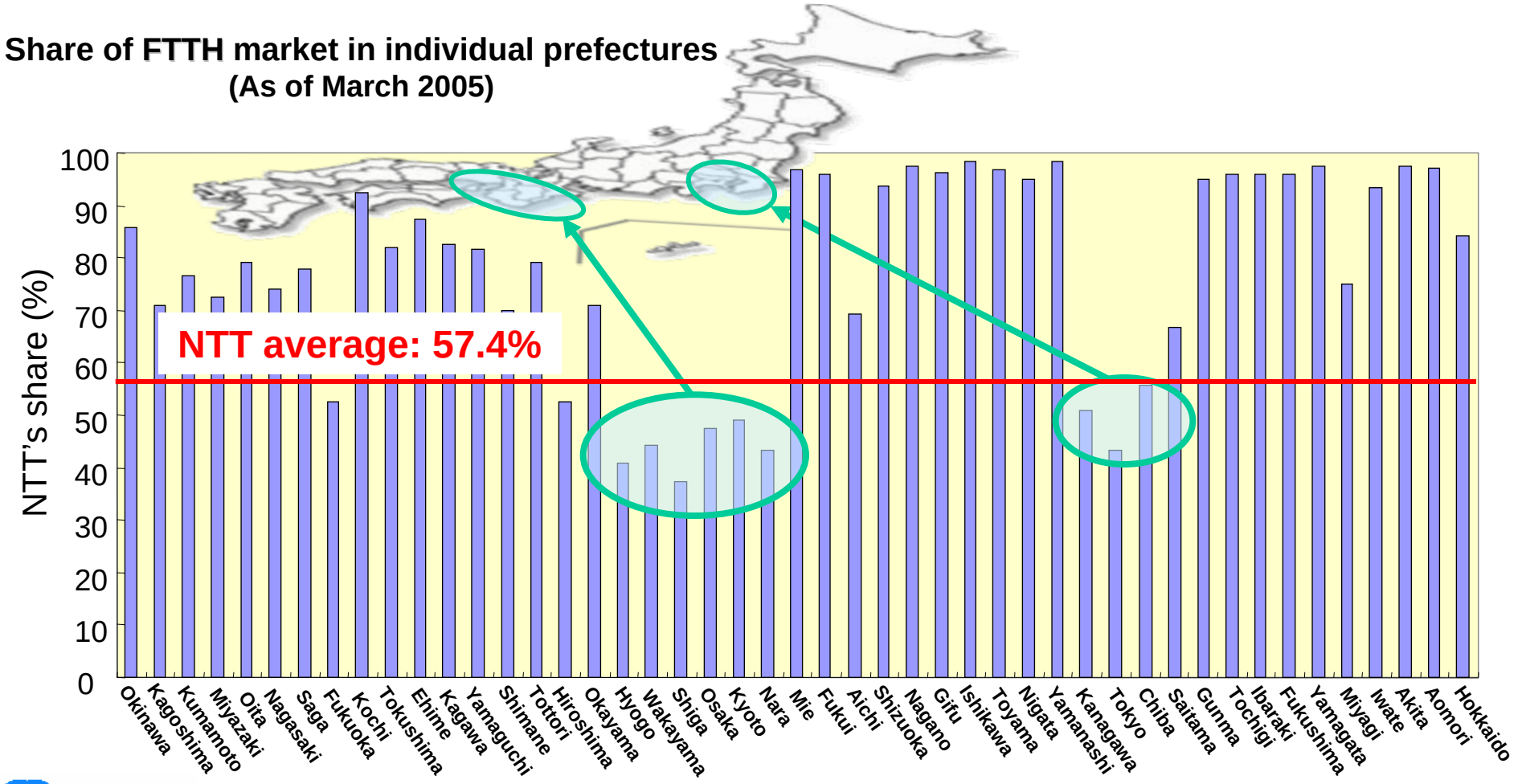
Intense competition in broadband access

- Competition in the telecommunication market is intensifying in Japan.
- NTT faces strong competition in gaining share in broadband access.



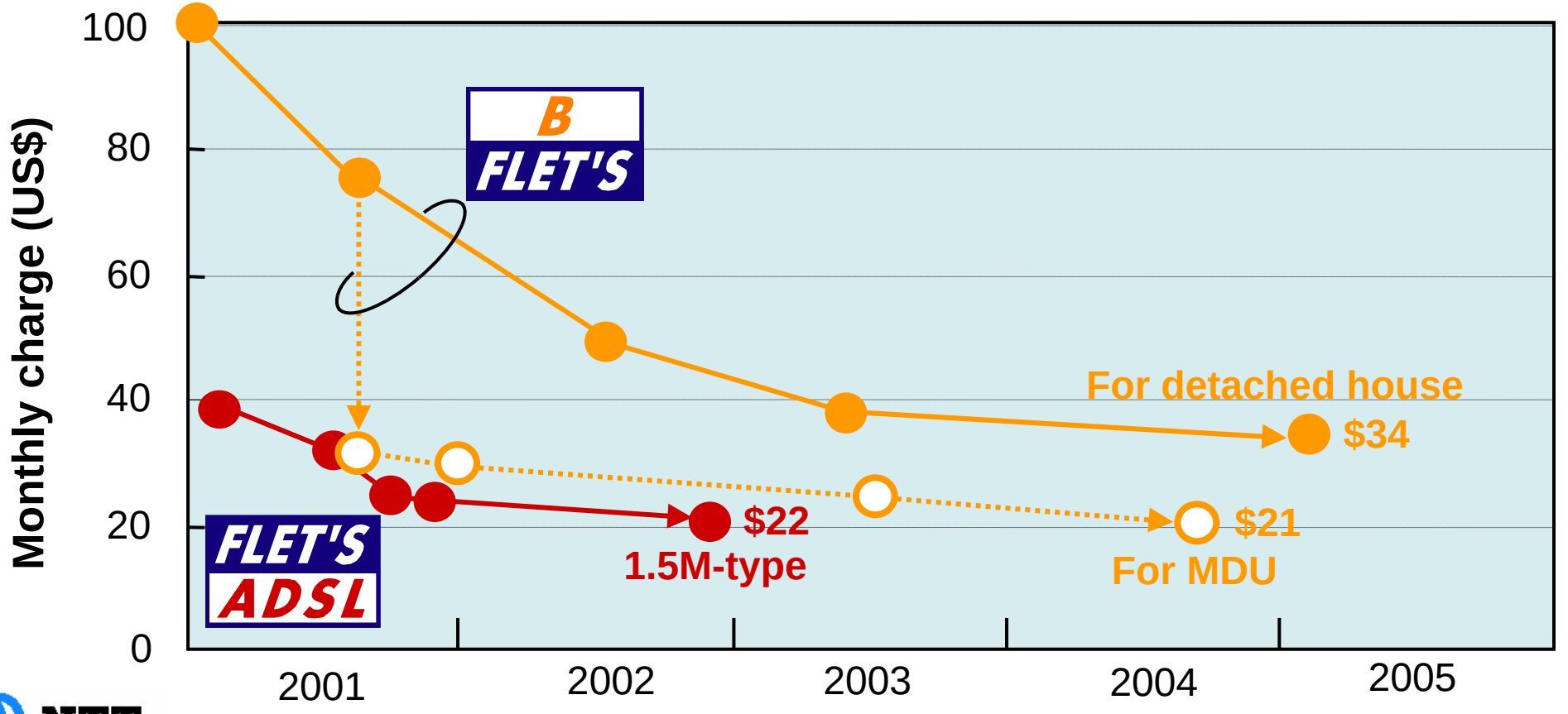
Share of FTTH, prefecture by prefecture

NTT has over 50% share in optical access nationwide. However, in urban areas, where fibers can be installed efficiently, NTT faces tough competition and is falling behind in many prefectures.



Rapid reduction in the charge for broadband access

- Strong competition has led to a price war, bringing down the charges for ADSL and even FTTH dramatically.
- Strong competition has made it hopeless to seek to gain significant revenue from telecommunication traffic.



NTT's Activities

NTT Medium-term Strategy - November '04

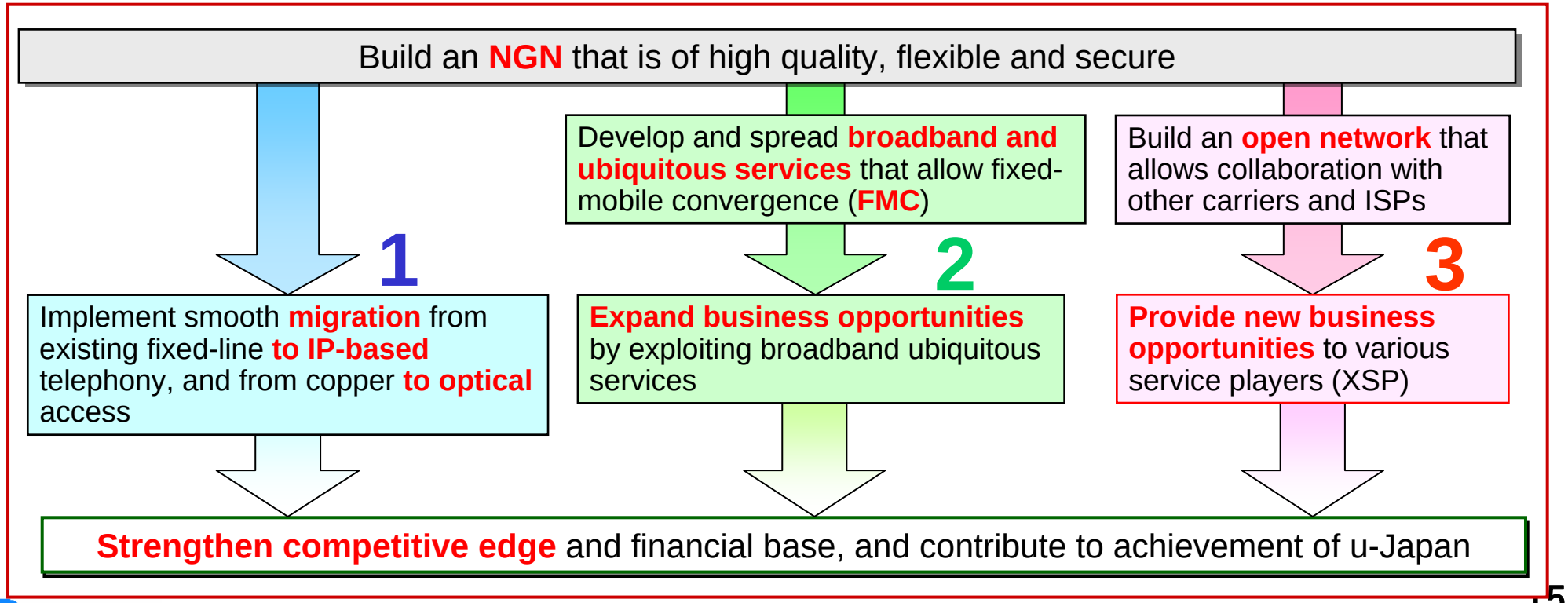
Objective

Contribute to National Plans of e-Japan and u-Japan to solve social problems such as population aging and environmental issues

Milestone

Migrate 20 million customers to optical fiber access and next-generation network services by 2010

Specific actions



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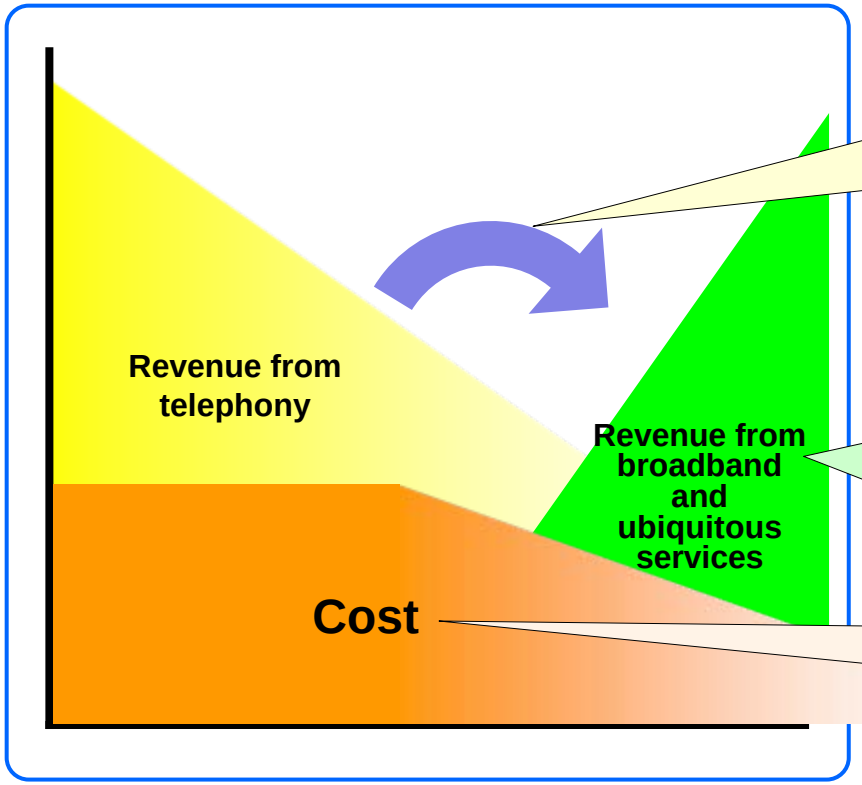

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  → **Revenue shift** from telephony

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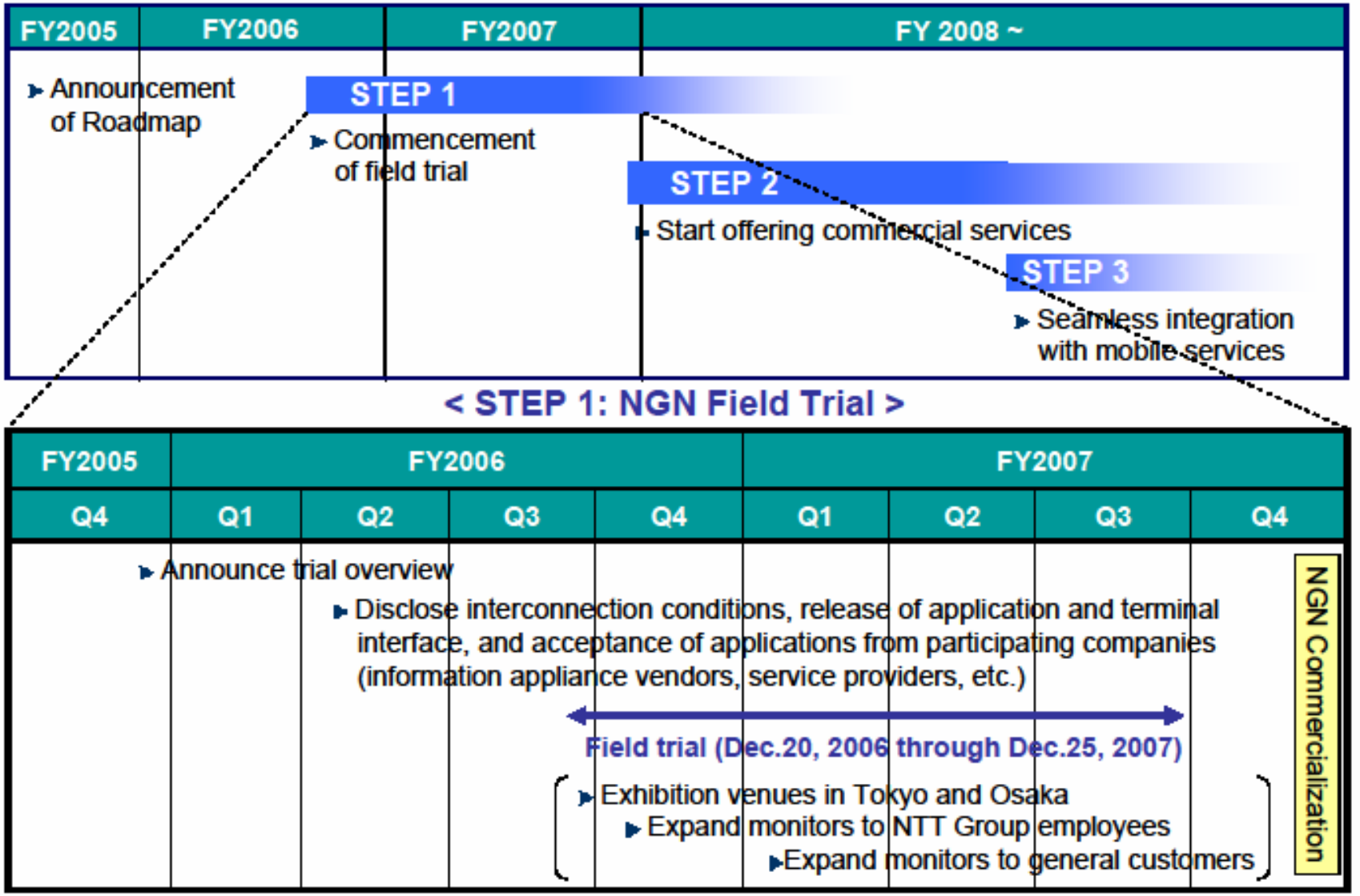
- Collaborate with various service players in creating new businesses
  → **Expand telecoms market**

3

- Migrate telephone network to IP
  → Reduce **CapEx and OpEx**

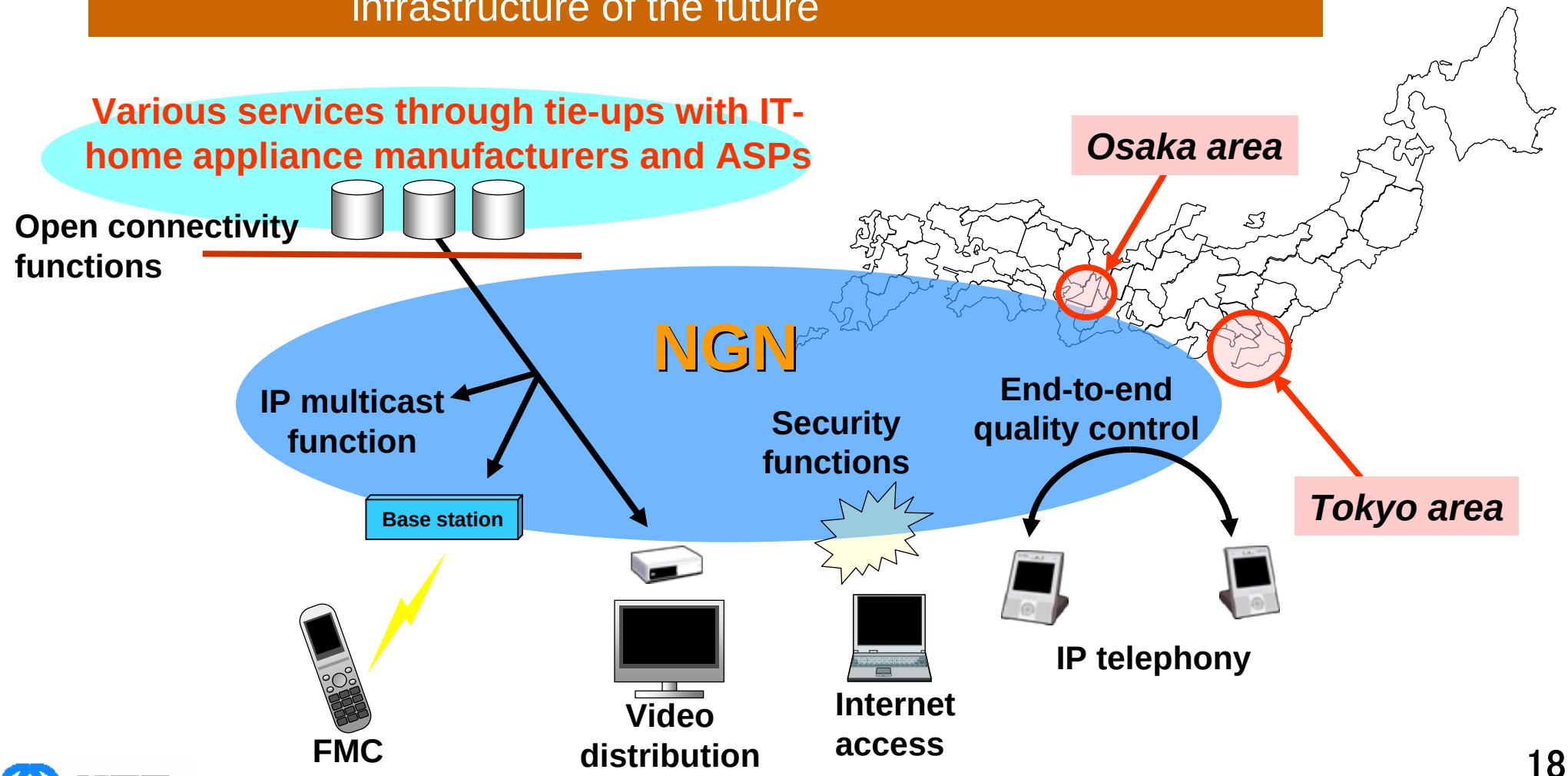
1

NTT's Roadmap to Rollout NGN



Overview of Field Trials of NTT's NGN

Objectives : - Verification of the NGN implementation
- Creation of new business opportunity with ASPs
- Building consensus to use NGN as a communication infrastructure of the future



Examples of services tested in the trial

NGN for Business

- High definition visual communication
- Multipoint Web Conferencing System
- Wideband IP conference phone
- Enterprise-oriented network service
- Push to talk with multimedia over NGN, etc.

NGN for Life

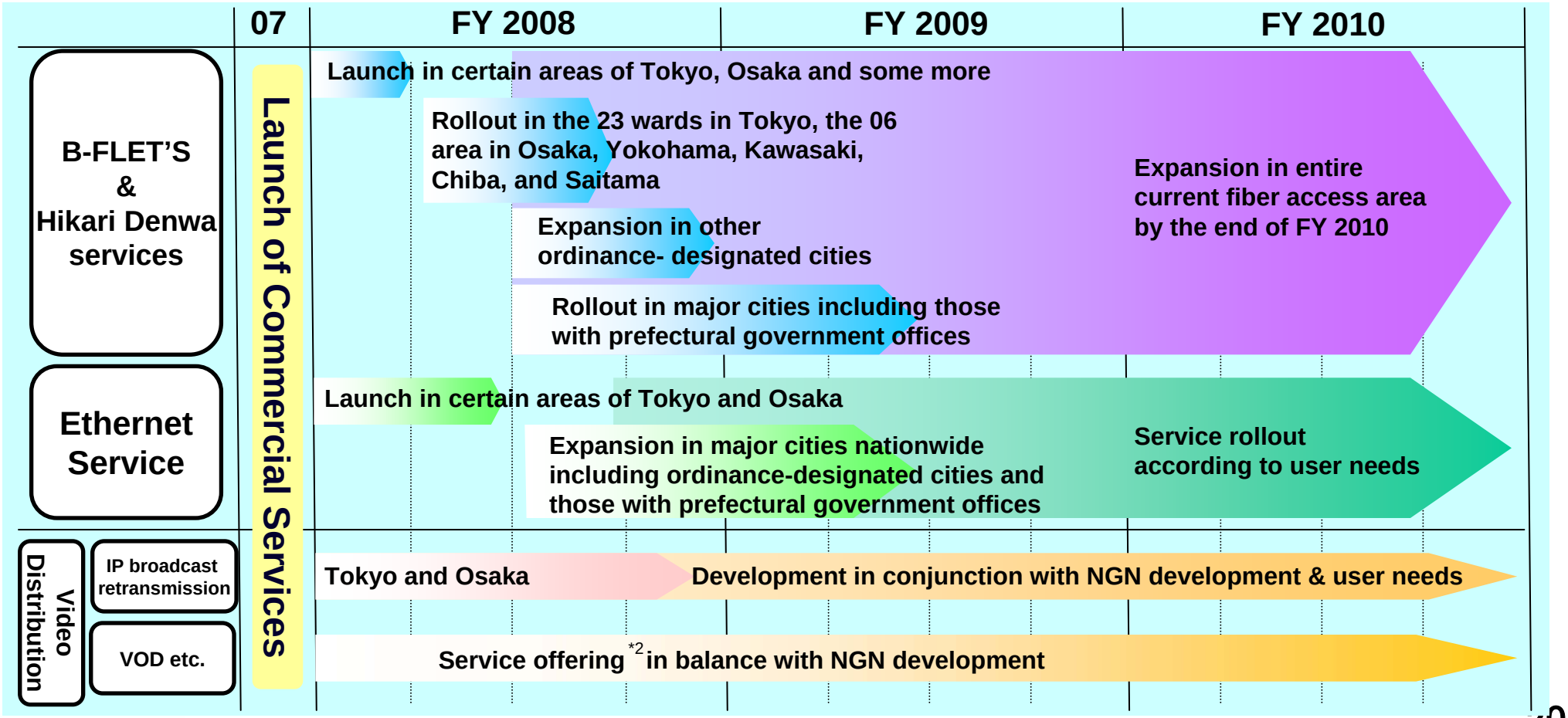
- Broadcast retransmission over IP
- High-definition IPTV service
- IP high-definition videophone
- Wideband IP phone
- One phone, etc.

NGN for Society

- Home security and control
- Telepathology system
- Healthcare
- Ubiquitous network service for kid's safety
- Gentle touch supervision by robot, etc.

Covered area in NGN commercialization

- During FY 2007, launch NGN service in certain areas of Tokyo & Osaka
- During FY 2008, expand NGN service area in major cities
- By the end of 2010, cover the entire current FTTH service area



NGN Commercialization and Development

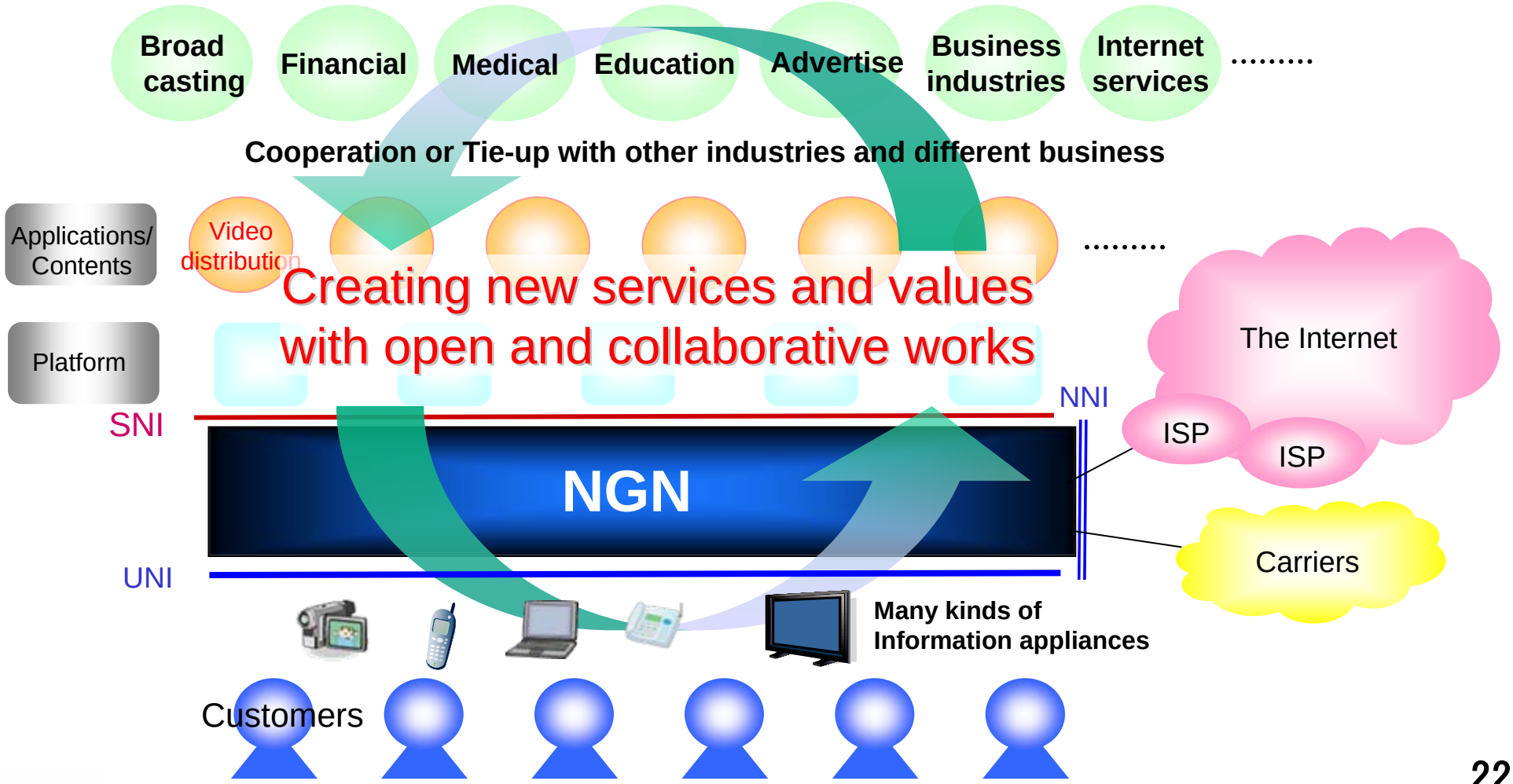
- QoS services including Hikari Denwa*1, video telephony, and services for content distribution such as multicast
- Charges for best effort service and standard-QoS Hikari-Denwa and video telephony approximately the same as current levels
- Customer-friendly rate levels structure for QoS services other than those above (TBD)

category	Network services on NGN	Existing IP network services
Fiber Access Service	-The same as the existings	-Single-dwelling for family (~100Mbps) -Multi-dwelling for mantion(~100Mbps) -Office use(~1Gbps)
IP telephony (0AB-J)*2	-HIkari Denwa incl. both the existing quality and **high quality** New -*Business type is upcoming*	-Hikari Denwa incl. office type
/Video telephony	-Video telephony incl. the existing quality and **two high quality grades** New	-Video telephony
VPN service	-Center-end type, CUG type -*QoS guaranteed one is upcoming*	-Office & Group access
Service for content distribution	-The same as the existings **- unicast/ multicast with securing bandwidth** New	-FLET'S .Net EX/ v6 cast (unicast, multicast)
Ethernet service	- The same as the existings and **inter-prefectural** New	-Business Ethernet (intra-prefectural)

*1: Hikari Denwa is the service name of VOIP provided by NTT EAST/WEST
*2: Geographic number for PSTN and IP telephony with equivalent quality to PSTN

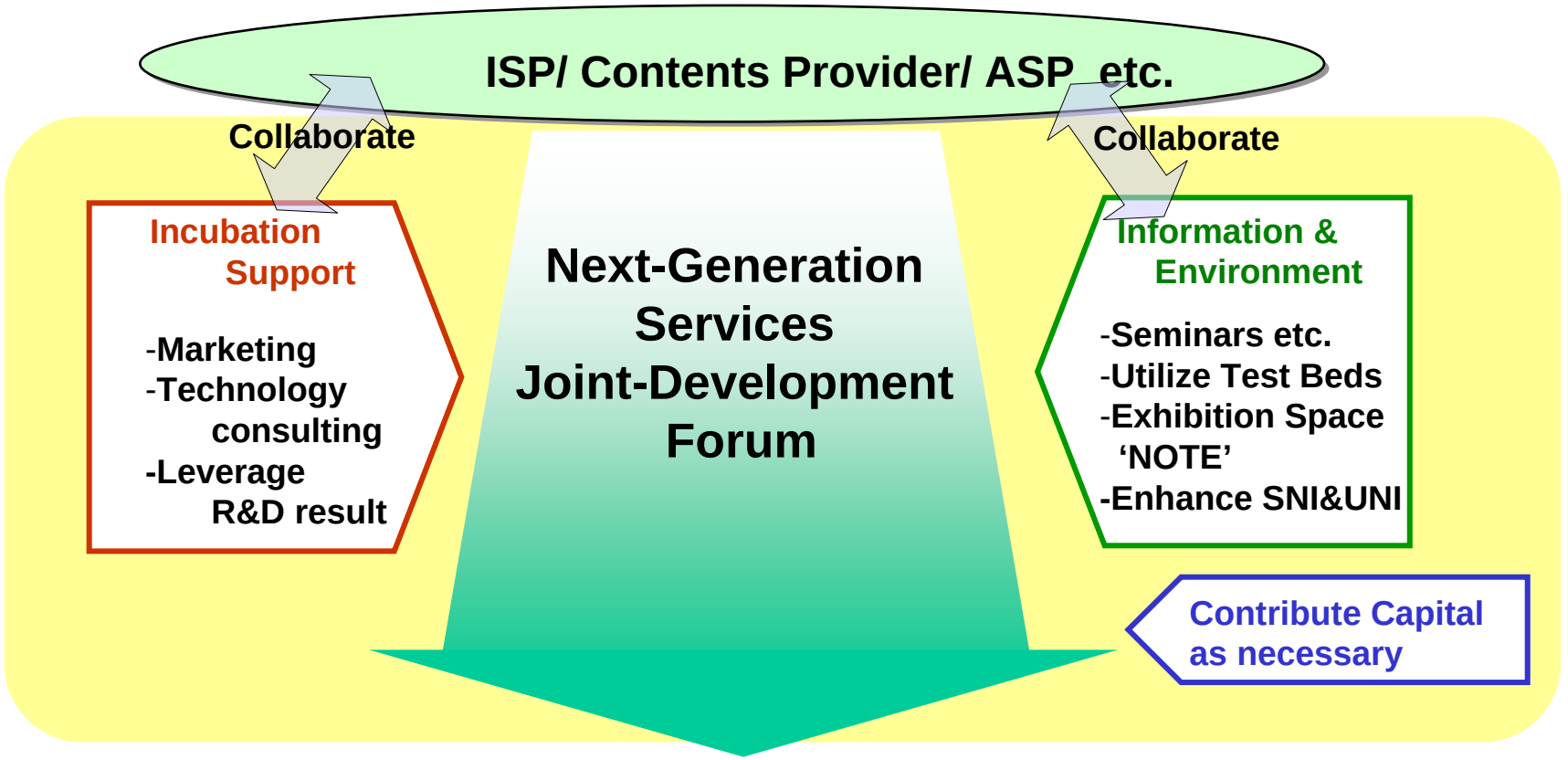
New Service Creation on NGN

Creation of new services in cooperation with various industries

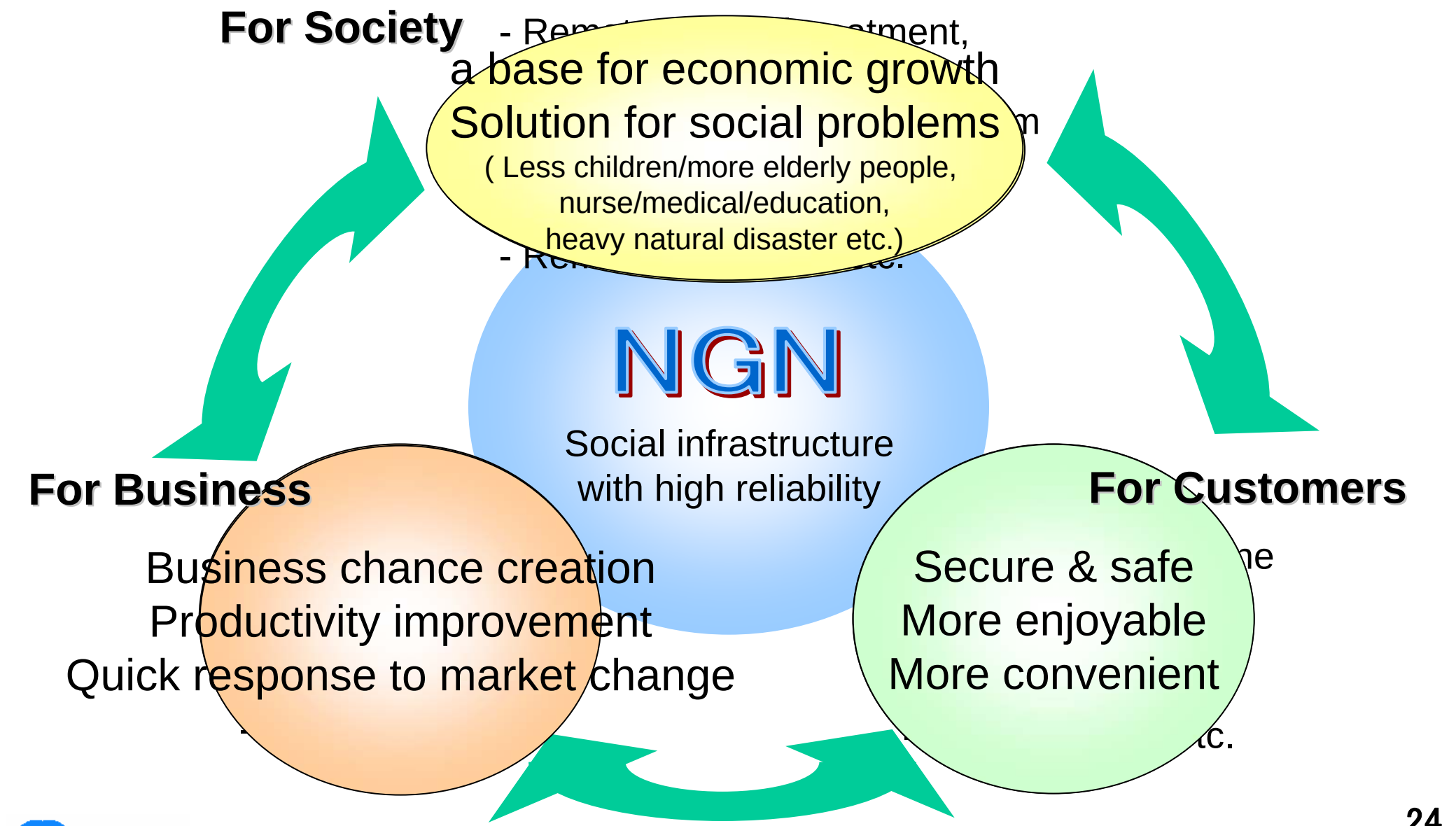


Next-Generation Services Joint-Development Forum

- ‘Joint-Development of Services’; Joint-Development with business from various industries, creating new business models that take advantage of NGN features
- “Next-Generation Services Joint-Development Forum”(tentative name) to be launched next spring



For What on NGN?



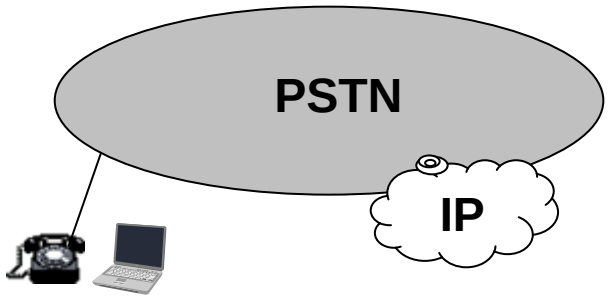
NTT's history and plan for introducing the NGN

Rapid growth of Internet

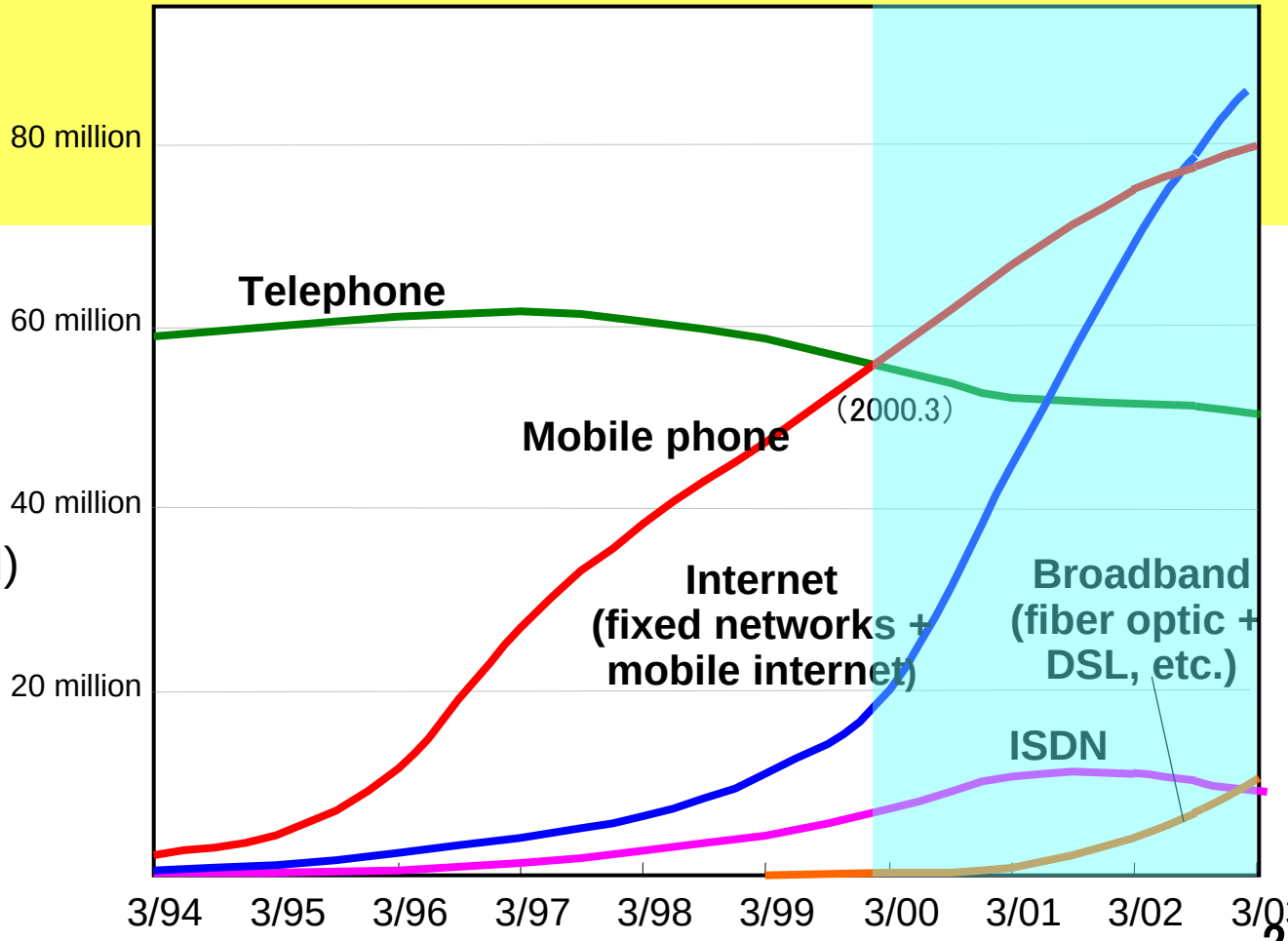
IP network Pre-NGN

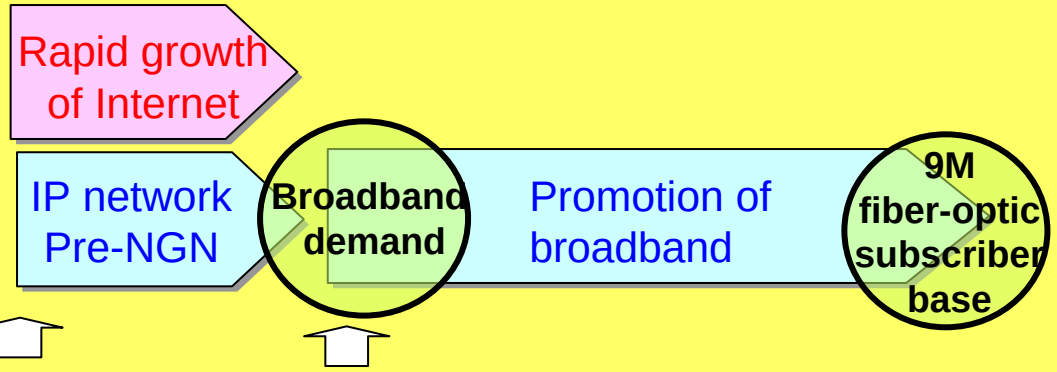
Broadband demand

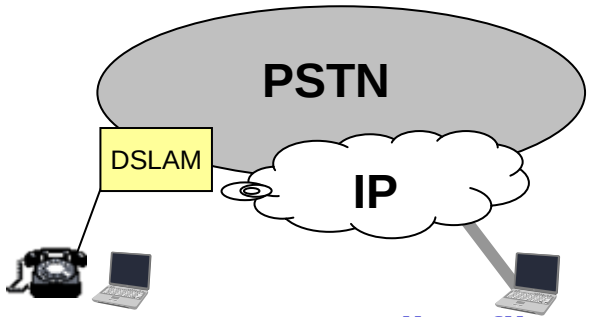
1999:
Started IP network
(pre-NGN)



1999: Start IP network (pre-NGN) for Internet access

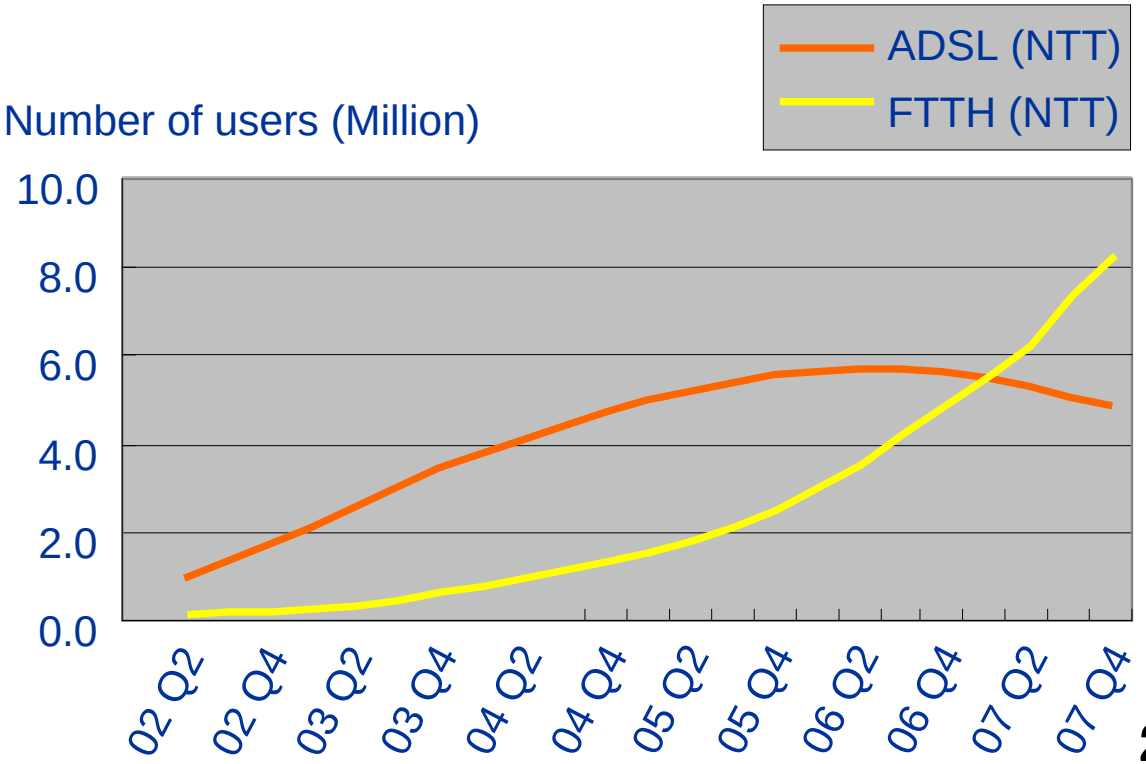


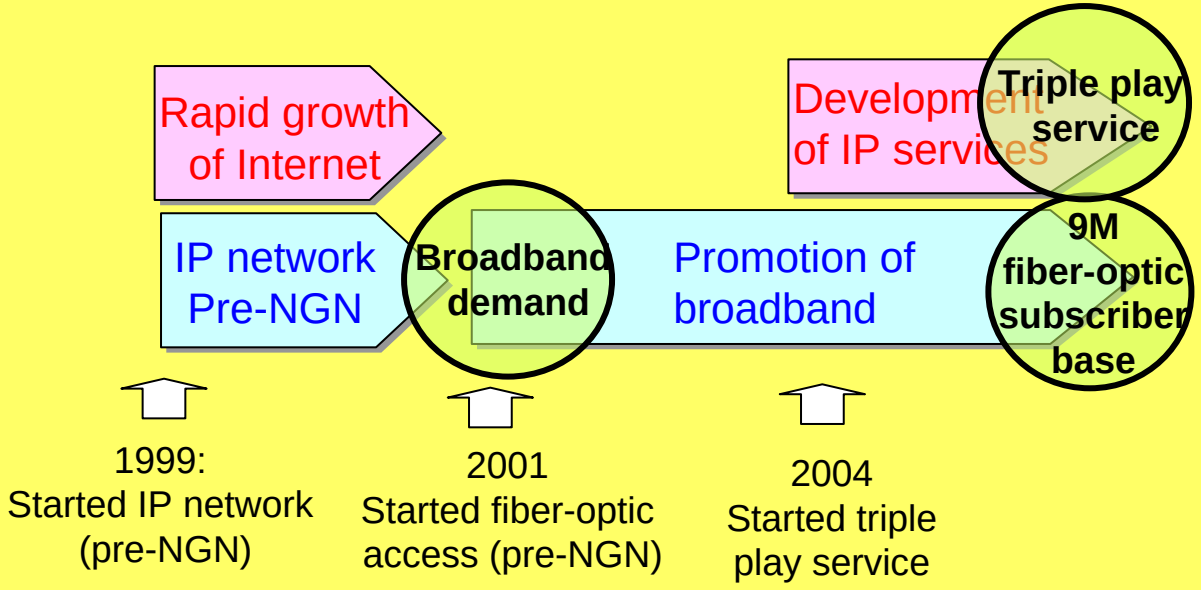


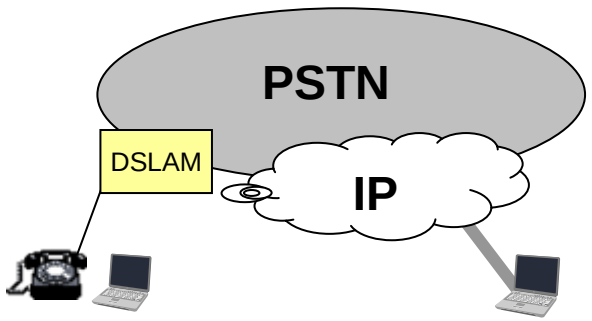


Expanding fiber-optic subscriber base

2001: Start fiber-optic access service (pre-NGN)







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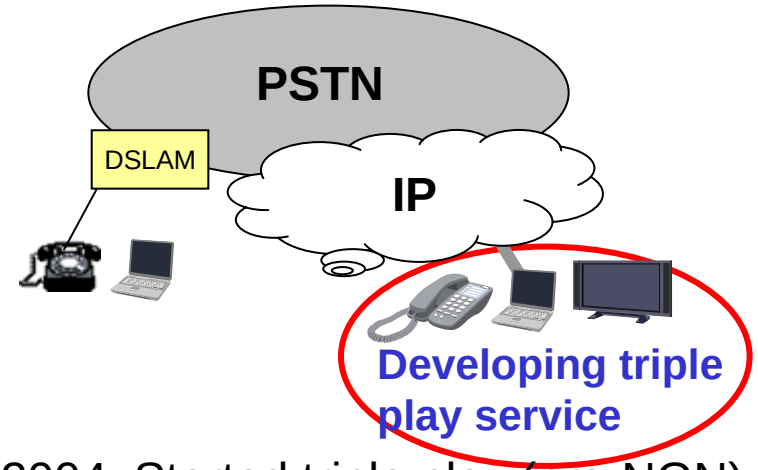
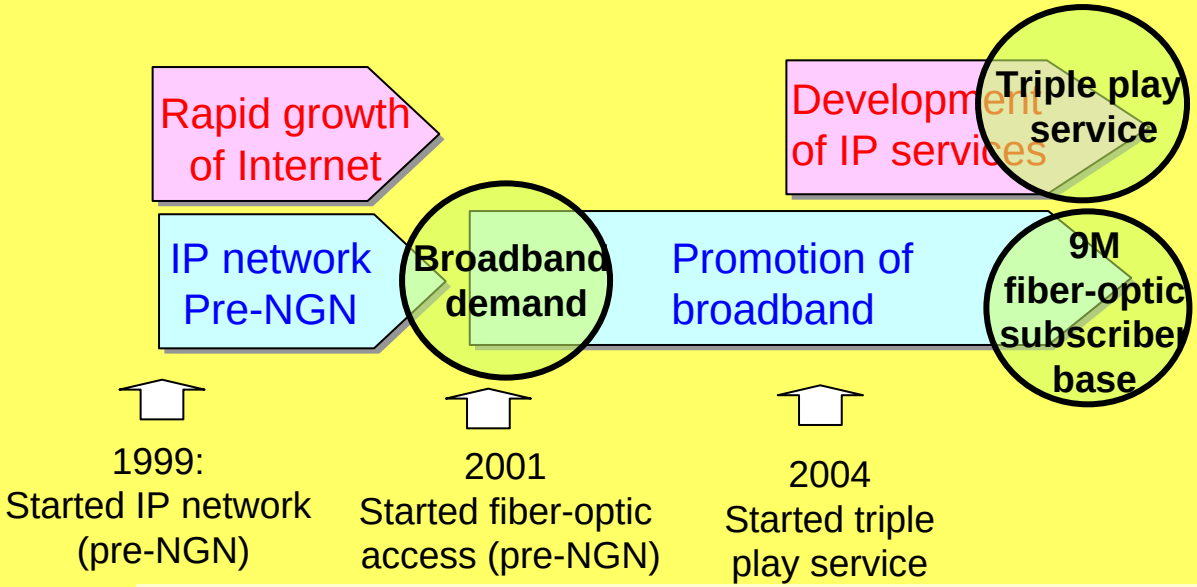


2004: Started triple play (pre-NGN)



FLET's Service features started 1999

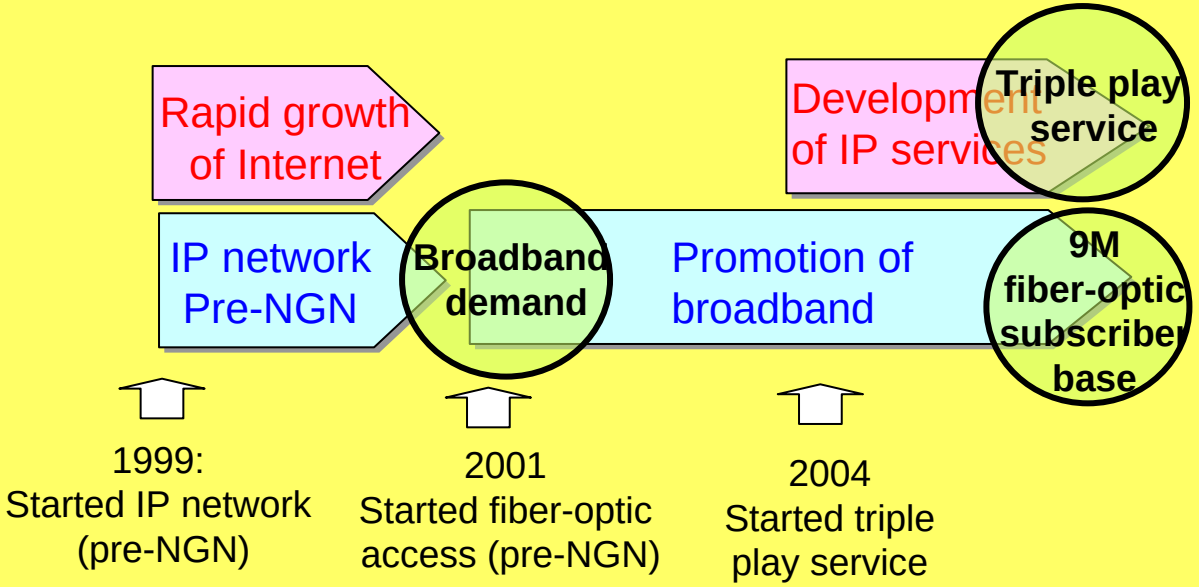
- Users can access their contracted ISP
- Best-effort network service for internet access
- Fixed monthly charge

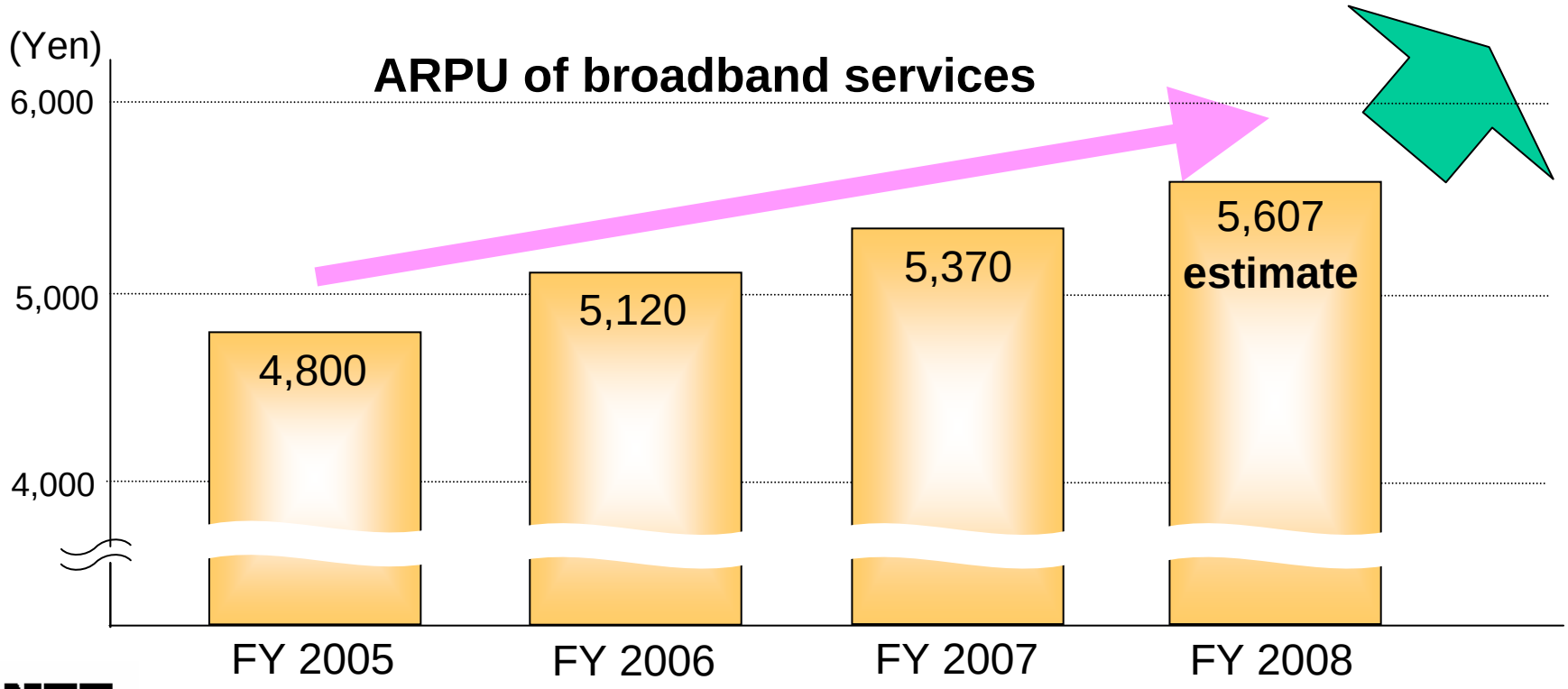
B-FLET's Variants (Peak rate: 100Mbps) started 2001

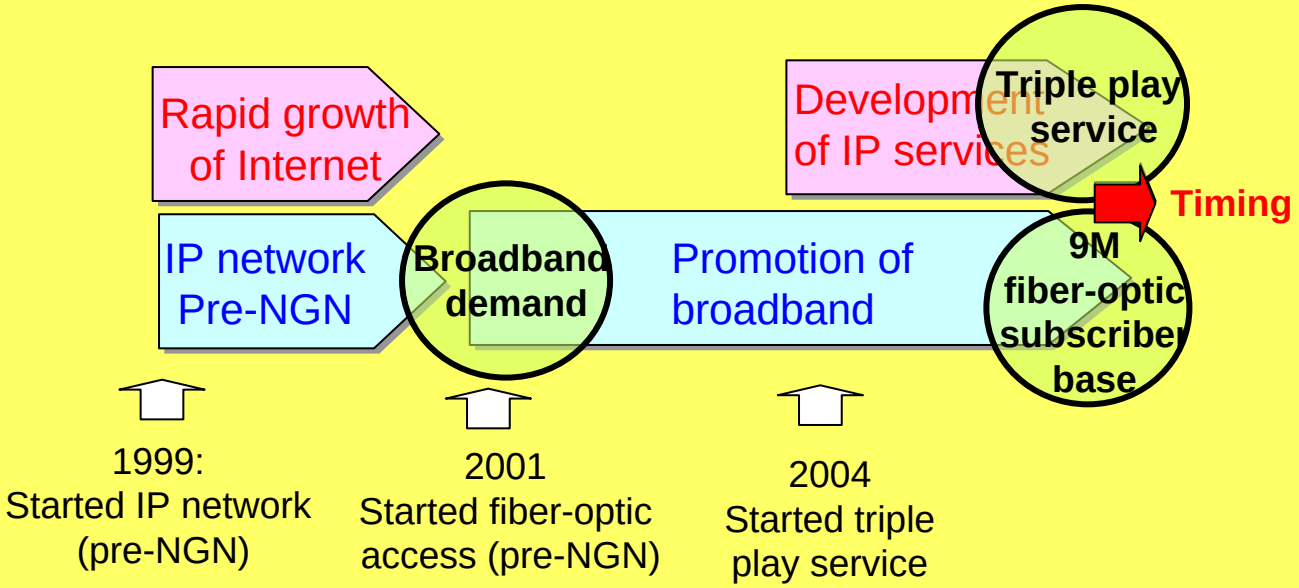
- Business type *(for large businesses)*
- Basic type *(for SOHO & heavy users)*
- Condominium type *(for mass market users)*
- Hyper-Family/Premium type *(for mass market users)*

Services on **B-FLET's** (Triple Play) started 2004

- High Speed Internet access
- IPTV up to 32,000 VODs, 100 multicast channels, including HDTV
- RF video up to 300 channels, including HDTV
- POTS quality VoIP


Rapid growth of Internet
Development of IP services
Triple play service
IP network Pre-NGN
Broadband demand
Promotion of broadband
9M fiber-optic subscriber base
1999: Started IP network (pre-NGN)
2001 Started fiber-optic access (pre-NGN)
2004 Started triple play service


(Yen)
ARPU of broadband services
6,000
5,000
4,000
4,800
5,120
5,370
5,607
estimate
FY 2005
FY 2006
FY 2007
FY 2008



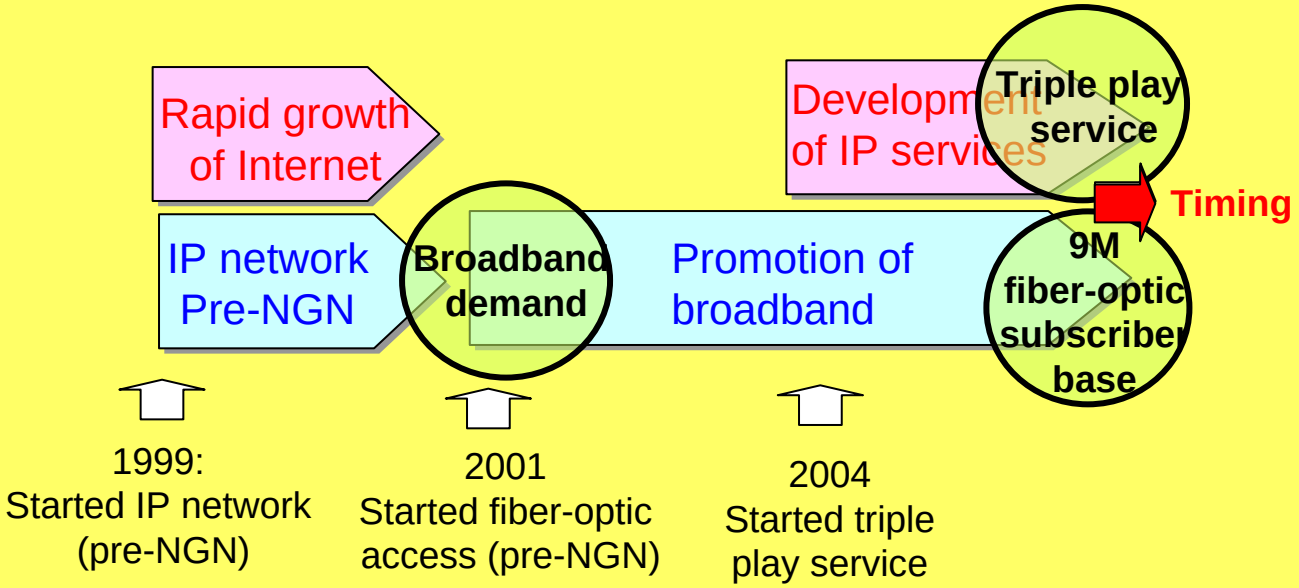
Timing of NGN launch….

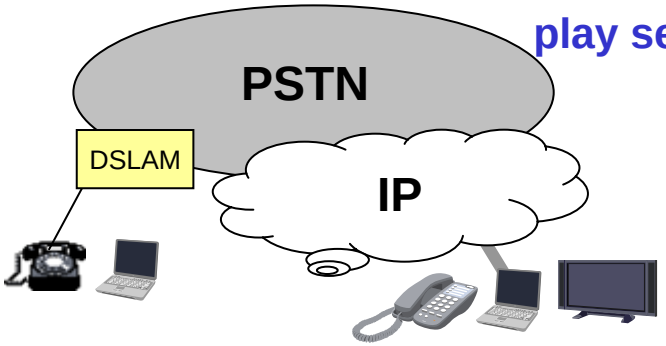
- Establishment of nationwide customer base (9M subscriber)

Requirements		Solutions brought by NGN
Low cost structure	→	Converged network
Reliability and traffic control	→	Carrier-grade IP network

- Start of triple play services

Requirements		Solutions brought by NGN
New telephone service menu for IP era	→	Simulation base PSTN evolution
Attractive network for content providers	→	QoS and Capacity
Market expansion to new business areas	→	Open Interface





2004: Started triple play (pre-NGN)

Developing triple play service

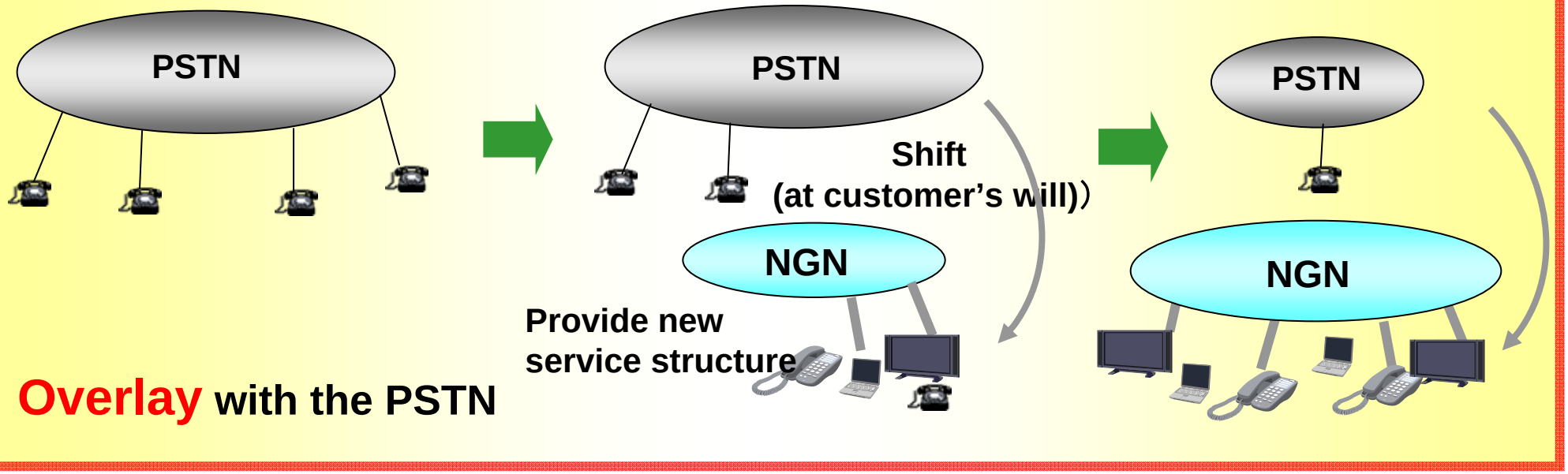
Field trial

Timing

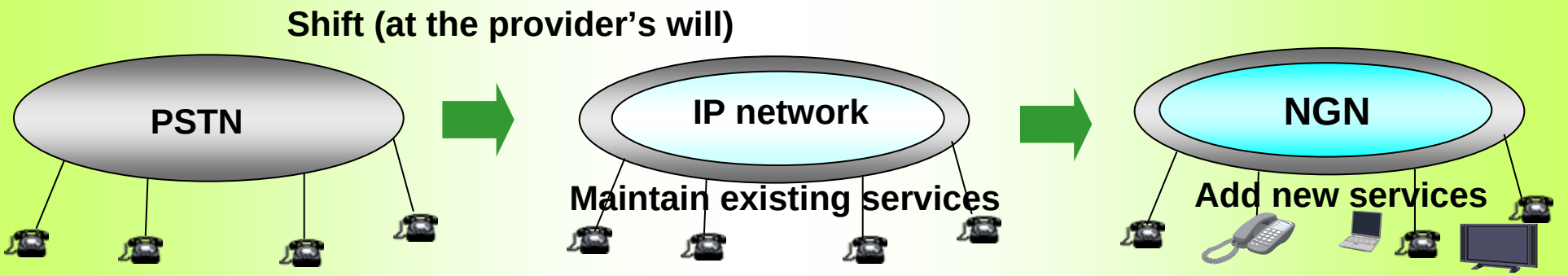
Significance of the field trials

- The starting point for collaboration with service providers.
- Verification of the NGN implementation

Alternative ways of migration to the NGN

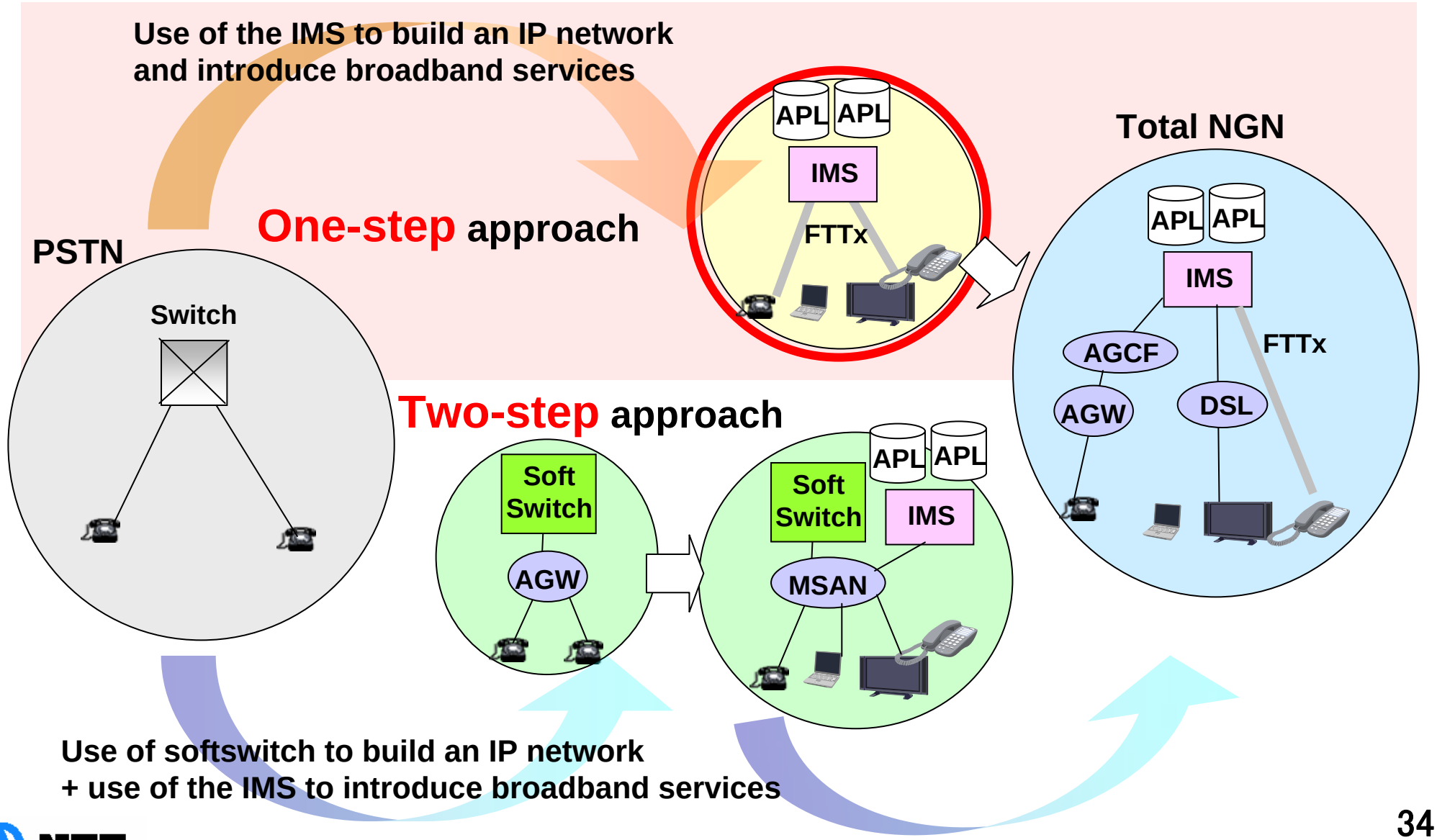


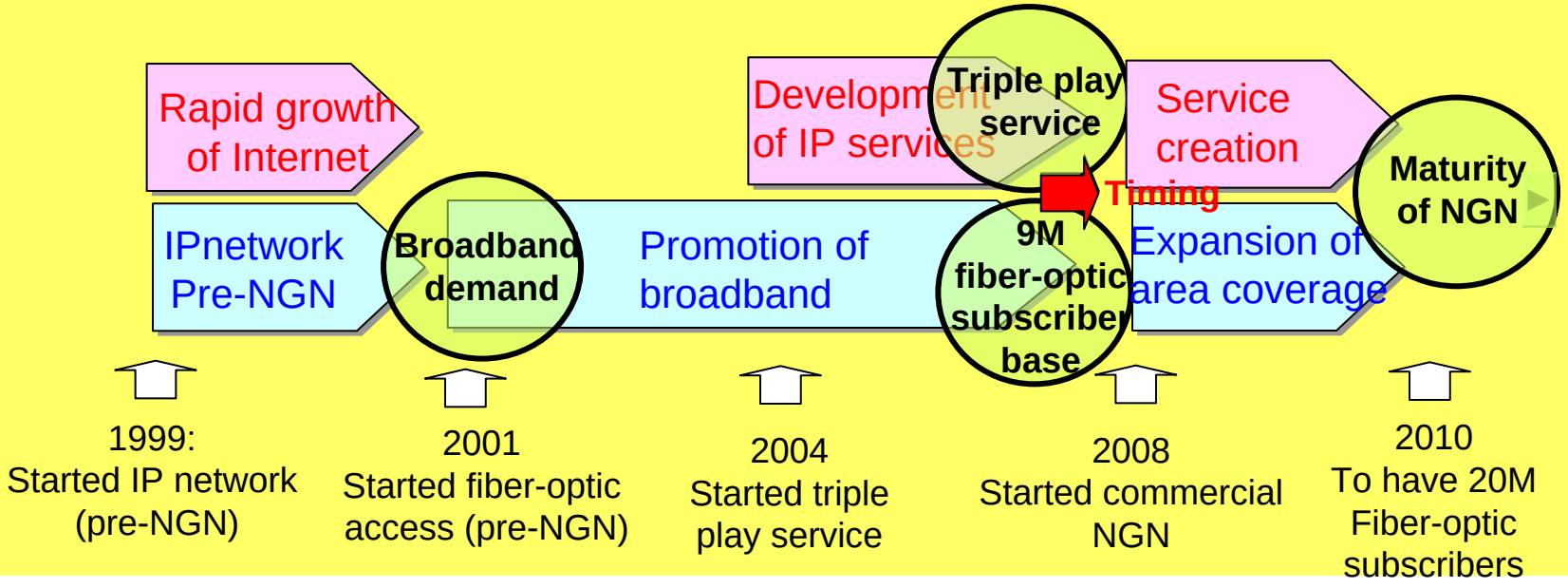
Overlay with the PSTN

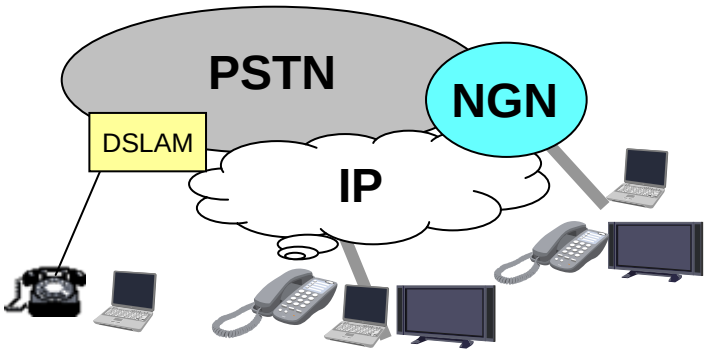


Replacement of the PSTN

Alternative approaches to migrating telephony



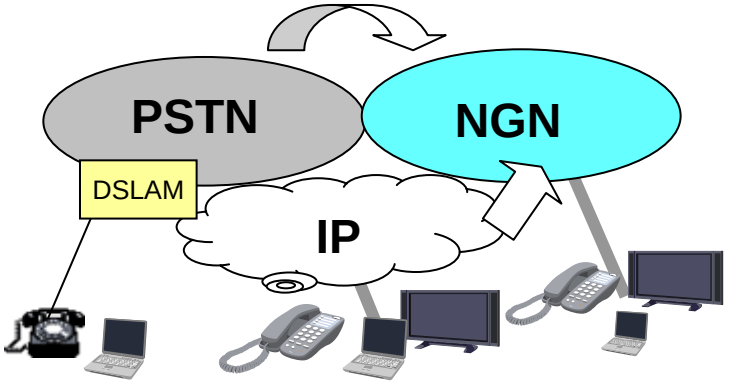




2008: NGN commercialization

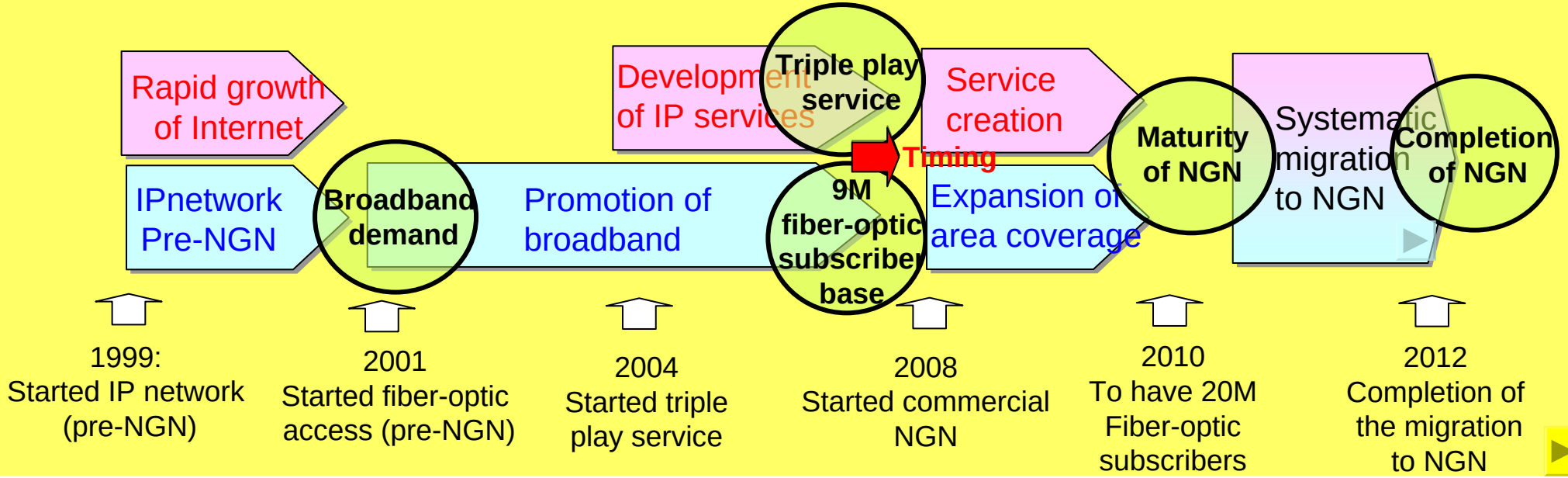
Start from triple play with QoS and security

Small start and rapid expansion of service area coverage

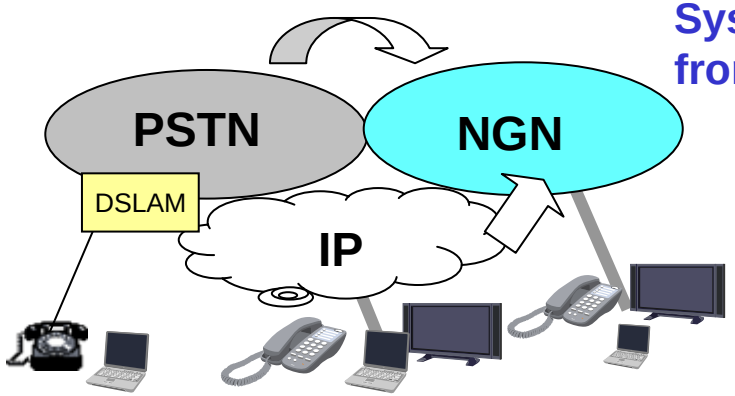


2010: 20M fiber-optic service subscribers

- Small start
  - Covering a wide area in short time frame
- Version up from pre-NGN
  - Same categories of services = upward compatibility + QoS and security
  - New services aimed towards new business areas



Systematic migration from existing IP network



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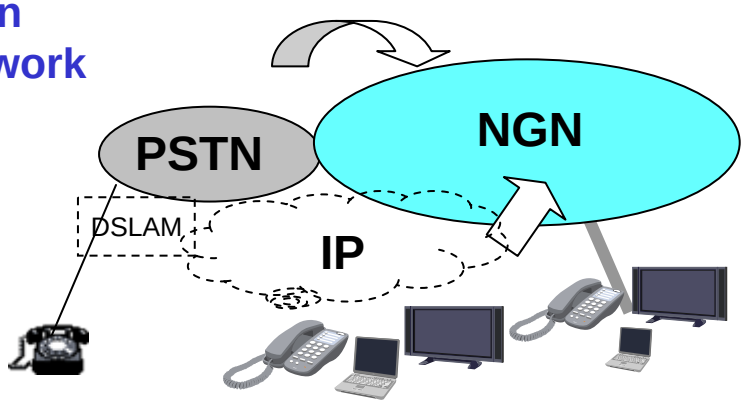
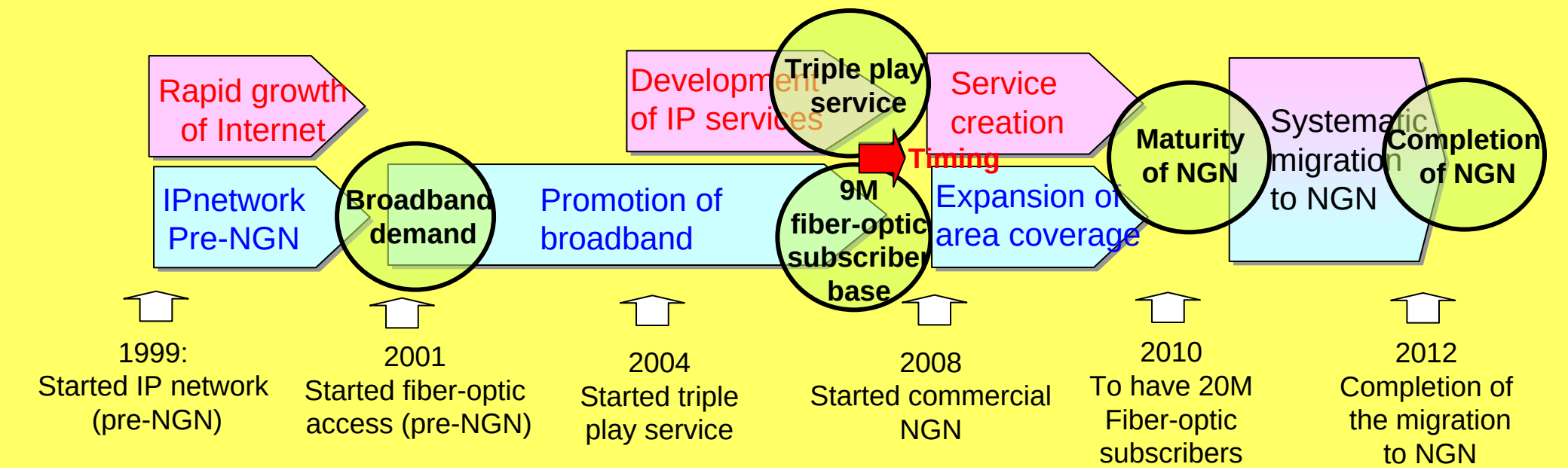
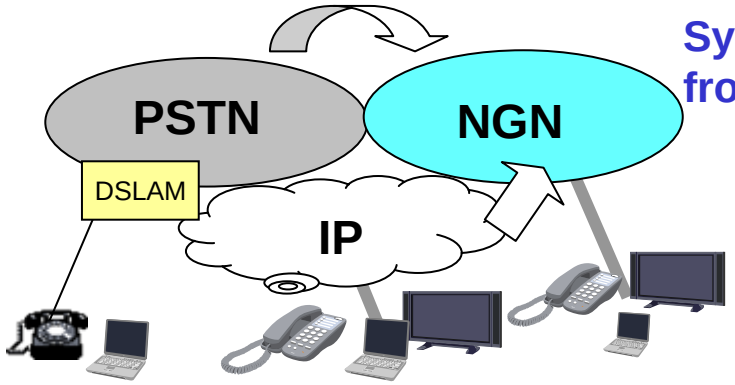


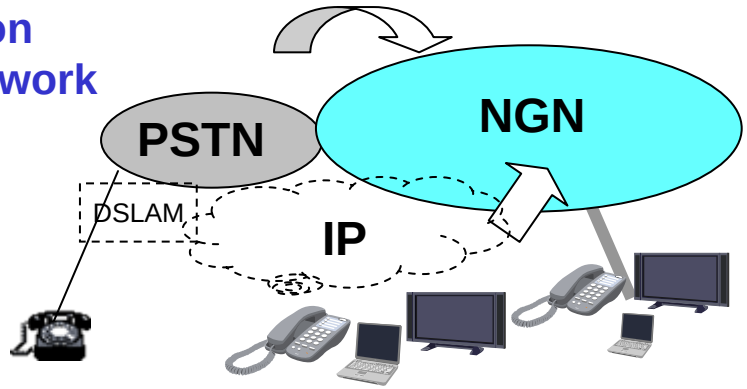
2012: Completion of the migration from existing IP network to NGN





2010: 20M fiber-optic service subscribers

Systematic migration from existing IP network



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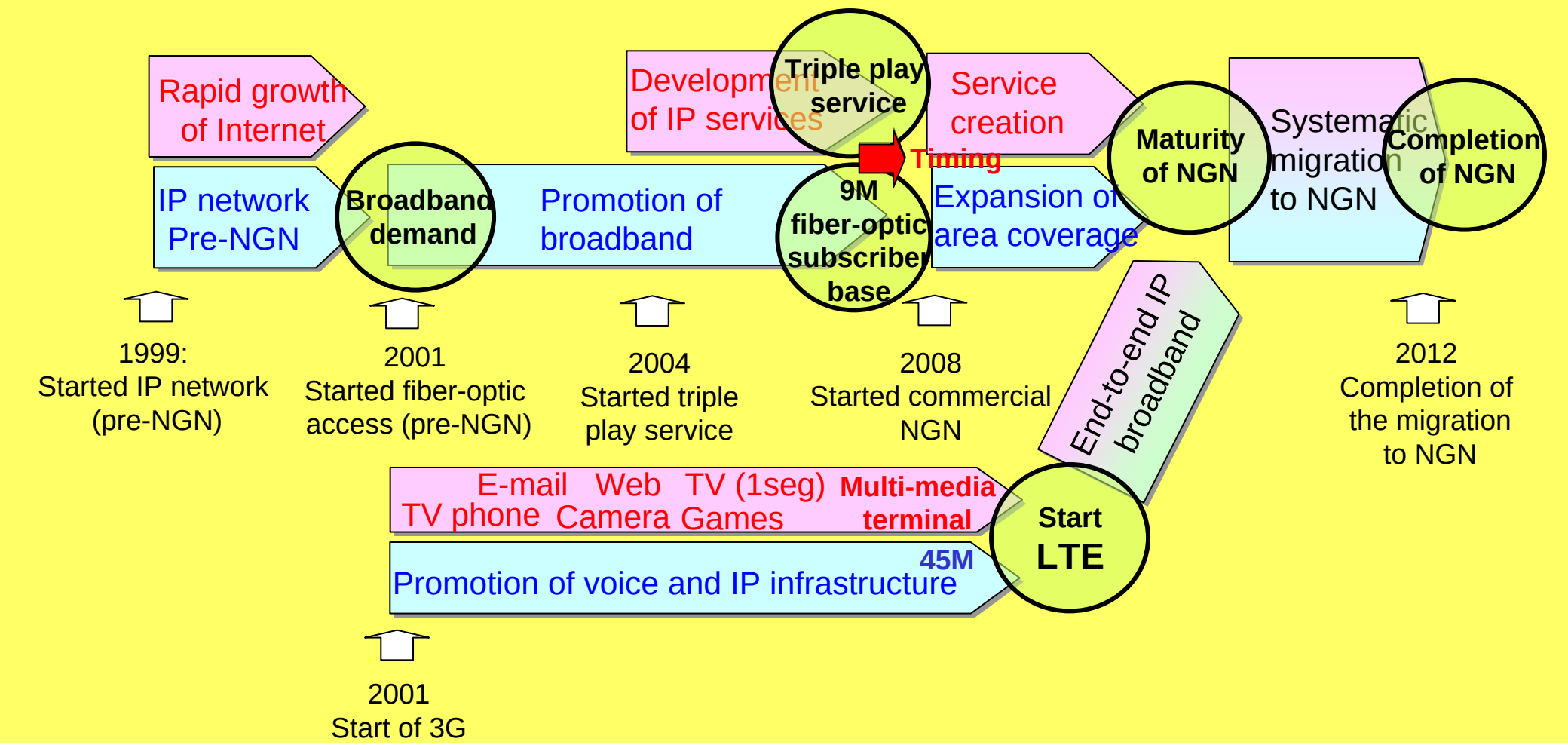


- Deployment of both fixed and mobile full-IP network infrastructure will be in 2010
  - This will be based on 3G infrastructure subscriber base started in 2001
  - Mobile handsets have already become multi-media terminals using i-mode, video phone, 1seg TV, etc.
  - LTE will drive end-to-end IP broadband communications.

Questions for launching the NGN

Questions for launching the NGN

There are two questions regarding the launch of the NGN

- **Chicken or egg?**
  Which comes first? (or, Highway or sports car?)

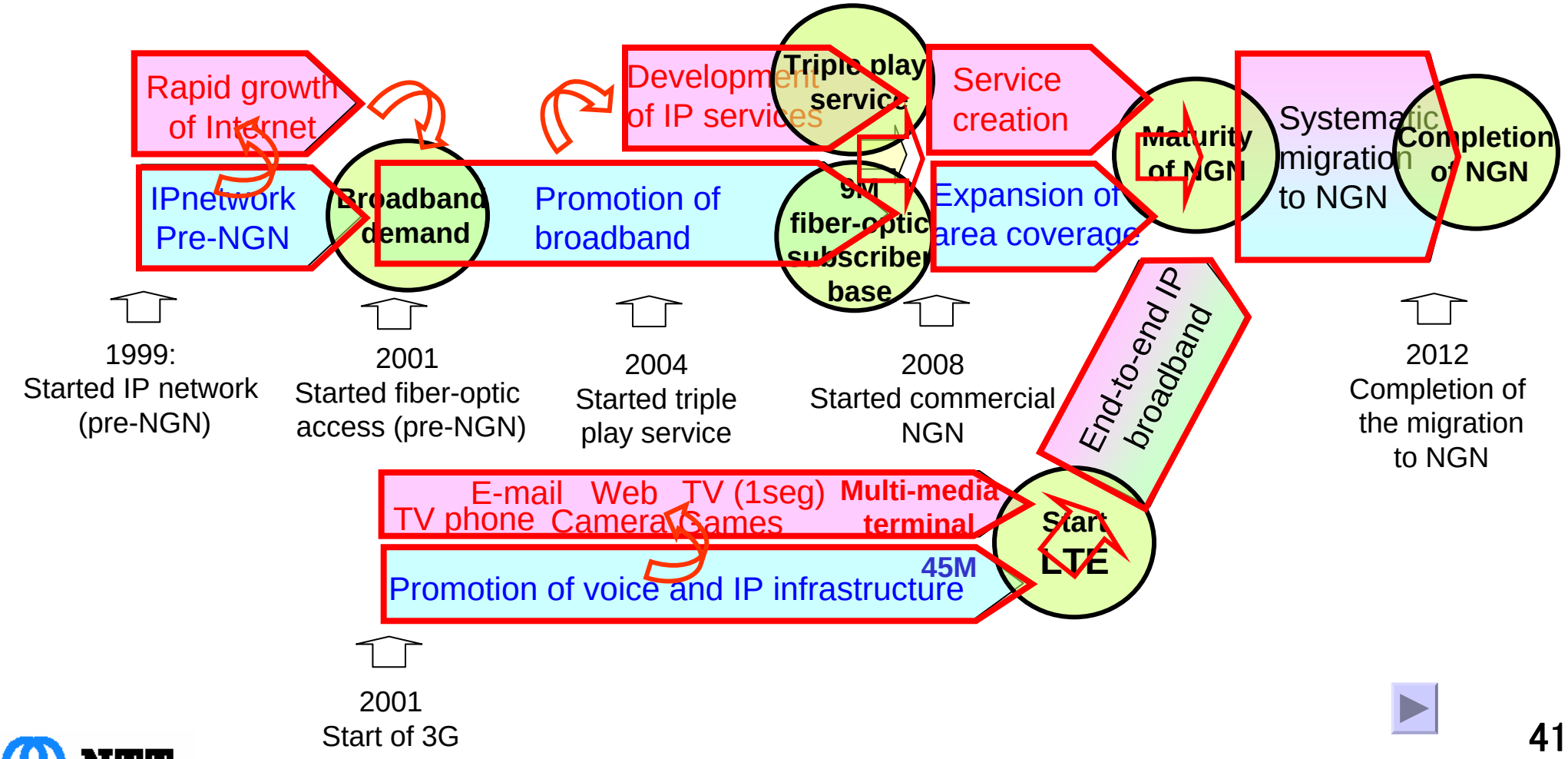
  NTT may appear to be looking at infrastructure alone.
  However, NTT's approach is based on **synchronizing development of services and infrastructure**

- **From where do subscribers migrate ?**
  What is the subscriber base ?

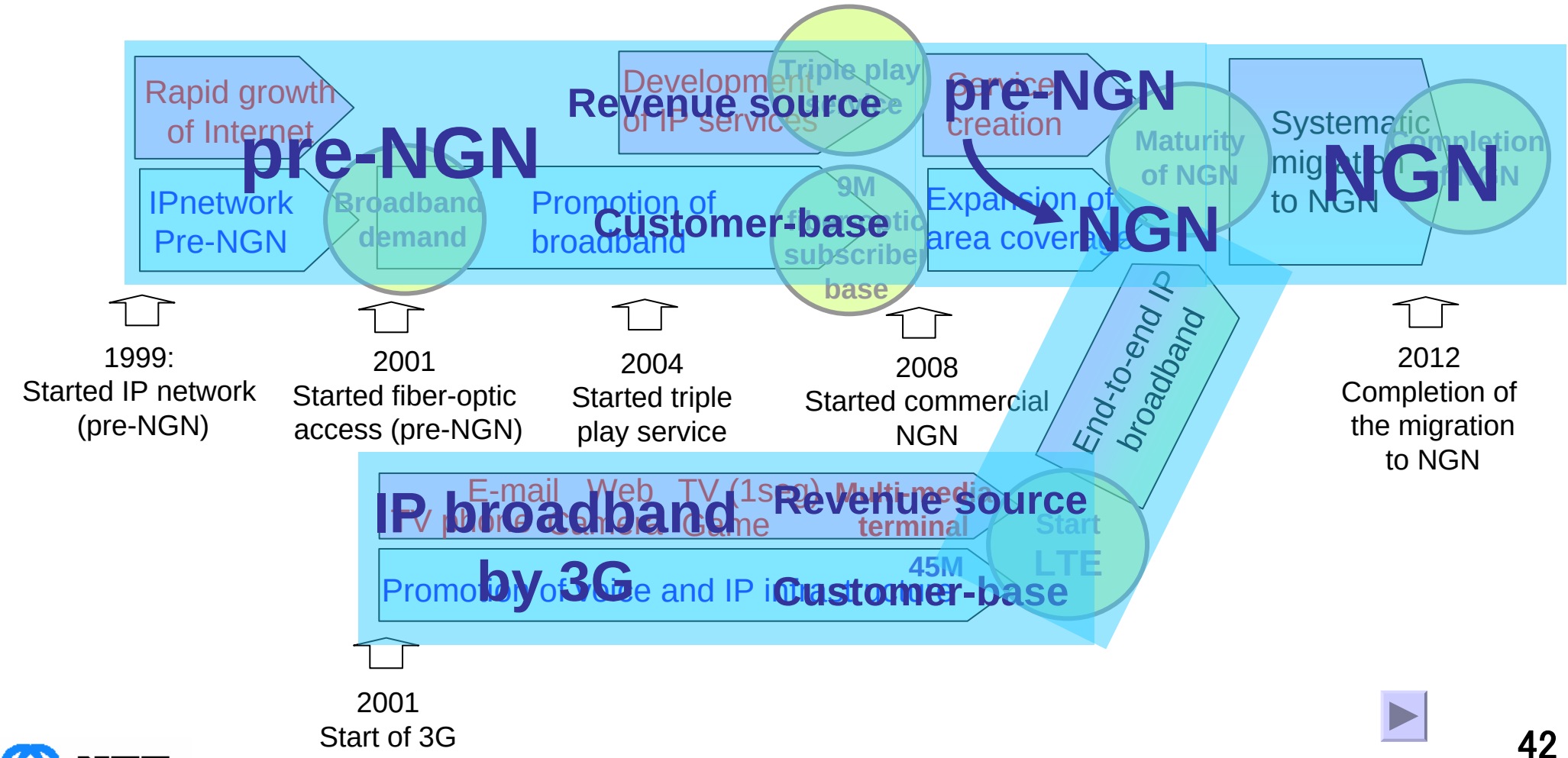
  BT: Migrate from PSTN
  Europe: Migrate from GSM world

  NTT: **Migrate from IP broadband**

NTT's approach is based on **synchronizing development of services and infrastructure**



NTT subscriber base and revenue source will be **migrated to NGN from IP broadband**



Summary

Summary

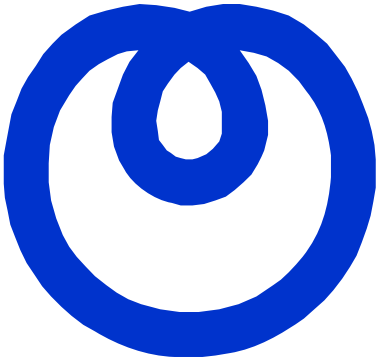
NTT's history and plan for the NGN

- Since NTT first provided an IP network service for Internet access, NTT has promoted optical access and triple play services.
- To meet its timetable to get a 9M optical access subscriber base and establish revenue source from triple play, NTT has just started NGN commercial service.
- The NGN started in limited areas such as Tokyo and Osaka as an upgrade of the existing IP network service.
- The NGN will cover a wide area in short time frame and create new services aimed at new business areas.

NTT's approach to launching the NGN

- NTT's approach is based on synchronizing the development of services and infrastructure.
- NTT's subscriber base and revenue source will be migrated from IP broadband to the NGN

Thank you



NTT