Launching an NGN commercial service
- NTT's approach -

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Tatsuro Murakami
NTT Information Sharing laboratory Group

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Background and history

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Internet access

- **Internet access**
  - NTT started to provide dial-up always-on access to the Internet at a flat rate in November 1999. This was done to meet the government requests.
    As the results
    - Rapid increase in the number of Internet users. (Ref. 1)
    - Anticipated rise in the demand for broadband access
  - NTT started its ADSL service in December 2000.
    A competitor (Softbank) promoted its ADSL that exploits LLU (local loop unbundling)
    - It bundled Internet access and Internet phone services
    - It brought about price collapse by giving away sets of broadband router & IAD to its customers.
    - This brought about a competition in speed in ADSL.
  - NTT started full-scale optical access (FTTH) service in August 2001.
    - This was intended to save NTT by sidestepping the competition involving LLU.
    - This service marked the culmination of speed competition in ADSL.

    The number of optical access users increased and exceeded that of ADSL users. (Ref.2)

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Local Loop Unbundling

- **LLU (local loop unbundling) policy**
  - NTT started to provide LLU, the price of which was based on long-run incremental cost, in April 2000.
    NTT was compelled to lease its copper wire network to competitors at a low price on the grounds that copper cables were a public asset because the investment in them was made while NTT was a public corporation.
  - Competitors began providing ADSL services in September 2001.
    Competitors installed DSLAMs in NTT buildings to set up connections to their IP networks.
    - While NTT is required to unbundle Internet access and ISP services to enable users to select an ISP of their choice, Softbank, its competitor, bundles Internet access and ISP services.
    - Softbank brought down the price of ADSL by reaping profit from its ISP service.
  - Using LLU, competitors began providing a Class 5 phone service.
    Competitors took telephone subscribers away from NTT by introducing softswitches, etc.
    - Competitors provided low-price services by taking advantage of the low-cost feature of long-run incremental cost.

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Local Loop Unbundling (cont.)

- NTT had to counter this by lowering the price of the PSTN service.
- The above had the effect of destroying the economic viability of Japan's telephone market, making it impossible for telecom carriers to generate sustained revenue from their telephone service.
- NTT has been extending the lives of telephone switches to minimize its investment in the PSTN.

- Since August 2001, NTT has adopted a blue ocean strategy in which it has encouraged the access market to shift to optical access.
  This strategy is intended to save NTT from the unfavorable competition in copper access.
  - NTT bundles optical access with IP phone service (simulation-based IP phone service) started from 2004.
  - NTT offers the IP phone service at a low price by limiting the variety of services it offers, in order to prevent telephone traffic from being carried by competitors over the Internet.
  - Optical access is no longer simple pipes but retains revenue-generating subscribers.

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Optical Access

- **Optical access**
  - NTT has been installing optical access networks since around 1990.
    - When existing copper cables come to the end of their lives, NTT replaces them with optical cables. (Being susceptible to corrosion, copper cables have shorter lives than optical cables.)
    - The replacement of copper cables with optical cables, which have far greater capacity, resolves the severe problem of shortage in duct space. (This replacement also dramatically increases the transmission capacity.)
  - NTT started to provide optical access for Internet access in 2001.
    - This effectively defeats ADSL in the speed competition.
    - This enables NTT to escape the LLU problem.
    - The bundling of IP phone service at a low price accelerates the shift to optical access.
  - In the 2nd quarter of 2010, optical access became available in over 90% of existing telephone service areas, and was subscribed to by about 14 million customers. (About 37 million customers still subscribe to the PSTN.)

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IP Telephone

- **IP telephone**
  - NTT has started VoIP service called OCN.phone in 2002. This is ISP telephone targeted to copper line - 2nd line VoIP.
    - It's for competition against Softbank BB phone which provides cheap (sometime free) telephone service as a topping of ISP.
    - Japanese standard body (TTC) specified interconnection rule between ISP telephone by SIP.
  - The government provided the rule for IP telephone using existing numbering plan. It is defined by QoS and emergency call in October 2003.
    - To use this rule NTT started IP telephone serviced over FTTH in 2004. It is PSTN simulation service - 1st line VoIP.
  - Just before NTT started NGN, government provided the interconnection rule for IP telephone
    - NTT, KDDI and Softbank which are three measure operators in Japan had interconnection testing successfully in 2007.
    - And finally NTT can launch NGN commercial service since March 2008.

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IP Network

- **IP network**
  - The environment surrounding IP networks has been changing (as seen in 2004).
    - Increase in the number of subscribers to optical access (which is extremely broadband)
    - Increase in the number of subscribers to IP phone service (1st VoIP)
    - Start of video delivery service (IPTV)
  - It became necessary to drastically upgrade IP networks.
    NTT announced its Medium-term Management Strategy and Roadmap in 2004. (Ref. 3)
    - NTT simplified the core network and increased its capacity.
    - NTT introduced the IMS (by increasing the capacities of SIP servers)
    - NTT introduced QoS control (by introducing RACF and edges)
    - NTT provided multicast capability.
  - NTT upgraded its IP network to the NGN.
    NTT conducted field trials of the NGN in 2007, and started its commercial service in March 2008. (Ref. 4)
    - NTT's NGN is not a simple replacement of its PSTN (i.e., simply providing existing telephone services).
    - Hence, NTT has built the NGN as an overlay to the PSTN, and skipped the introduction of softswitches. Instead, it introduced the IMS, which is a multimedia service platform, from the beginning. (Ref. 5)

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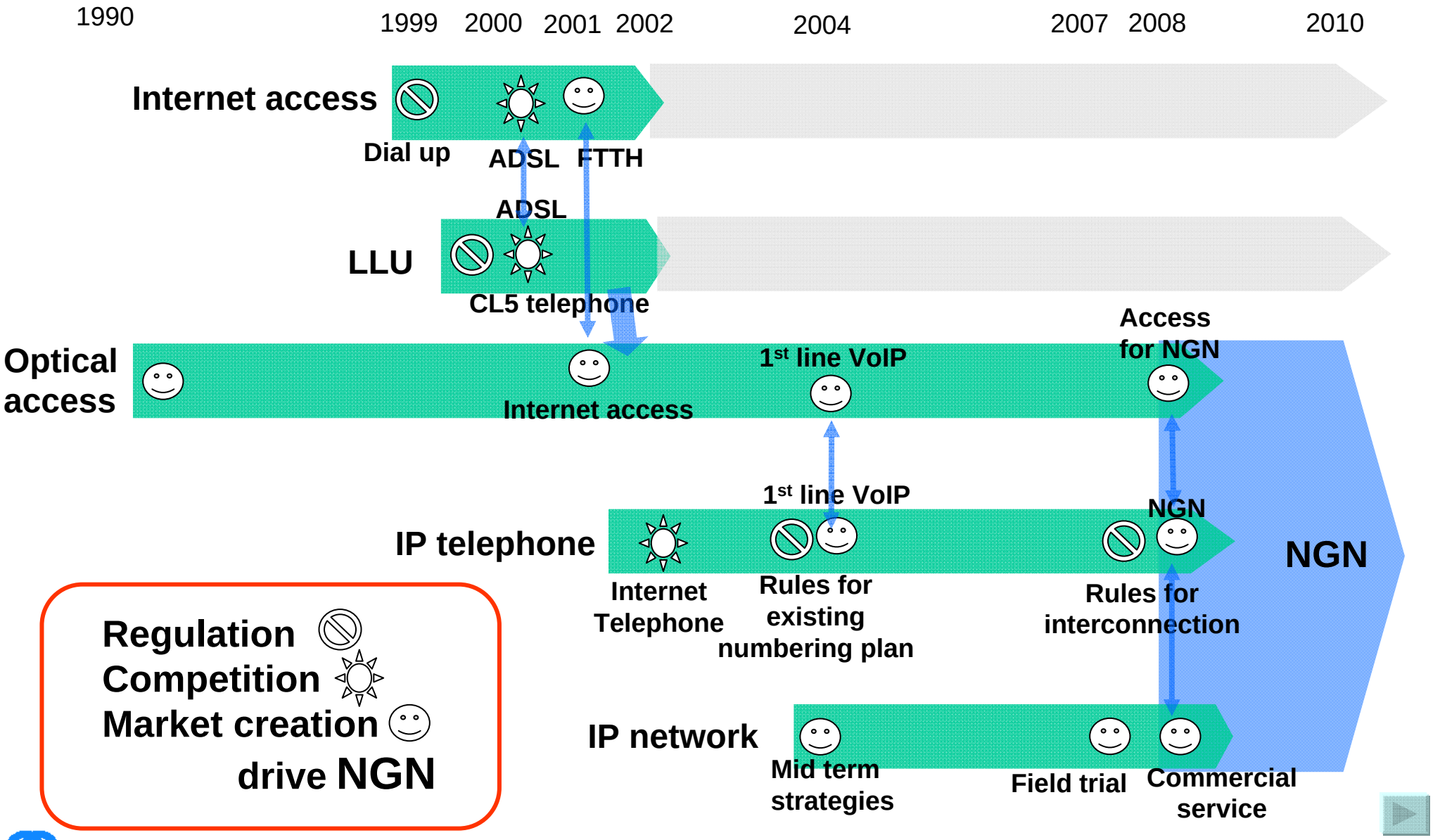
Background and history for NGN in Japan



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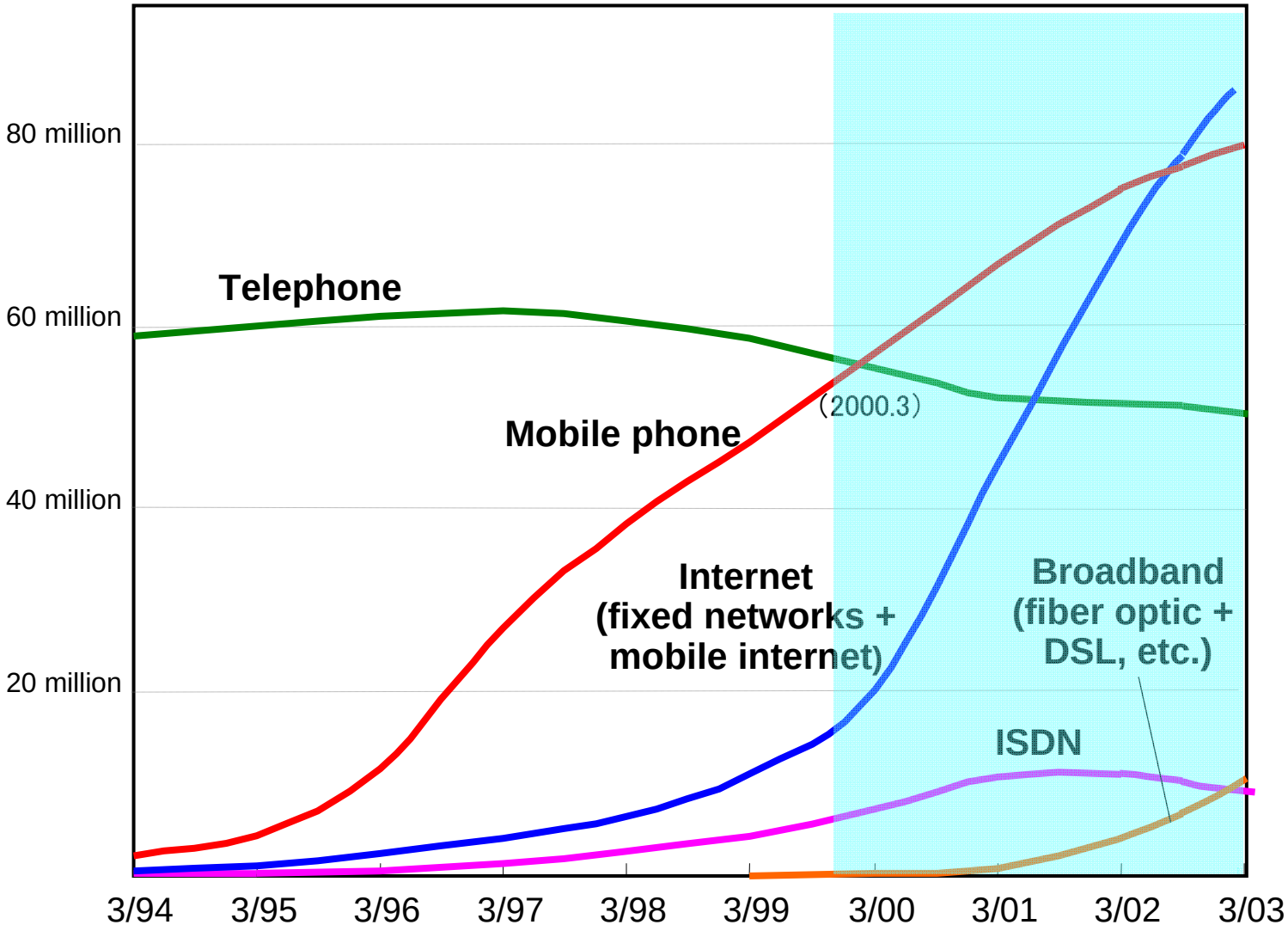
Ref.1 User of Internet in NTT



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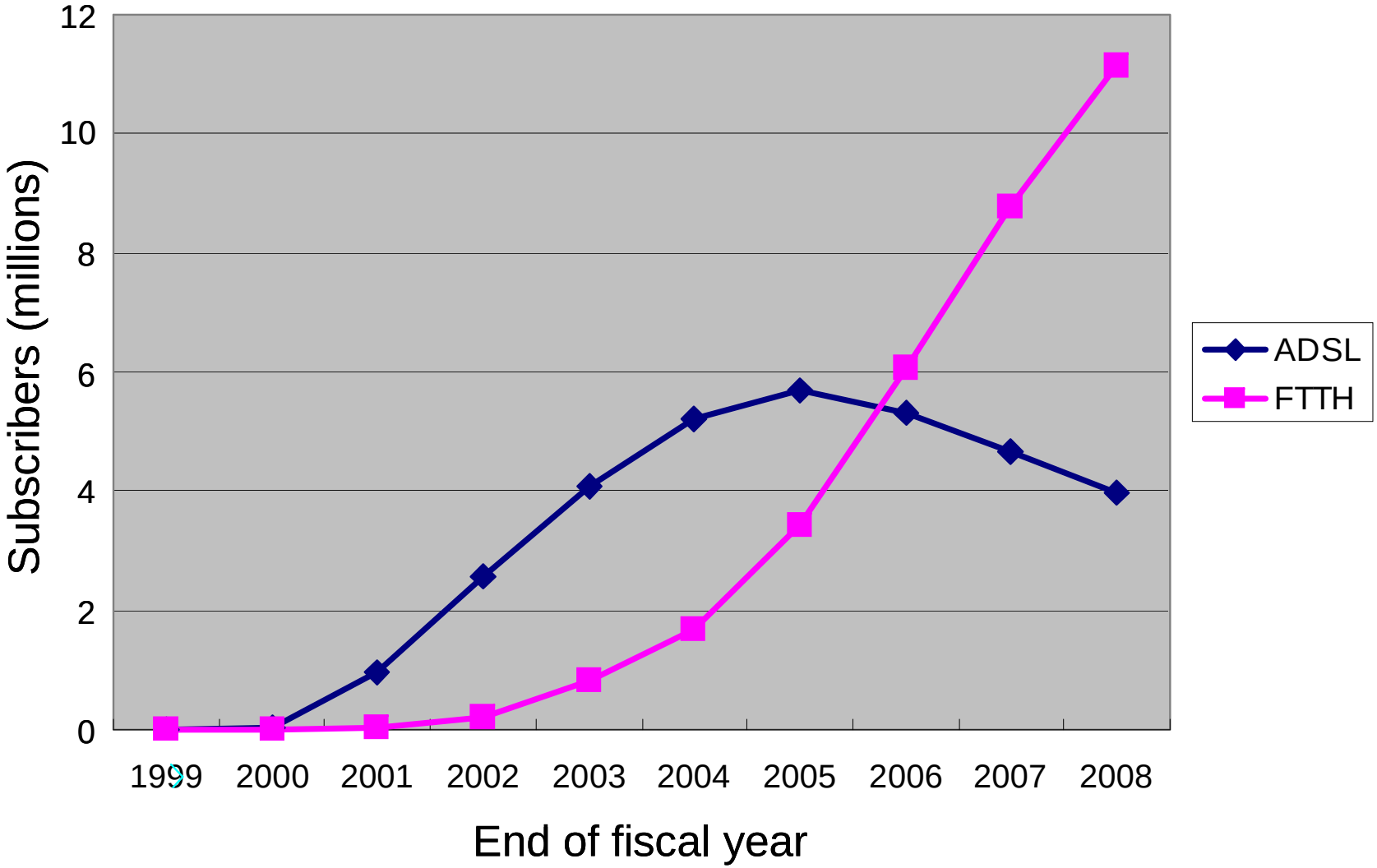
Ref.2 Subscriber of Broadband access in NTT



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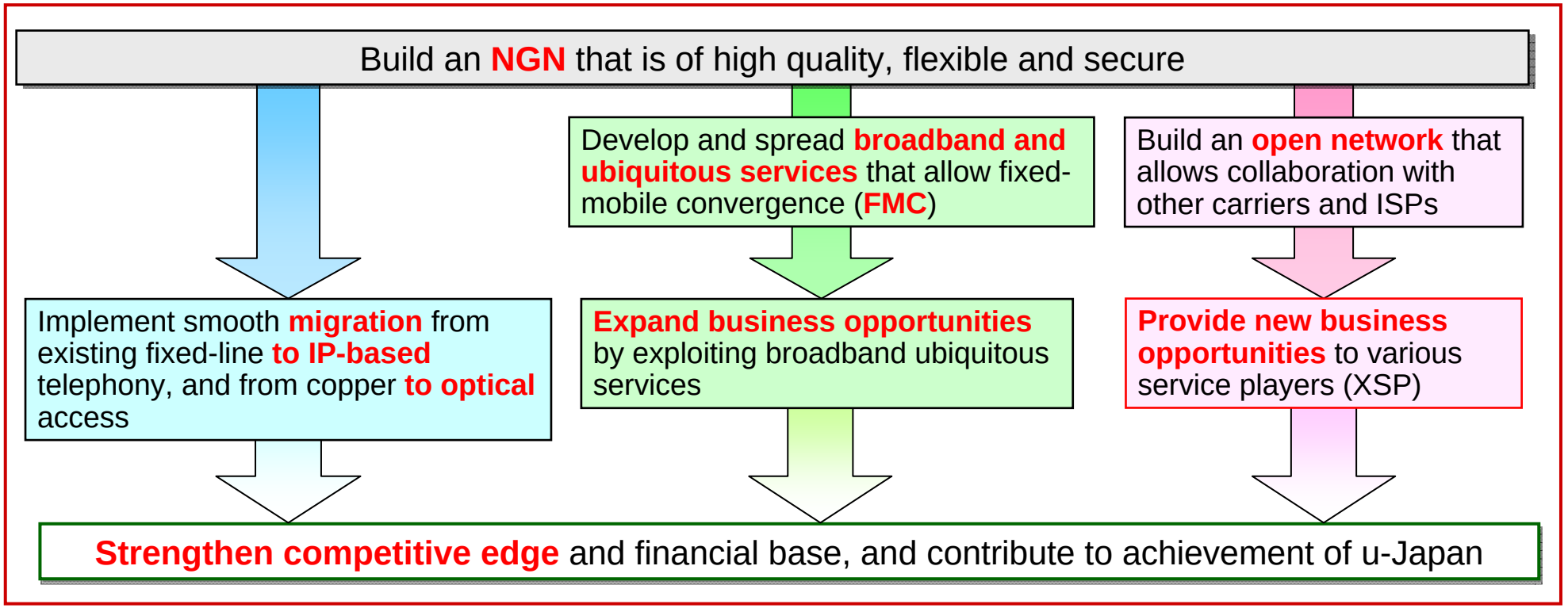
Ref. 3 NTT Medium-term Strategy - November ’04

Objective

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

Specific actions



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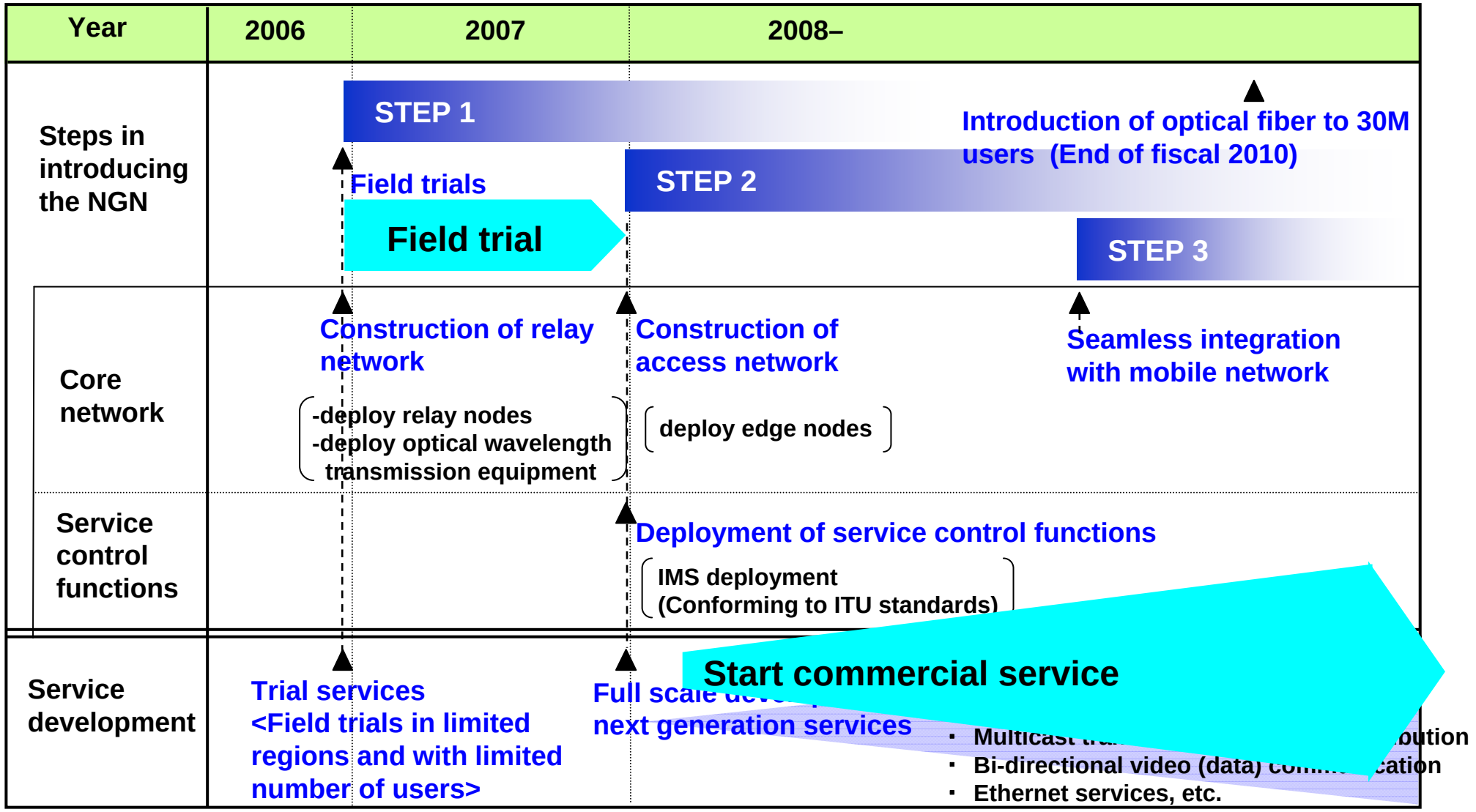
Ref.3 Roadmap announced in 2004



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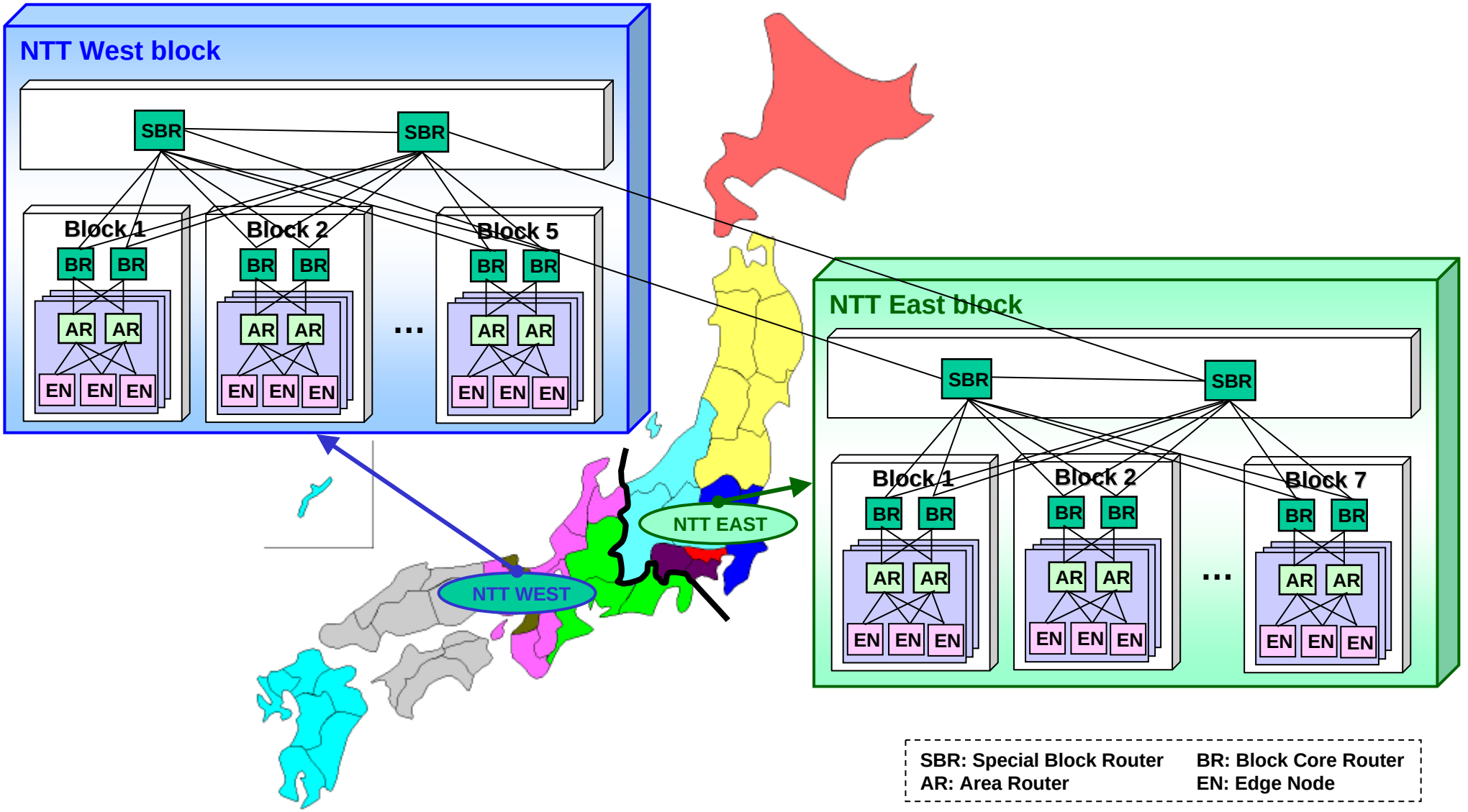
Ref.4-1 Geographical configuration of NGN



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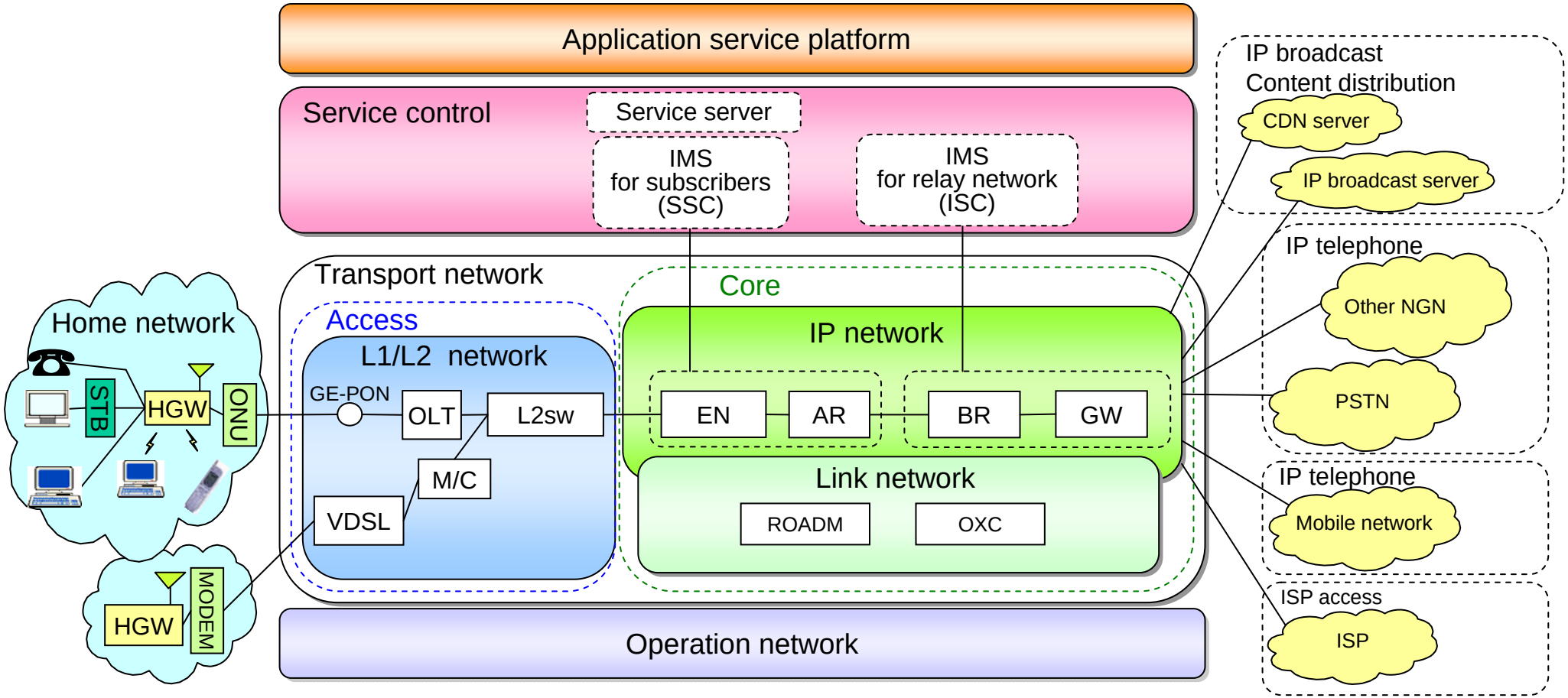
Ref.4-2 Abstract of NGN network structure



SSC: **S**ubscriber **S**ession **C**ontrol server
ISC: **I**ntermediate **S**ession **C**ontrol server
BR: Block Core Router
AR: Area Router
GW: Gate Way
EN: Edge Node

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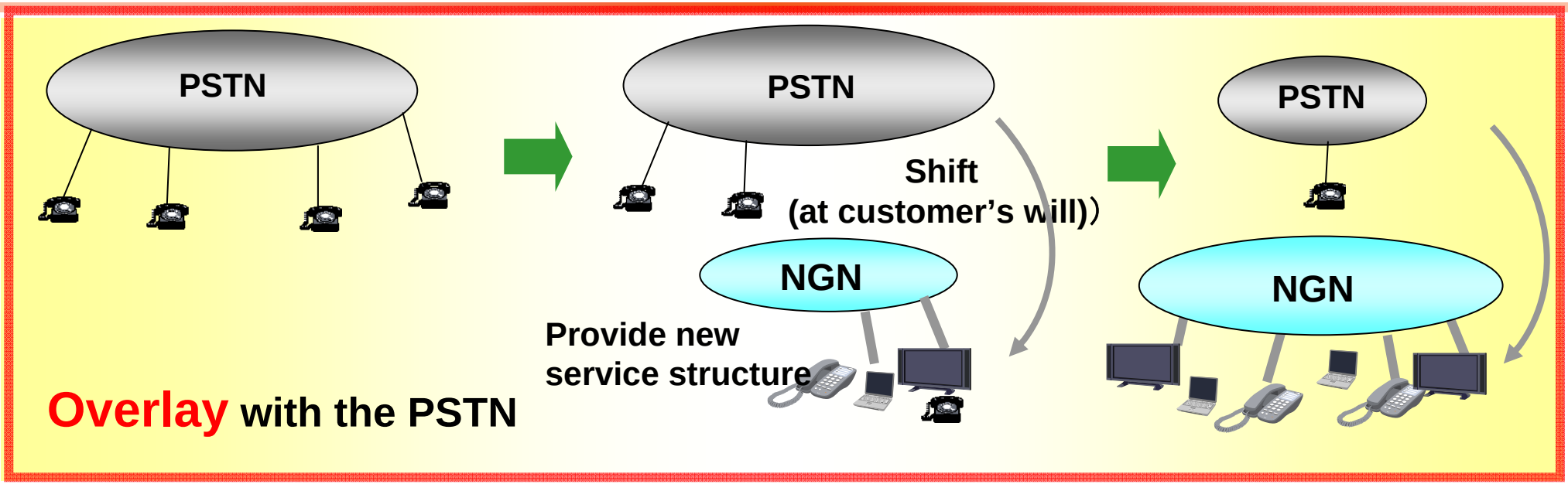
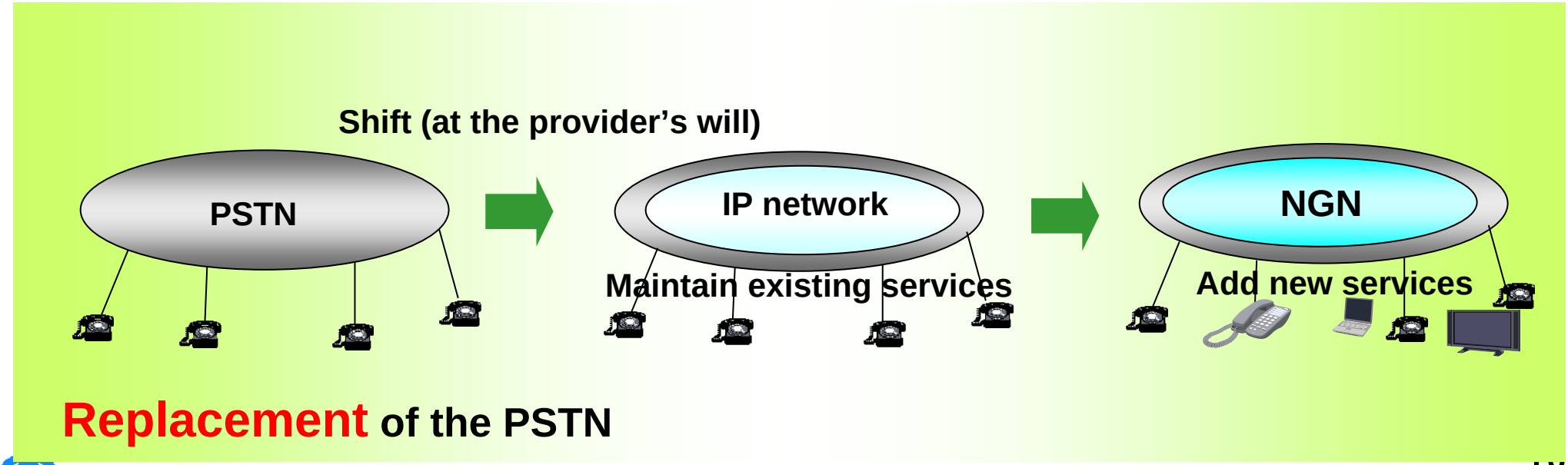
Ref.5-1 NTT took Overlay method to establish NGN





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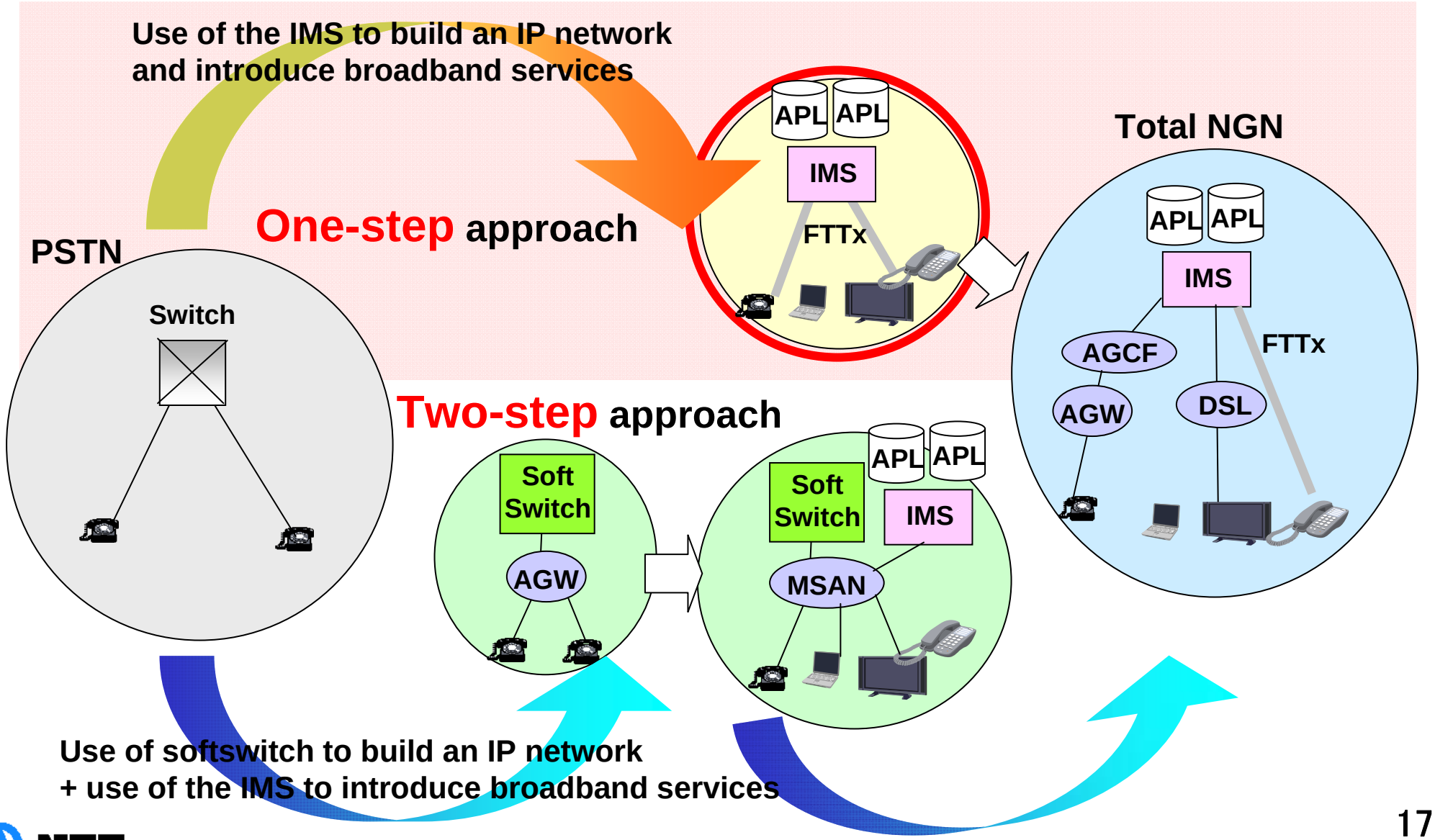
Ref.5-2 NTT skipped introduction of Softswitch



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Load to the NGN

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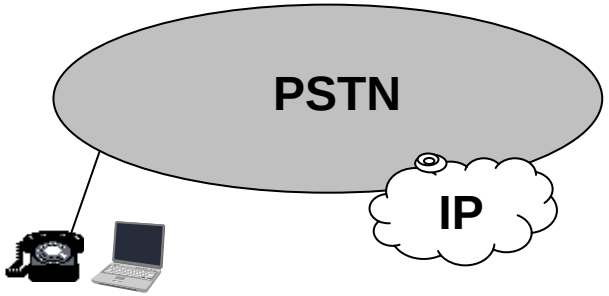
Rapid growth of Internet

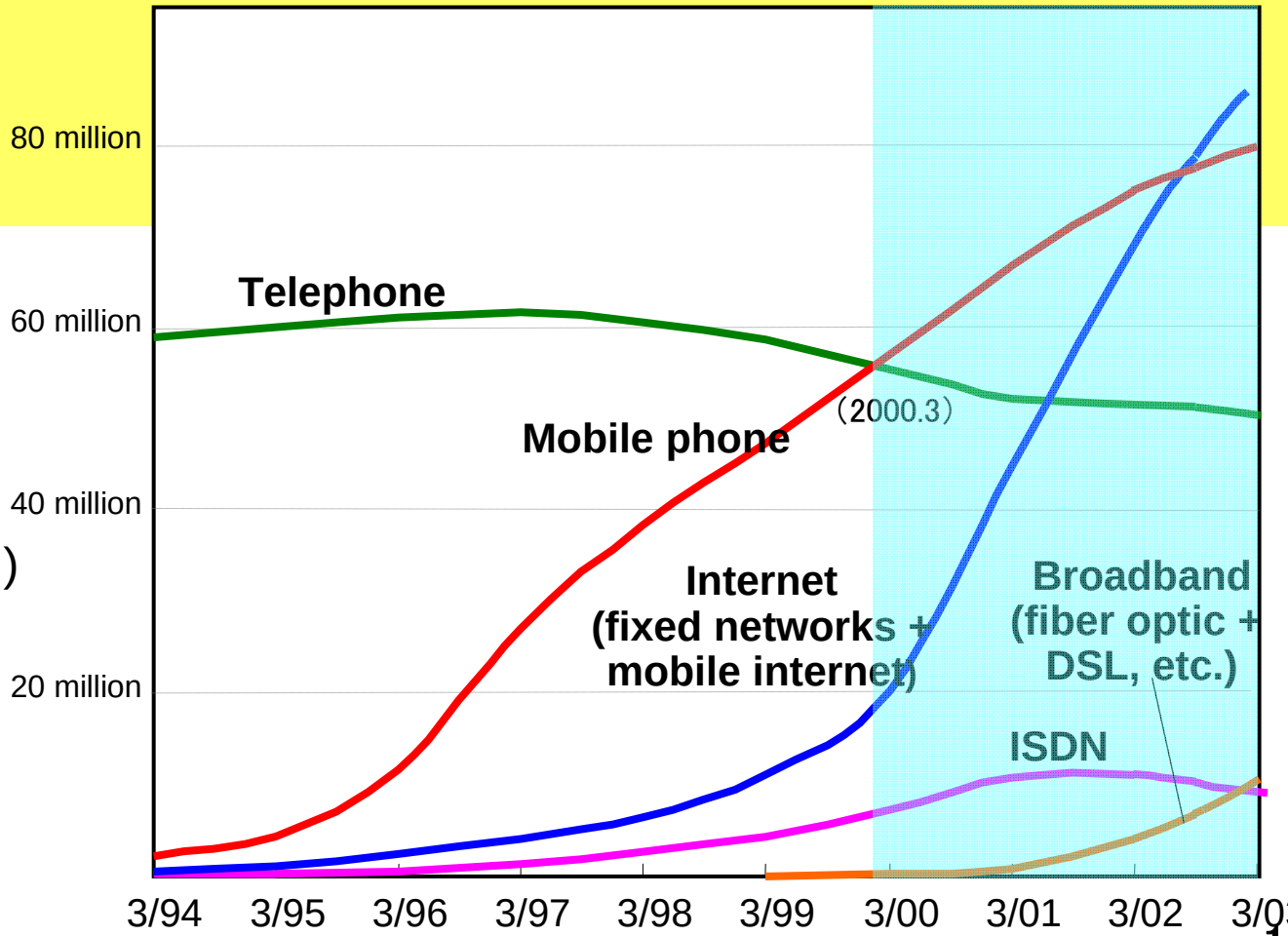
IP network Pre-NGN

Broadband demand

1999:
Started IP network
(pre-NGN)



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



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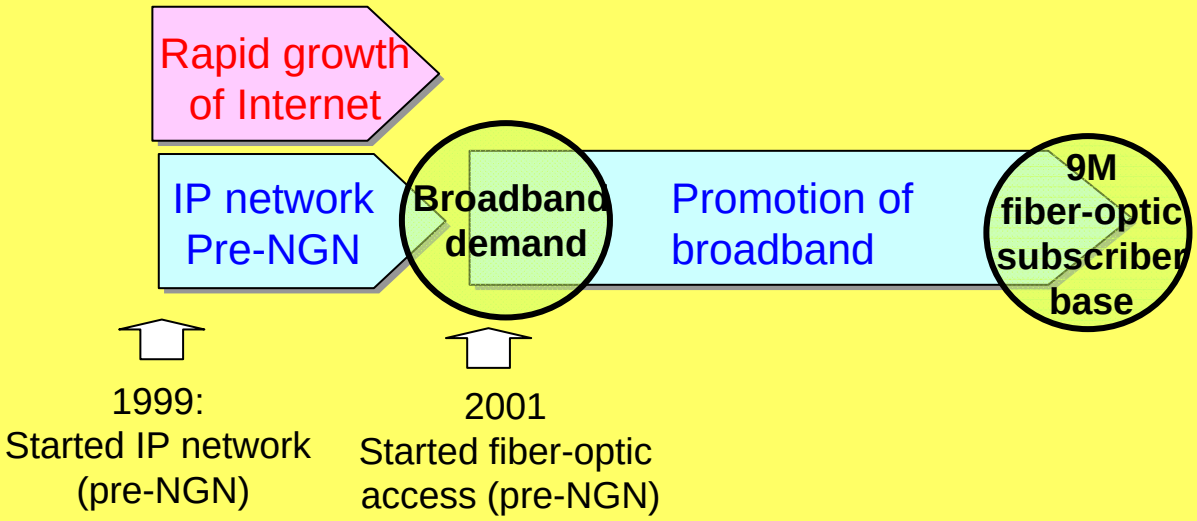
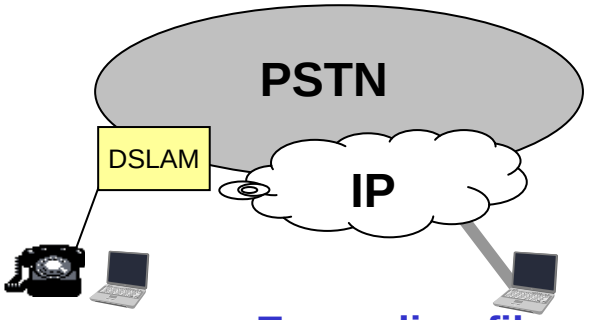
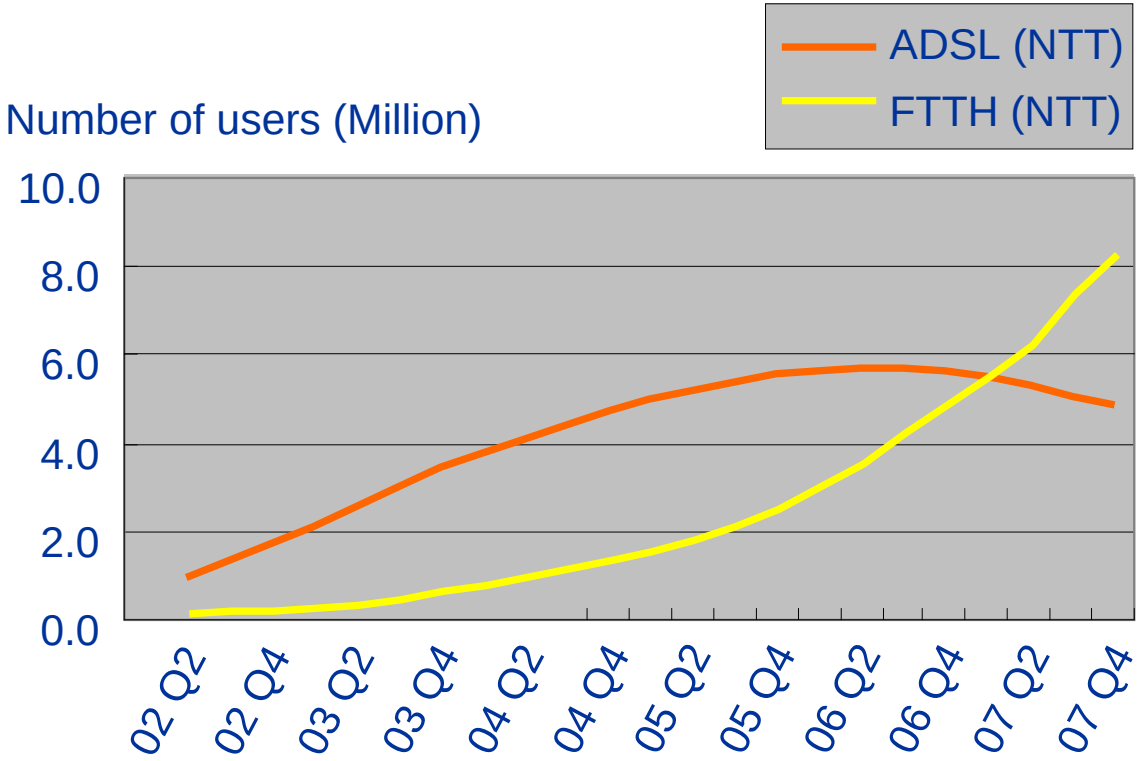




Expanding fiber-optic subscriber base

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



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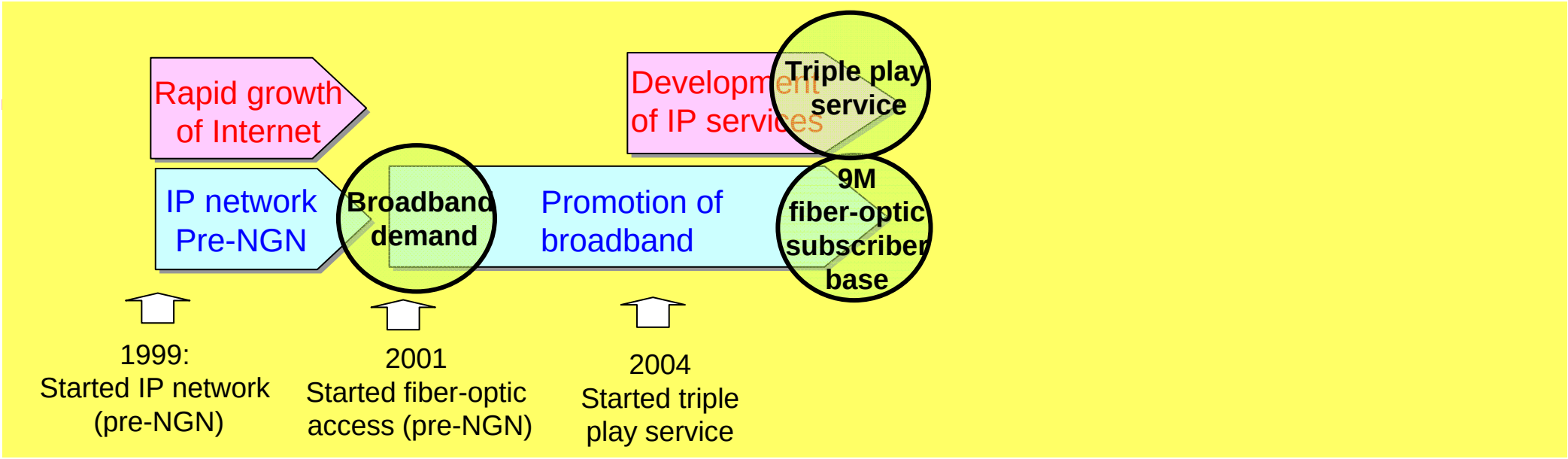

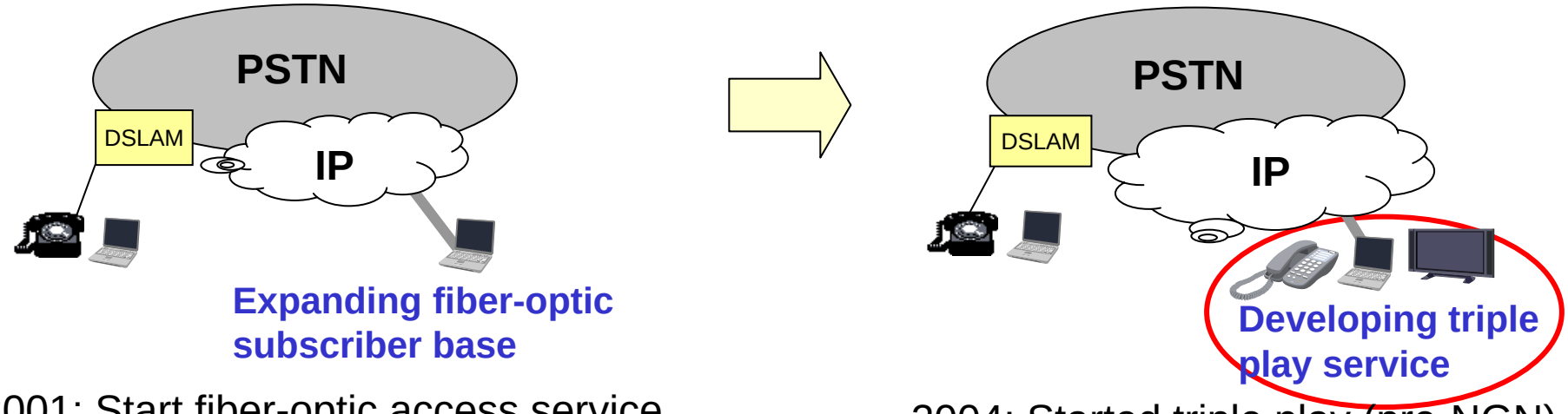

2001: Start fiber-optic access service (pre-NGN)

2004: Started triple play (pre-NGN)

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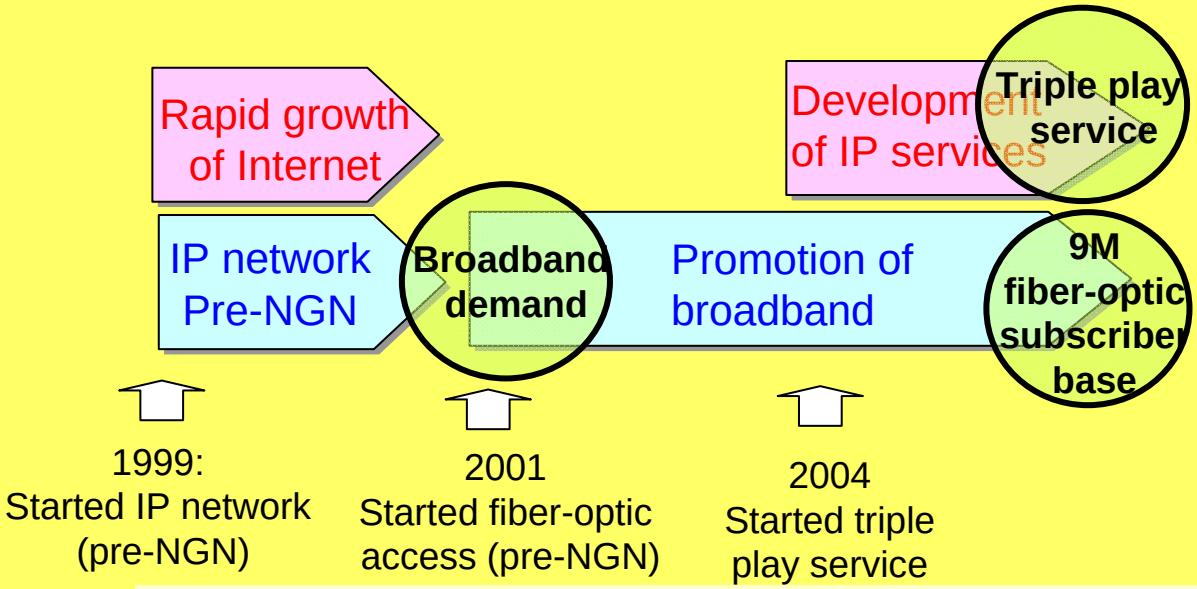

FLET's Service features started 1999

- 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

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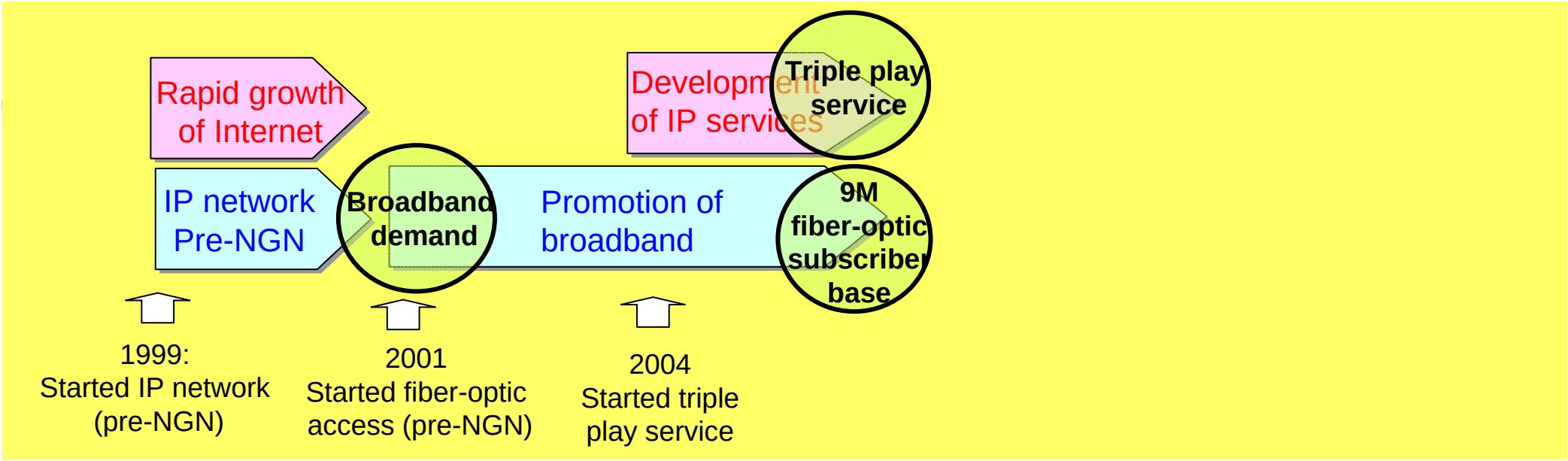
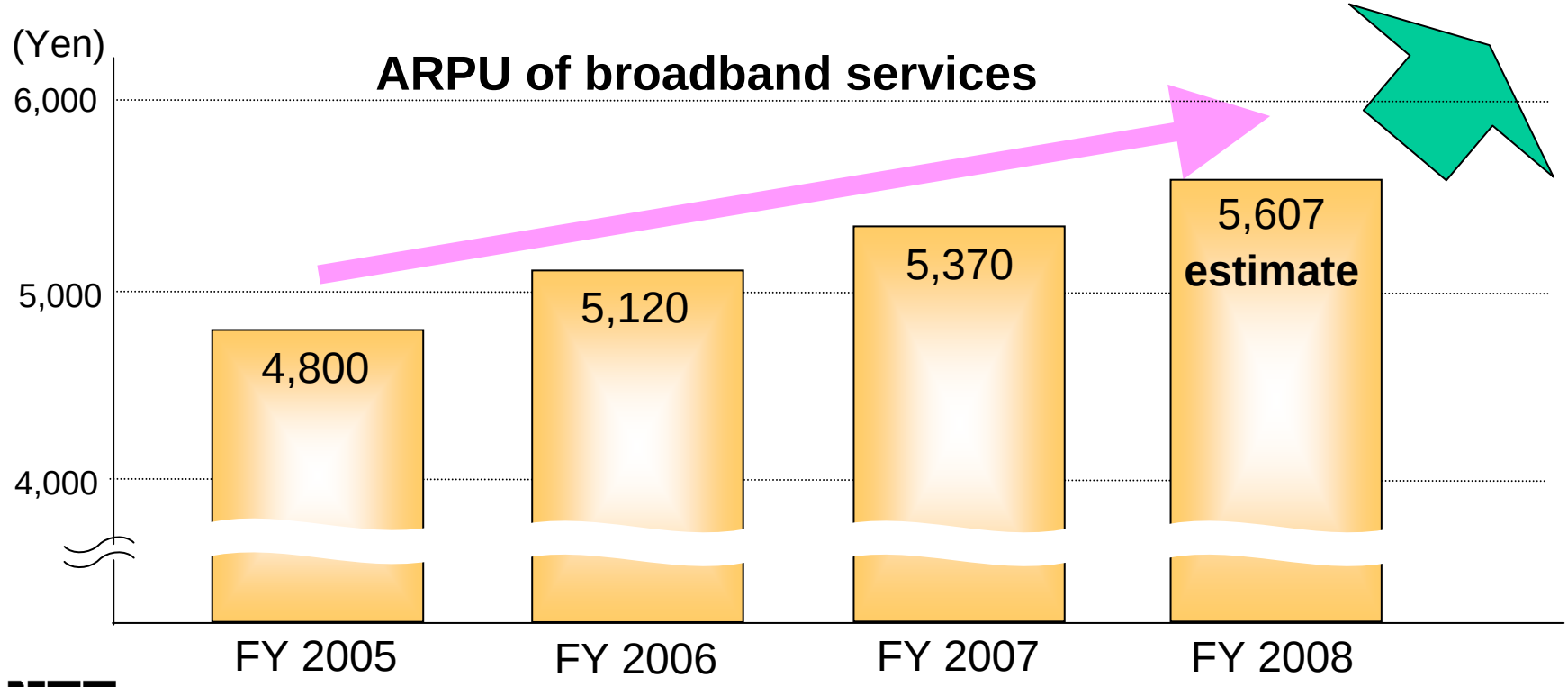

Rapid growth of Internet
IP network Pre-NGN
Broadband demand
Development of IP services
Triple play service
Promotion of broadband
9M fiber-optic subscriber base
1999: Started IP network (pre-NGN)
2001 Started fiber-optic access (pre-NGN)
2004 Started triple play service


(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

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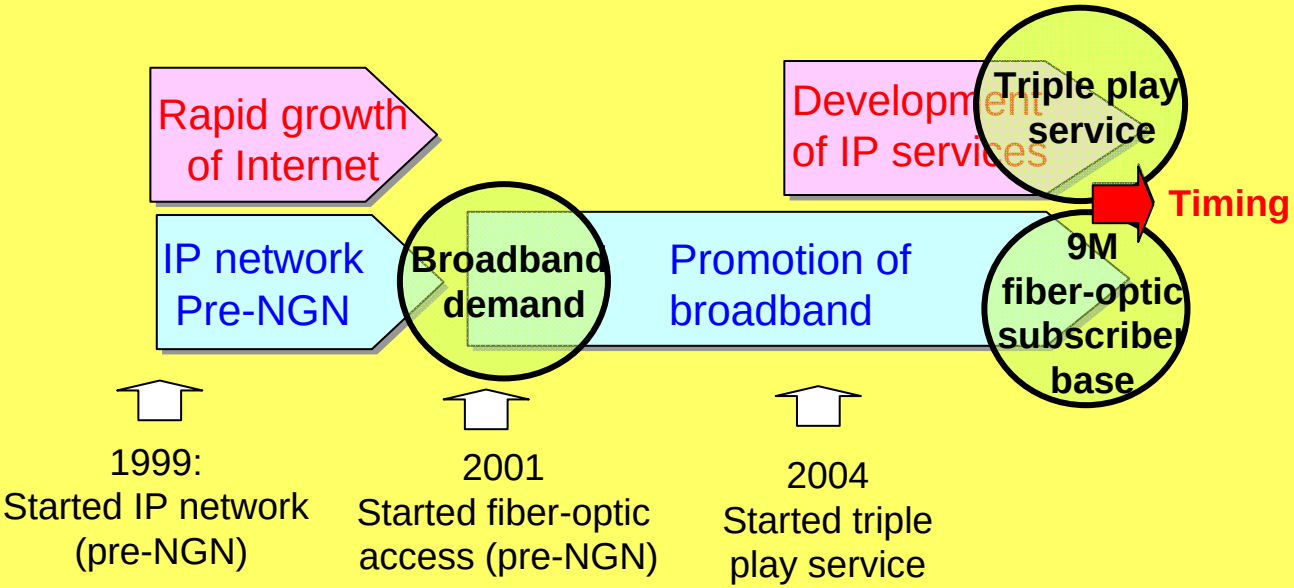

Timing of NGN launch….

- 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

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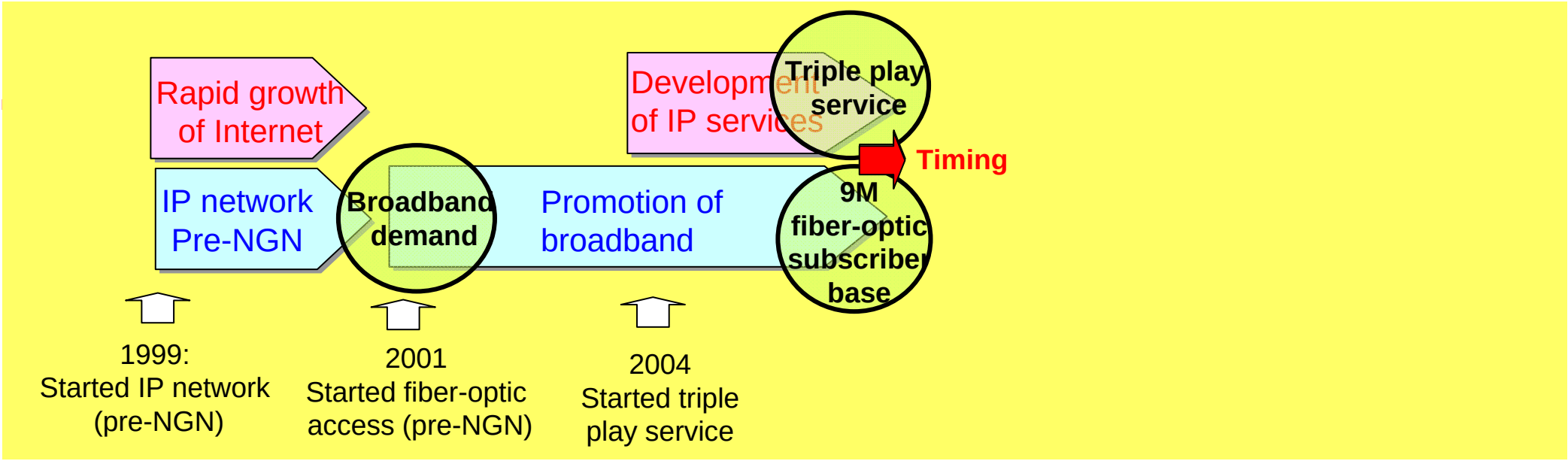
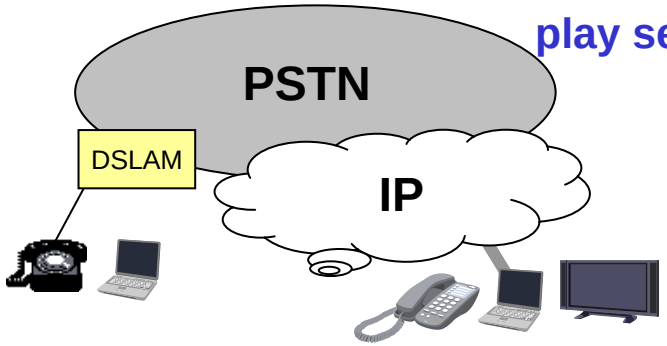


Developing triple play service



2004: Started triple play (pre-NGN)

Field trial

Timing

Significance of the field trials

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

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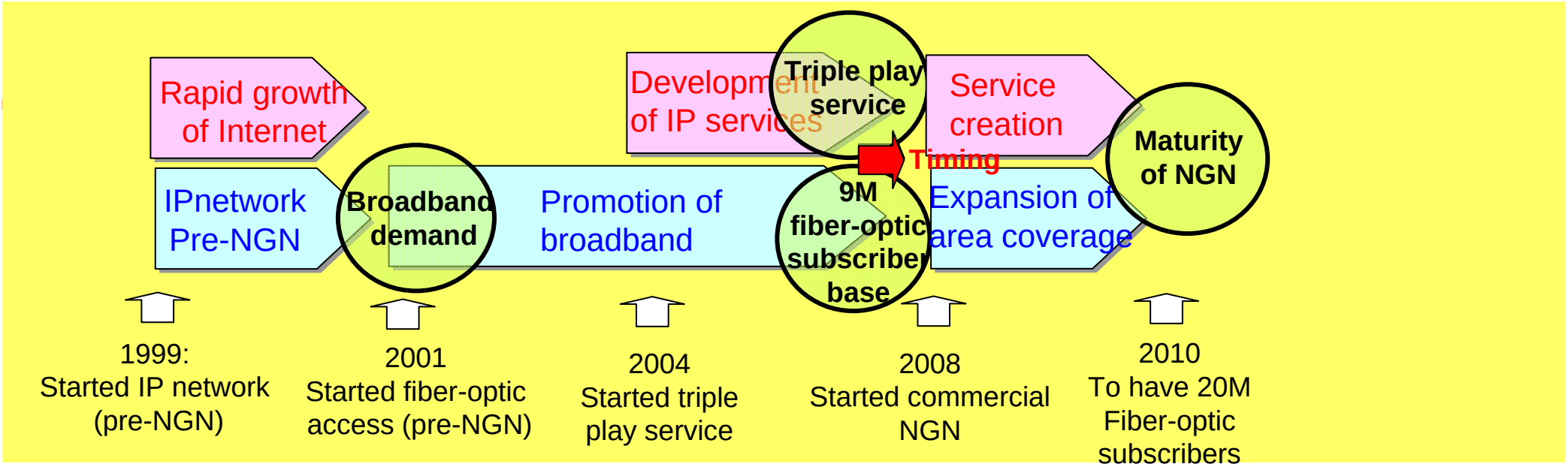
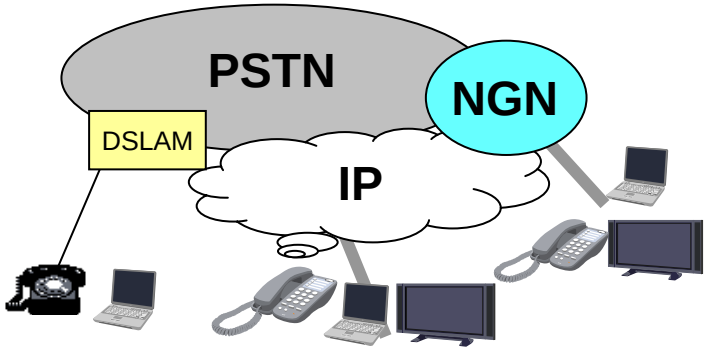
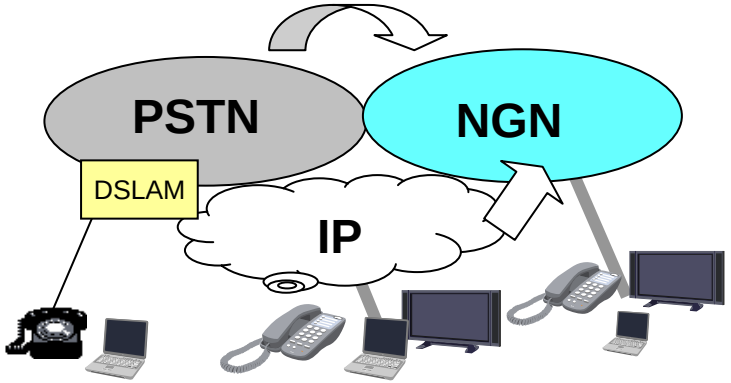




2008: NGN commercialization

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

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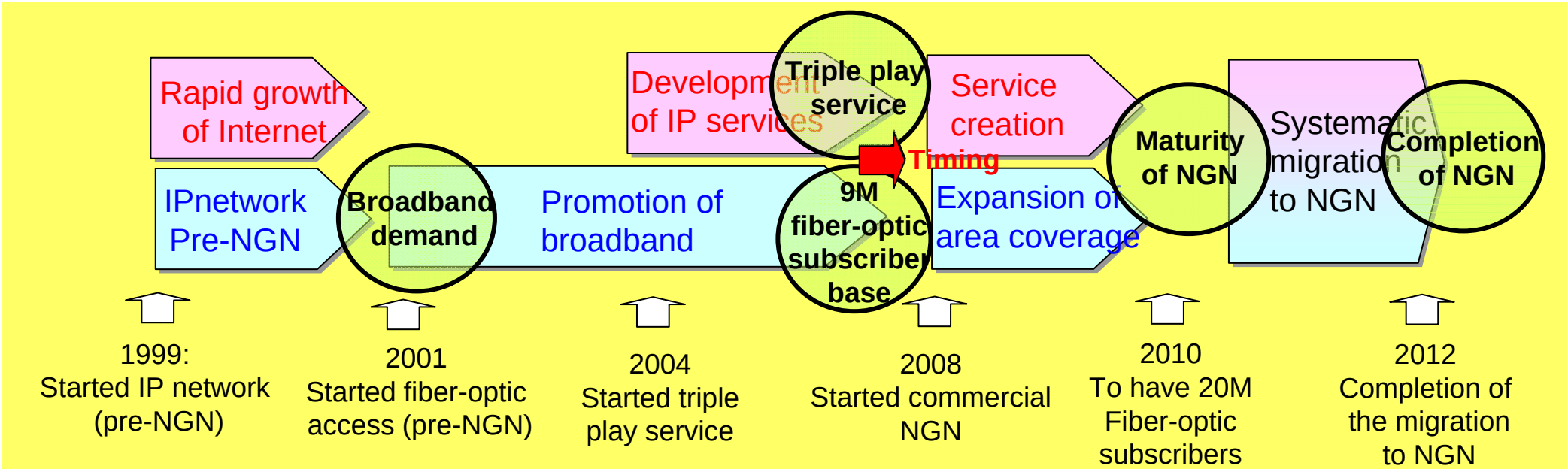
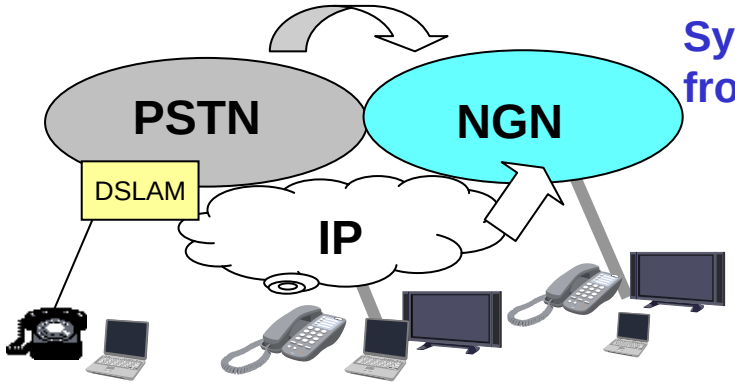
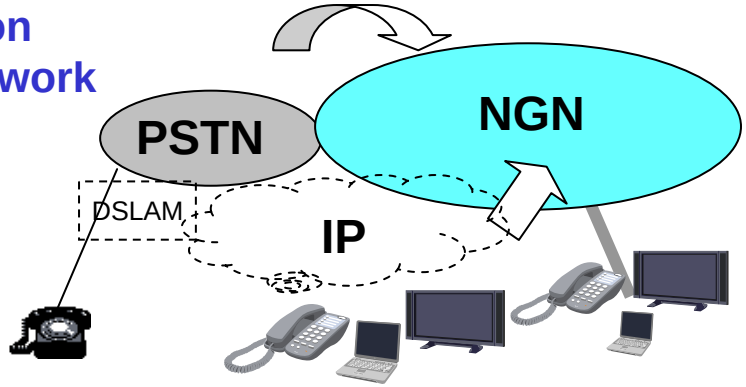




2010: 20M fiber-optic service subscribers

Systematic migration from existing IP network



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

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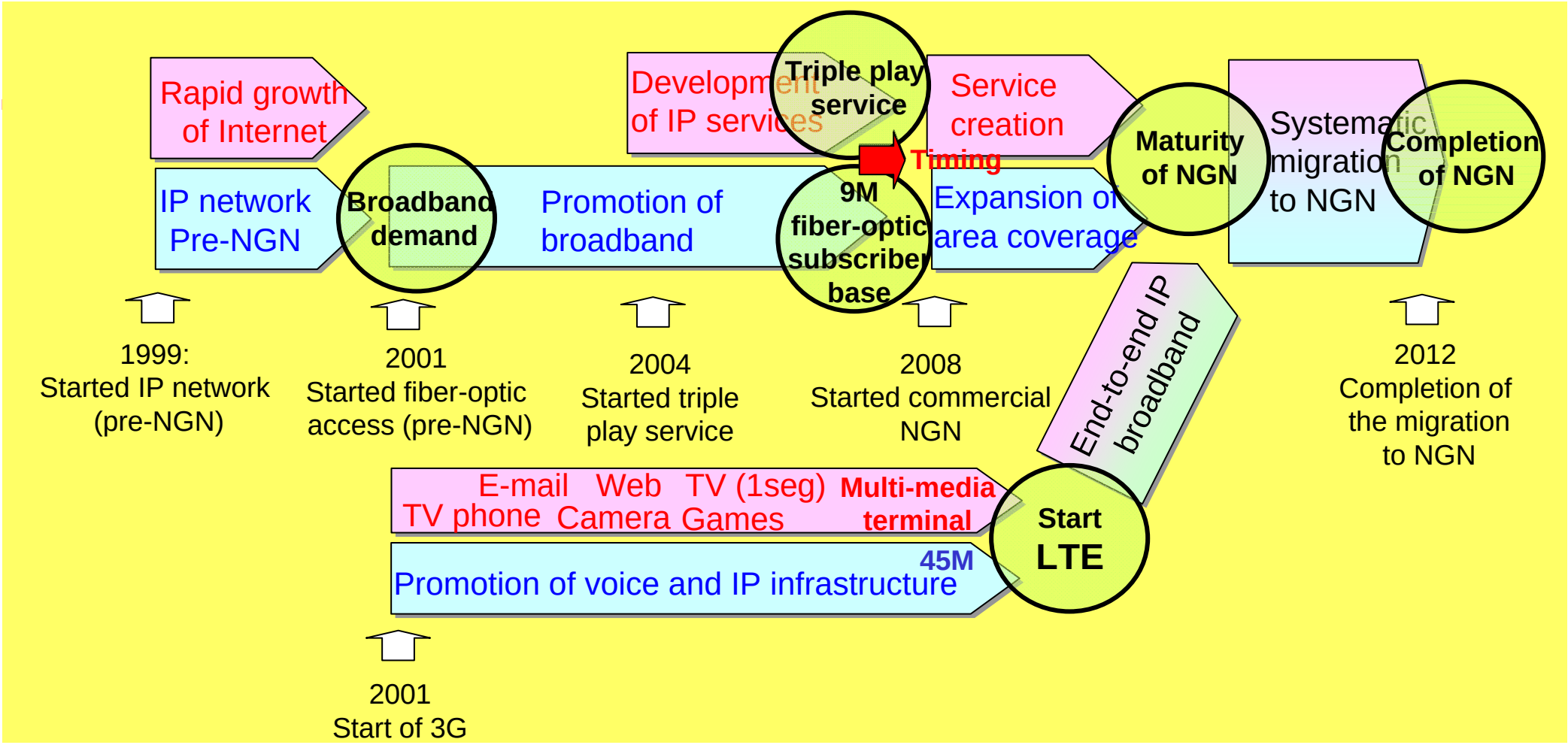

- Deployment of both fixed and mobile full-IP network infrastructure will be in 2010
  - This will be based on 3G infrastructure subscriber base started in 2001
  - Mobile handsets have already become multi-media terminals using i-mode, video phone, 1seg TV, etc.
  - LTE will drive end-to-end IP broadband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

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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**

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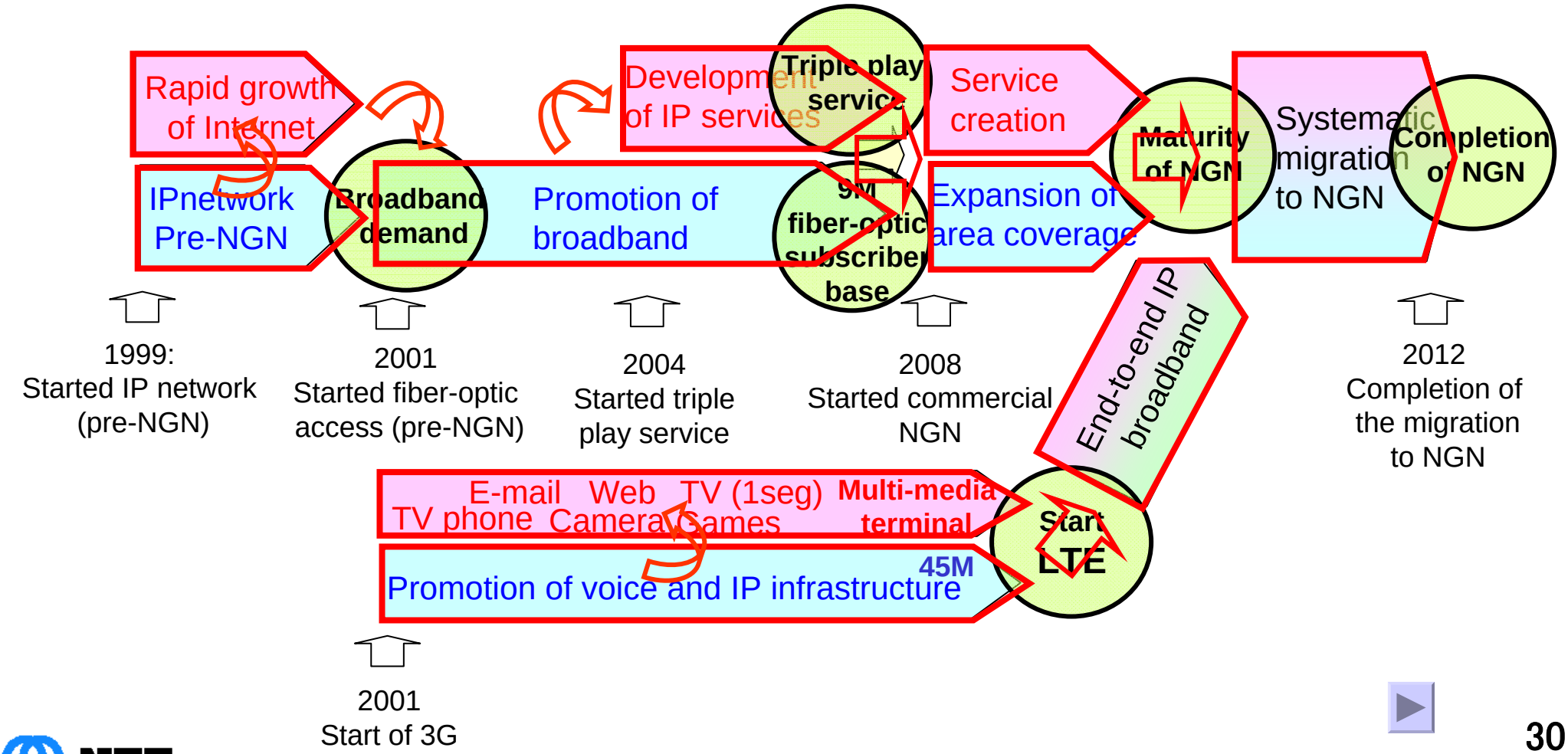
NTT's approach is based on **synchronizing development of services and infrastructure**



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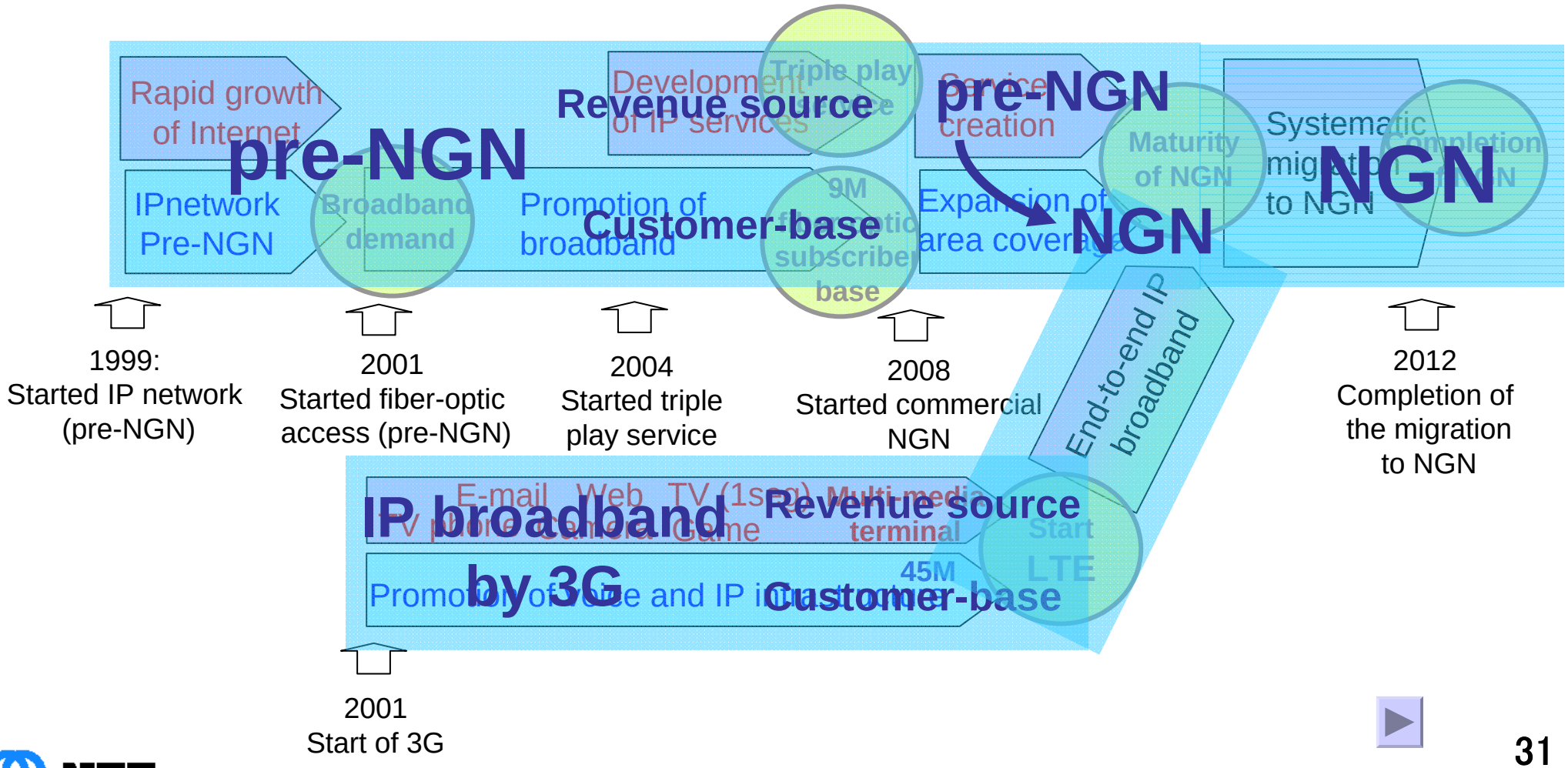
NTT subscriber base and revenue source will be **migrated to NGN from IP broadband**



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Load to the NGN

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

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Future vision

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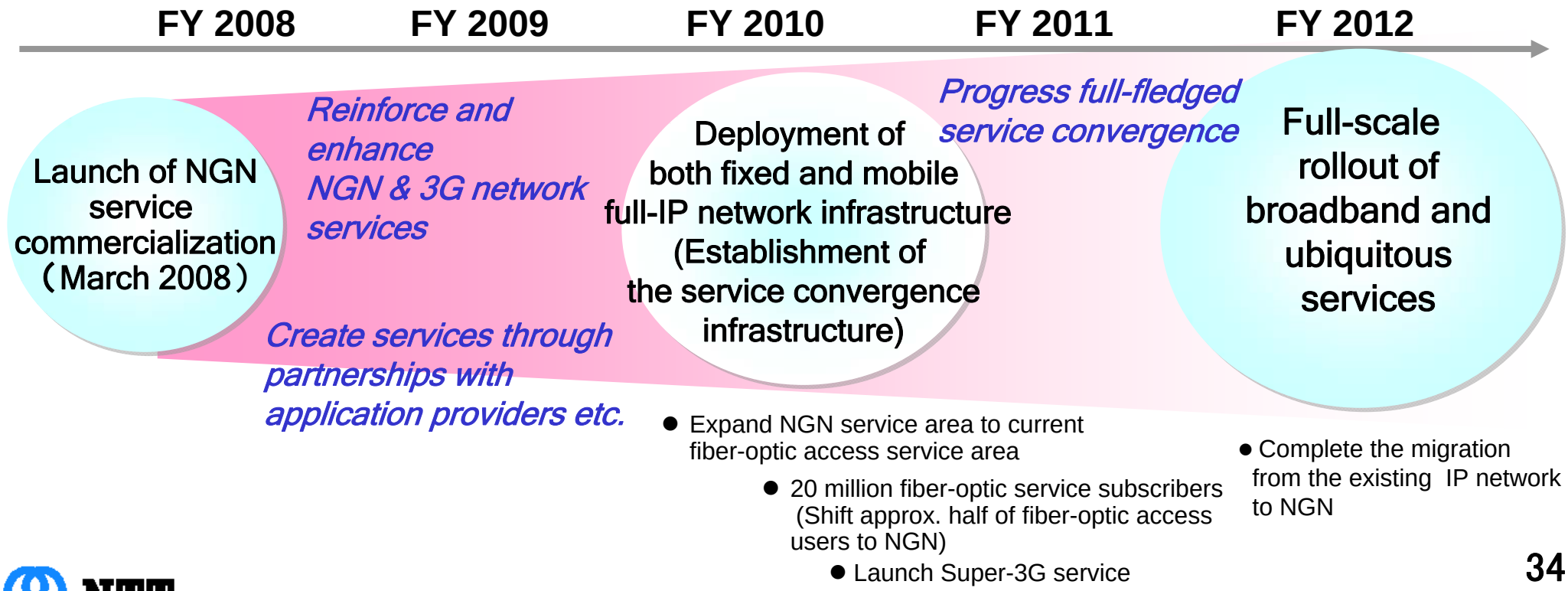
Roadmap announced in 2008

- Creating and rolling out broadband and ubiquitous services in accordance with customer needs, leveraging full-IP network infrastructure
- Driving the transformation of business portfolio centering on IP and solution businesses
- Promoting reforms to the business operations of group companies in conjunction with the transformation of business portfolio



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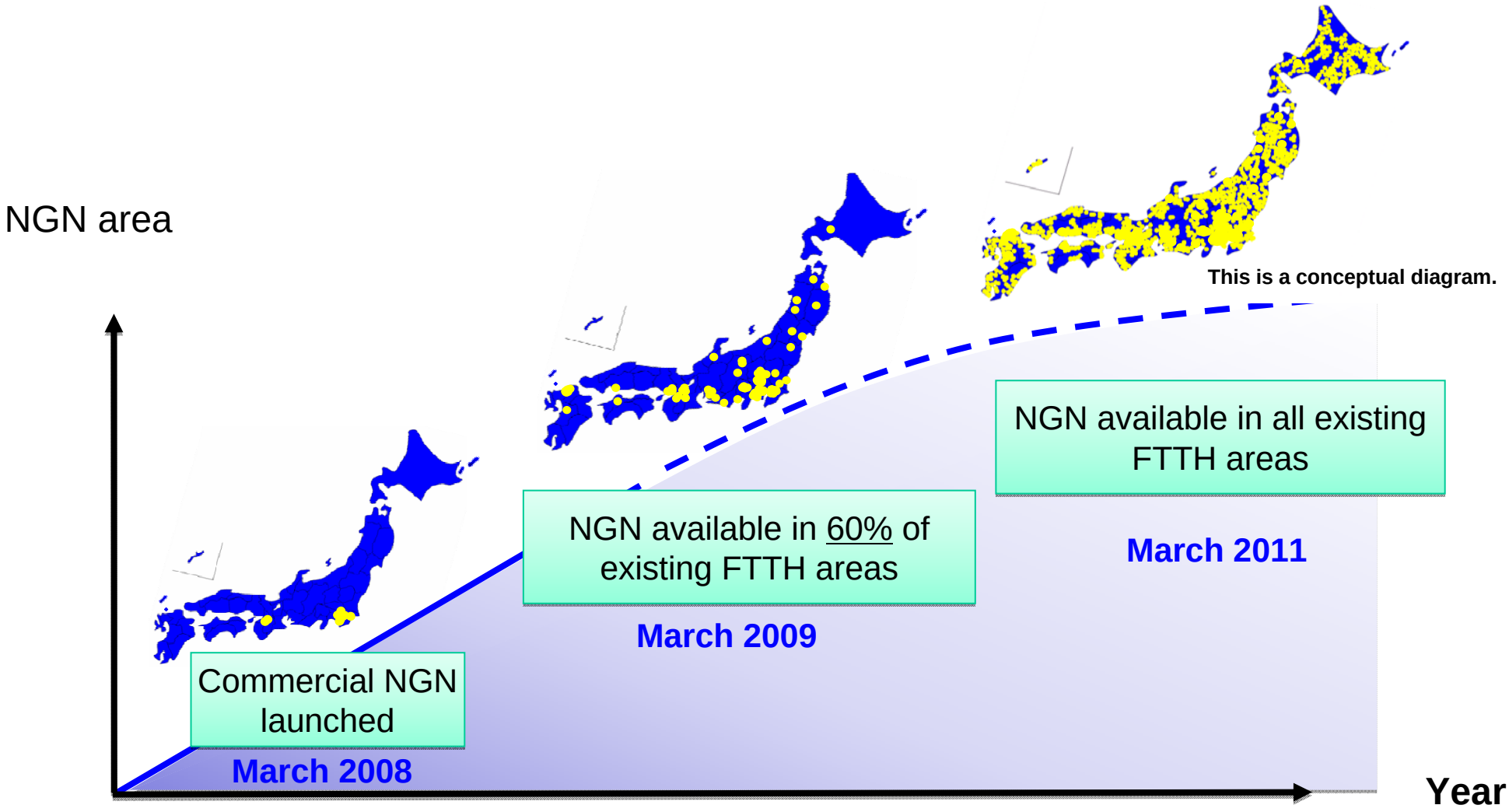
Expansion of areas in which NGN is available



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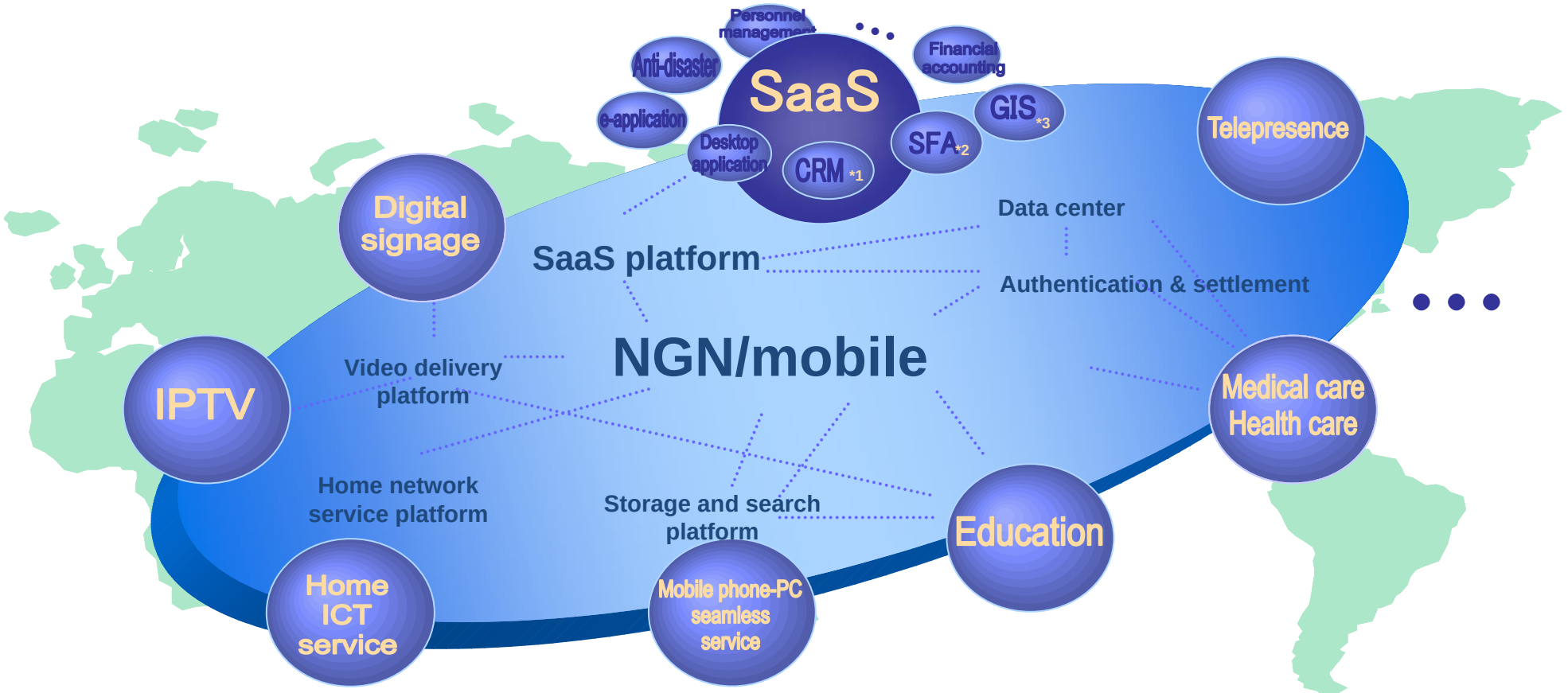
Main examples of service creation

Service creation through convergence of network and application



*1 CRM: Customer Relationship Management
*2 SFA: Sales Force Automation
*3 GIS: Geographic Information System

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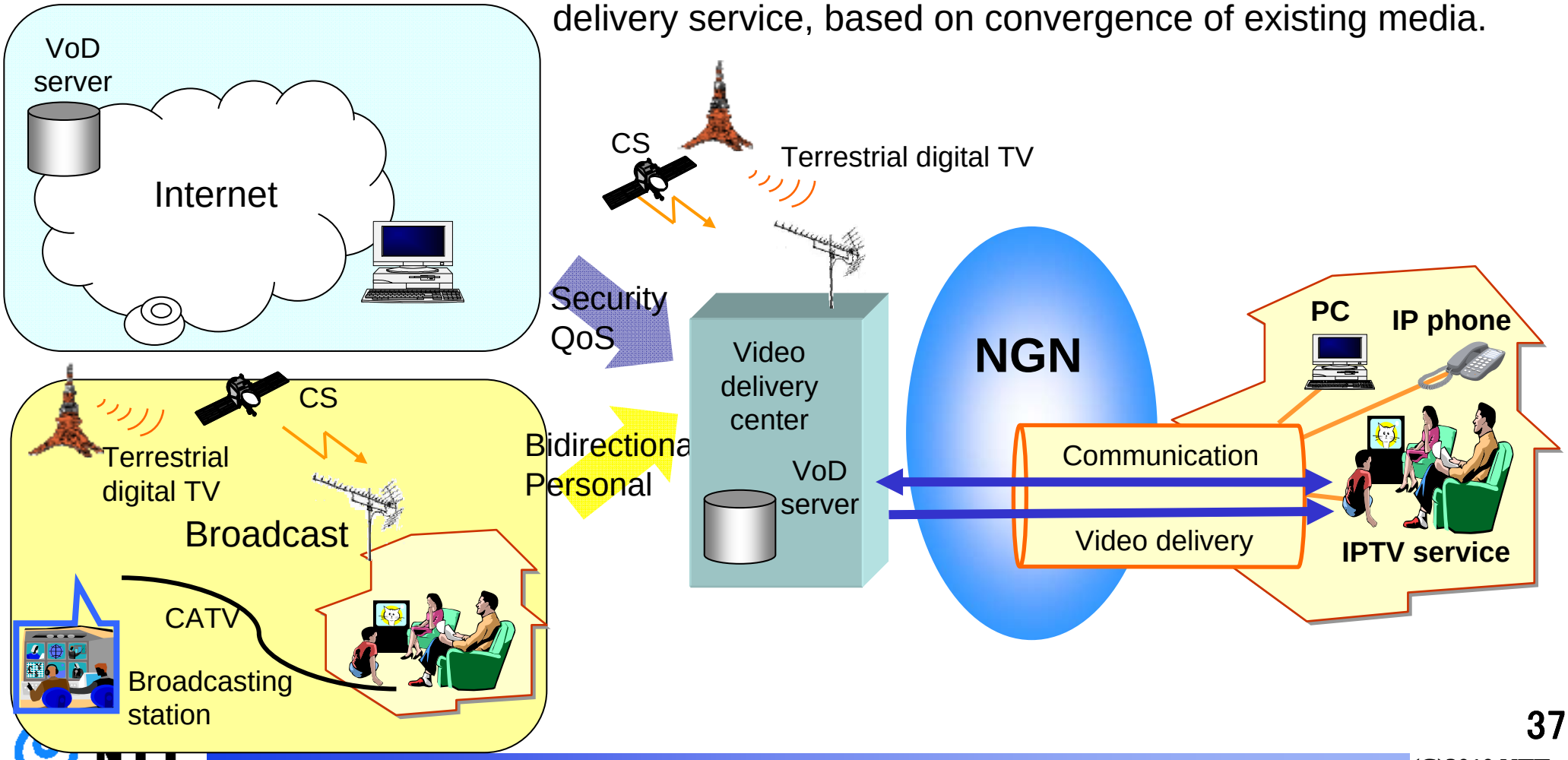
New video delivery service (IPTV)

- Broadcast programs provided by terrestrial digital TV or Satellite TV are being migrated to the NGN with bidirectional communication and personal preference capabilities.
- VoD content provided by Internet is also being migrated to the NGN using its security and QoS capabilities.
- Specifically, IPTV over the NGN is a value added video delivery service, based on convergence of existing media.



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Digital signage

- Digital signage delivers advertisements to a variety of displays via the NGN.
- Digital signage can both deliver video advertisements, as does TV, and provide interactive click advertisements on the Internet.
- Digital signage makes it possible to deliver content suited to the circumstances (time of day, location, etc.), collect information about viewers, and deliver on-demand ads.

Display inside train car

In-shop monitor

Huge outdoor display

A consortium was established to define industry-wide rules for distribution methods, level of audio content, copyrights issues, etc.
Its 128 members include Dentsu, Hakuhodo, Panasonic, Fujitsu, Hitachi and NTT (as of Jan. 2009).

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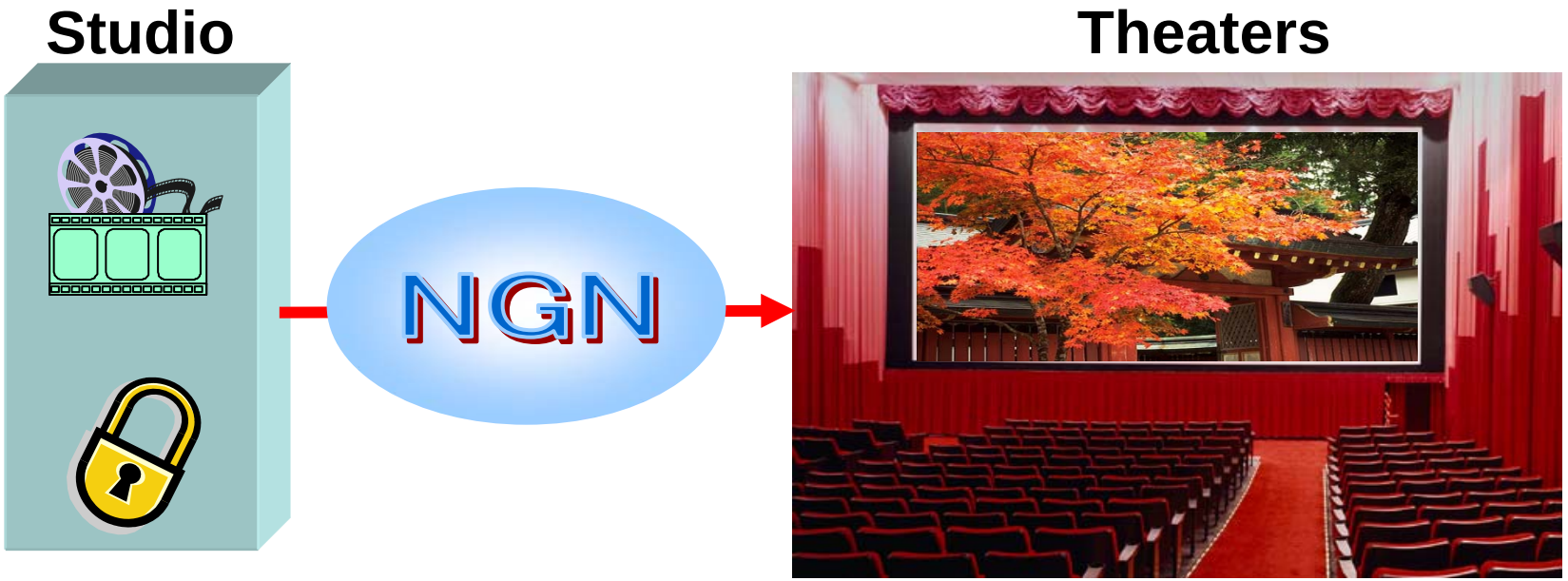
Digital cinema

- Digital cinema delivers movies to theaters via the NGN in real time without using films.
  - Digital cinema not only reduces cost due to the elimination of films but also allows flexible playing of movies at theaters.
  - A digital cinema system can be used for live delivery and projection of concert and sports games on a large screen.



➢**Master quality**
➢**Illegal copy block**

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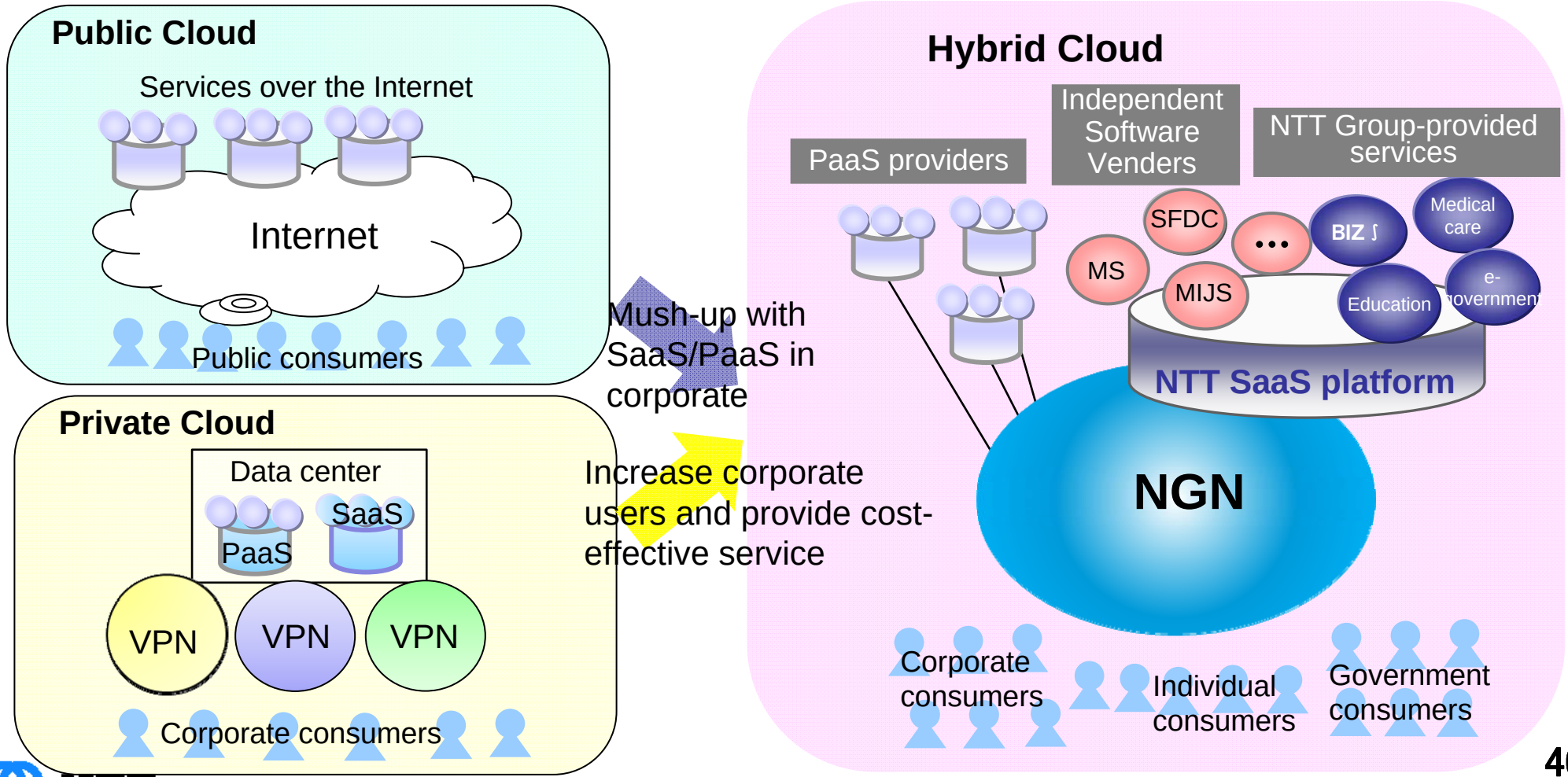
Cloud Computing (SaaS over NGN)

- Providing SaaS/PaaS over the NGN results in an increase in corporate customers of SaaS/PaaS providers, including small companies, government users and B2B2C users.
- The NGN also provides the above customers with cloud computing services over the Internet, mashed-up with SaaS/PaaS, which is a Hybrid type of Cloud Computing.



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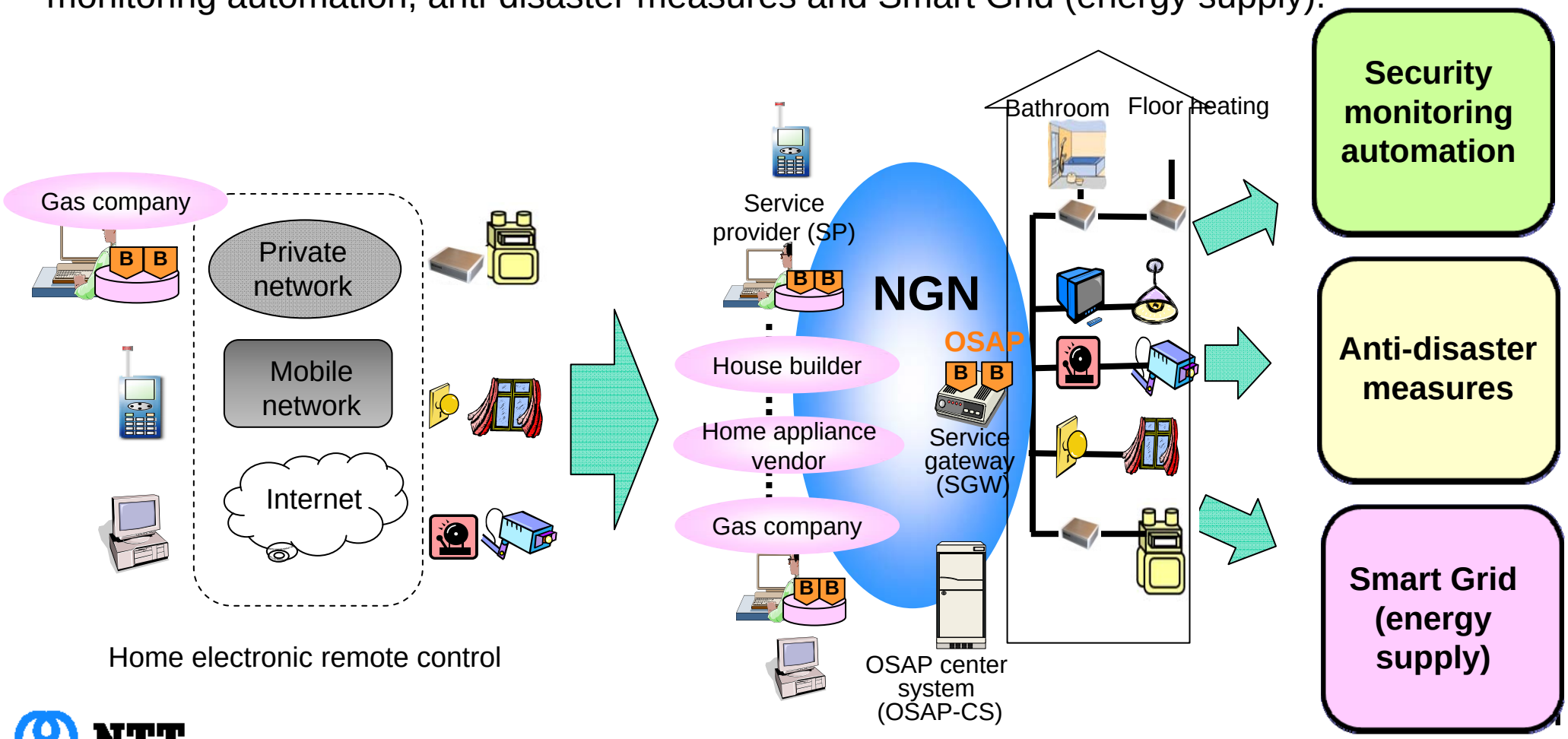
Home ICT

- Activities relating to home electronic remote control, using private network, mobile network or Internet, are moving on secure and reliable NGN connection of home ICT with OSAP. The home network will be controlled remotely, with security and reliability.
- Home ICT over the NGN will extend to the social environment, with services such as security monitoring automation, anti-disaster measures and Smart Grid (energy supply).



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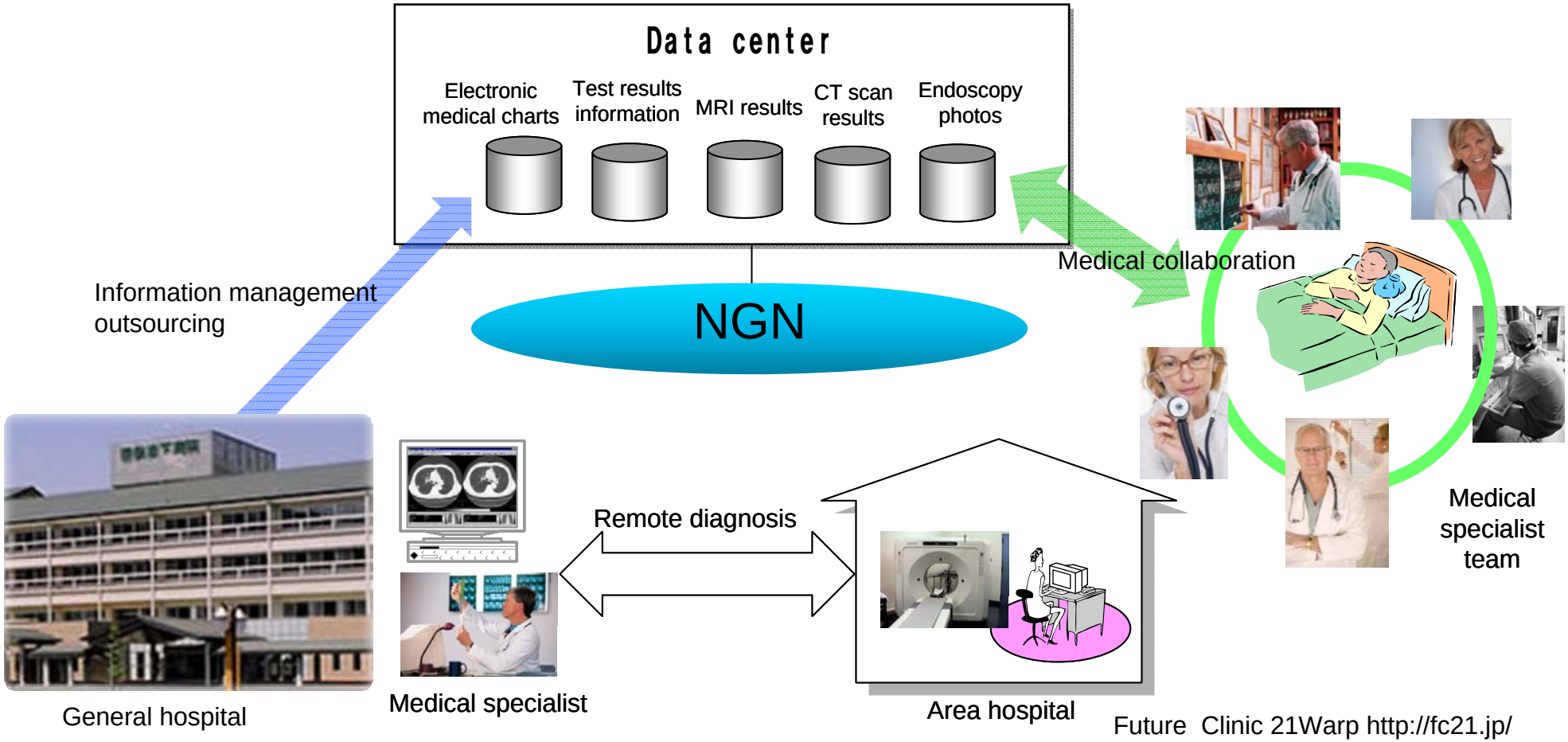
Remote medical care

Delivering electronic medical charts and medical examination information (such as blood tests, MRI, and CT) through clouds not only enables the outsourcing of health information management for large hospitals but also promotes remote diagnoses in localities where medical specialists are lacking as well as collaboration of specialist teams in examining patients.



Future Clinic 21Warp http://fc21.jp/

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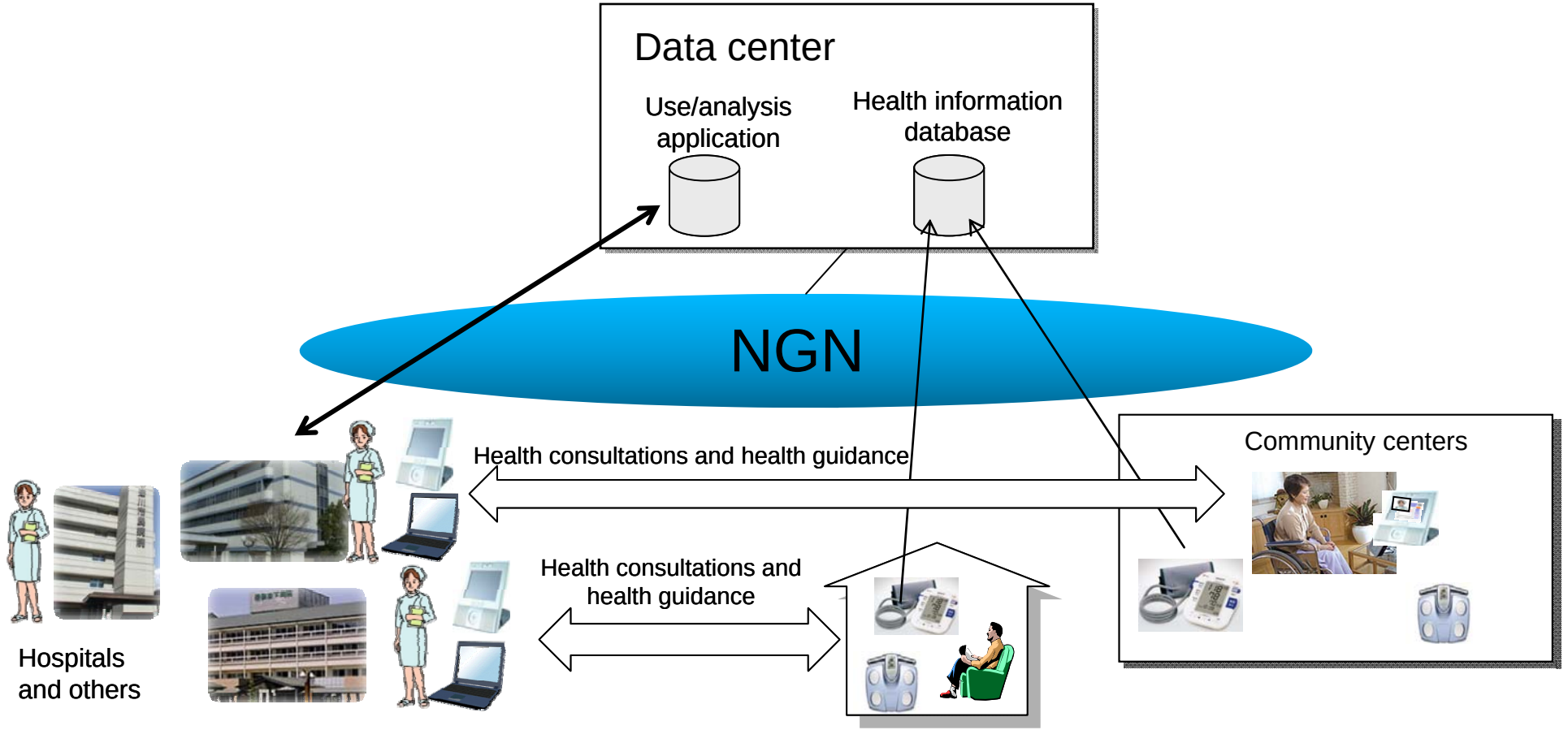
Health care

By registering health information, such as blood pressure and body fat, in data centers over networks, it becomes possible for health workers from hospitals and other health care organizations to refer to the information and conduct health consultations and health guidance from remote locations. This capability means not only that people can receive health consultations in their homes; it also provides a reason why elderly people gather together at community centers.



Healthcare Solution http://www.ntt-west.co.jp/solution/solution/category/healthcare.html

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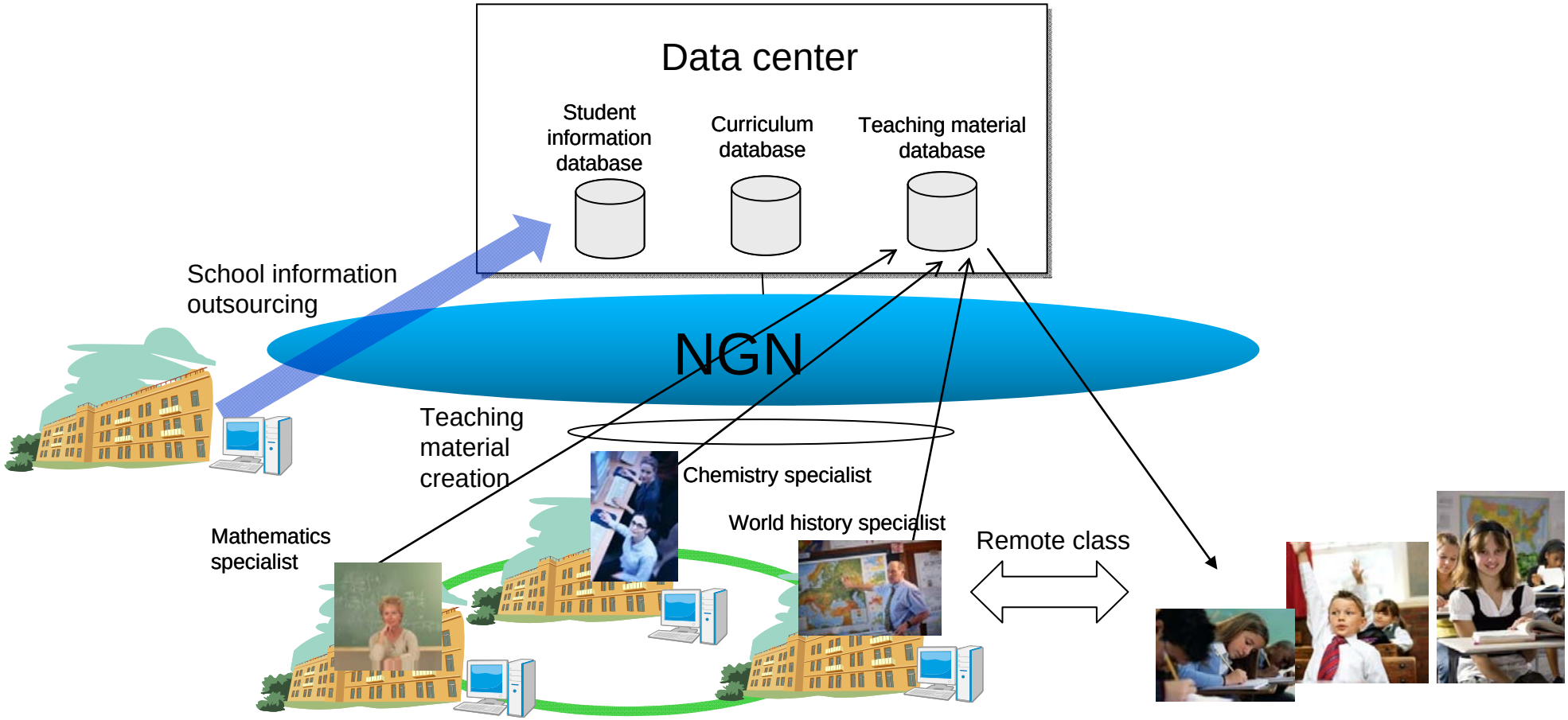
Education

With a view to improving security, schools have begun to outsource information management so that teaching materials and student information are stored at data centers. This development accelerates the computerization of teaching materials. As a result, there are expectations for greater popularization of e-learning, and also for inter-academic collaboration in which schools provide to each other teaching materials that each creates in its field of expertise.



School solutions http://www.ntt-east.co.jp/business/edu/index.html

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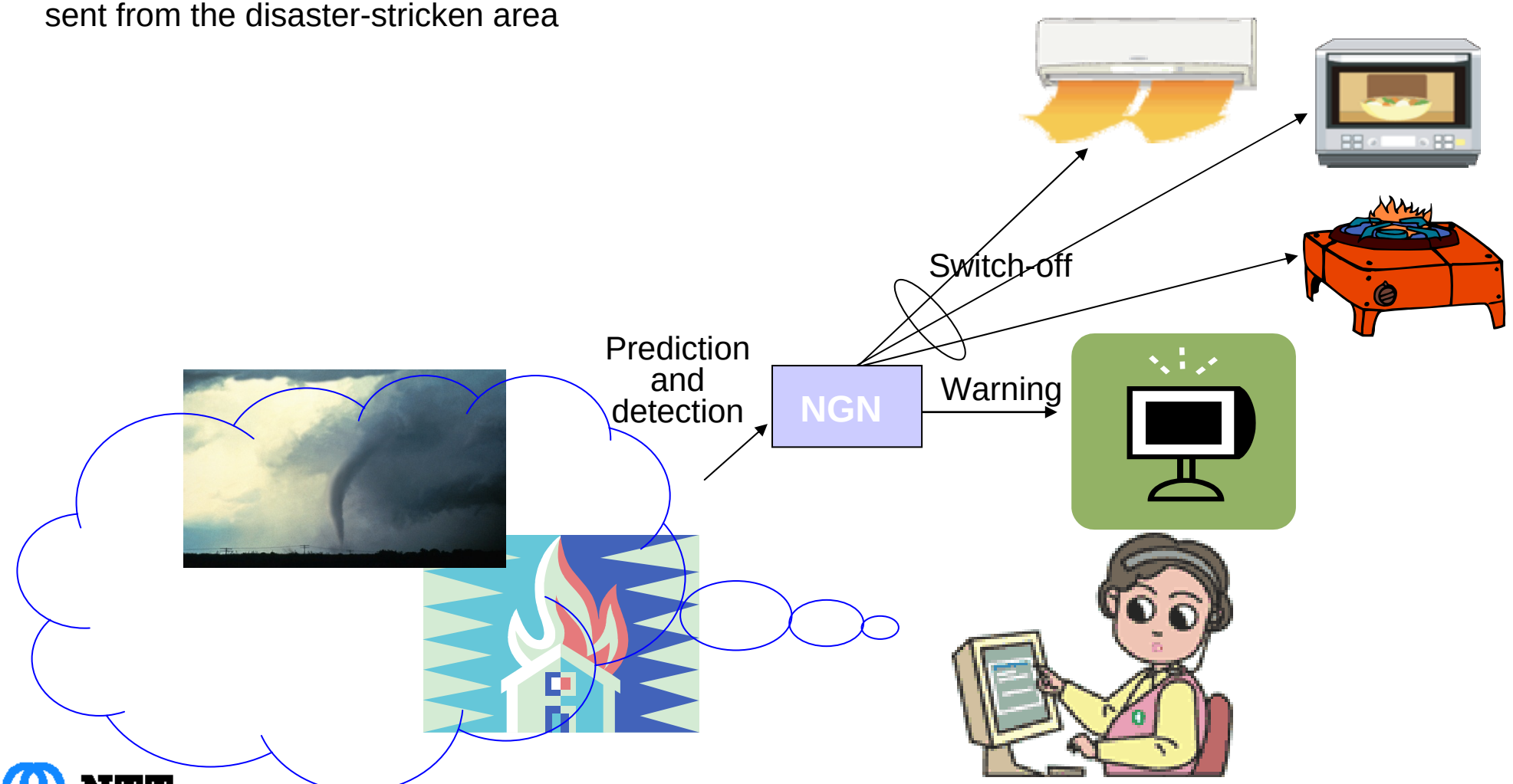
Contingency planning for disasters

When an earthquake early warning has been received, safety measures, such as automatic switch-off of machines, can be implemented rapidly over the network.
Enables people to check easily the well being of their acquaintances in the disaster-stricken area by automatically extracting an image of the face of the person concerned from the high-definition videos sent from the disaster-stricken area



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New Service Creation on NGN

Creation of new services in cooperation with various industries

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The Forum for Collaborative Creation of Next Generation Services

➢ **Aim to deepen understanding of the NGN by society, and collaborate with a variety of partners to develop, and start business with, NGN-based services.**

Forum for Collaborative Creation of Next Generation Services

Enterprises / venture companies

Provide information on NGN

- **NGN-related news**
- **Experts' columns**
- **Online communities**
  - Education
  - Finance
  - SaaS

Own website

Host real events

Seminar	Exchange between Forum members

NTT Group's management resources

Support efforts to turn services into business
- Technical consultation
- Testbed, etc.

Venture capital

NTT Investment Partners Fund

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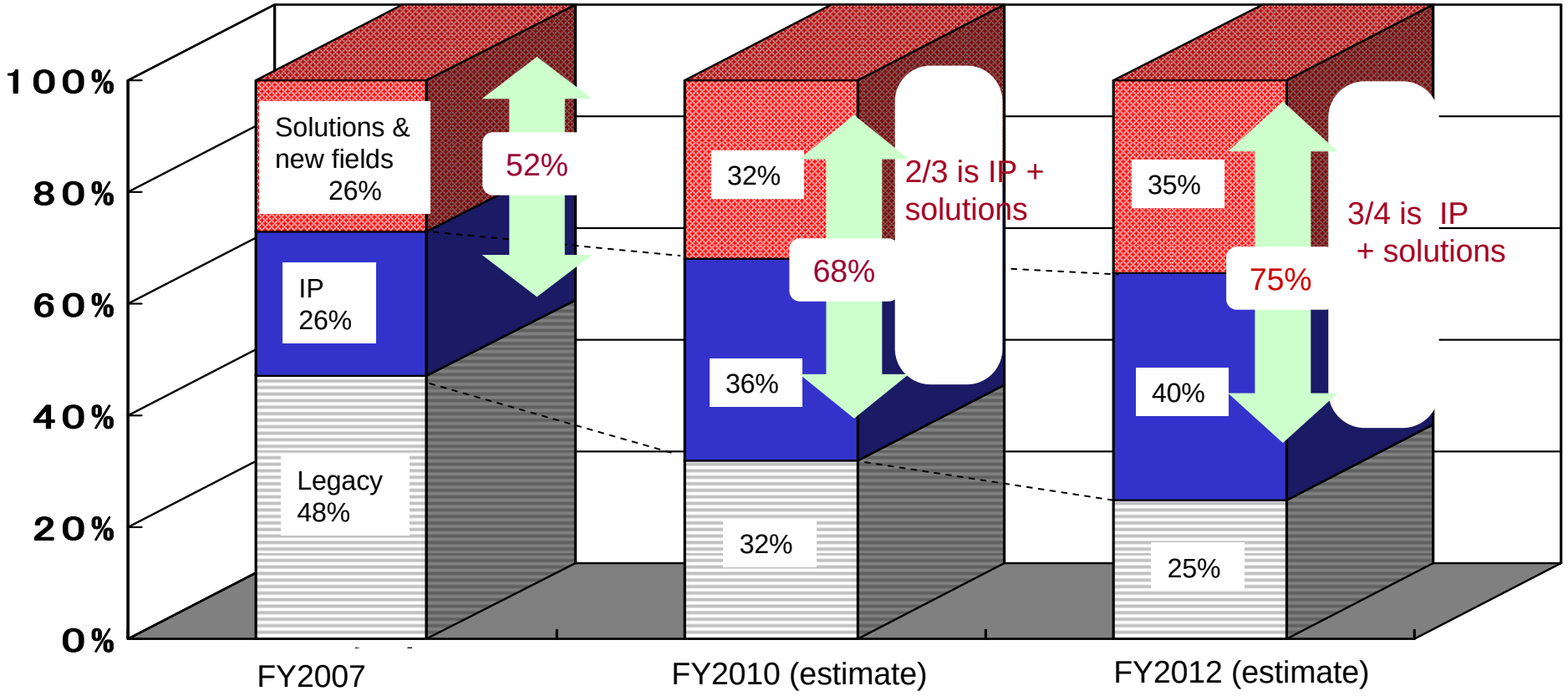
Reforming the NTT Group's business structure

- **Reform business structure from one based on legacy services to one focusing on IP, solutions and other new business fields.**

Proportions in the consolidated sales



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NTT toward NGN era

Aim to become a “service creating company”

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What are NGN for ?

Motivations to build NGN **Issues common to all carriers**

- Cost reduction by adoption of IP
- Shift of revenue source to broadband ubiquitous services
- Customer acquisition by cultivating new markets

→ **For share-holders**

NGN for life

- High-quality phones
- IPTV
- Home ICT, etc.

NGN for business

- SaaS
- Telepresence
- Digital signage, etc.

Features Of NGN

- Quality
- Security
- Reliability

→ **For customers**

Cataclysmic changes in the global economy, environmental problems, aging population and declining birthrate, etc.

→ **What ICT can do through NGN:**

Contribute solutions to: Employment problem, growing disparities, green energy, recycling, shortage of medical doctors, health care, care of the aged, food safety, children's safety, anti-disaster measures, etc.

→ **For society**

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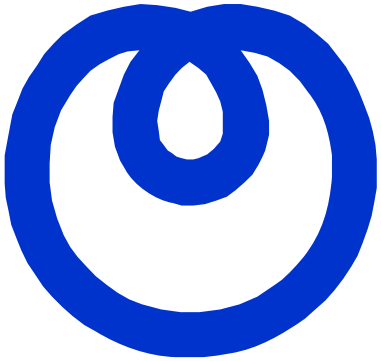
Thank you



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