Telecommunication Development in China

CAICT, MIIT

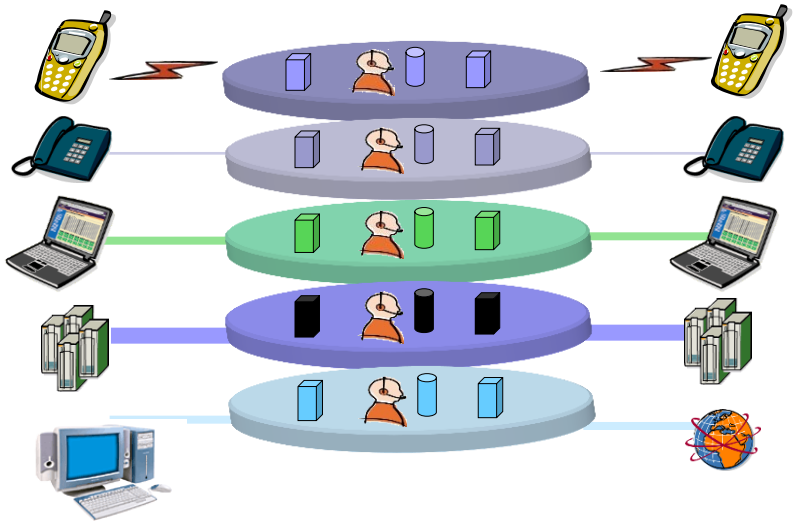
1 Overview of network evolution

2 Overview telecommunication Industry

3 NGN, Soft-switch and IMS

Network evolution

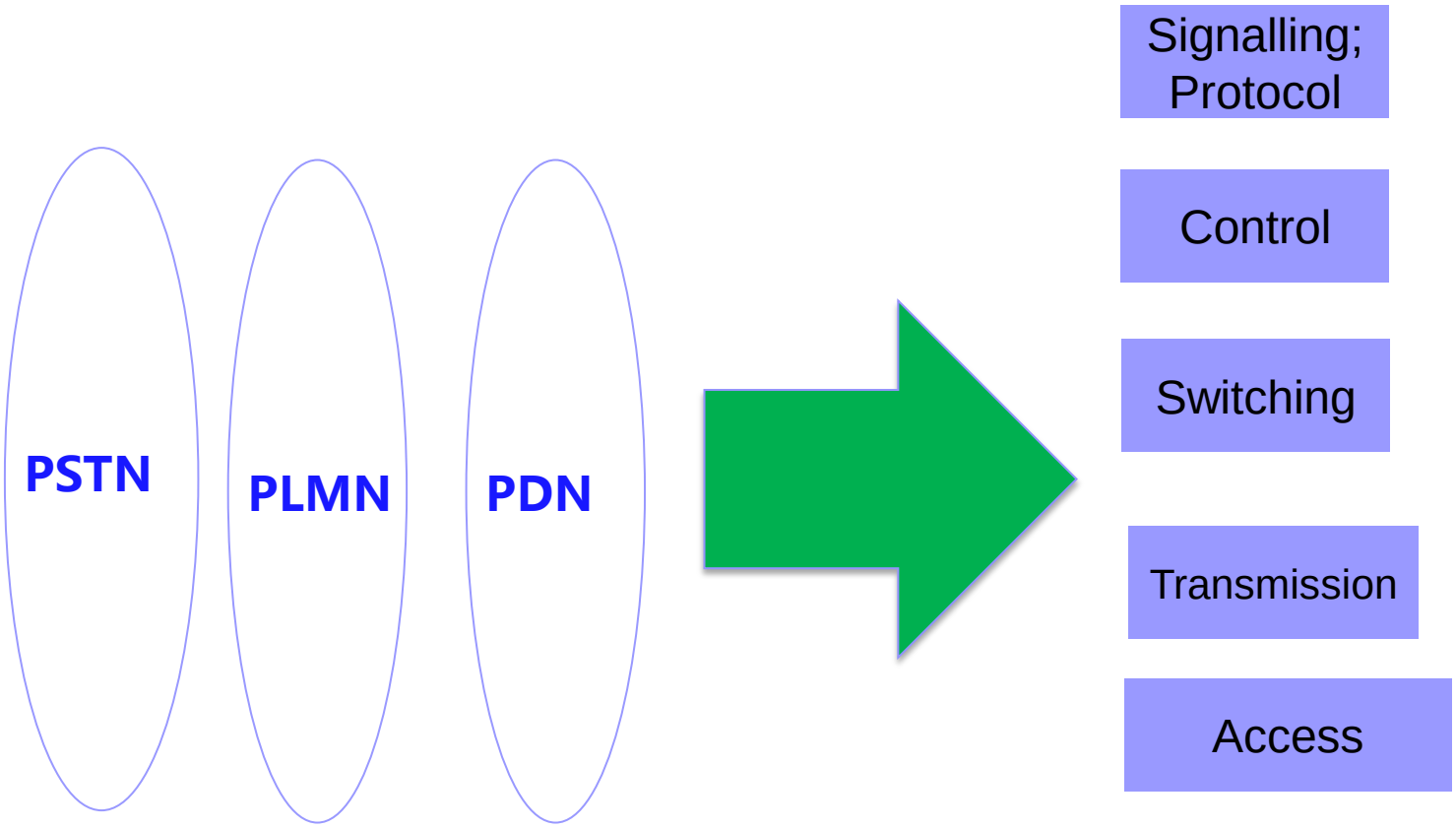
Past



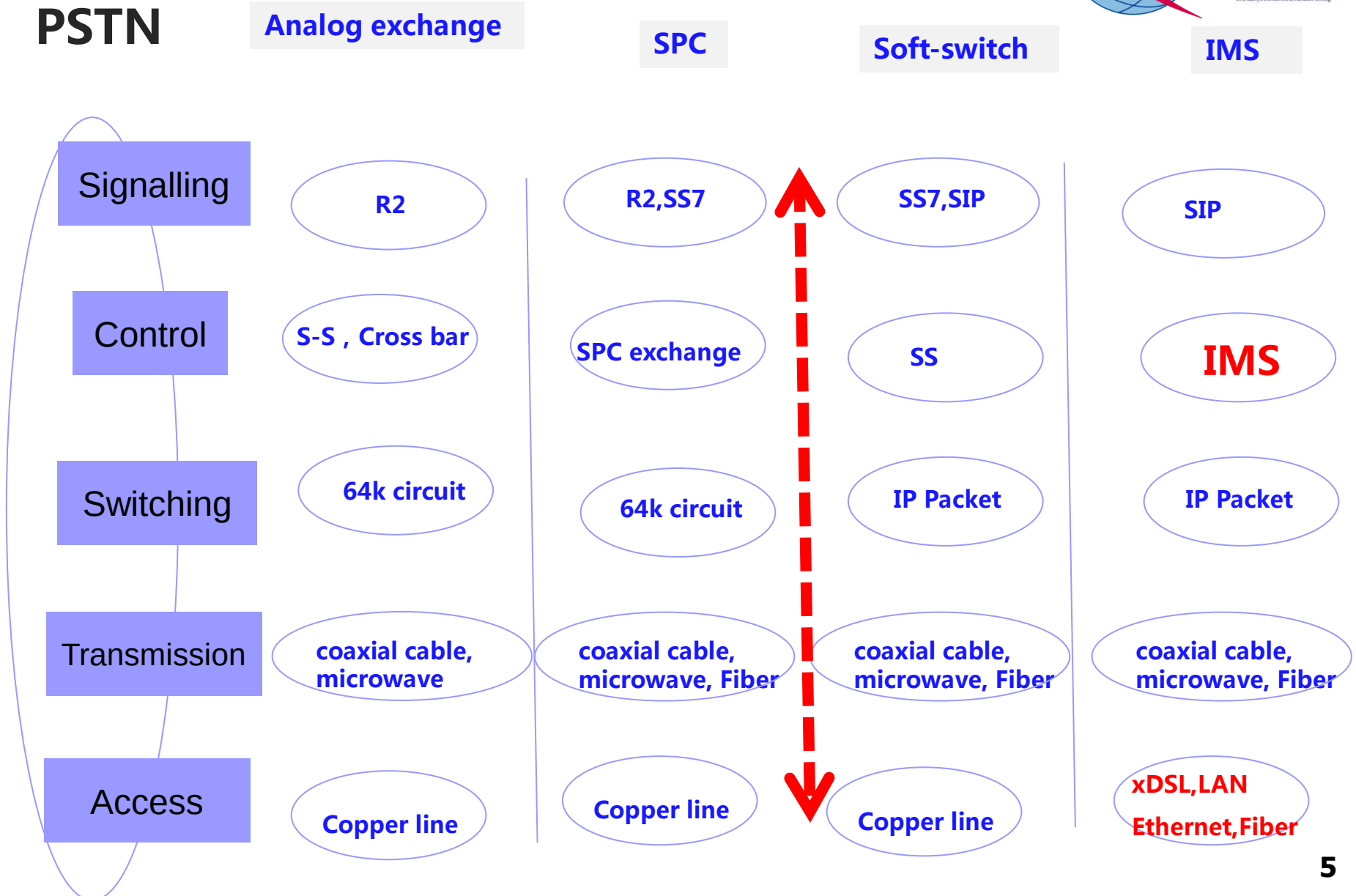
Each Service has its own Network

- **Service deployment requires high upfront investment**
- **No service interaction**
- **Multiple customer profile**
- **Multiple operational cost**

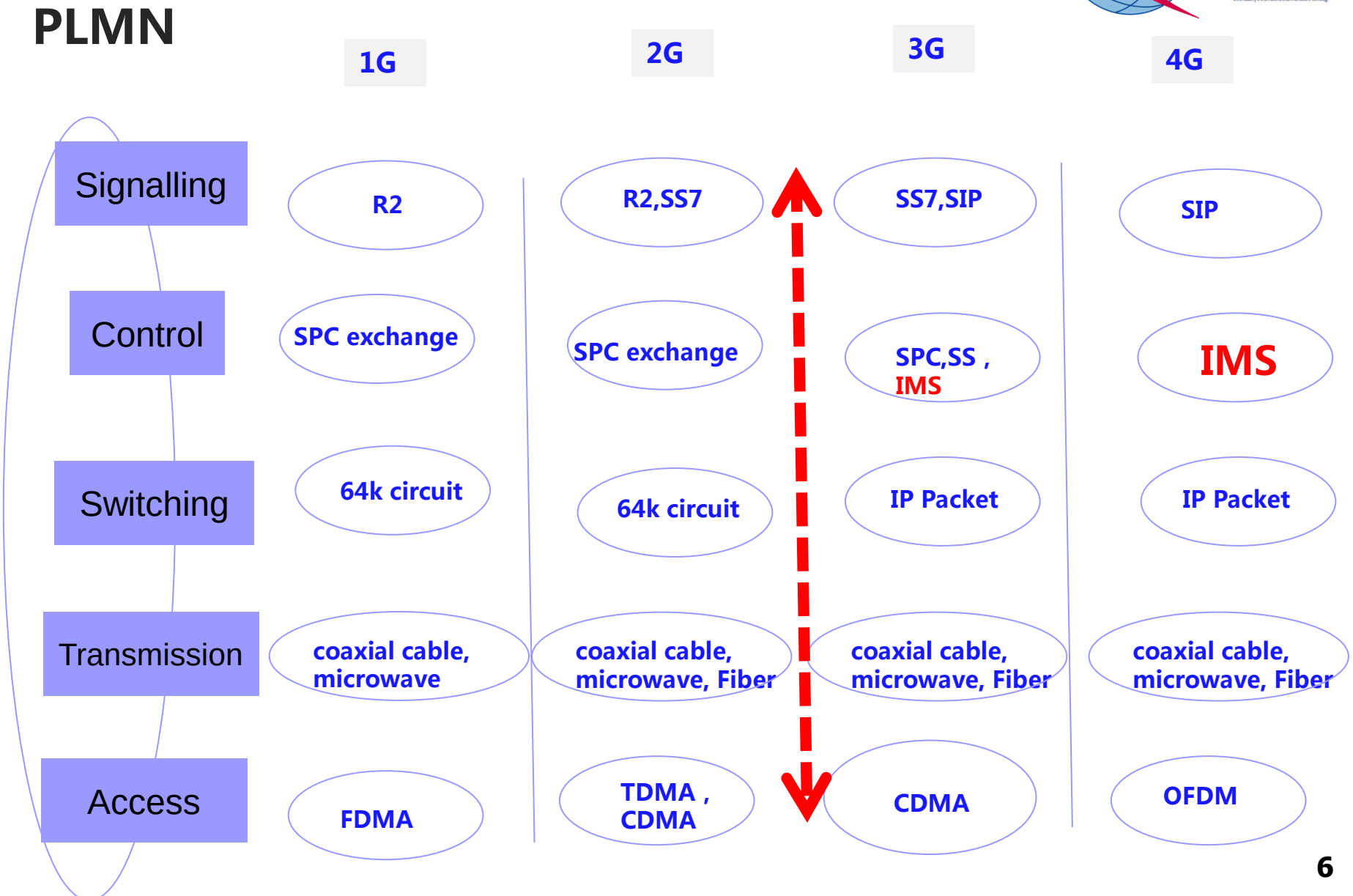
Service network evolution



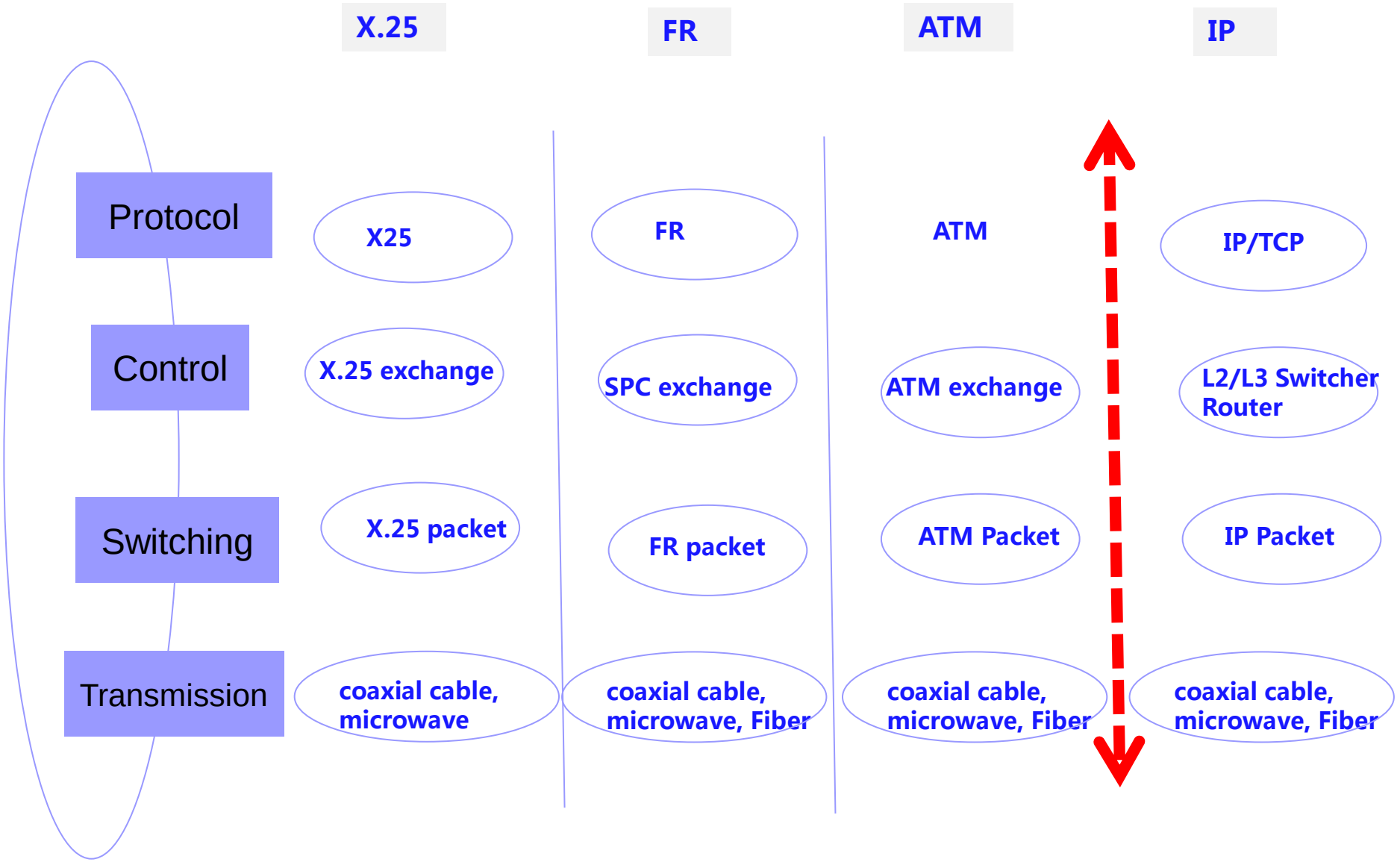
PSTN technology evolution



PLMN technology evolution

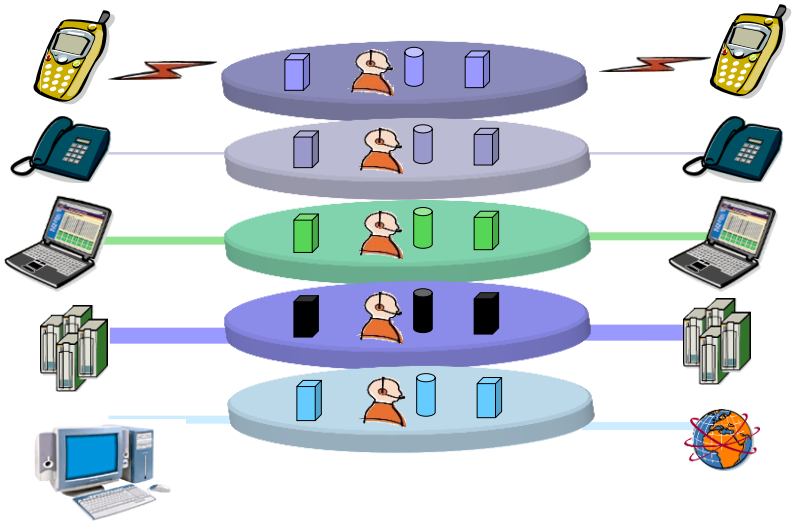


PDN technology evolution

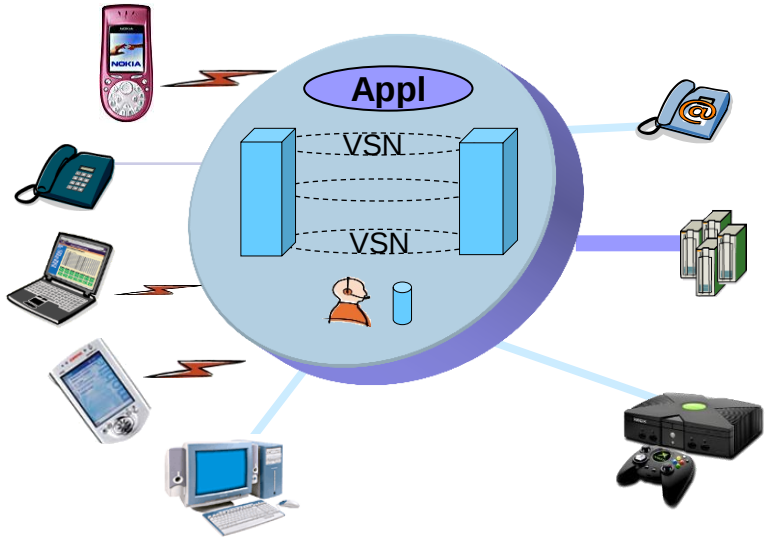


Network evolution

Past

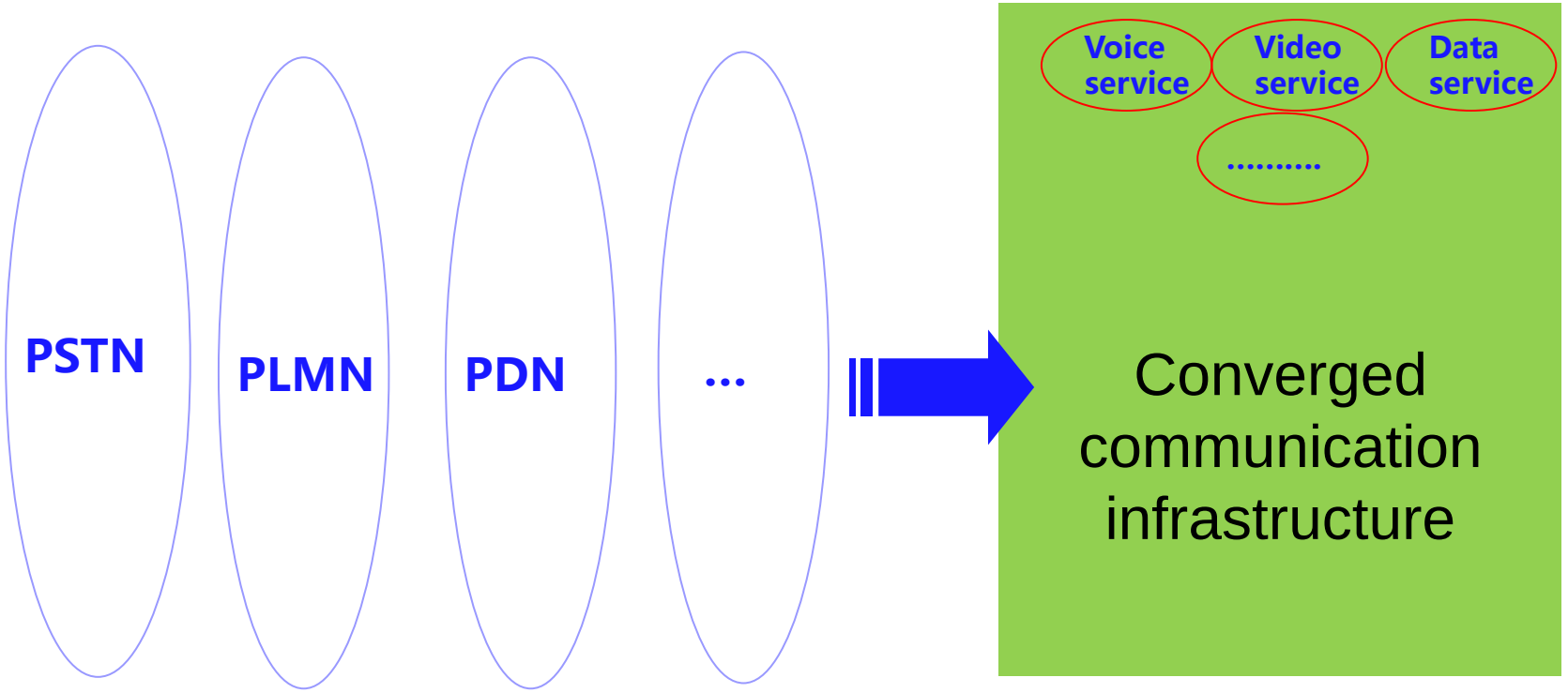


New Service Network

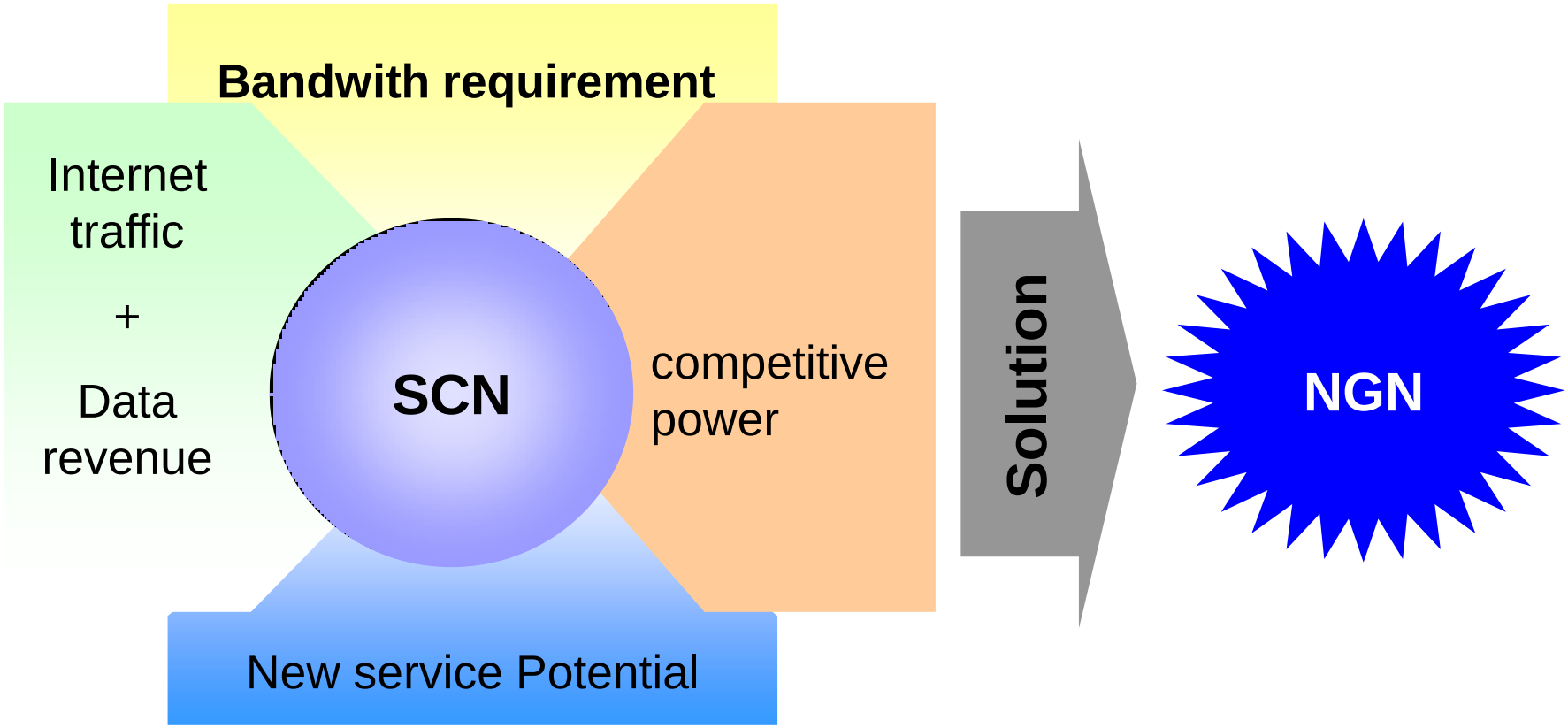


- **Virtual Service Networking**
- **Seamless Service Linkage**
- **Single customer profile**
- **Operational cost rationalisation**

Network evolution



The origin of NGN

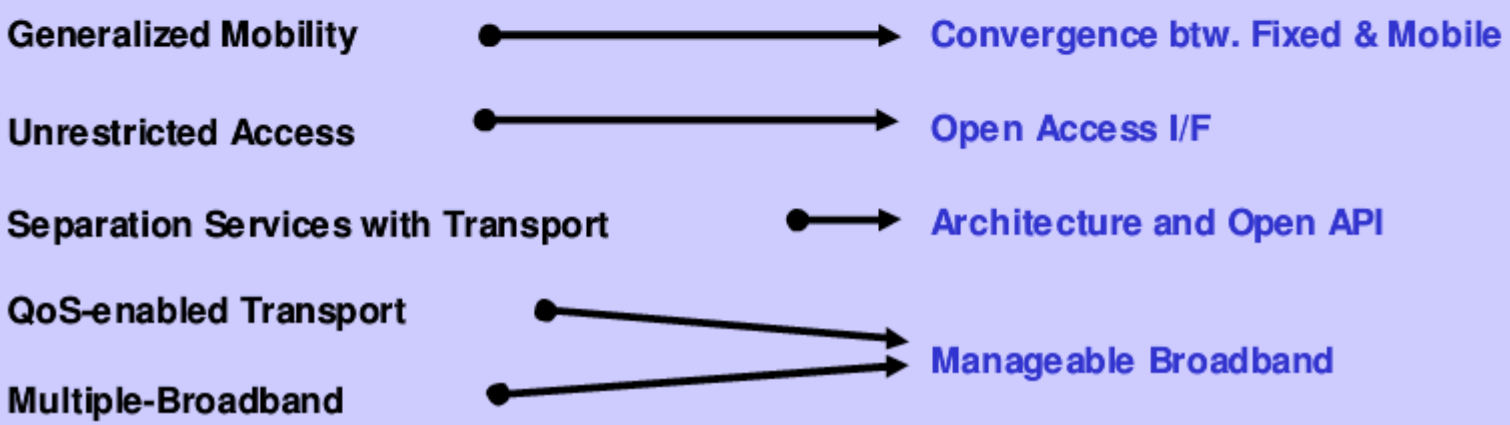


Definition of Next Generation Network

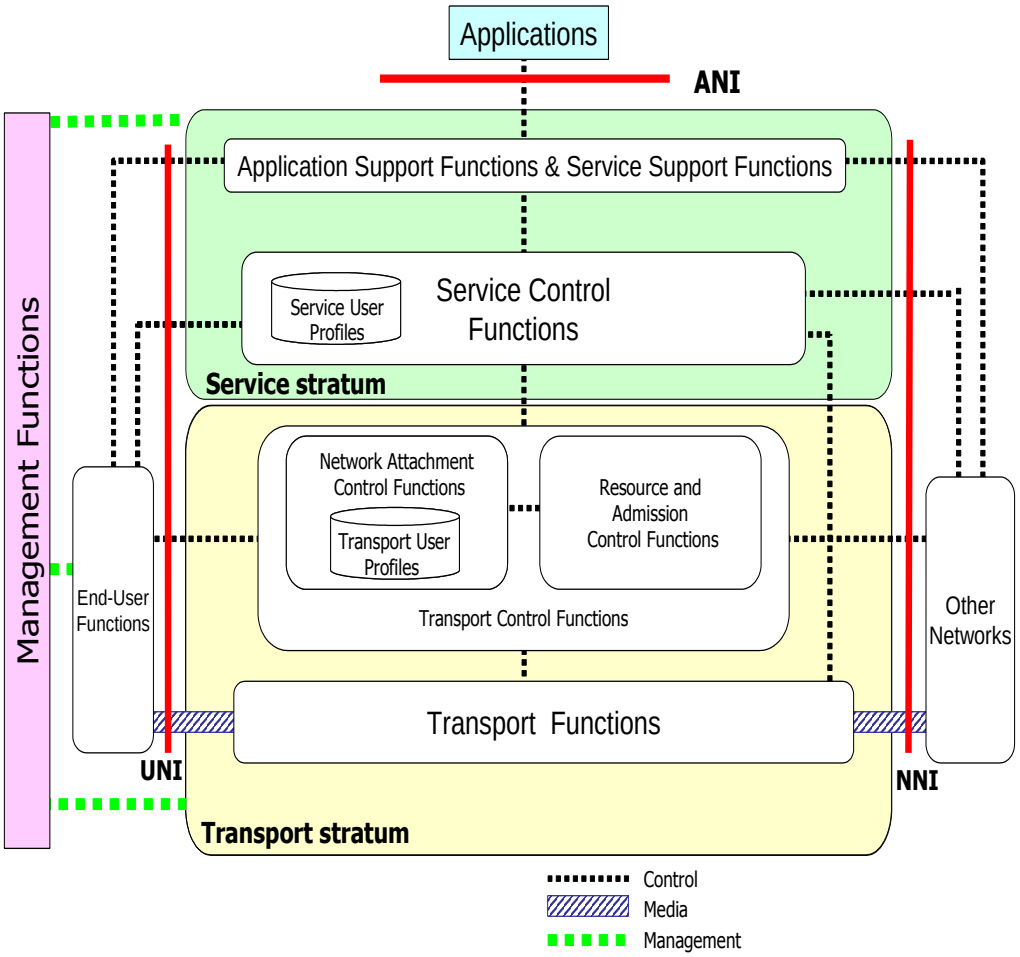
Definition of NGN (Y.2001)

A NGN is a packet-based network able to provide telecommunication services and able to make use of multiple broadband, QoS-enabled transport technologies and in which service-related functions are independent from underlying transport-related technologies. It offers unrestricted access by users to different service providers. It supports generalized mobility which will allow consistent and ubiquitous provision of services to users.

Target Standards Area



High-level architecture of NGN

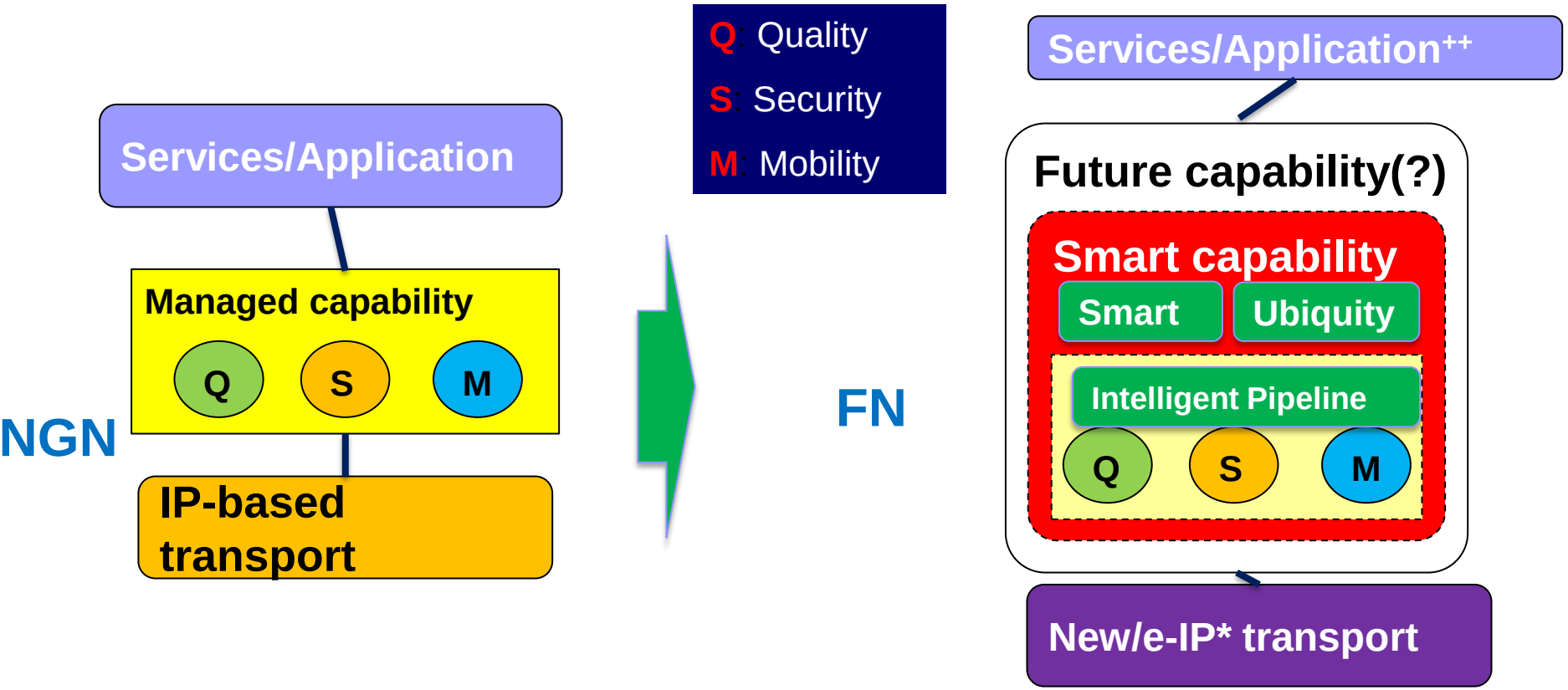


- Y.2001: General overview of NGN
- Y.2002: Overview of ubiquitous networking and of its support in NGN
- Y.2006: Description of capability set 1 of NGN release 1
- Y.2007: NGN capability set 2
- Y.2011: General principles and general reference model for Next Generation Networks
- Y.2012: Functional requirements and architecture of next generation networks

Refer to:Y.2012: Functional requirements and architecture of the NGN release 1

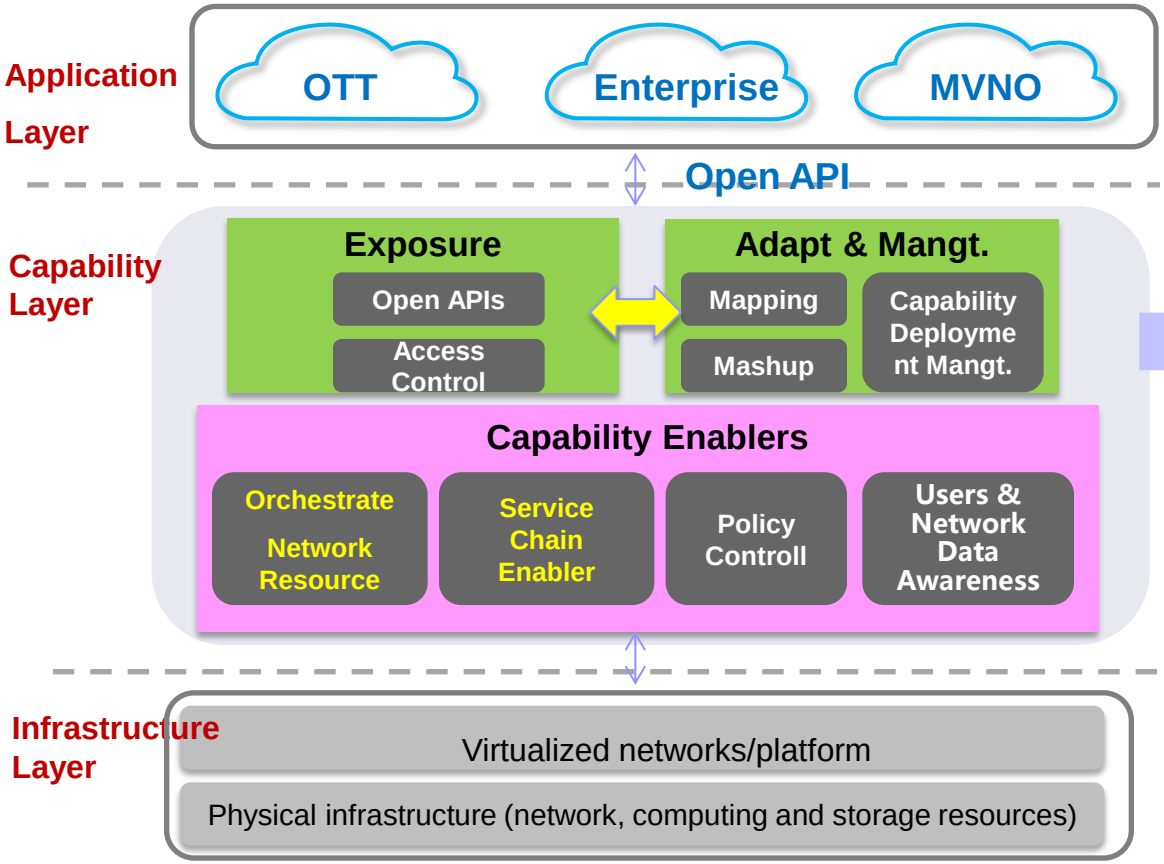
Networks evolution from NGN to FN

- **Developments of networking capabilities shall be continued and "smart" is one of important theme**
  - Y.3001: Future networks: Objectives and design goals
  - Y.3011: Framework of network virtualization for future networks
  - Y.3012: Requirements of network virtualization for future networks
  - …



IMT-2020 network

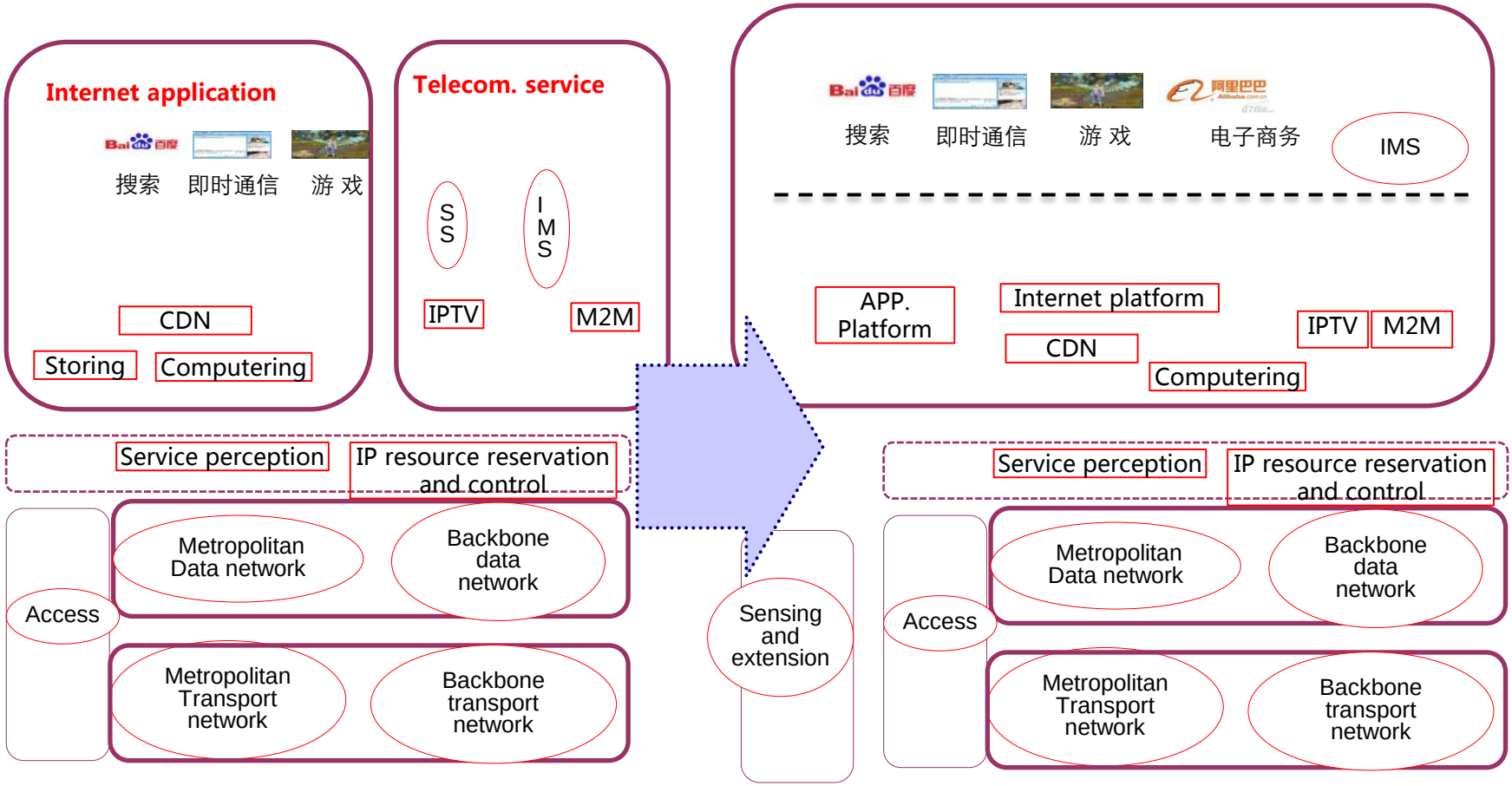
- The Focus Group on network aspects of IMT-2020 was established in May 2015 to analyse how emerging 5G technologies will interact in future networks as a preliminary study into the networking innovations required to support the development of 5G systems.
- The group took an ecosystem view of 5G research of development and published the analysis in a Report to its parent group, ITU-T Study Group 13.



- A new Network Capability Layer: with resource orchestration, capability enabler to achieve a highly efficient coordination between service and network
- Network capability exposure function will incorporate with new 5G architecture from access to core network side.

Telecommunication evolution

- Ubiquitous sensing and extension
- Delayering and Flat structure ;
- Convergence between Internet and Telecomunication



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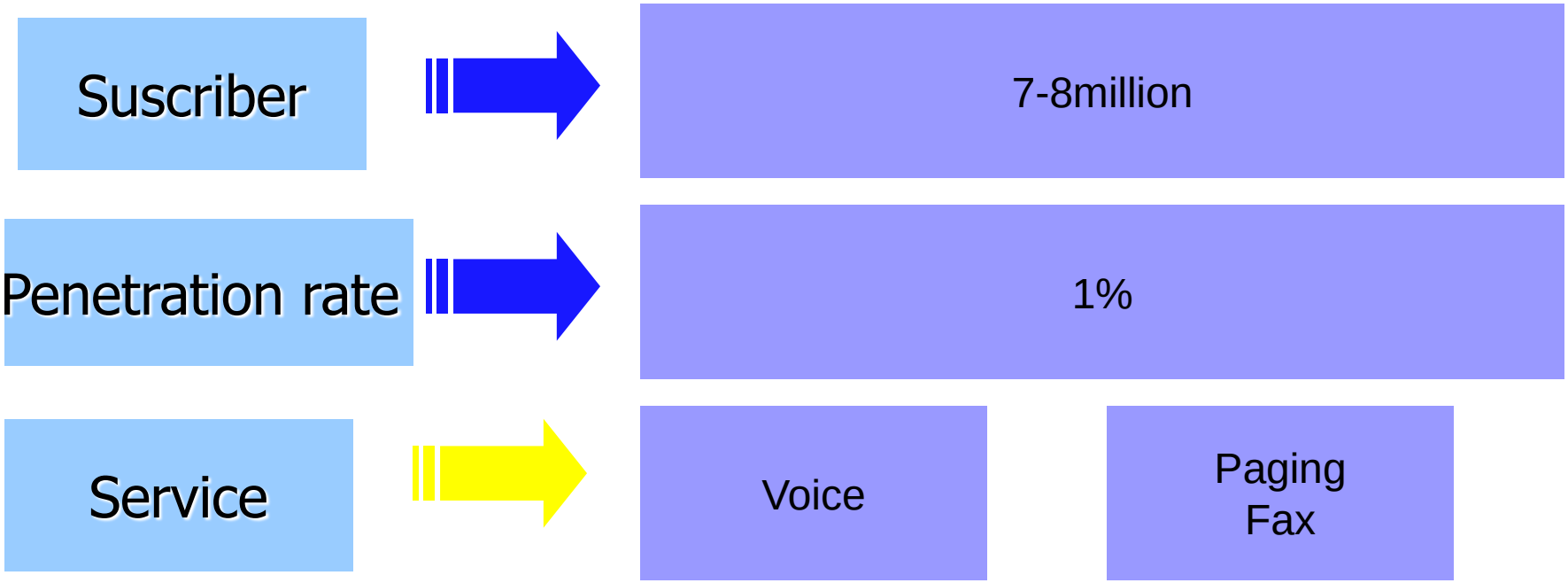
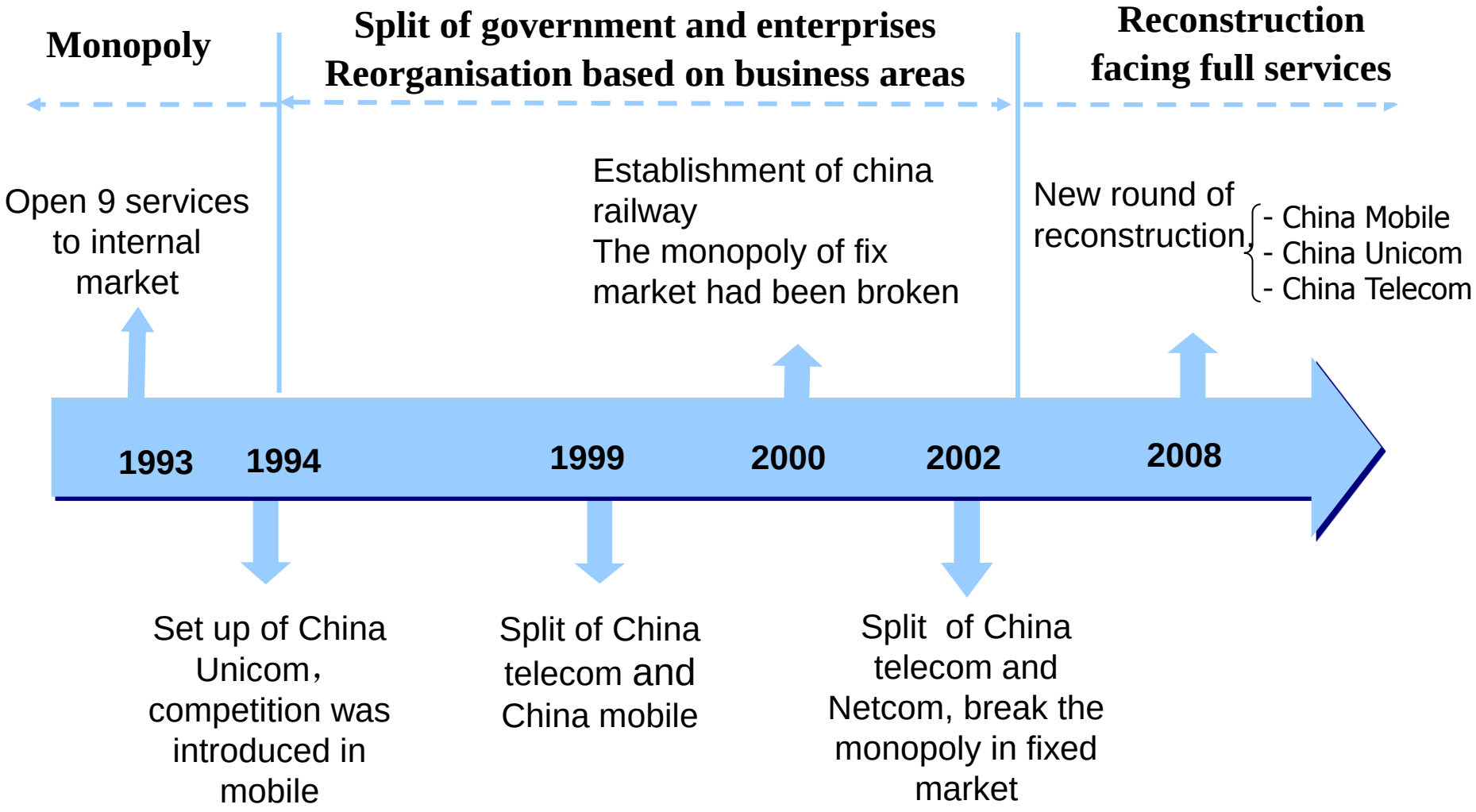
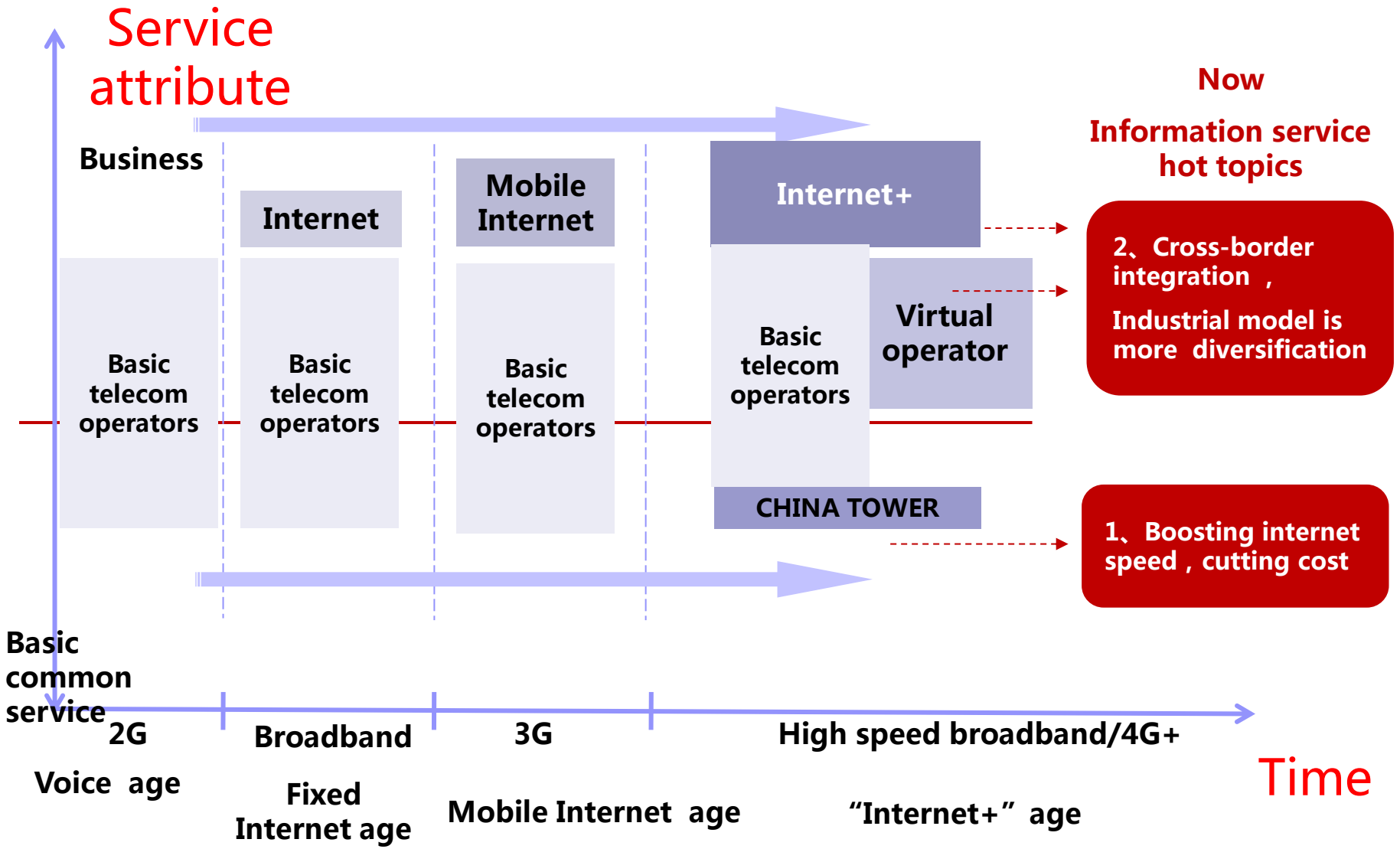
Telecommunication industry of China 25 years ago



The change telecommunication players of China from last 25years



The change telecommunication players of China during last 20 years

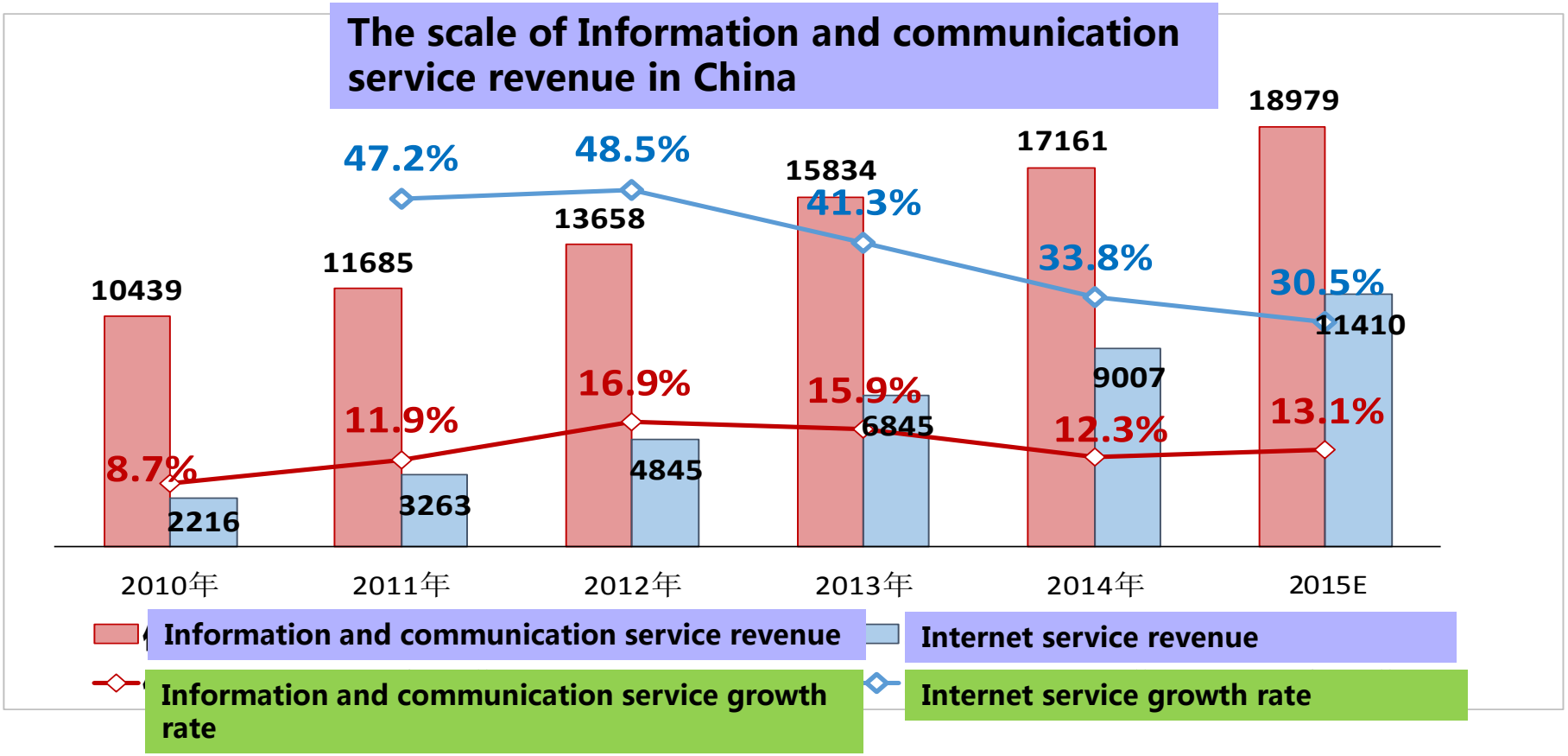


Telecommunication industry of China now

China's information and communication services revenue in 2015 was 1.9 trillion yuan, increased by 13.1%,

——the Internet based business income was 1.4 trillion , which was increased by 30.5%

—— Traditional telecom business revenue was 760 billion yuan, which was decreased by 7%.



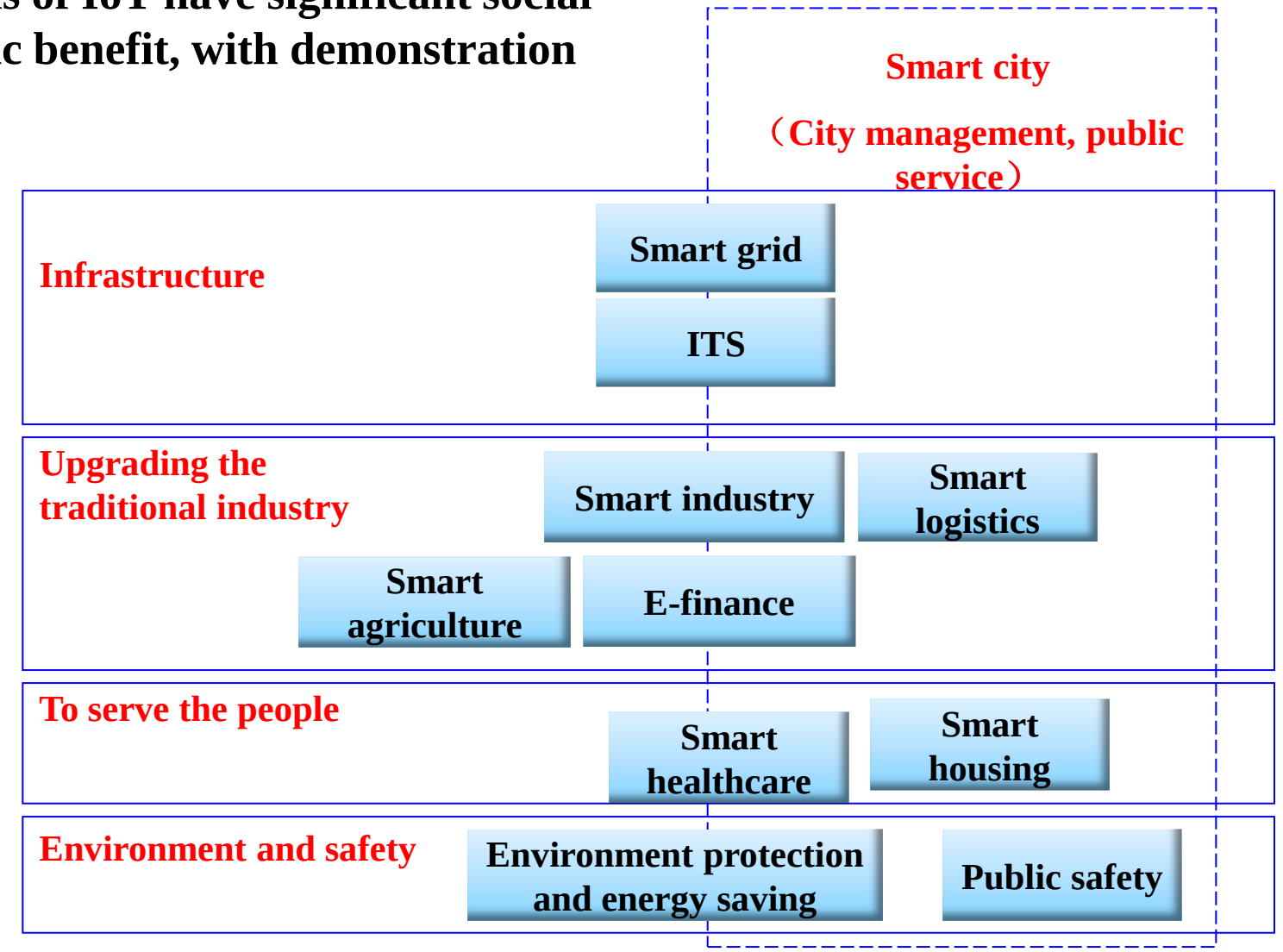
Telecommunication industry of China now

IIoT | Smart City | CC | E-health

Subscriber	Voice:1.5billion（Mobile:1.3billion） Fixed broadband：270million
Penetration rate	>100%
Service	Voice Short message; Internet service

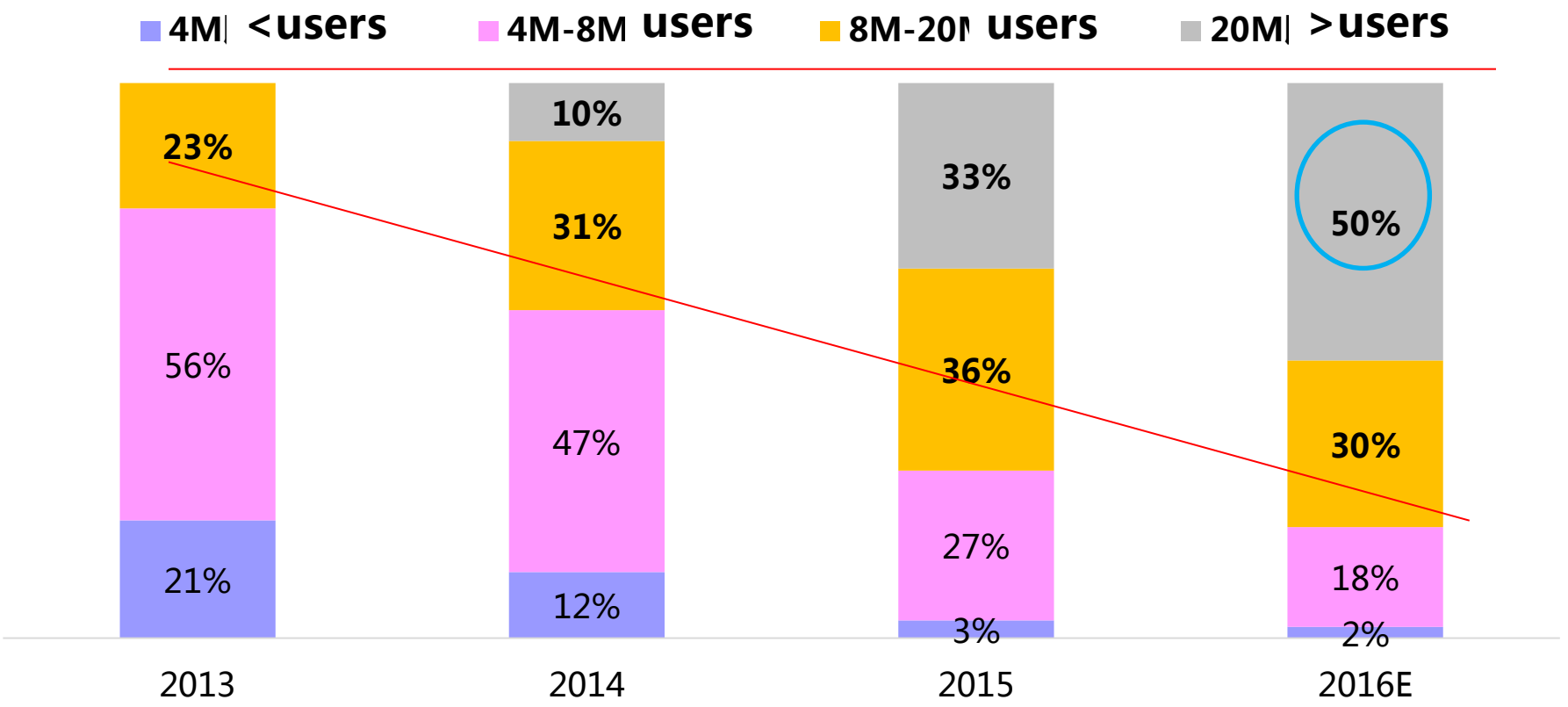
Hot areas for IoT application

The hot areas of IoT have significant social and economic benefit, with demonstration effect.



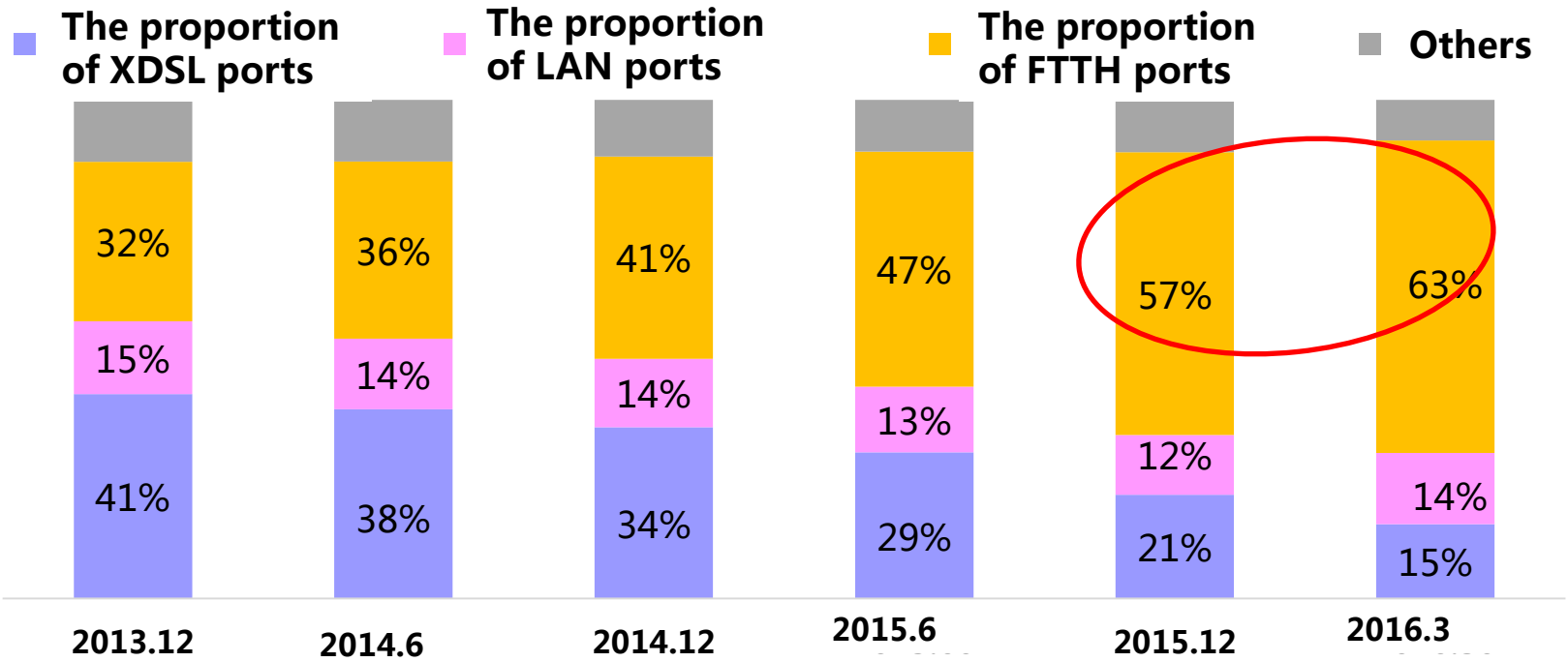
Telecommunication in China now

- **Fixed broadband into the 20M era:** as of the first quarter, the number of 8M users was 200 million, the 8M users accounted for more than 75.6%; the number of 20M users was 110 million, the 20M users accounted for more than 39.2% which would be 50% expected at end the year.



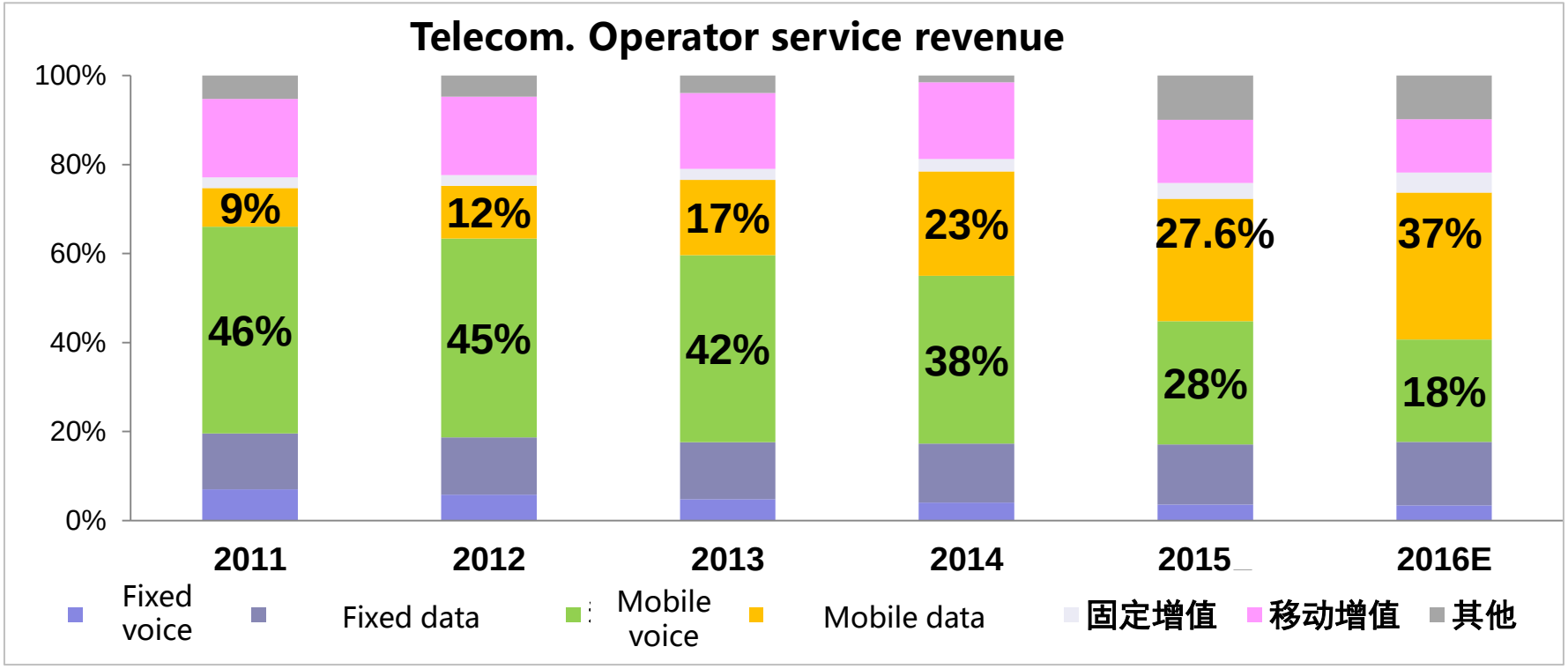
Telecommunication in China now

- Rapid growth of the length of the fiber cable: as of the first quarter, the total length of the cable line up to 26 million km.
- FTTH port is 390 million accounting for over 60%.



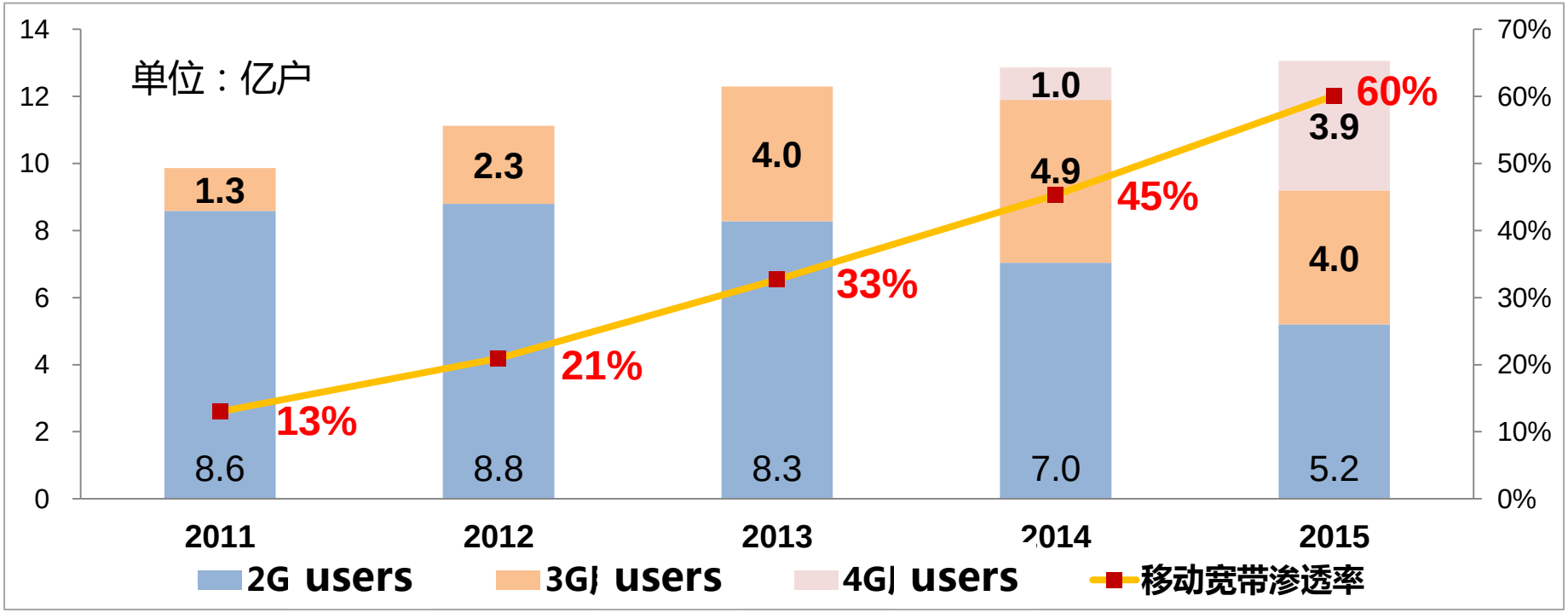
Telecommunication in China now

- Non-voice revenue expansion for 5 consecutive
- Mobile data revenue beyond mobile voice: as of the first quarter of 2016, mobile data revenue is nearly 100 billion yuan, accounting for 33.6% of business income, for the first time beyond the mobile voice.

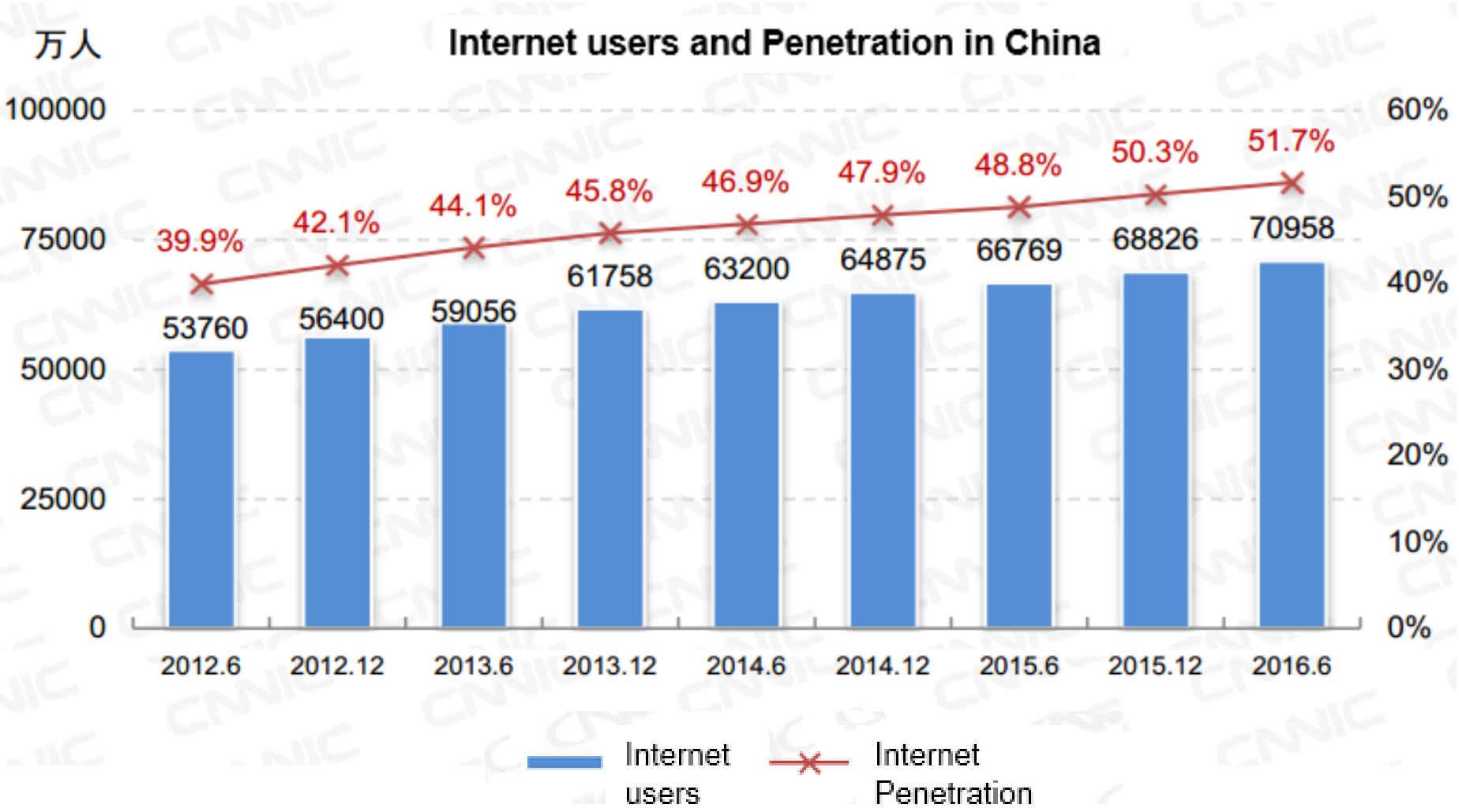


Telecommunication in China now

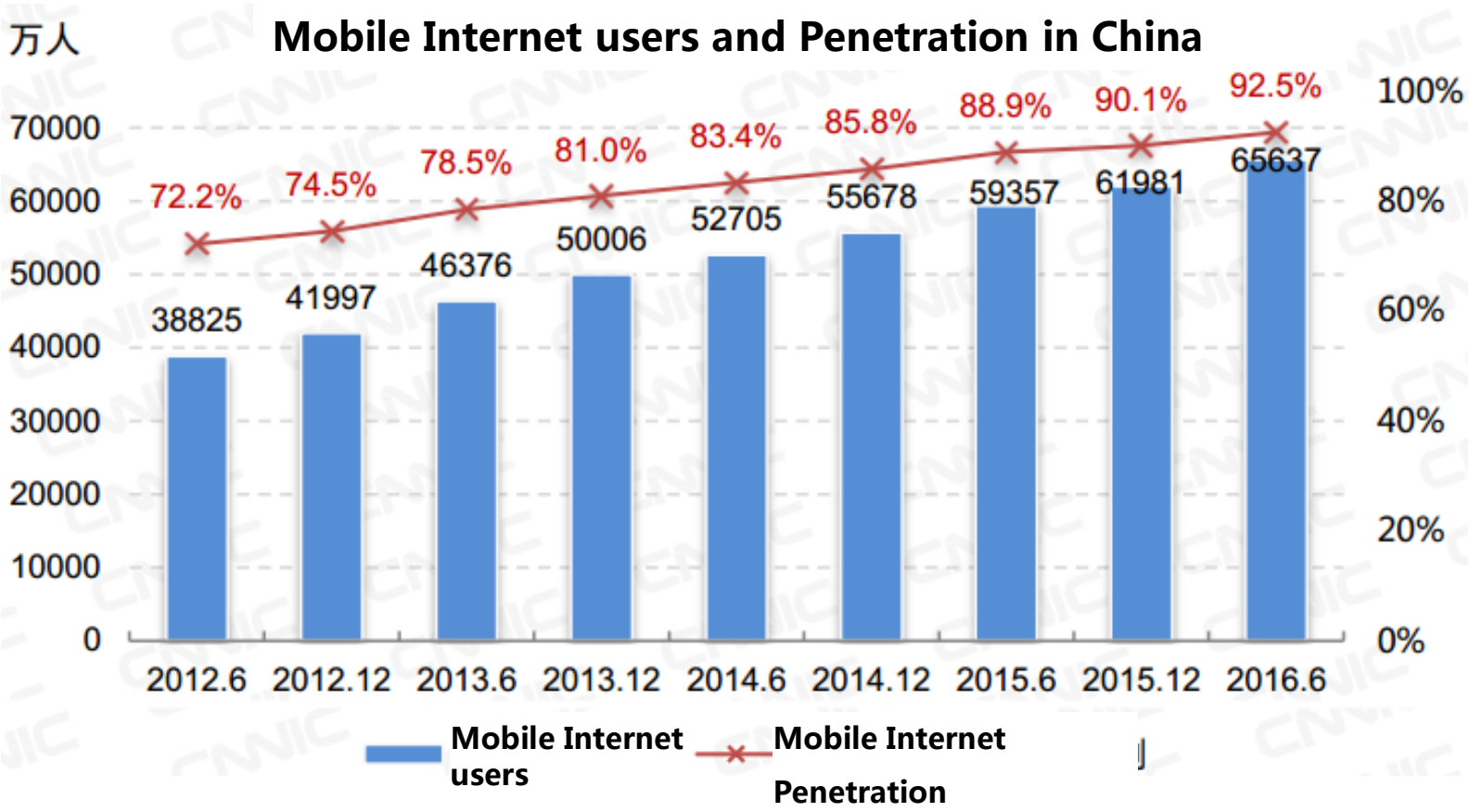
- As of the first quarter, the number of mobile broadband users is nearly 800 million, the user penetration rate is over 60%.
- The migration to 4G for Mobile users : as of the first quarter, 4G users is 530 million, the penetration rate was 41% .



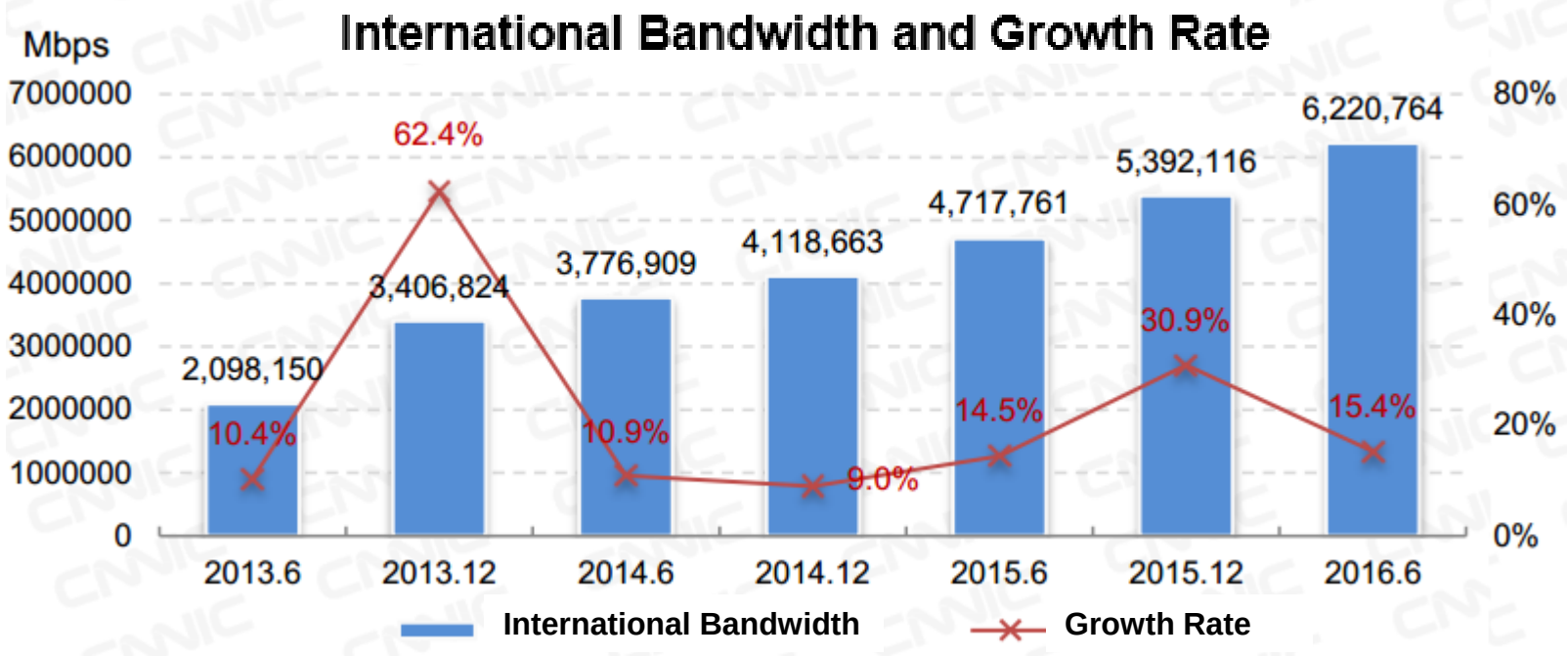
Internet of China now



Internet of China now



Internet of China now

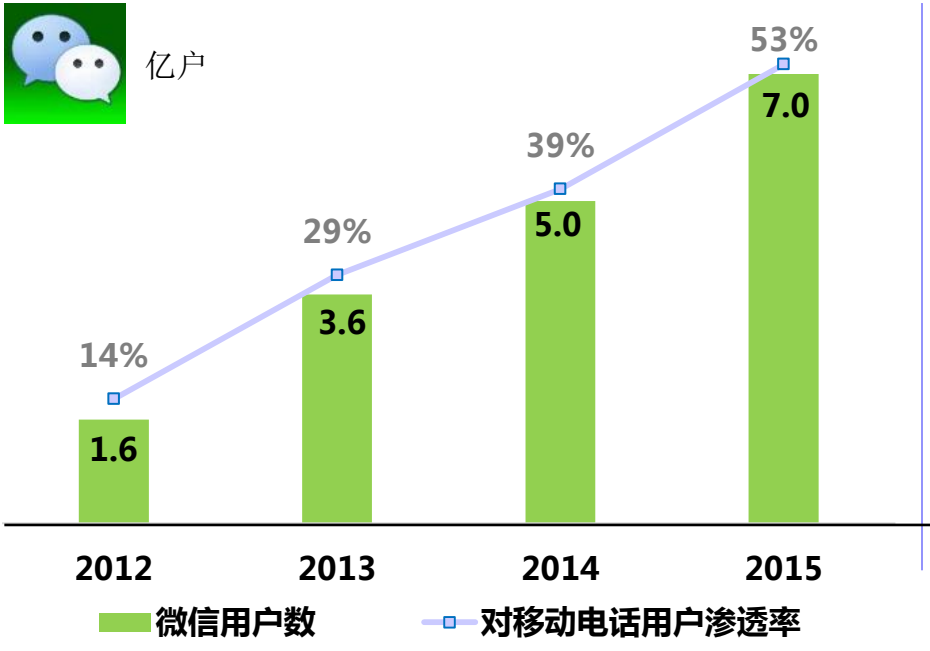


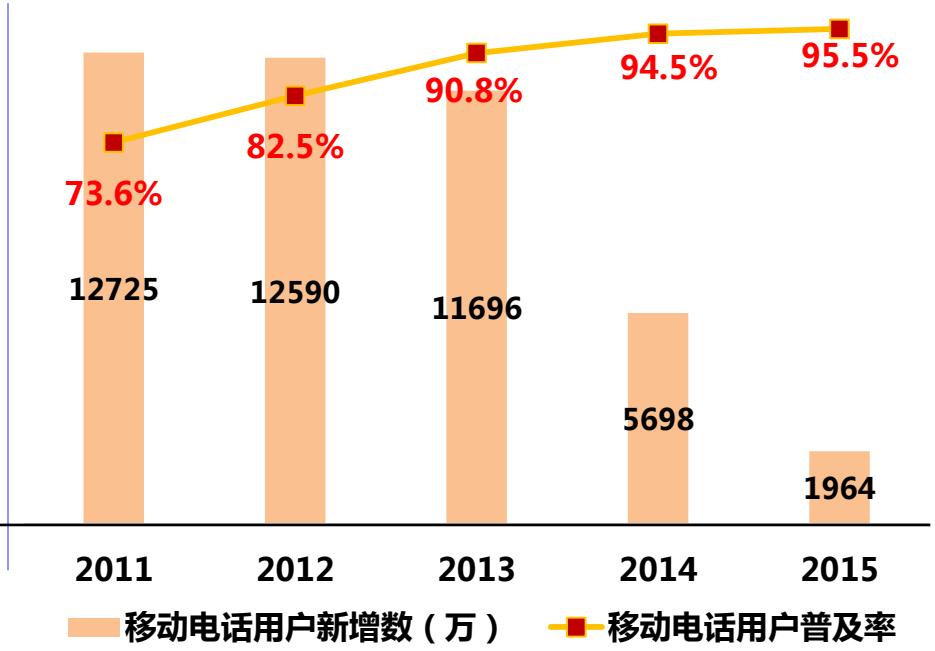
ISPs	International Bandwidth（Mbps）
China Telecom	3,817,006
China Unicom	1,501,805
China Mobile	787,263
Others	114,,690
合计	6,220,764

Telecommunication in China now

- The number of WeChat monthly active users is of nearly 700 million.
- WeChat has been second of the world's mobile instant messaging platform

- The mobile users number decline from 130 million in 2011 to the 19 million 2015.
- mobile voice revenue growth was changed from positive to negative in 2014.





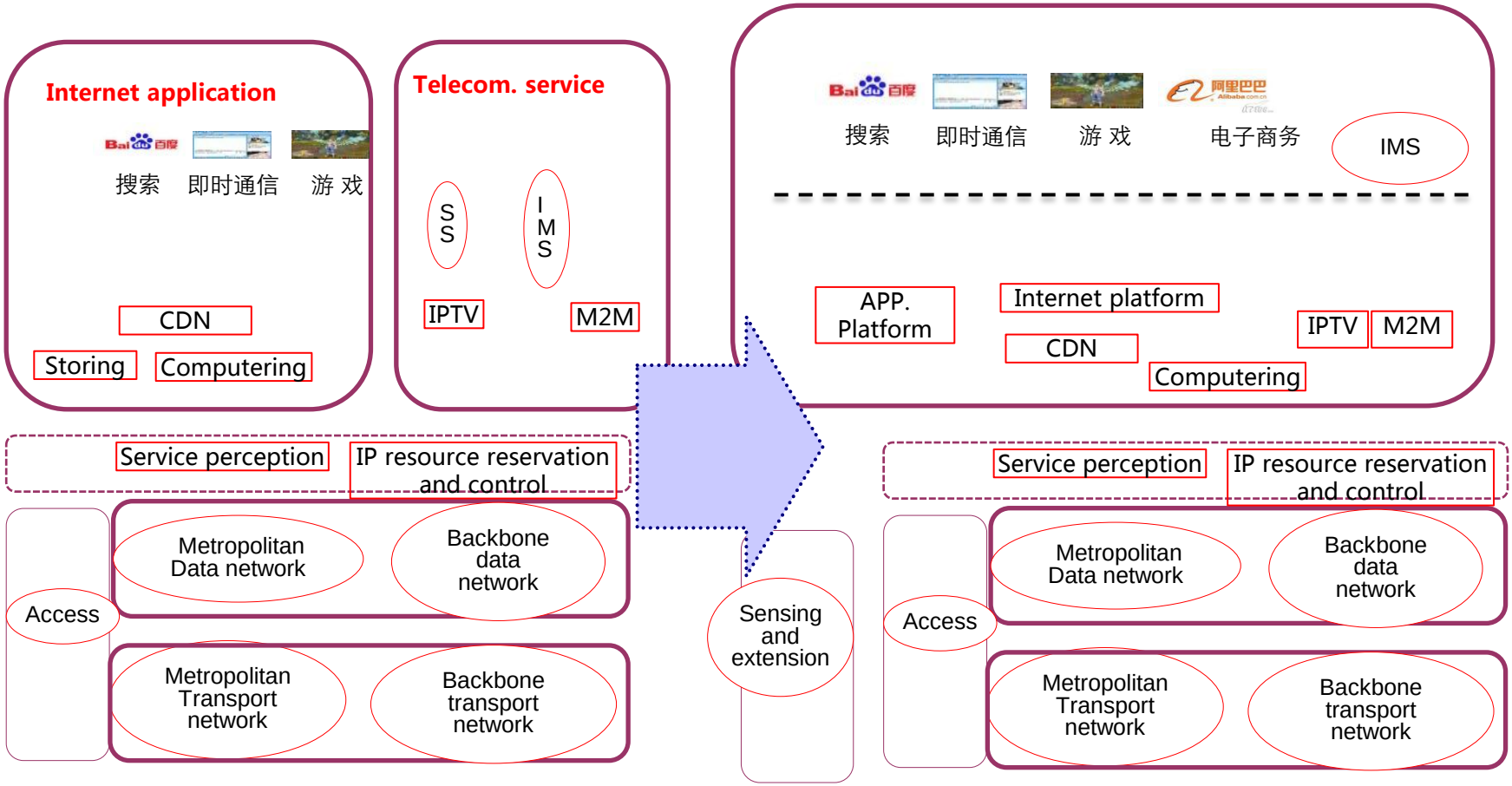
Internet in China

- OTT Players are becoming main force in telecommunication industry. The transfer of industrial value from the telecommunications companies to Internet companies was accelerated;

Company	Revenue (billion US$)	Revenue growth rate （%）	Net profit (billion US$)
China Mobile	101.4	4.3	16.7
China Telecom.	94.7	2.1	5.6
China Unicom.	75.6	-3.4	4.5
Alibaba	15	32.7	11
Tencent	15.8	30.3	4.4
Baidu	15	35.3	11

Telecommunication evolution

- Ubiquitous sensing and extension
- Delayering and Flat structure ;
- Convergence between Internet and Telecomunication



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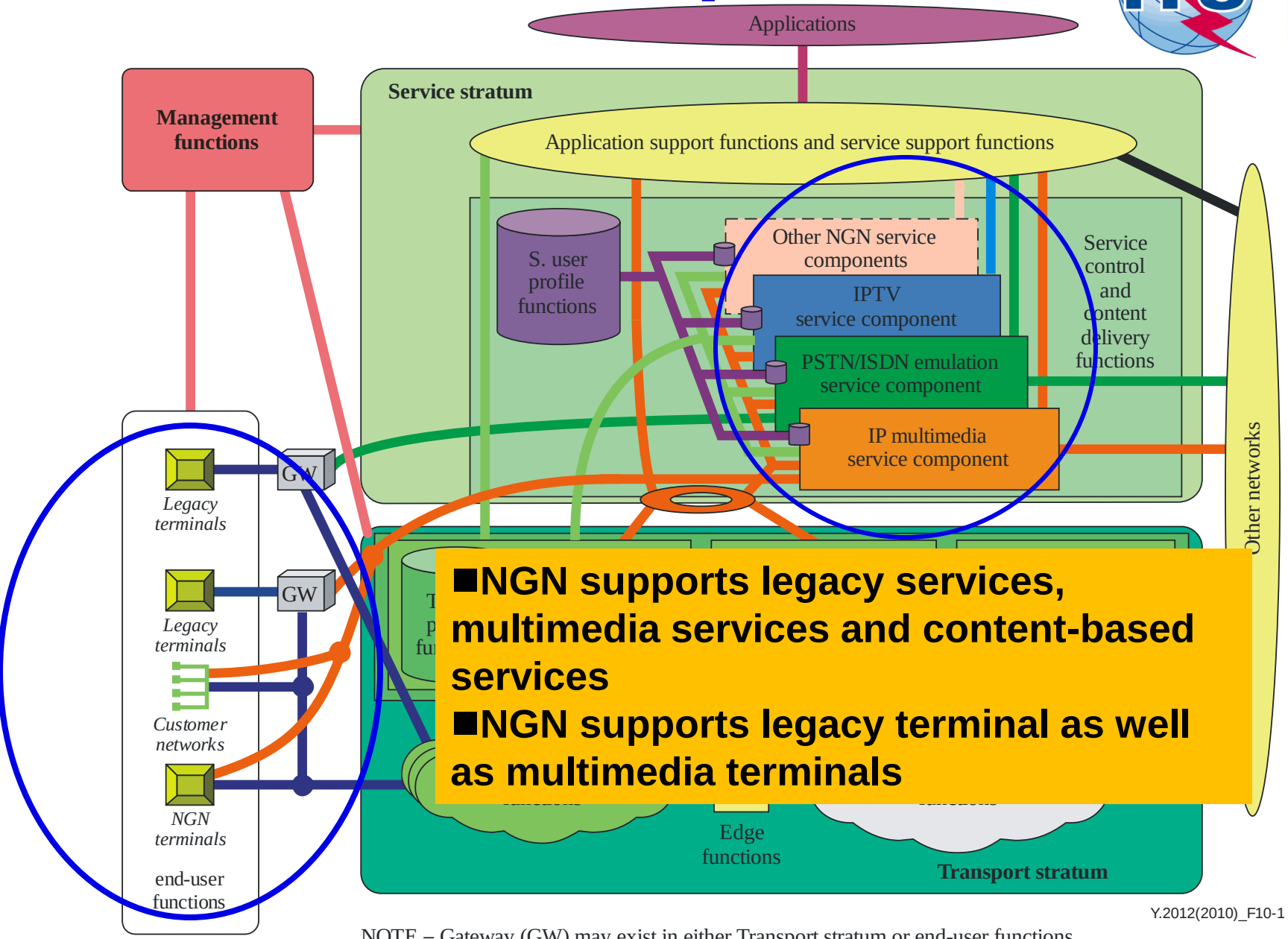
NGN component

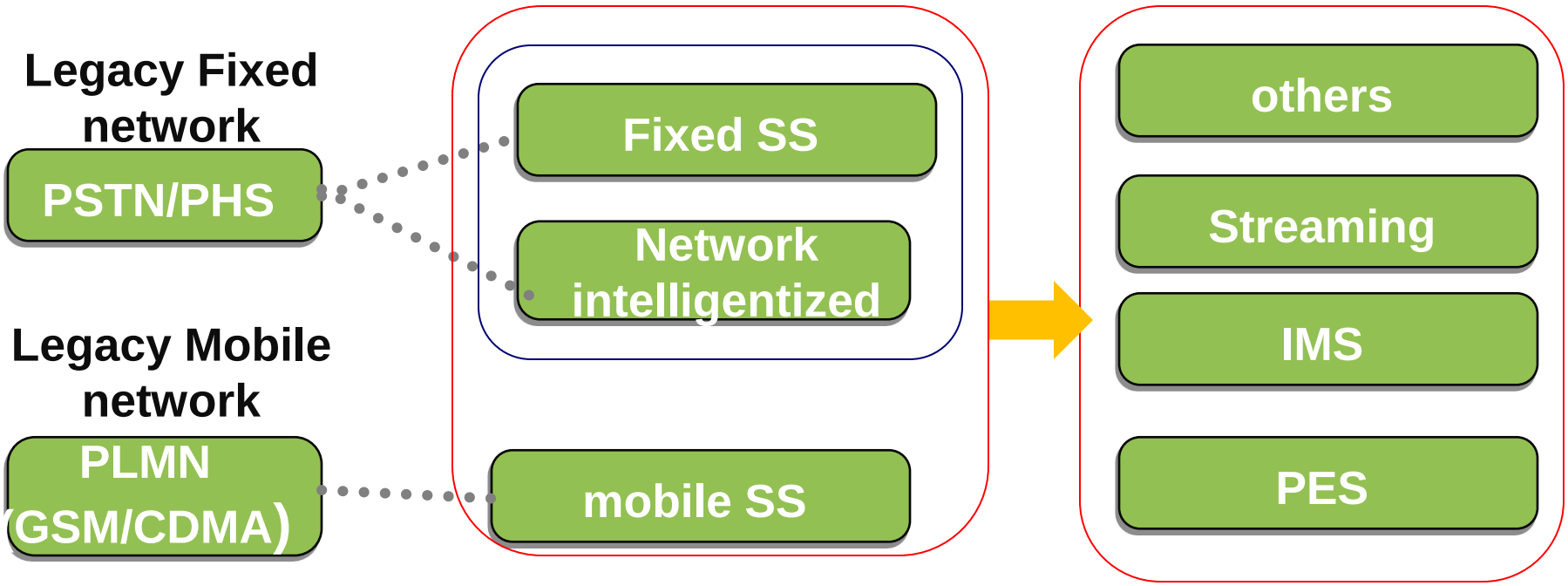


■NGN supports legacy services, multimedia services and content-based services

■NGN supports legacy terminal as well as multimedia terminals

NOTE – Gateway (GW) may exist in either Transport stratum or end-user functions.

Our evolution steps of core network

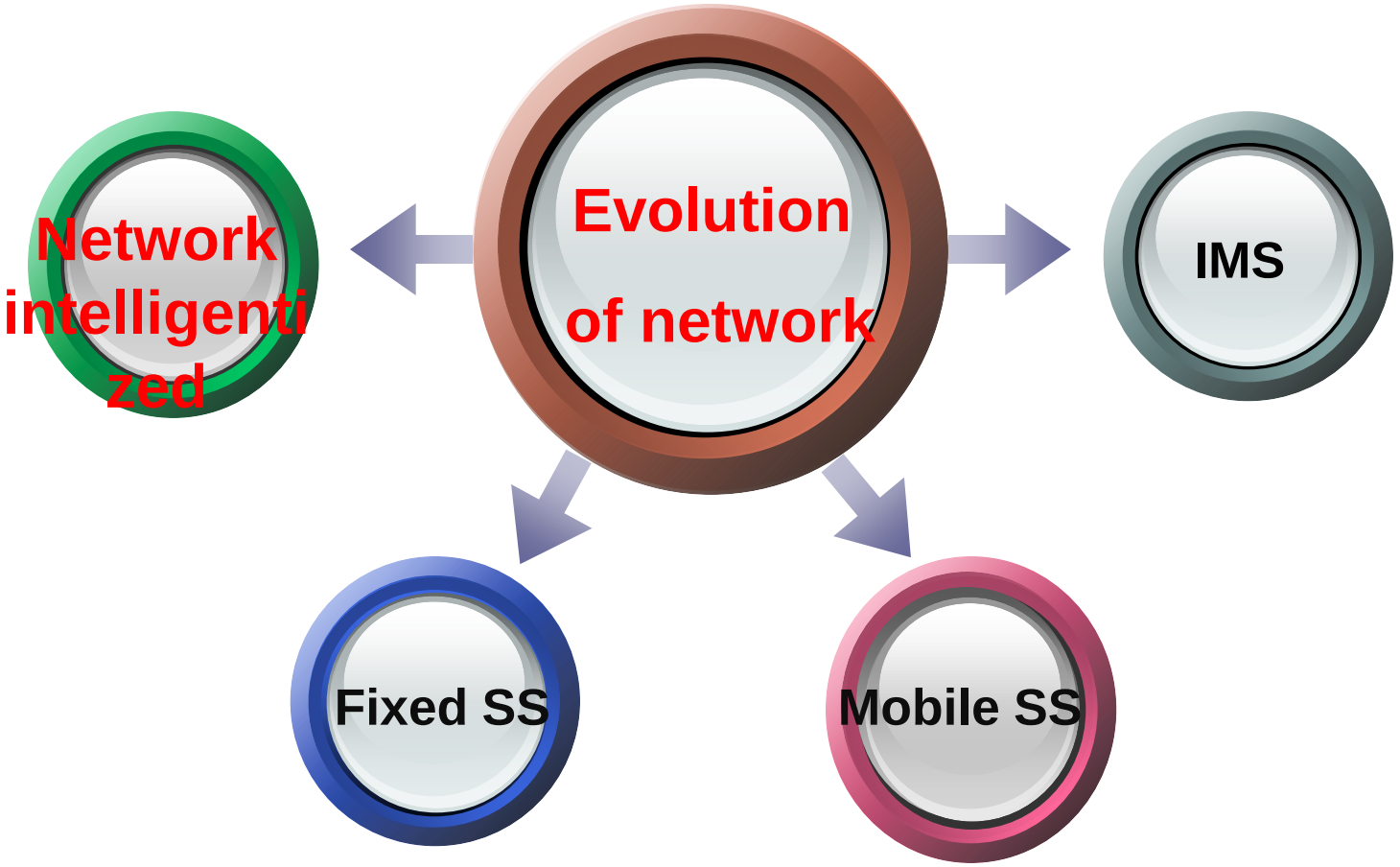


■From TDM to IP
■Enhance the intelligence

■IP multimedia capabilities enhancement

The evolution of core control network is co-occurred with the construction of IP bearer network.

Main points of network evolution



Background for Network intelligentized

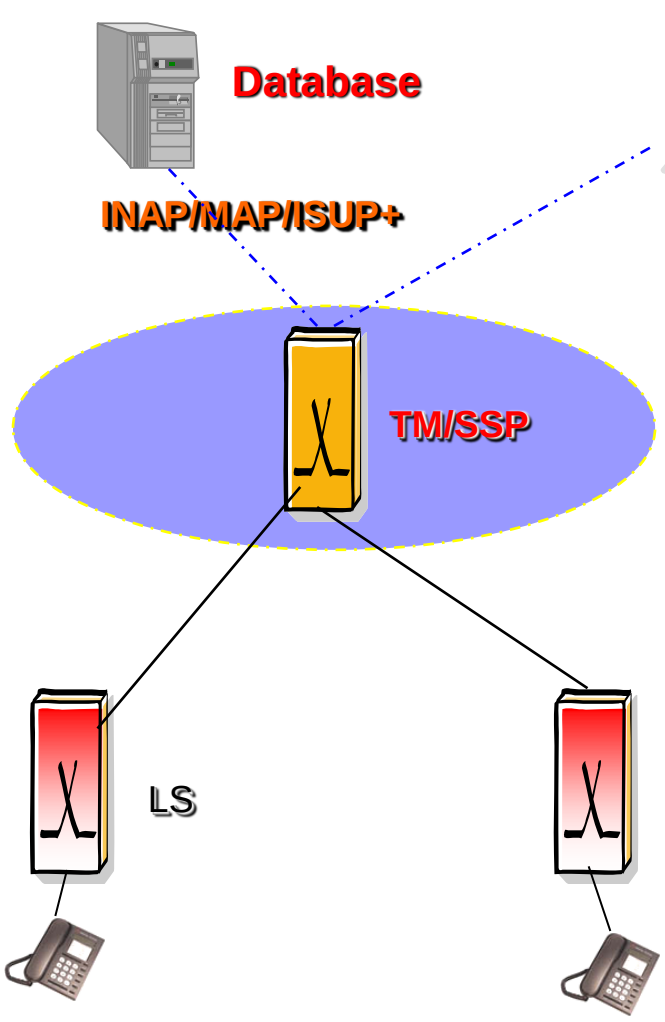
The main problems of PSTN in 2005:

- continuous decreasing of fixed traffic, especially the influence of FMS(Fixed mobile substitution)
- some PSTN switches were very old, or were lack of technical supporting from vendor

Time deployed	Before 93	93-96	97-2000	after 2000	total
Switch number	1,241	1,833	2.091	1,057	6,222
percent	20%	29%	34%	17%	

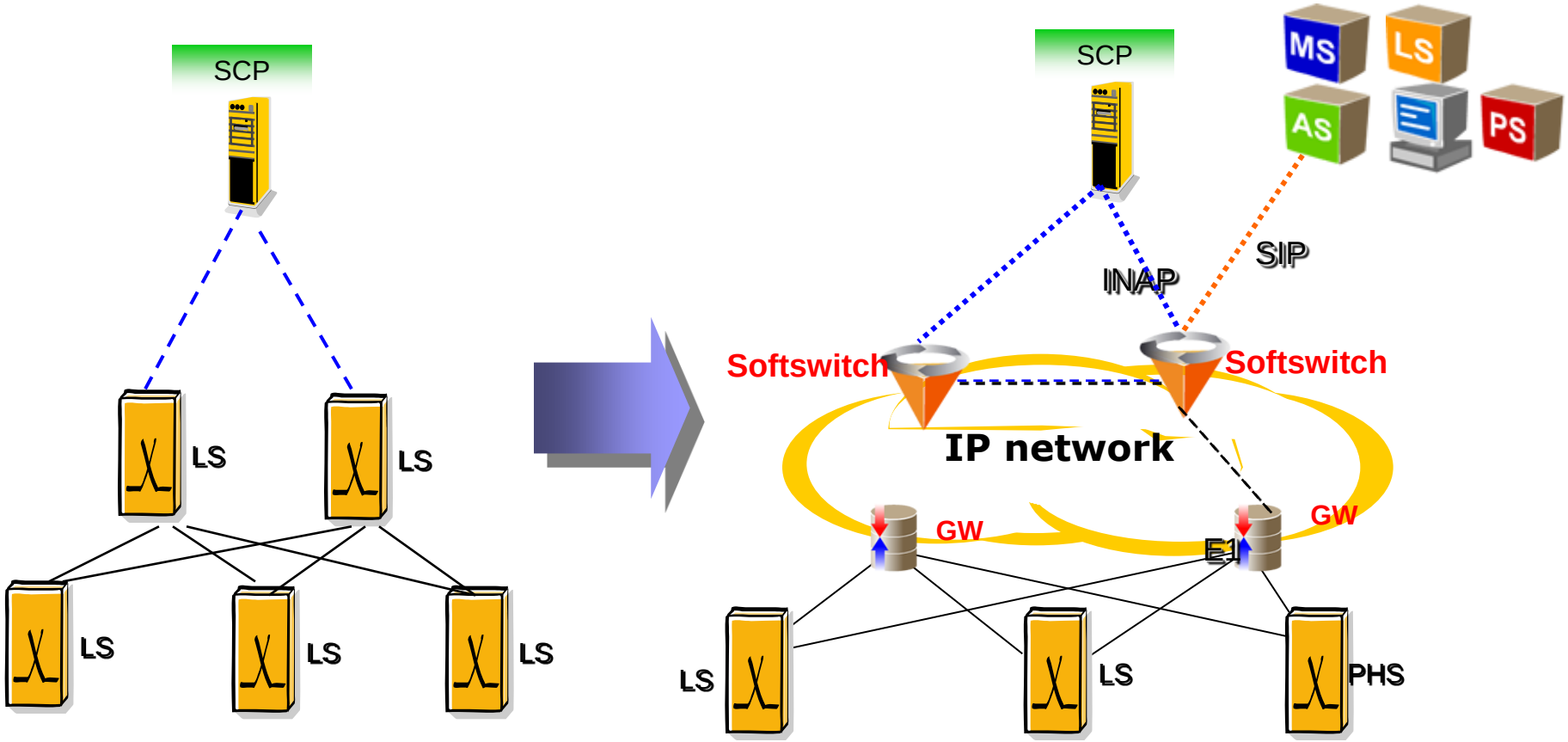
- Difficult to provide value-added services, such as billing in detail, NP, called trigger services, mixed number between PSTN and PHS, ring back tones, etc

Instance of network intelligentized

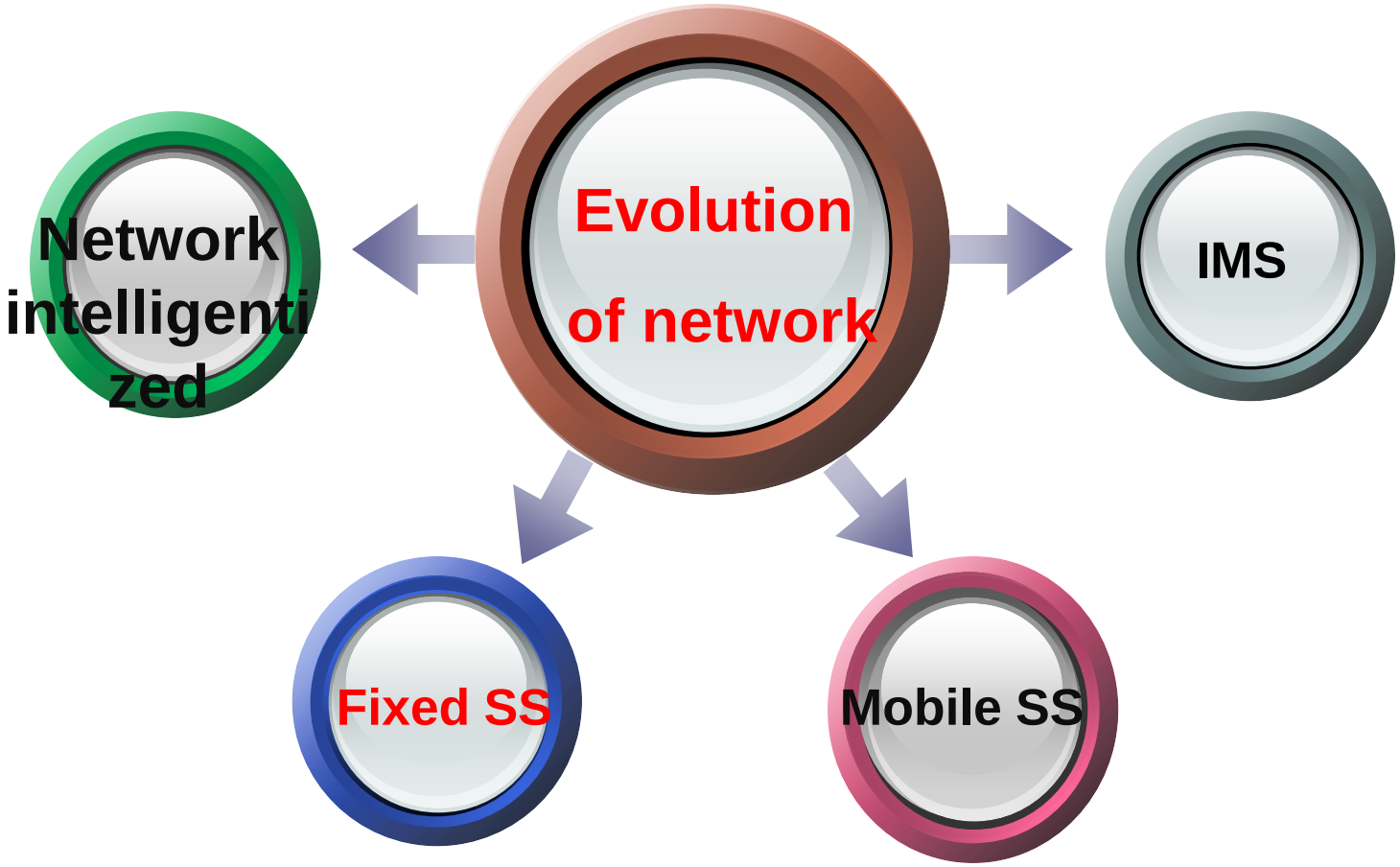


- LSs only provide access to fixed phone
- All the calls will be transferred to Tandem switch
- Tandem switches trigger database-look up based on the fixed phone users' subscription
- Database will analysis the service requests and deal with it, thus embed the intelligence of service process

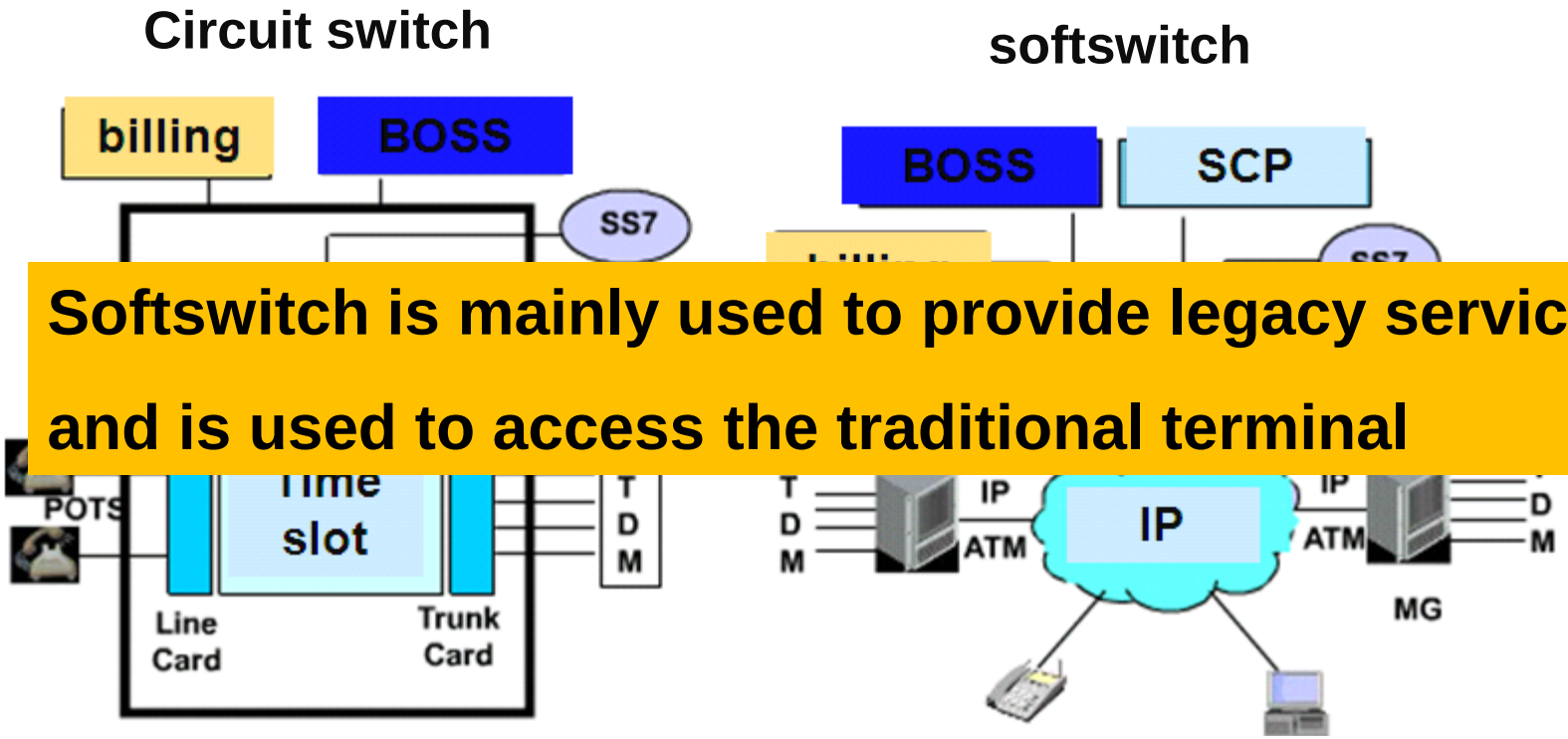
At this stage softswitch is introduced in Local network



Main points of network evolution



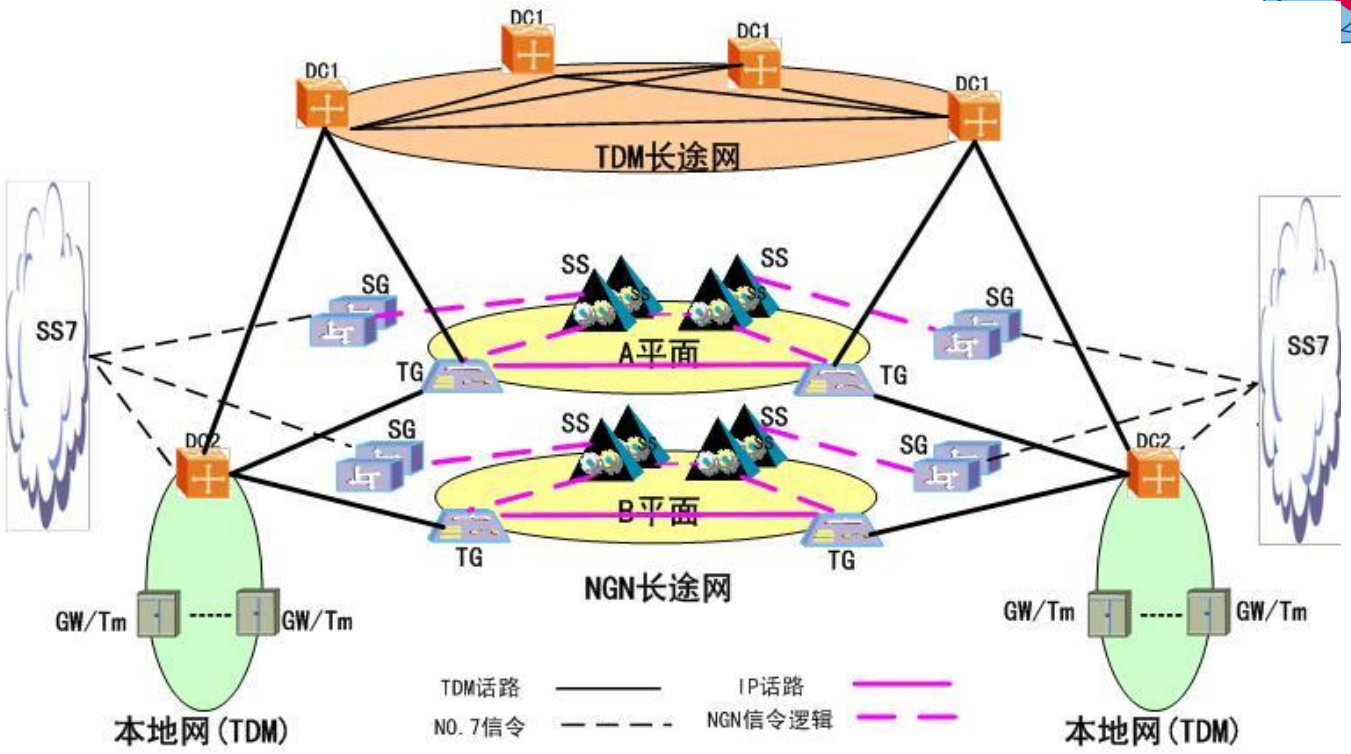
Concept of softswitch



Softswitch is mainly used to provide legacy services, and is used to access the traditional terminal

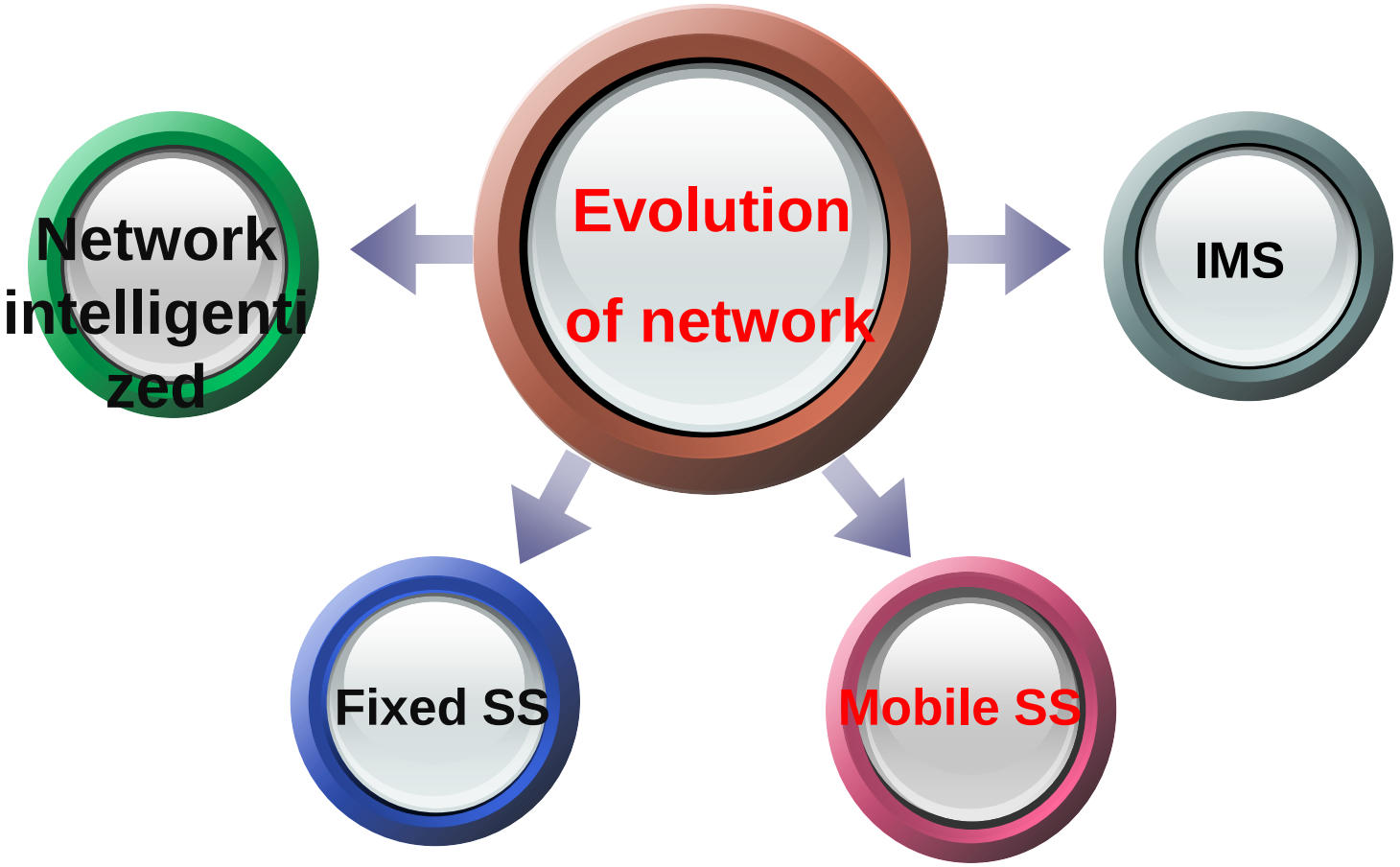
- Separation of call control and bearer
- SS provides call control related functions
- SS provides Basic services and supplement services

Softswitch @ long distance backbone network

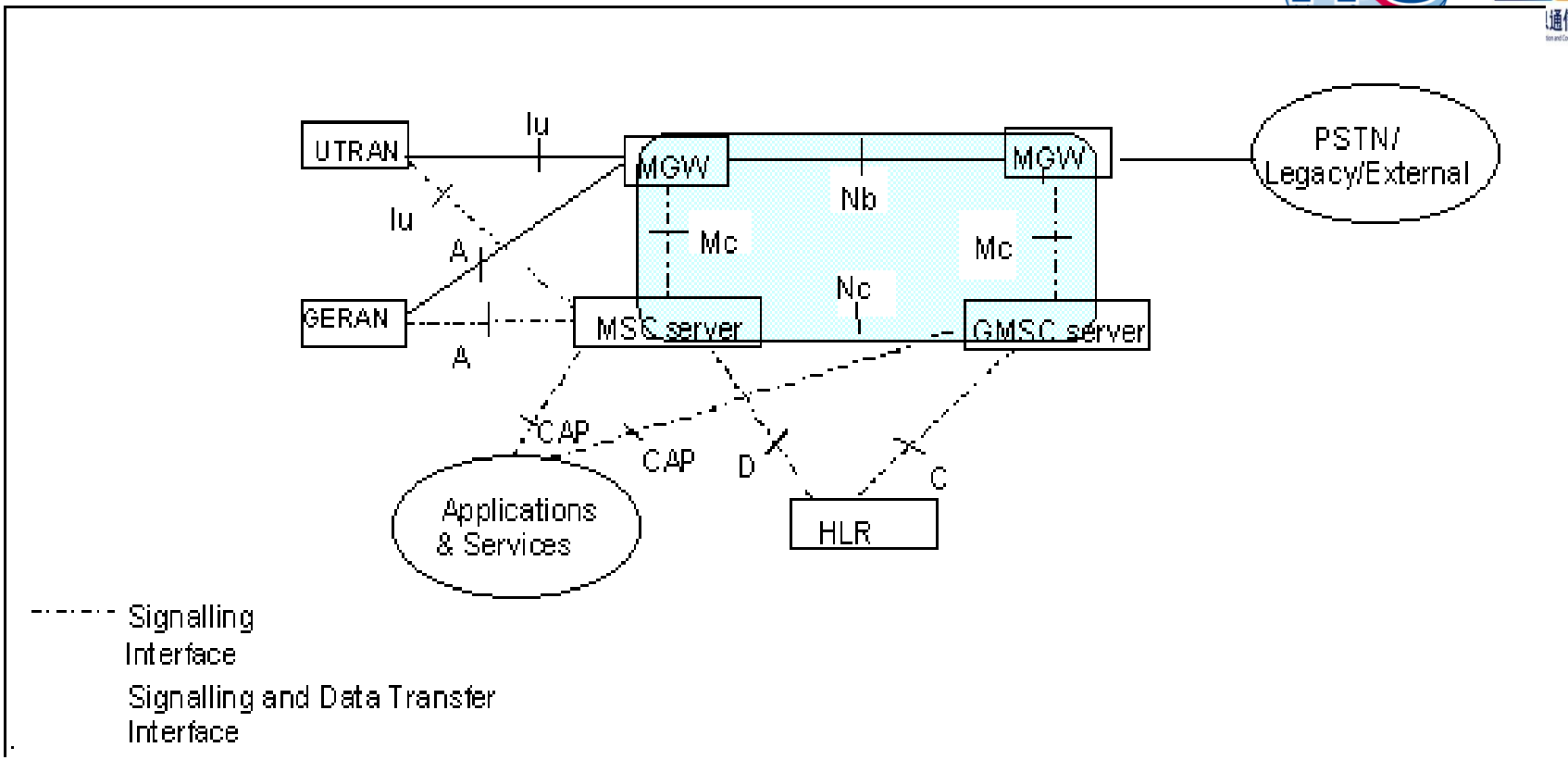


- The large-scale deployment of Softswitch is on the long-distance backbone network
- Then softswitch was rolled out in the national wide of china

Main points of network evolution

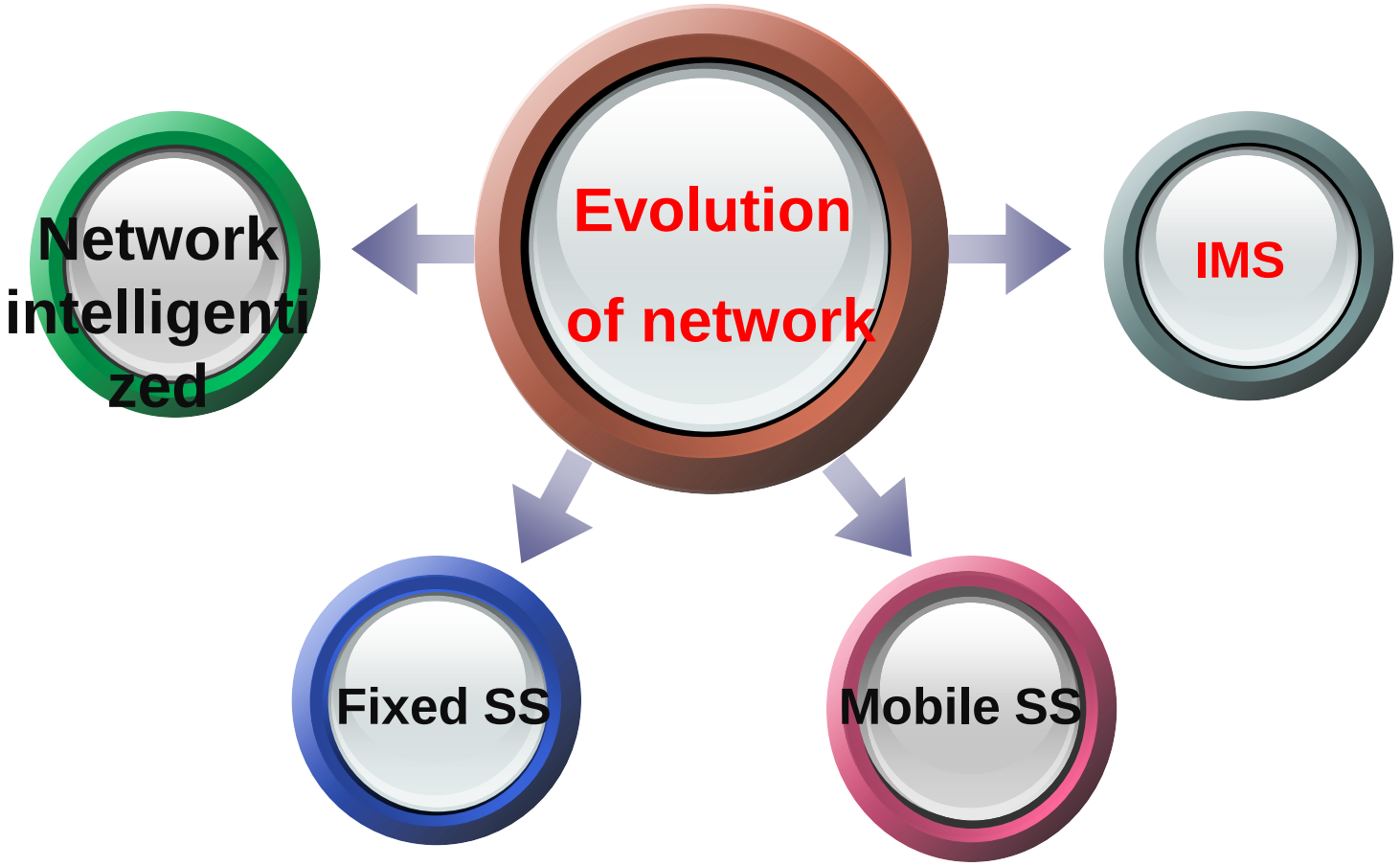


The difference of fixed SS and mobile SS



- Mobile softswitch is introduced in 3GPP R4
- In 2003.11, China mobile deployed mobile softswitch as long-distance backbone network

Main points of network evolution

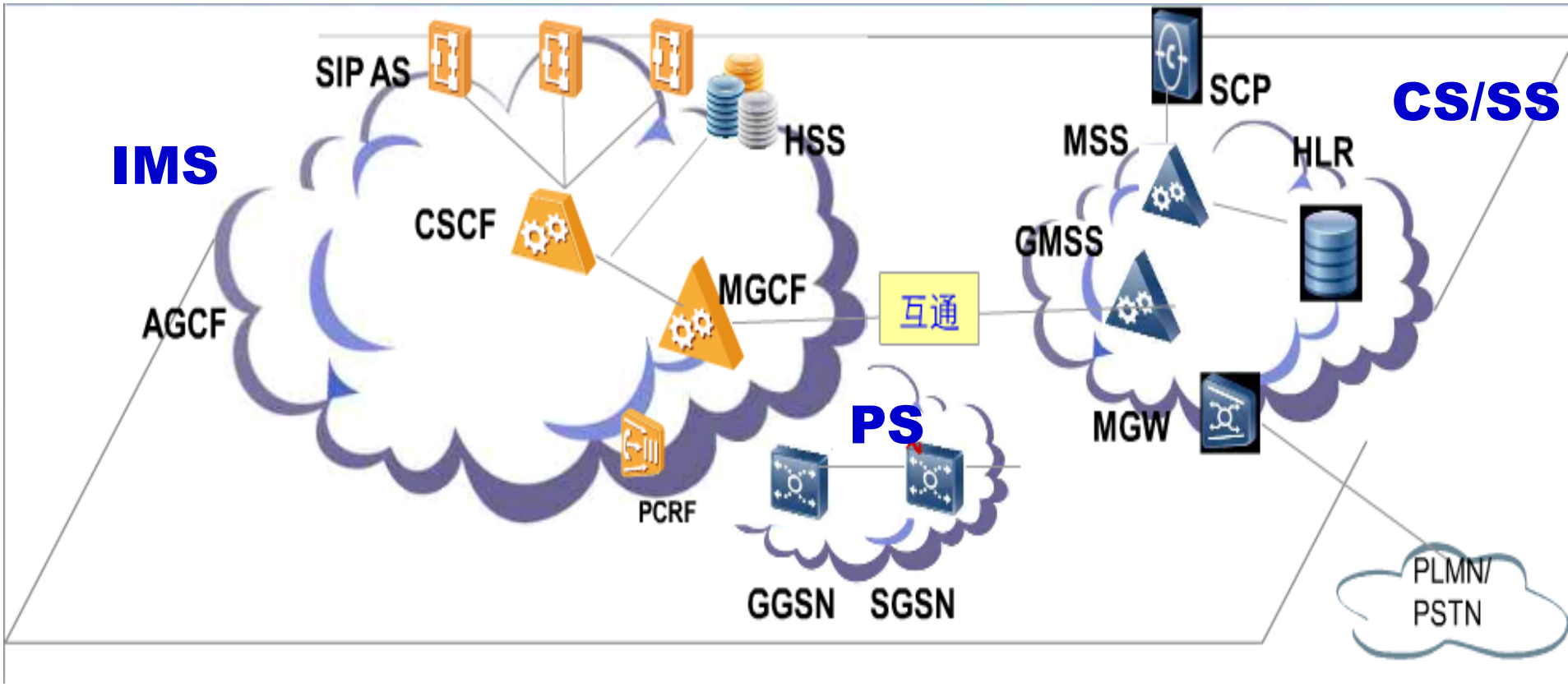


What is IMS?

IP Multimedia Subsystem(3GPP TS 23.002)

The IM subsystem comprised all CN elements for provision of IP multimedia services comprising audio, video, text, chat, etc. and a combination of them delivered over the PS domain.

The position of IMS in network

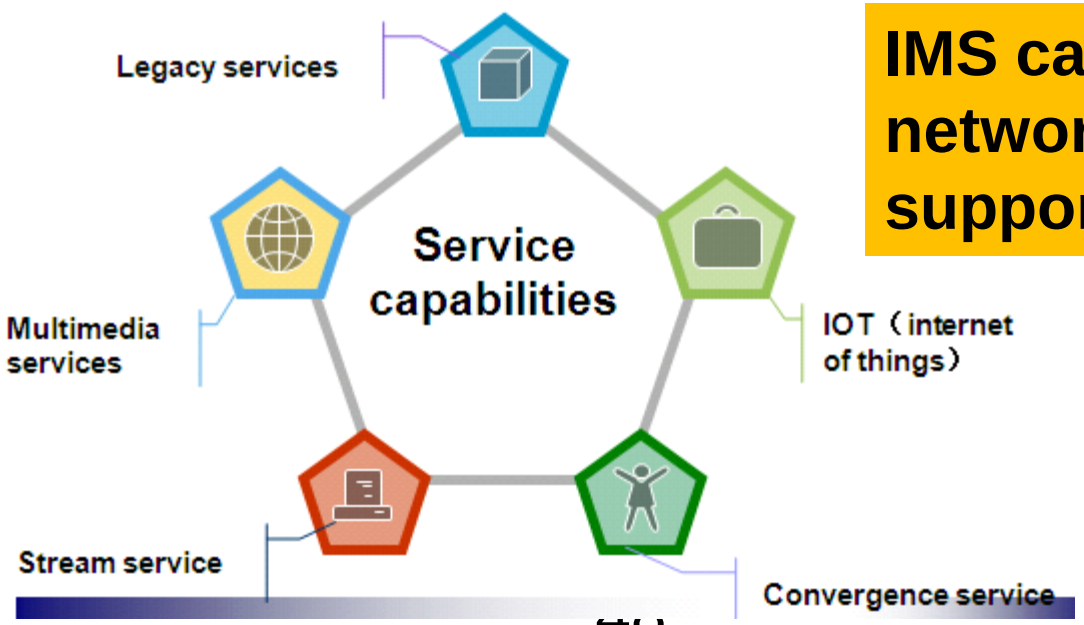


- IMS will use the PS(mobile IP bearer) as an access
- IMS will interwork with SS

Feature of IMS

- **Service control is independent from access**

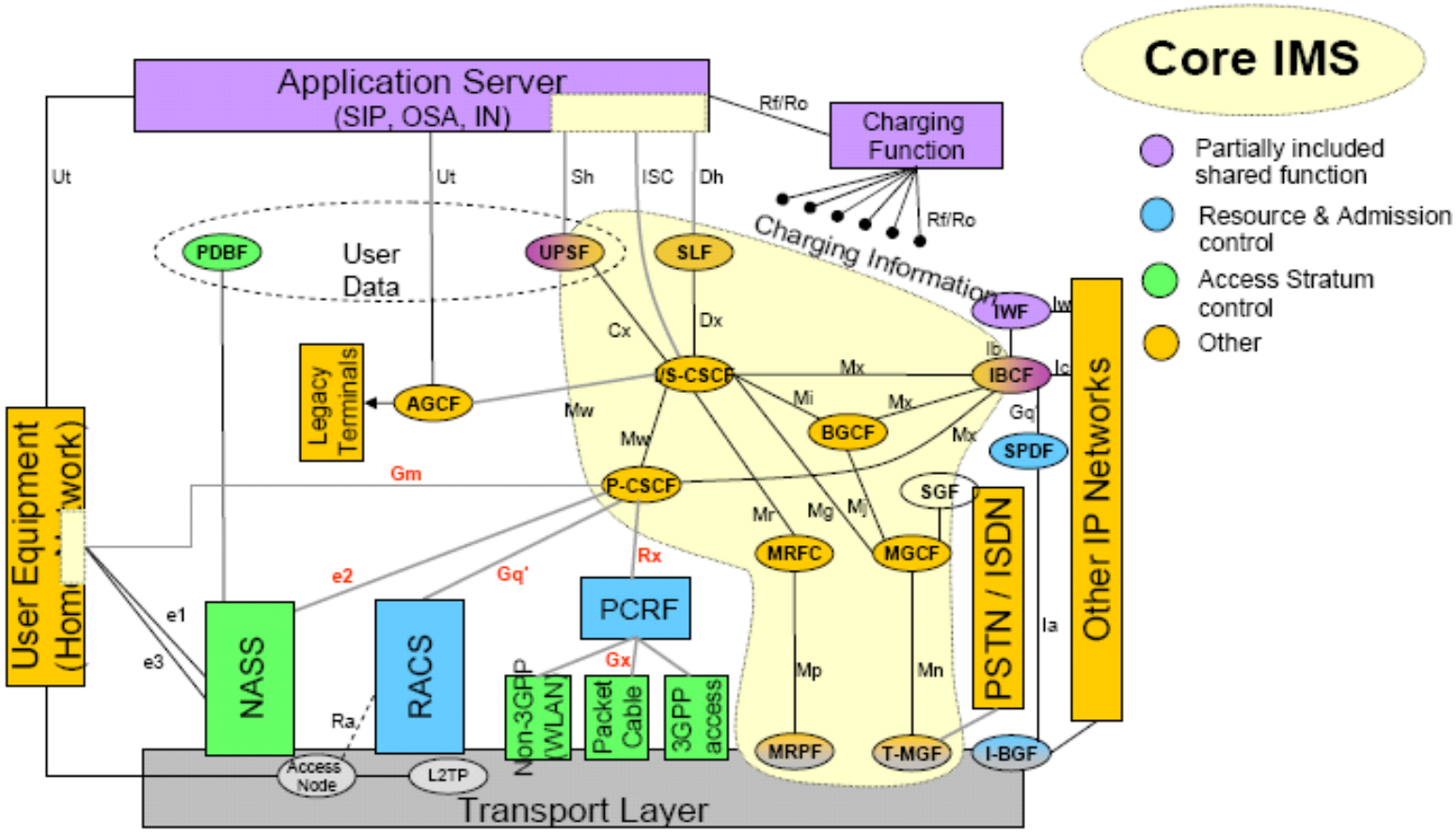
IMS enables the network service control layer independent from access network(either fixed or mobile access). AS the unified session&call control , IMS is able to provide the converged fixed and mobile service in a rapid way



IMS can be used as a network infrastructure to support SIP-based services

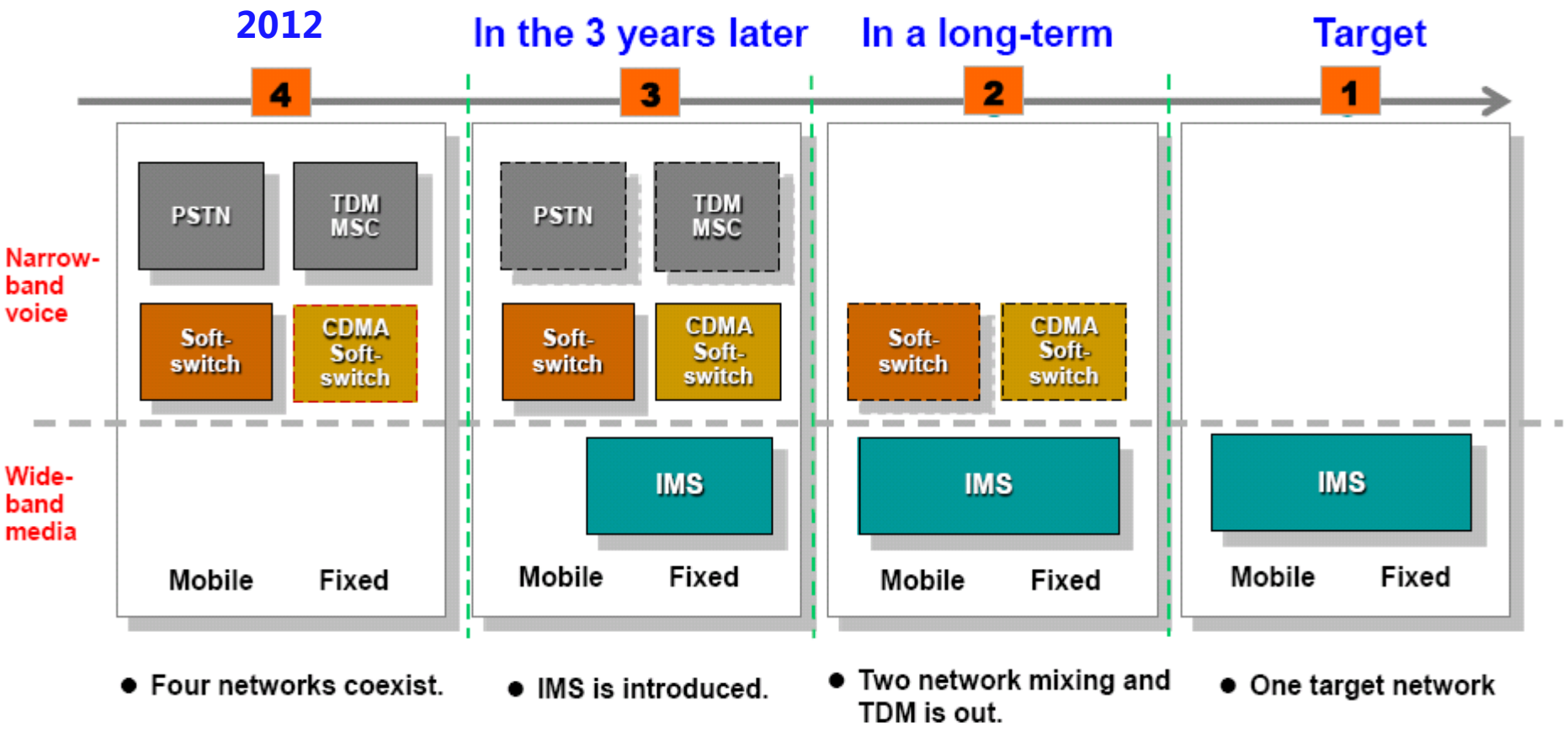
common IMS/unified IMS

Definition of Core IMS



Functional entities of Core IMS. External **interfaces of Core IMS functional entities are also part of the core IMS** (e.g. Interface towards application server and user equiment).

Evolution Roadmap of China Telecom



- China telecom plans that PSTN will be substituted gradually, then the subscribers will be transferred to soft-switching and IMS network.
- Currently, the performance of IMS services is under validating on site.

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  - ✓ Former Chairman of FG M2M of ITU-T
  - ✓ FormerTSR Coodinator of ITU-T IoT-GSI
  - ✓ Now Vice-chairman and WP1 chairman of ITU-T SG13

Thank you!