IP Multimedia Convergence Technologies Implemented by IMS and Other Functions

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- Telecommunications trends leading to the NGN
- Technologies which enable network convergence
- NTT's plans for the deployment of its NGN
- Conclusions

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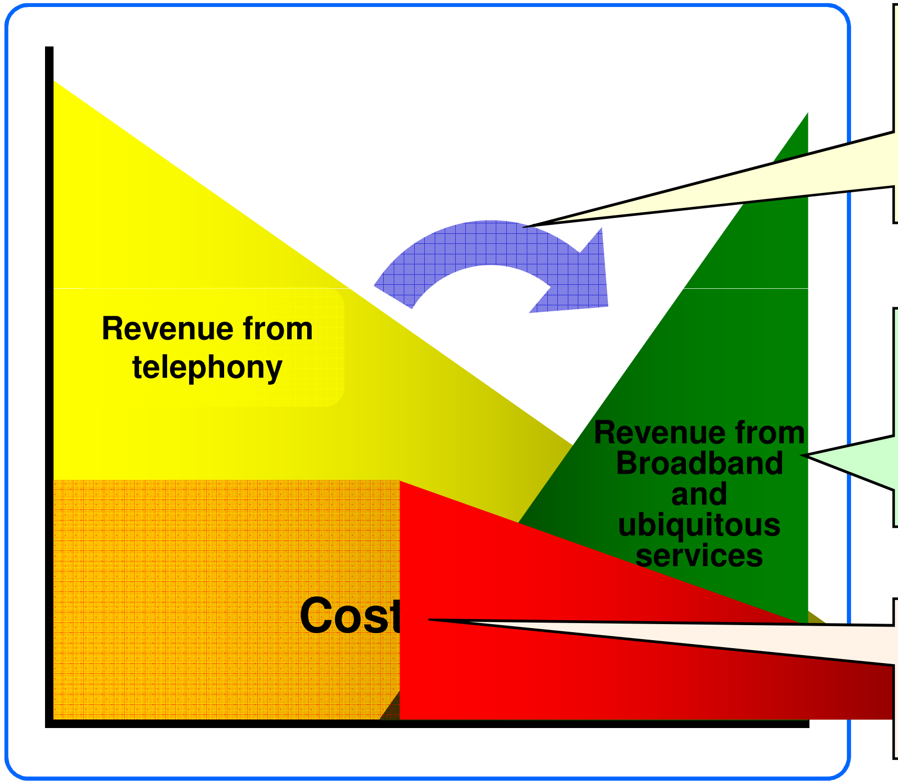
Issues facing telecom carriers

In addition to reducing CapEx and OpEx, another urgent task for network carriers is increasing revenue in order to increase profit.



- 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**

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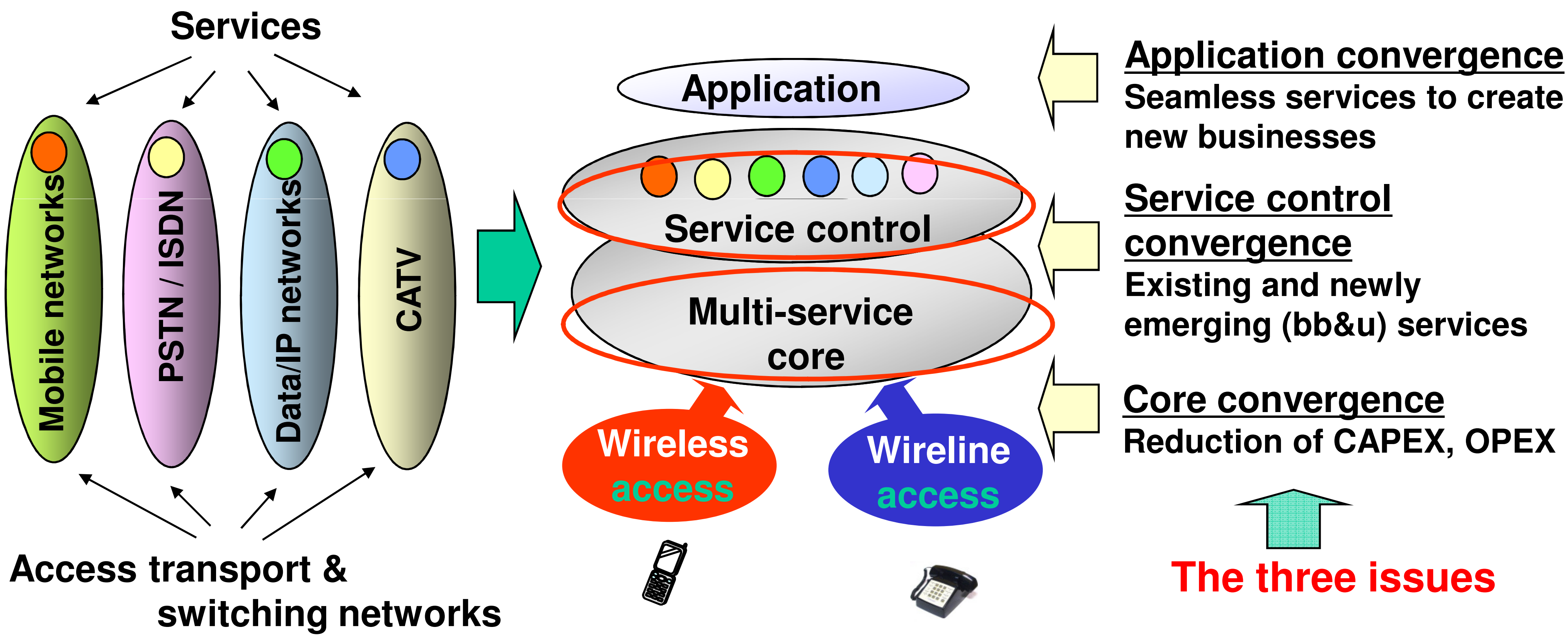
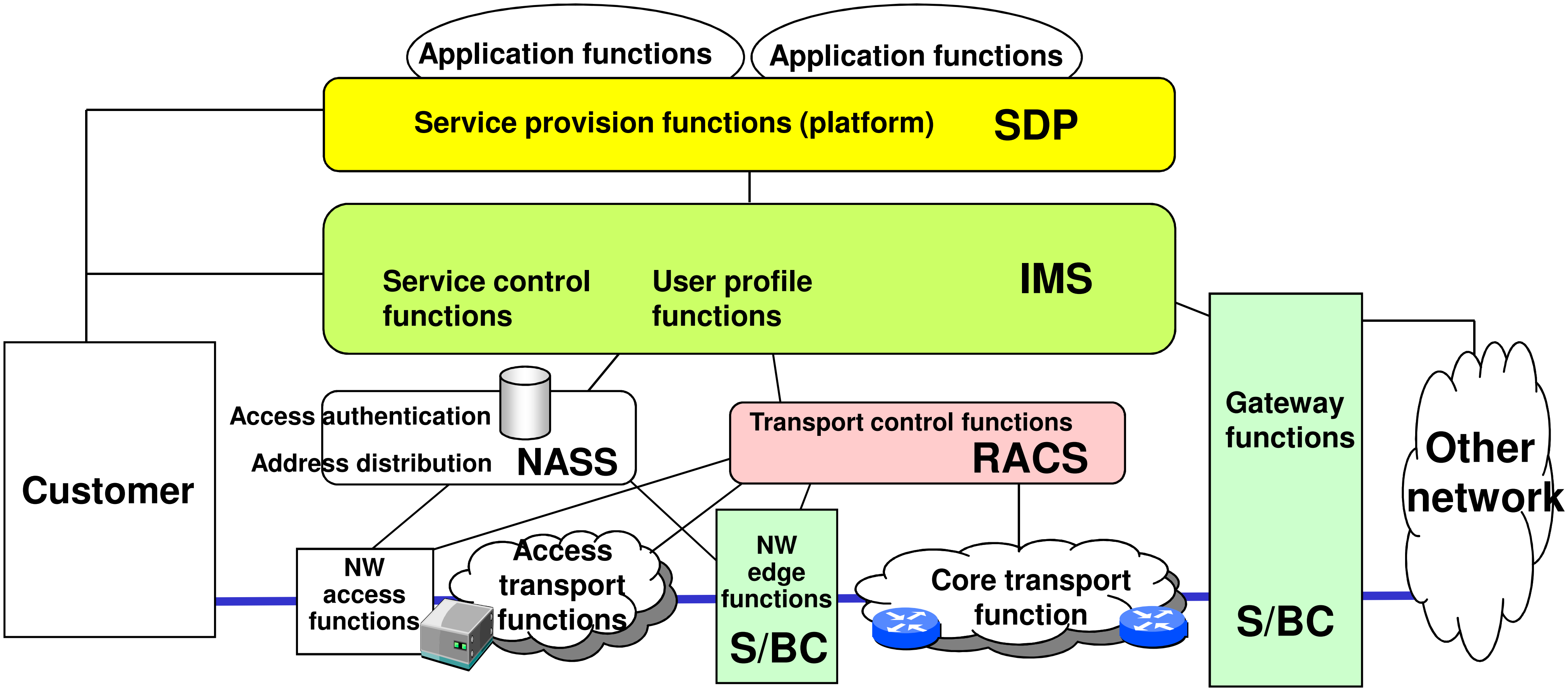
Network convergence, layer-structured model

Network convergence decomposes different networks, such as PSTN/ISDN, Mobile networks, Data networks and CATV, into four layers: "access", "core", "service control", and "application" layers.



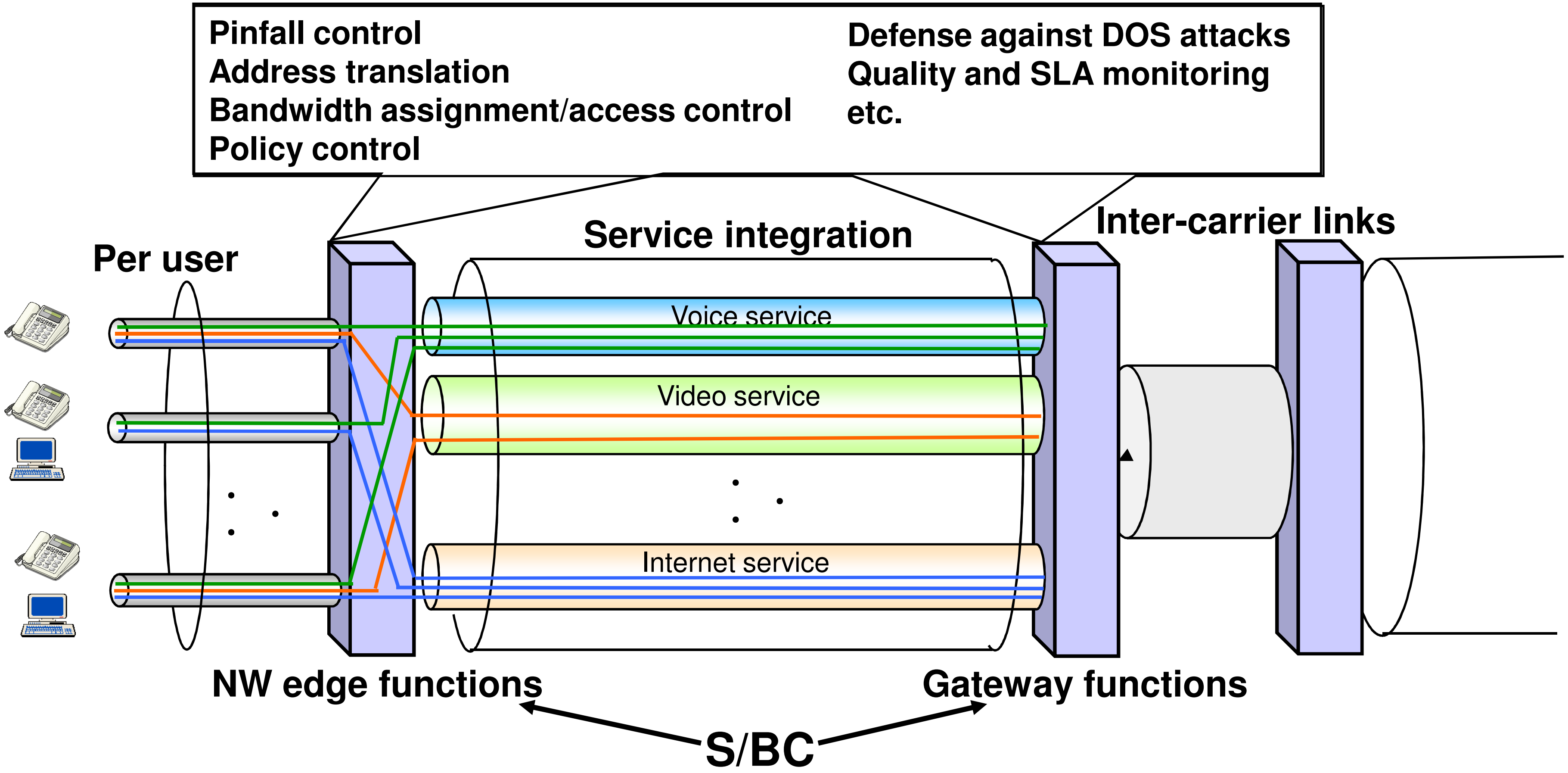
Overall picture of NGN architecture

Roughly speaking, the NGN functions can be realized by adding IMS, S/BC, RACS, SDP, etc. to an existing IP network.



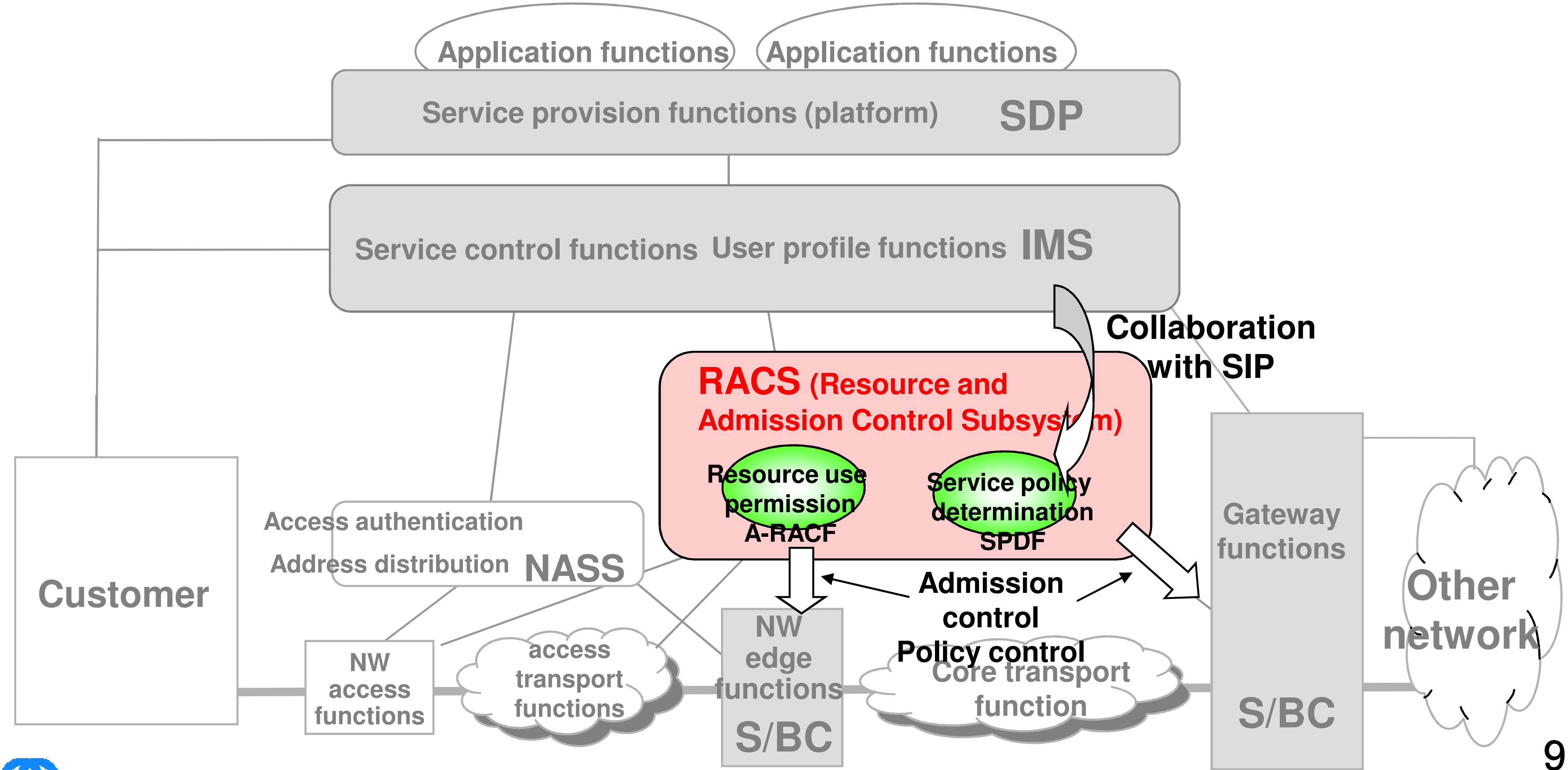
Multiplexing/Demultiplexing of IP bearers through S/BC

S/BC manages the multiplexing/demultiplexing of a variety of IP-based bearers, such as voice, video and other types of IP data. At the same time, it controls the QoS and security of each bearer according to a given network policy.



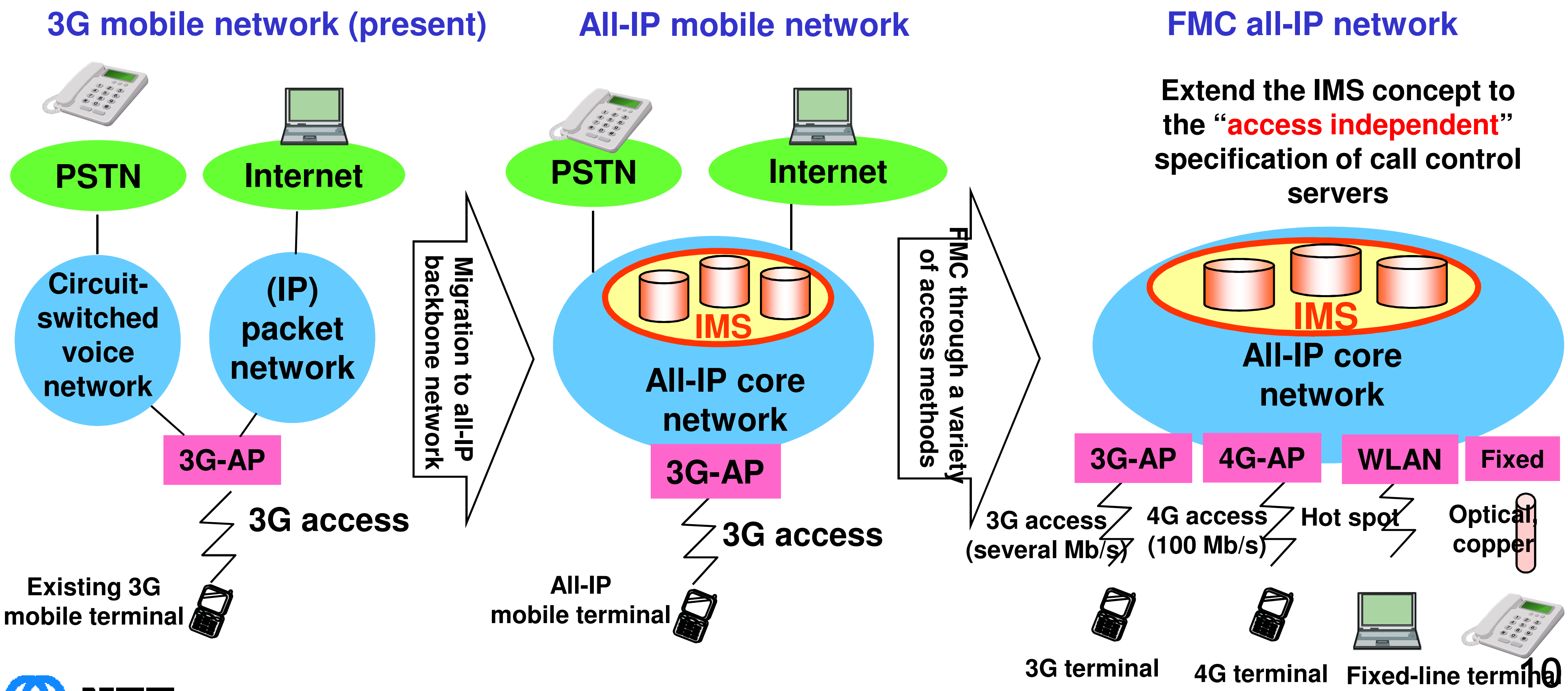
RACS - collaboration between service control and transport functions

RACS controls the transport QoS by means of collaboration between the service control functions and the transport functions.



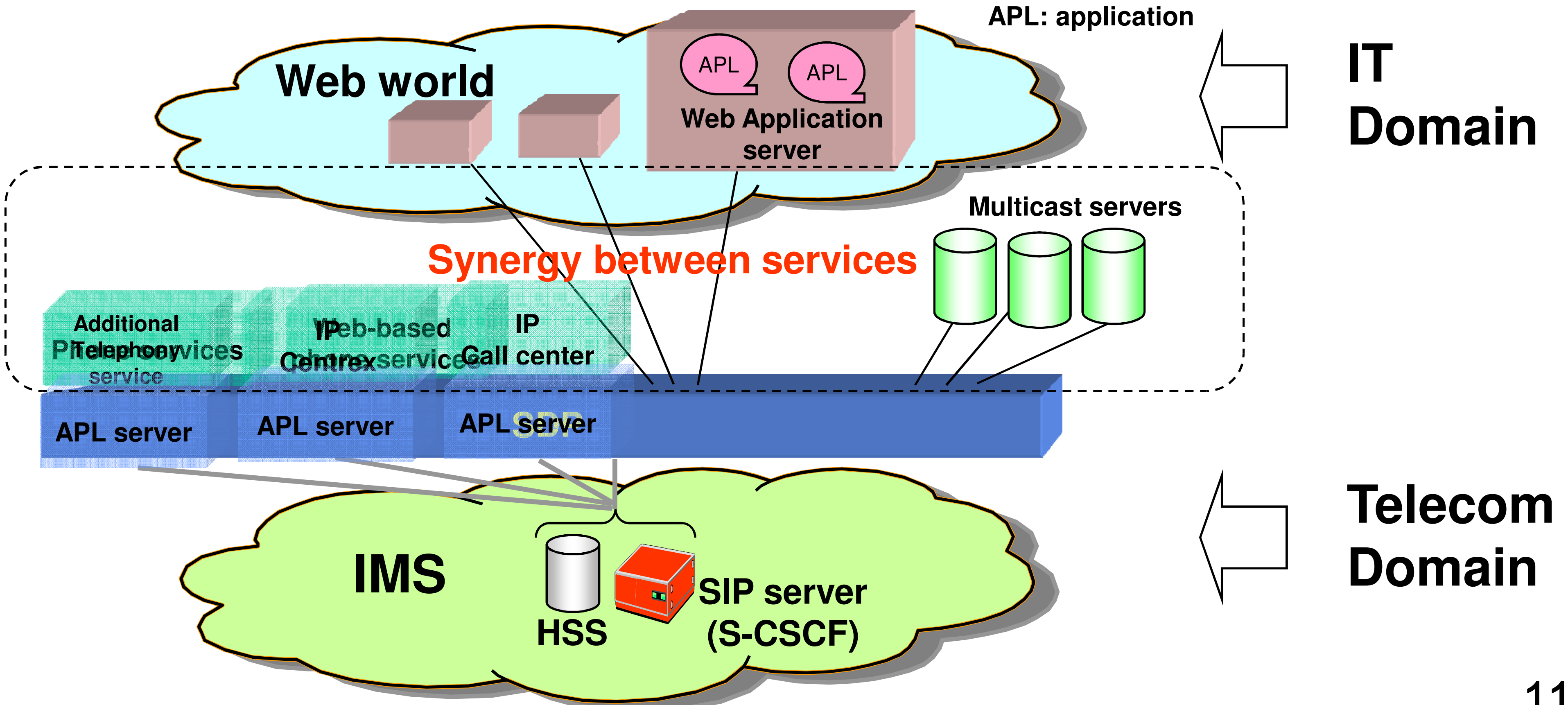
IMS - from 3G to NGN

The IMS is a call control architecture that has been studied for the all-IP implementation of mobile networks. The NGN applies IMS technology to fixed-line access networks, with some extension to the functions. A network based on the IMS is expected to facilitate convergence such as FMC (Fixed-Mobile Convergence).



Service delivery platform (SDP)

The SDP is the platform which has common functions for various application servers. The SDP has the role of connecting the Telecom Domain to the IT Domain and promoting the coordination of telecom services, Web services, and multicast services



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

Specific actions

Build an **NGN** that is of high quality, flexible and secure

Develop and spread **broadband and ubiquitous services** that allow fixed-mobile convergence (**FMC**)

Build an **open network** that allows collaboration with other carriers and ISPs

Implement smooth **migration** from existing fixed-line **to IP-based** telephony, and from copper **to optical** access

Expand business opportunities by exploiting broadband ubiquitous services

Provide new business opportunities to a variety of service players (XSP)

Strengthen competitive edge and financial base, and contribute to achievement of u-Japan

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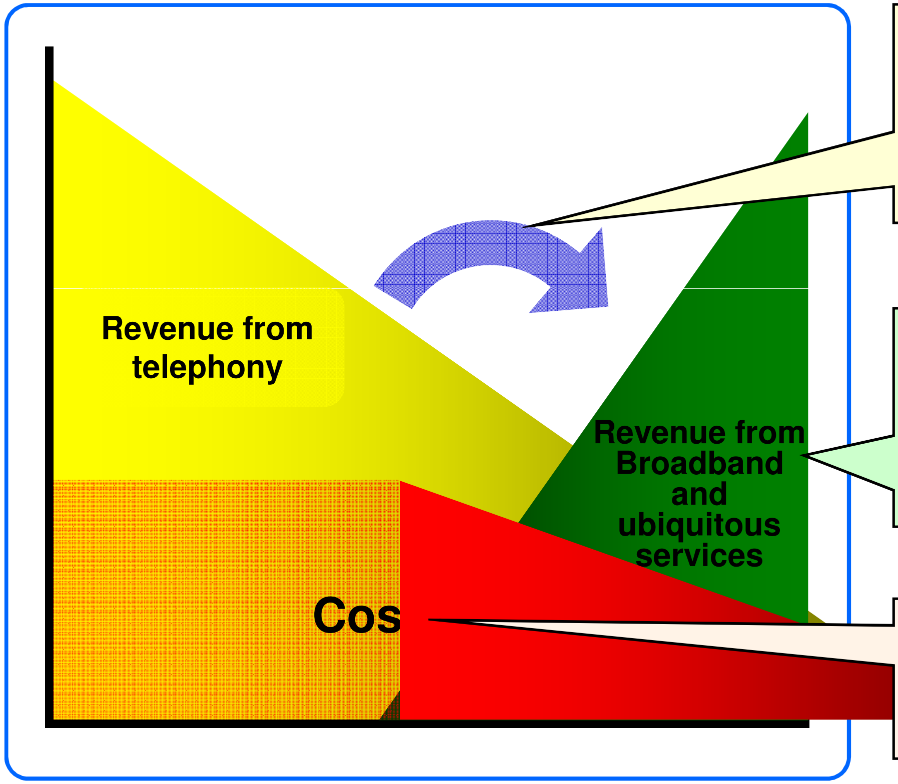
Issues facing telecom carriers

In addition to reducing CapEx and OpEx, increasing profit by increasing revenue is also an urgent task for network carriers.



- Promote broadband & ubiquitous services like FMC and triple play
  → **Revenue shift** from telephony 2

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  → **Expand telecoms market** 3

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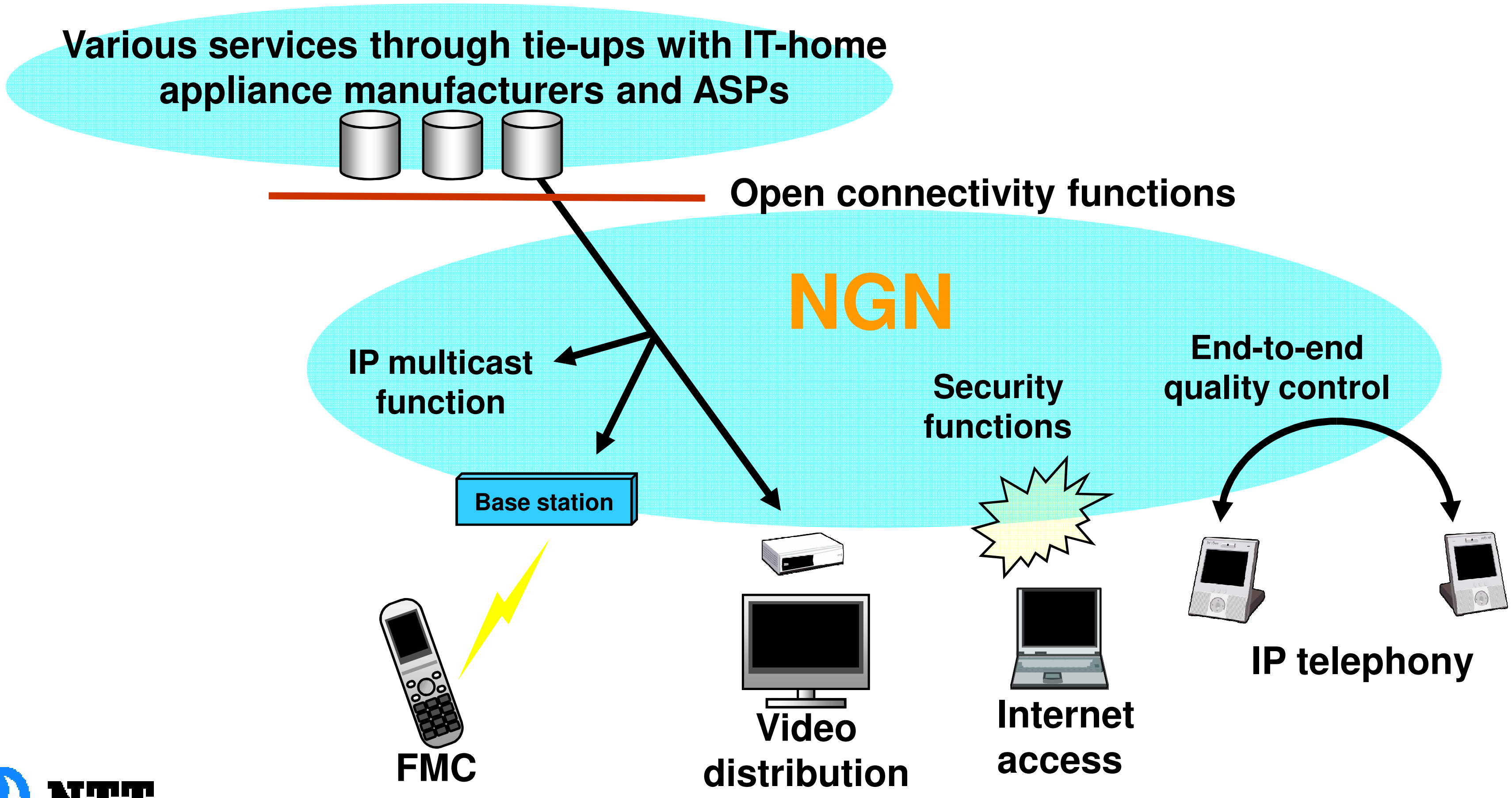
Roadmap to building NTT's NGN

Year	2006	2007	2008–
Steps in introducing the NGN		STEP 1 Field trials	STEP 2 STEP 3 Introduction of optical fiber to 30M users (End of fiscal 2010)
Core network		Construction of relay network -deploy relay nodes -deploy optical wavelength transmission equipment	Construction of access network deploy edge nodes Seamless integration with mobile network
Service control functions			Deployment of service control functions IMS deployment (Conforming to ITU standards)
Service development		Trial services <Field trials in limited regions and with a limited number of users>	Full scale development of next generation services ・ Broadband Internet access ・ IP telephony ・ Multicast transmission for video distribution ・ Bi-directional video (data) communication ・ Ethernet services, etc.

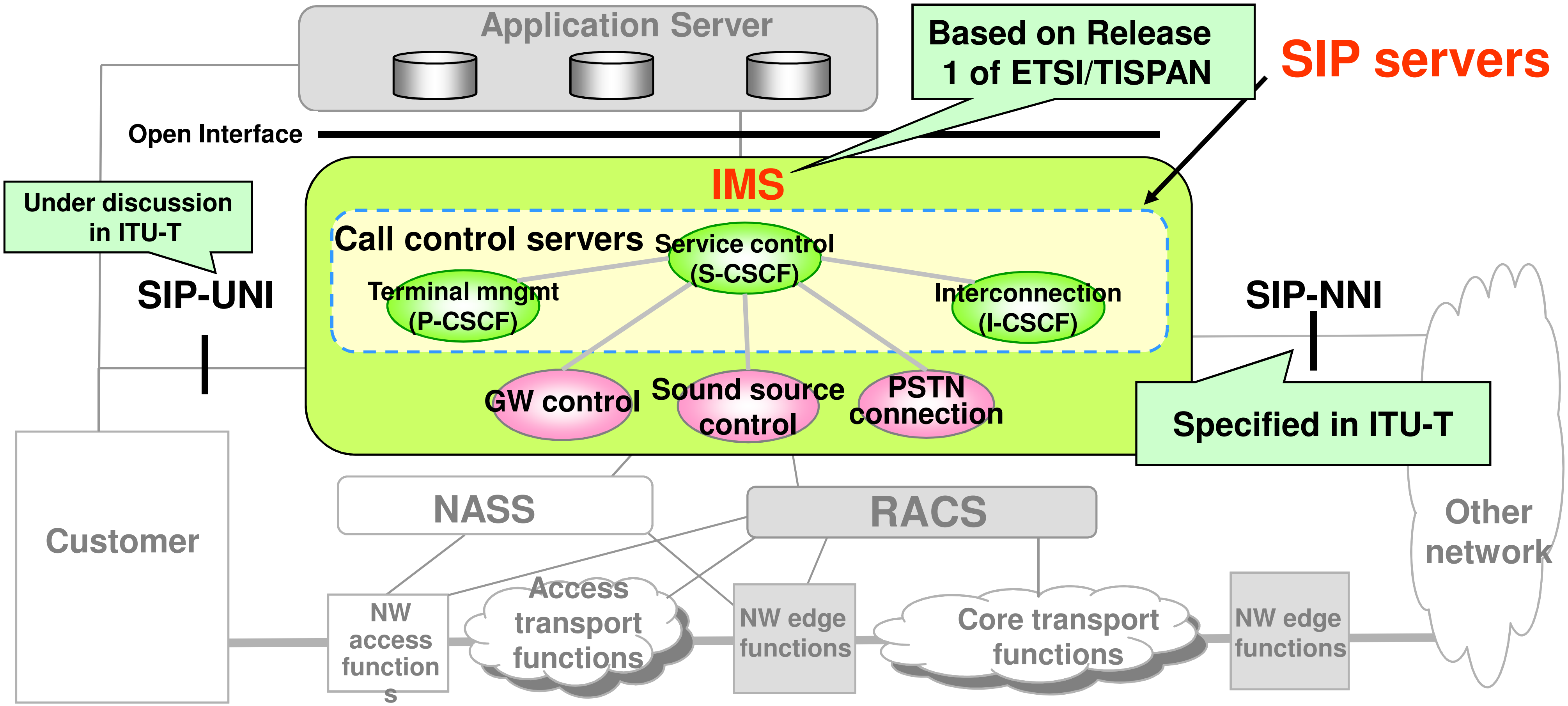
Overview of Field Trials of NTT's NGN

- **Trial period: One year from Dec. 2006**
  - Phase 1 (Dec. 2006-): Showrooms for visitors
  - Phase 2 (Jan. 2007-): NTT employees in following regions
  - Phase 3 (May – Dec. 2007): Customers in following regions
- **Areas: Tokyo and its surroundings and Osaka**



Implementing IMS functions

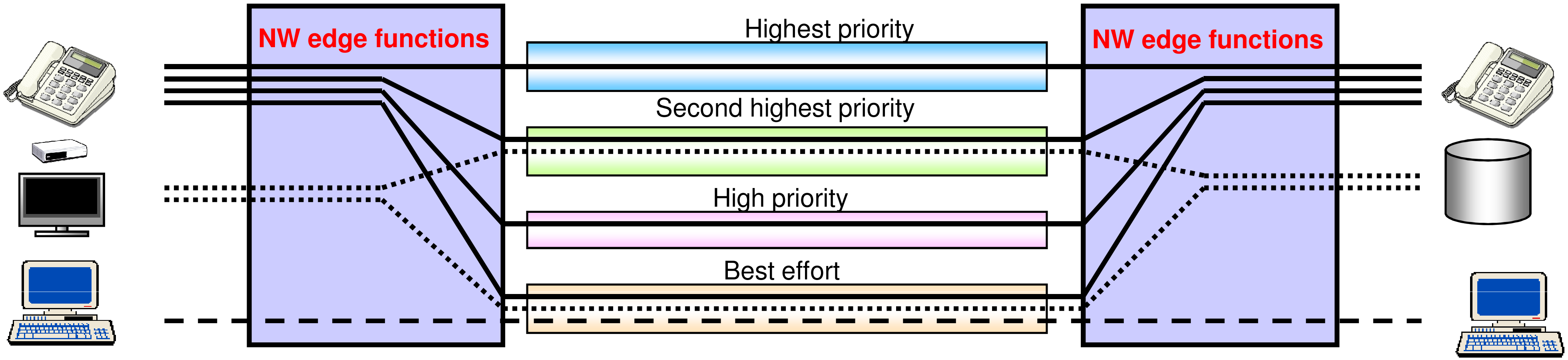
- IMS is implemented based on Release 1 of the ETSI/TISPAN specifications.
- NNIs and UNIs being discussed in ITU-T SG11 are implemented.



ETSI/TISPAN: European Telecommunications Standards Institute /Telecoms & Internet converged Services & Protocols for Advanced Networks
ITU-T: The International Telecommunication Union - Telecommunication Standardization Sector
IMS: IP Multimedia Sub-system
NASS: Network Attachment Sub-system
RACS: Resource and Admission Control Sub-system

Priority control according to the type of communication

- In the field trial, one of four quality classes is selected according to the type of communication.
- The edge controls the flow according to the given priority class.



Quality class		Highest priority	2nd highest priority	High priority	Best effort
Priority control class (Diffserv PHB)		EF	AF (2nd highest priority)	AF (high priority)	Default
Interactive (unicast) communication	IPv4	✓	✓	✓	-
	IPv6	✓	✓	✓	✓
Multicast communication	IPv6	-	✓	-	✓
PPPoE connection	IPv4	-	-	-	✓

RACS and NW edge functions

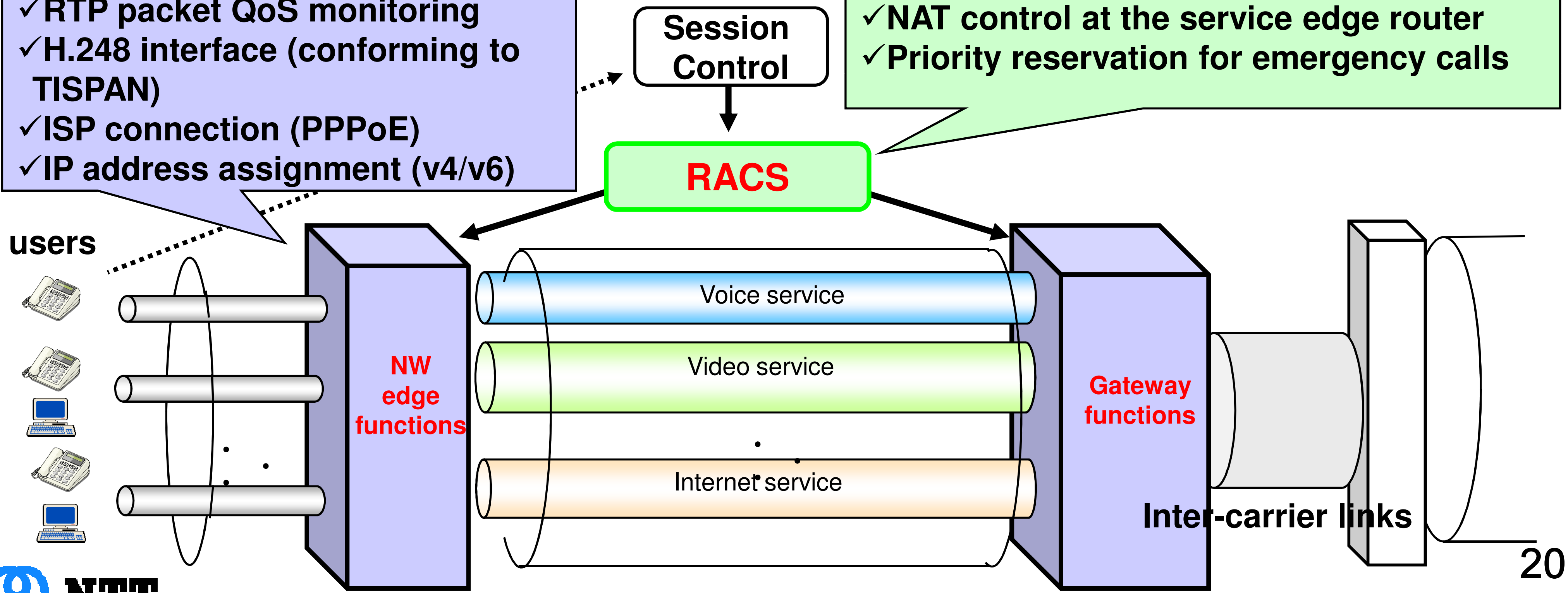
- RACS and NW edge functions share end-to-end QoS control.
- In addition, NW edge functions provide security, multicast and other functions.

NW edge functions

- ✓Address hiding by NAT
- ✓Per flow QoS control (Diffserv)
- ✓Packet filtering
- ✓Multicast support
- ✓RTP packet QoS monitoring
- ✓H.248 interface (conforming to TISPAN)
- ✓ISP connection (PPPoE)
- ✓IP address assignment (v4/v6)

RACS functions

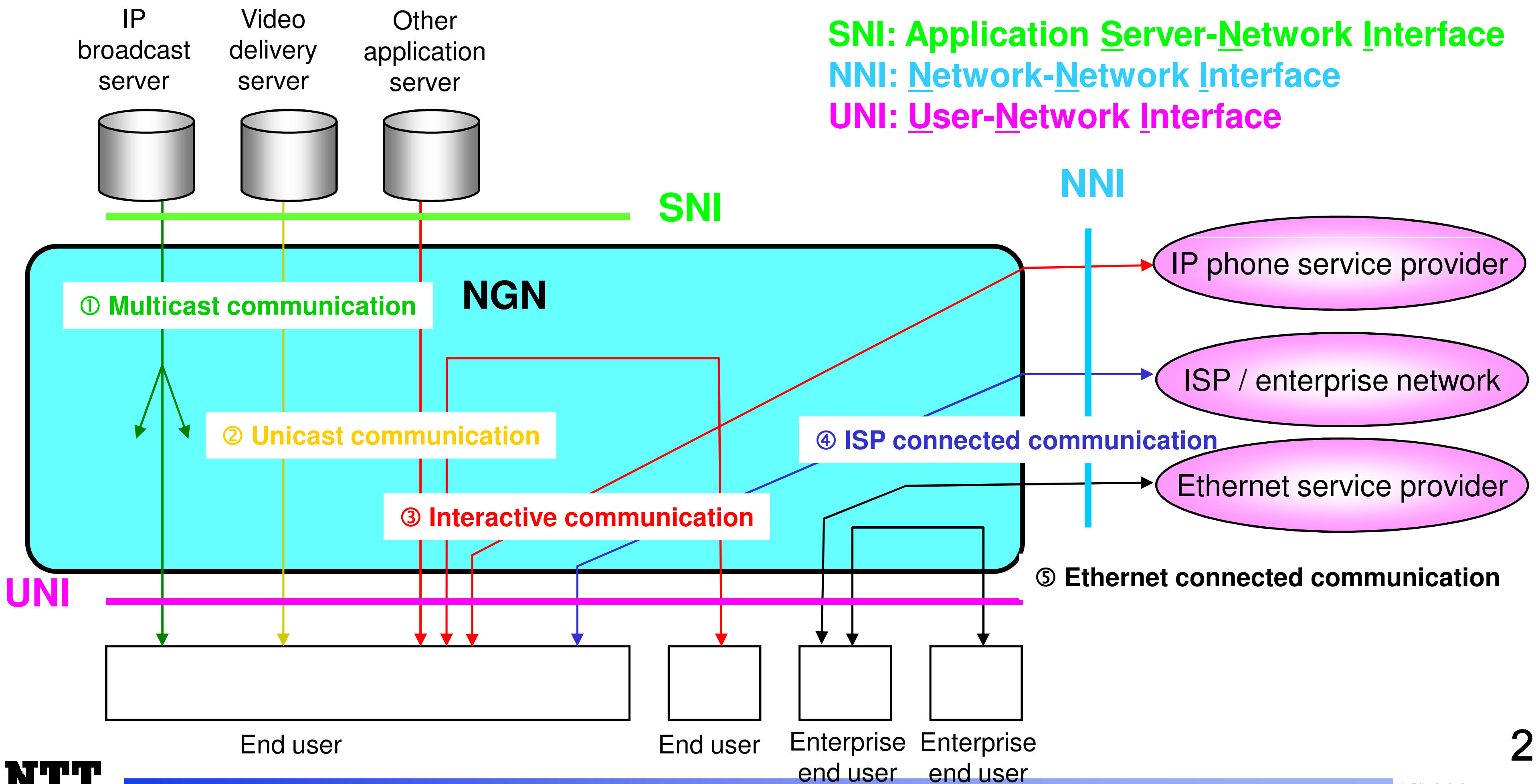
- ✓Dynamic bandwidth reservation and admission control in the access networks
- ✓NAT control at the service edge router
- ✓Priority reservation for emergency calls



Provision of SNI for service providers

- SNI (Application Server-Network Interface) is provided as an open interface.
- This enables service providers to provide services using not only SIP applications but also video delivery and is the result of a consensus between NTT and various service players in establishing the SDP.

SNI: Application Server-Network Interface
NNI: Network-Network Interface
UNI: User-Network Interface



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Conclusions

- Common issues facing telecom carriers are the need to do the following.
  - Migrate from PSTN to IP, so reducing capex and opex.
  - Shift revenue from telephony to broadband.
  - Create new services and businesses to expand the telcoms market.
- The NGN is an IP converged network using the following technologies to enable IP convergence.
  - S/BC (Session/Border Controller) and RACS (Resource and Admission Control Sub-system)
  - IMS (IP Multimedia Sub-system)
  - SDP (Service Delivery Platform)
- NTT's NGN is challenge to solve issues facing telecom carriers.
  - NTT's NGN will provide high reliability and flexibility to bring new capabilities to information and communication services
  - The field trials will verify the implementation of technologies based on the NGN architecture and feedback from the results will be used in standardization and the production of mature, commercial products.

Thank you