International Telecommunication Union

CNGI Project Introduction

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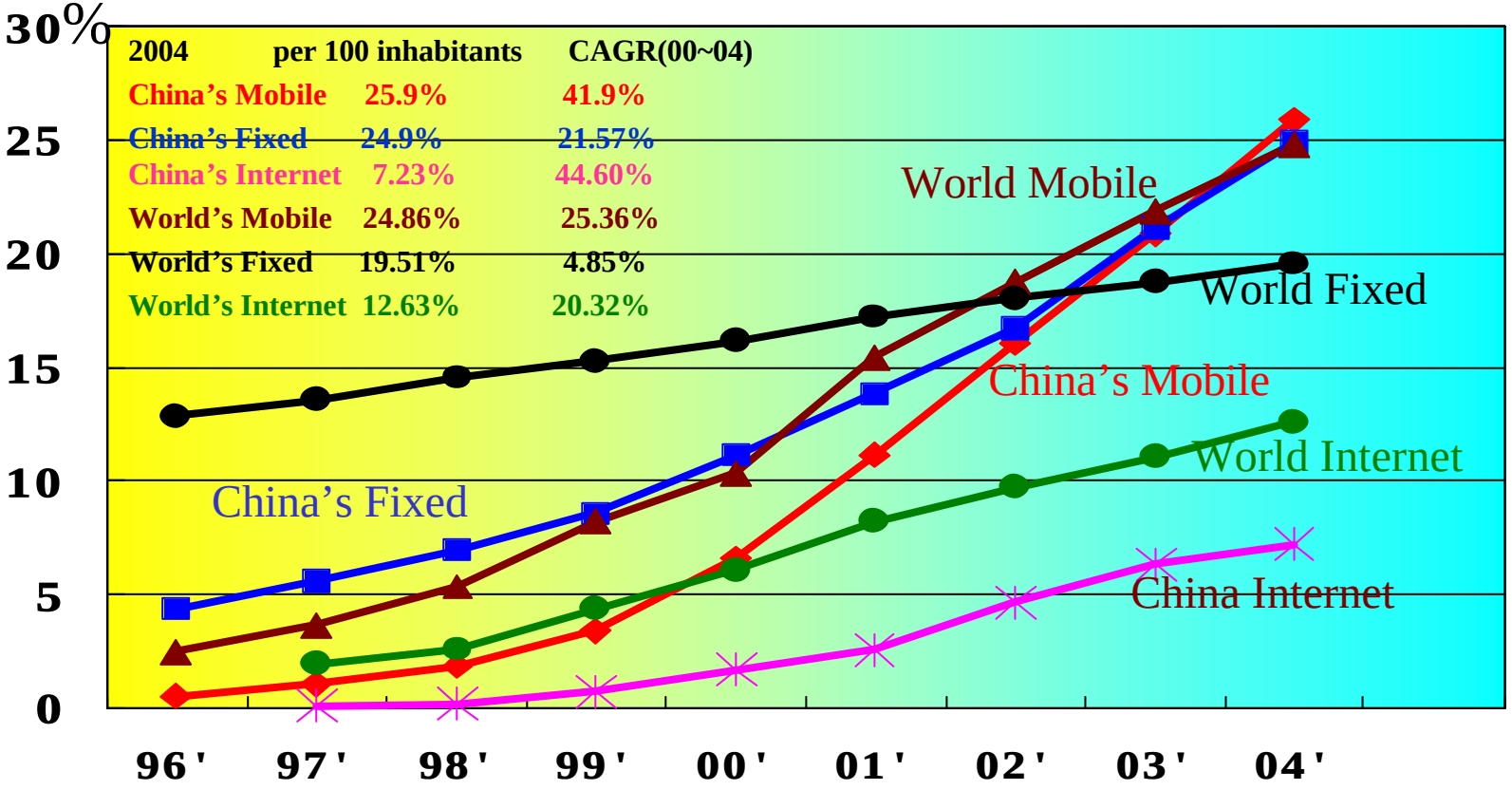
Experts Committee of China's Next Generation Internet Project

Survey on Internet Network of China

Workshop on IPv6
Geneva, 22-23 June 2005

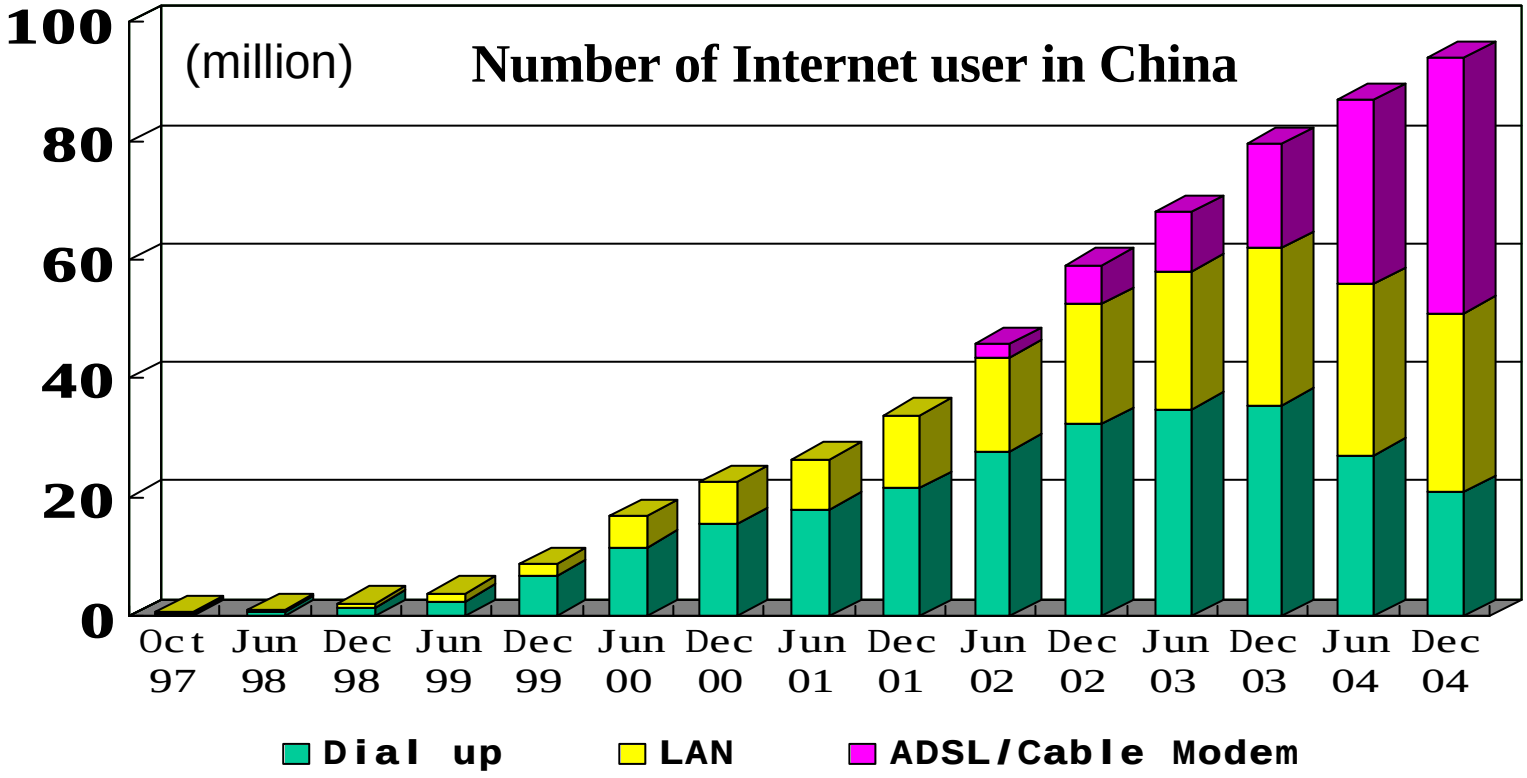
Telecom Penetration in the World and China

The penetration of fixed and mobile in China reach average level of the world and Internet is only half of the world, China's network will still has large development potential.

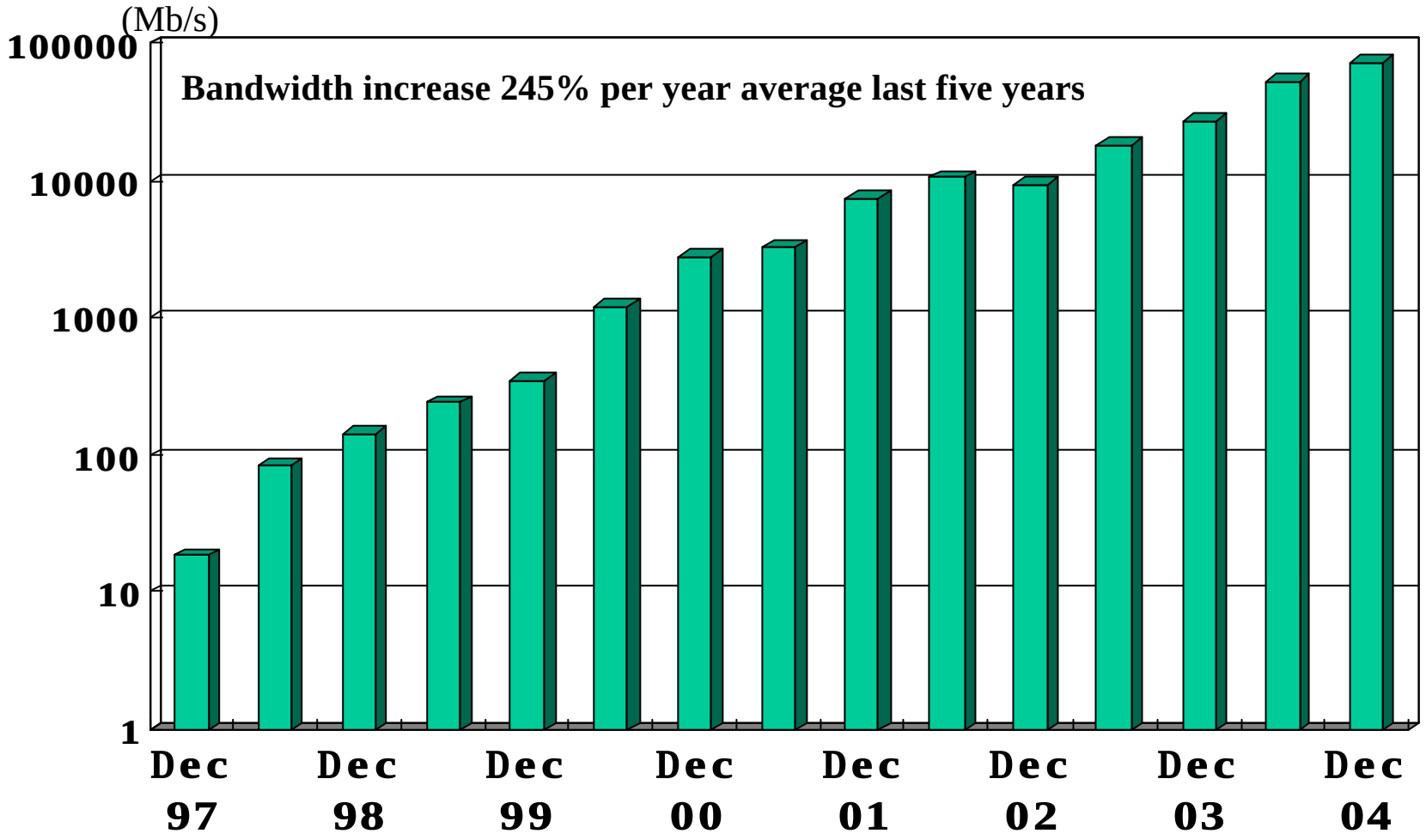


The Number of Broadband Access Will Overrun that of Narrow Band in China

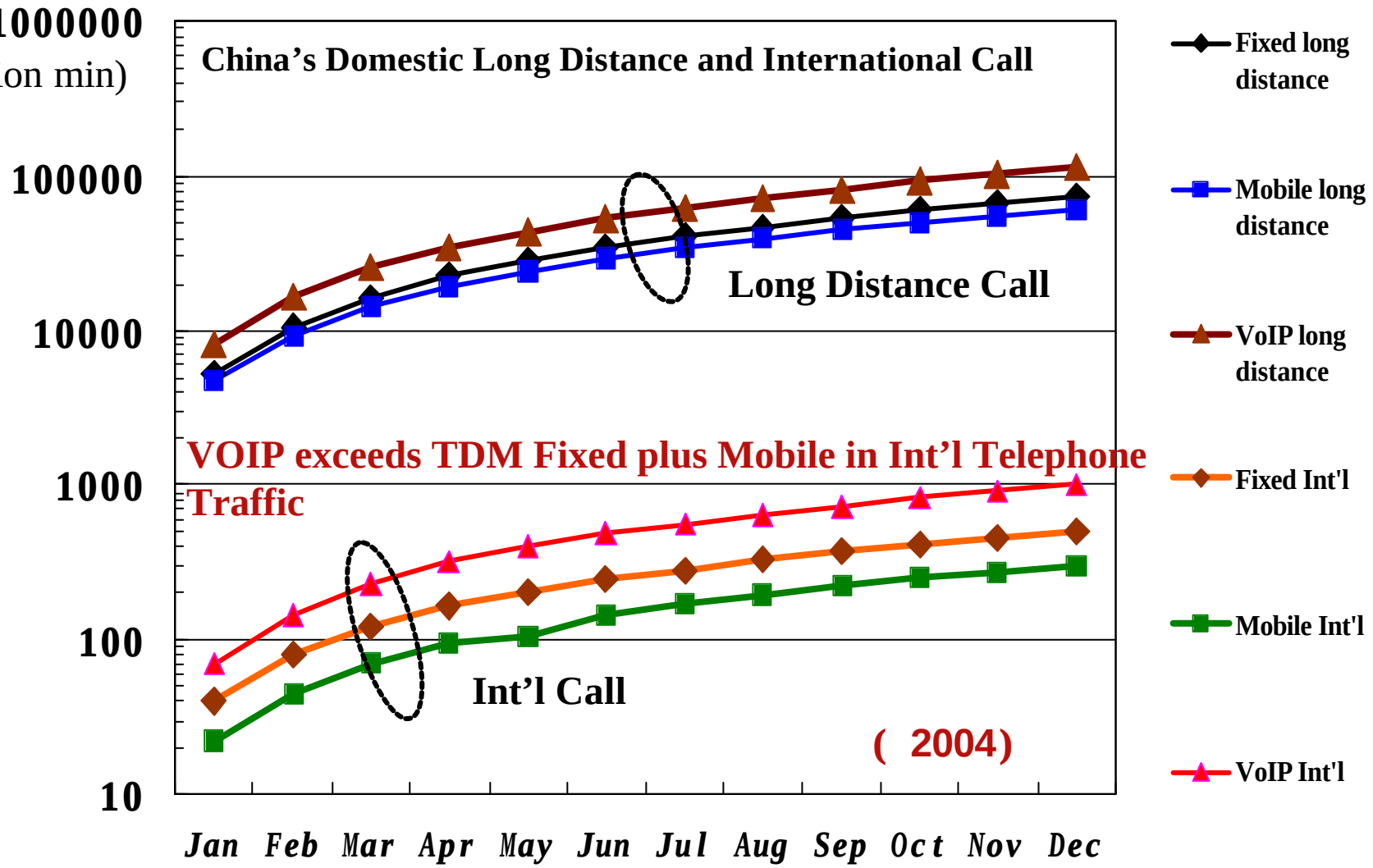
@ 45.5% of Internet users have been used ADSL, the proportion of broadband subscribers will exceeded 78% of total Internet users if the number of LAN users is included in count.



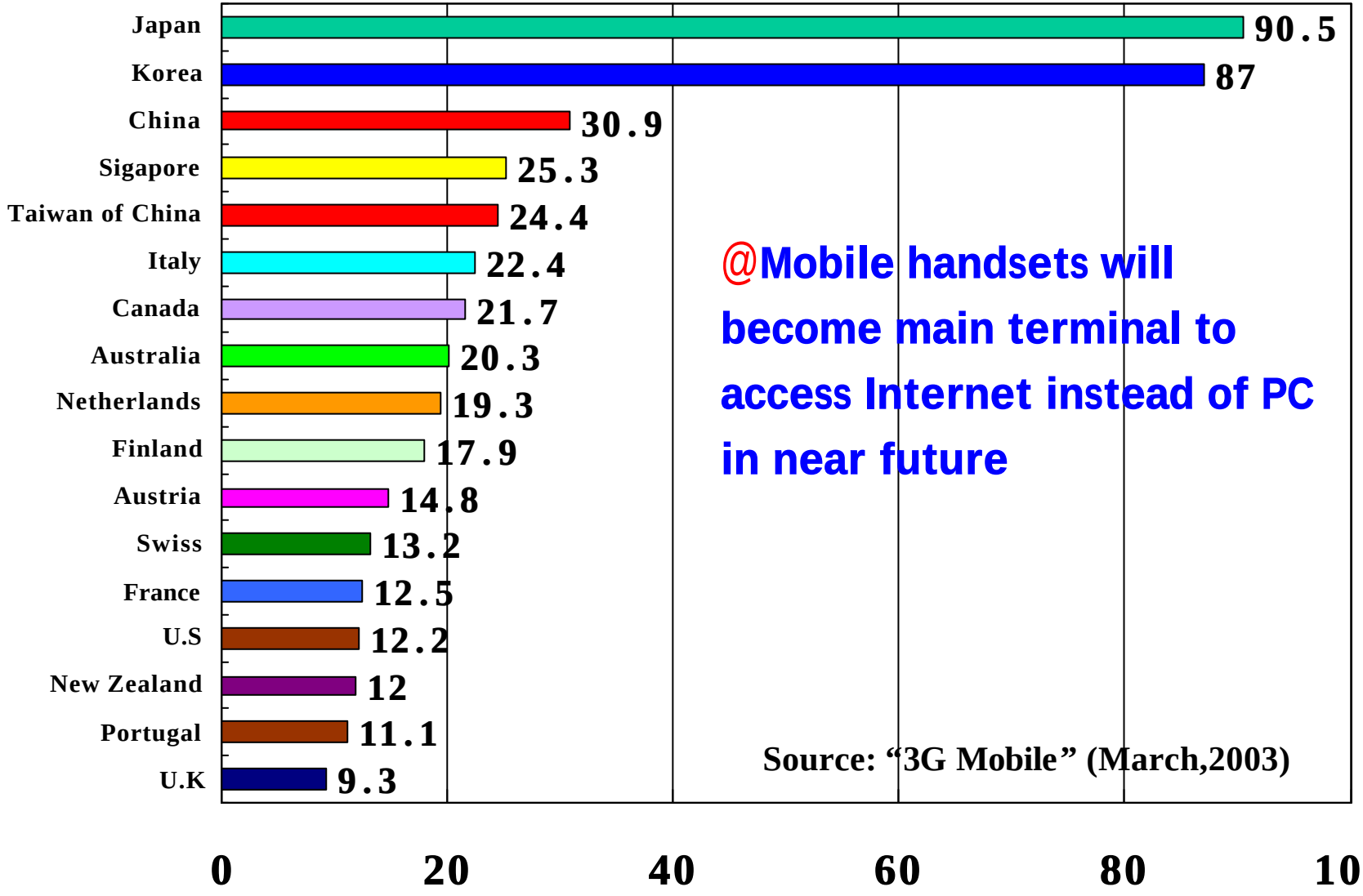
China's Internet
Int'l Trunk Bandwidth



Accumulative Call Duration of VOIP beyond TDM in China's Domestic Long Distance and Int'l Call



Percentage of Web-Ready Cell Phones



@Mobile handsets will become main terminal to access Internet instead of PC in near future

Source: "3G Mobile" (March,2003)

China may be one of the countries that firstly adopts IPv6

2004 Dec. 01 NIDA

Irrationally Allocated IPv4 Address Capacity

Rank	Country Name	N. of IPv4 address	Share
1	**The United States**	**1,281,905,102**	**68.81%**
2	**Japan**	**119,730,688**	**6.42%**
3	**Canada**	**64,327,168**	**3.45%**
4	**The Great Britain**	**63,288,536**	**3.39%**
5	**China**	**55,659,008**	**2.99%**
6	**Germany**	**46,597,840**	**2.50%**
7	**Korea**	**34,081,024**	**1.83%**
8	**France**	**32,565,504**	**1.75%**

Number of IPv4(IPv6) Address in China at Dec, 2004 (million) :

Main Land 59.94; Taiwan 14.87; Hong kong SAR 5.96; Marco SAR 0.127

(14/32+/48) (16/32+/48) (4/32+/64) (/32)

IPv4 address for China is so scarce, so it is indispensable to update to IPv6

Forecast for Telecom Penetration of China in 2020

@ Anticipative telecom penetration of China in 2020 ≈ that of developed countries in 2002. Network scale of China will be expanded to doubling and more.

@ Broadband access proportion will be quite high.

Penetration	2002							2004	2020 Forecast
	World	U.S	Japan	R.of Korea	Finland	H.K SAR of China	China	China	China
Fixed-line Phone (%)	18.04	114.7	58.58	48.86	54.73	56.74	16.8	24.8	~45
Mobile (%)	18.77	48.81	62.11	67.95	84.5	92.98	16.2	25.2	~60
Internet (%)	9.72	53.75	44.92	51.06	50.89	43.09	3.9	7.1	~40
Broadband (%)		6.5	6.1	21.3	5.3	9.4	0.3	1.8	~30

Network Development Entering New Stage

@ IP----dominant traffic

- Accumulative call duration of domestic long distance and Int'l communications: VOIP beyond TDM.
- Bandwidth of trunk occupied by IP traffic has been overtake traditional TDM fixed and mobile.

@ Broadband ----new focus for Competition on service

- China's cities/towns with population high density are in favor of broadband deployment. Internet users to use broadband access will more than that narrow band after a few years.

@ Mobile----entering 3G era

- Mobile frequency resource is scarcer in cities. Mobile operators in China will select 3G as start point of new competition.

NGI & NGN

Network Development Entering New Stage

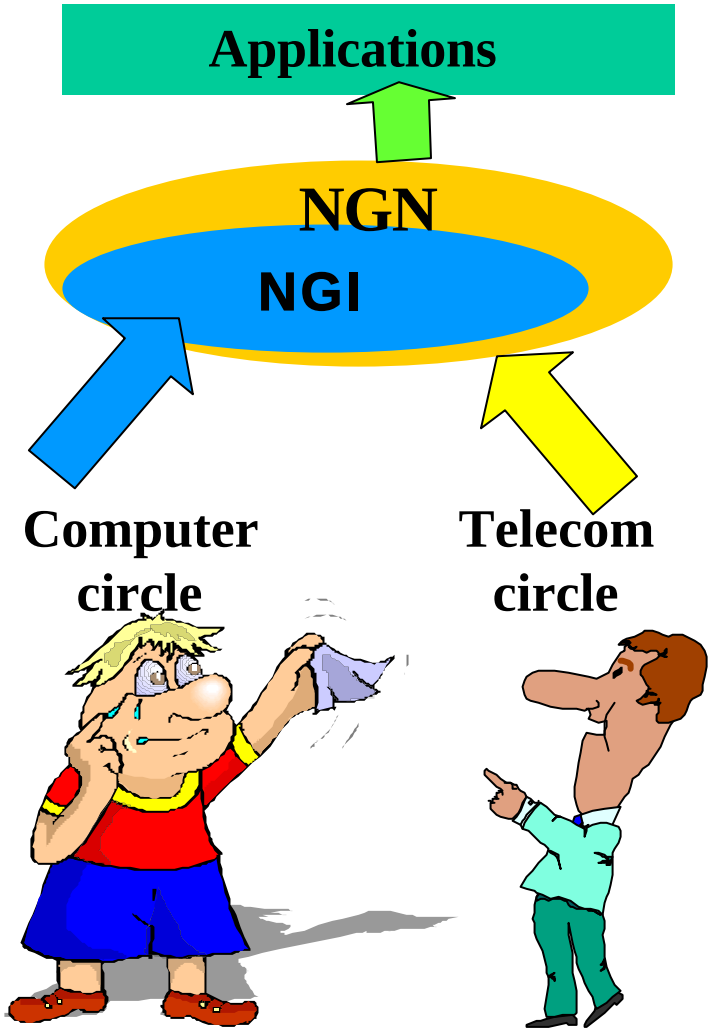
@ Network----changes to next generation

- Problems such as IP scalability, QOS and security are going more and more serious.
- Internet entering the domain to carry real time services has to confront challenge on QOS,while telecom network endures the pressure from broadband services.
- NGI and NGN---New generation network goals respectively for Internet and telecom network.
- The evolution vs. revolution on network development debates come in. Should the network be "connection-oriented" or "connectionless"?

NGN & NGI

@ NGI is following the thought-way of Internet. Commonly believe that IPv6 is one of the character of NGI, besides, several protocols need to be extended.

@ NGN adopts the Internet technique (IPv6 or IP friendly protocol) rather than its mechanism, It is not any longer that network is stupid and complex functions is pushed to terminal. Network must be active and smart in resource assignment and service delivery aspects.



NGN & NGI

NGI	NGN
packet based	Packet based, IPv6/v4 & possible other protocol
connectionless	connectionless, but it may needs to have something of the "connection-oriented" flavor.
integrated transport and control plans	separated transport and control plans, to enhanced the control plan function.
depend on terminal intelligentize, to emphasize decentralization and autonomy	to pay attention to combining network centralized management and distribution intelligence.
	to support generalized mobility which will allow consistent and ubiquitous provision of services to users.
best effort	administrable QOS
security resolve scenario based terminal	security resolve scenario based network.

NGN & NGI

@ NGN and NGI co-develop in the competition between them by learning technique each other

@ Although NGI is not the unique solution to NGN, but NGI can see as a main component of NGN.

@ It is relatively easy to develop NGN with NGI as start point

NGN and NGI---

Competitive or Complanmentary ?

Field Trail of NGI and NGN have been Conducted in China

@ NGN trial

- Telecom Operators soft-switch trail (China Telecom,China Netcom,China Unicom,China Mobile,China Railcom and Chinasat)

@ NGI and IPv6 test-beds

- IPv6 field trail of CERNET
- China-Japan IPv6 network test-bed
- China-U.S-Russia Science trail network
- IPv6 MAN demonstration network of Chongqing Information Port
- Hunan province IPv6 test-bed of China Telecom group
- China's Next Generation Internet demonstration project (CNGI)

Constructing
China's Future Network Platform

CNGI---China's Next Generation Internet Network Project

@ The CNGI project as one of hi-tech industrialization R&D Program have been supported by 8 Ministries:

- National Development & Reform Commission of China (NDRC)
- Ministry of Science and Technology of China (MOST)
- Ministry of Education of China (MOE)
- Ministry of Information Industry of China (MII)
- State Council Informatization Office of China (SCIO)
- Chinese Academy of Science (CAS)
- Chinese Academy of Engineering (CAE)
- National Natural Science Foundation of China (NSF)

CNGI Focal Points in the Near Future

- @ Construction of demonstration network platform
- @ Developing key technologies trial and importance applications demonstration.
  - **Study on protocol, standardization, transmission and multicast tech.**
  - **Realizing mobile access and roaming service**
  - **Build up network architecture**
  - **Study billing model**
  - **Test middleware and application underlay technologies.**
  - **Demonstrate video, mobile and grid applications**
  - **Study on convergence of voice, data and video services**
- @ Developing NGI equipments and software, promoting extend applications
- @ Participate activity to drafting NGI standard and push international cooperation.

Traits of CNGI

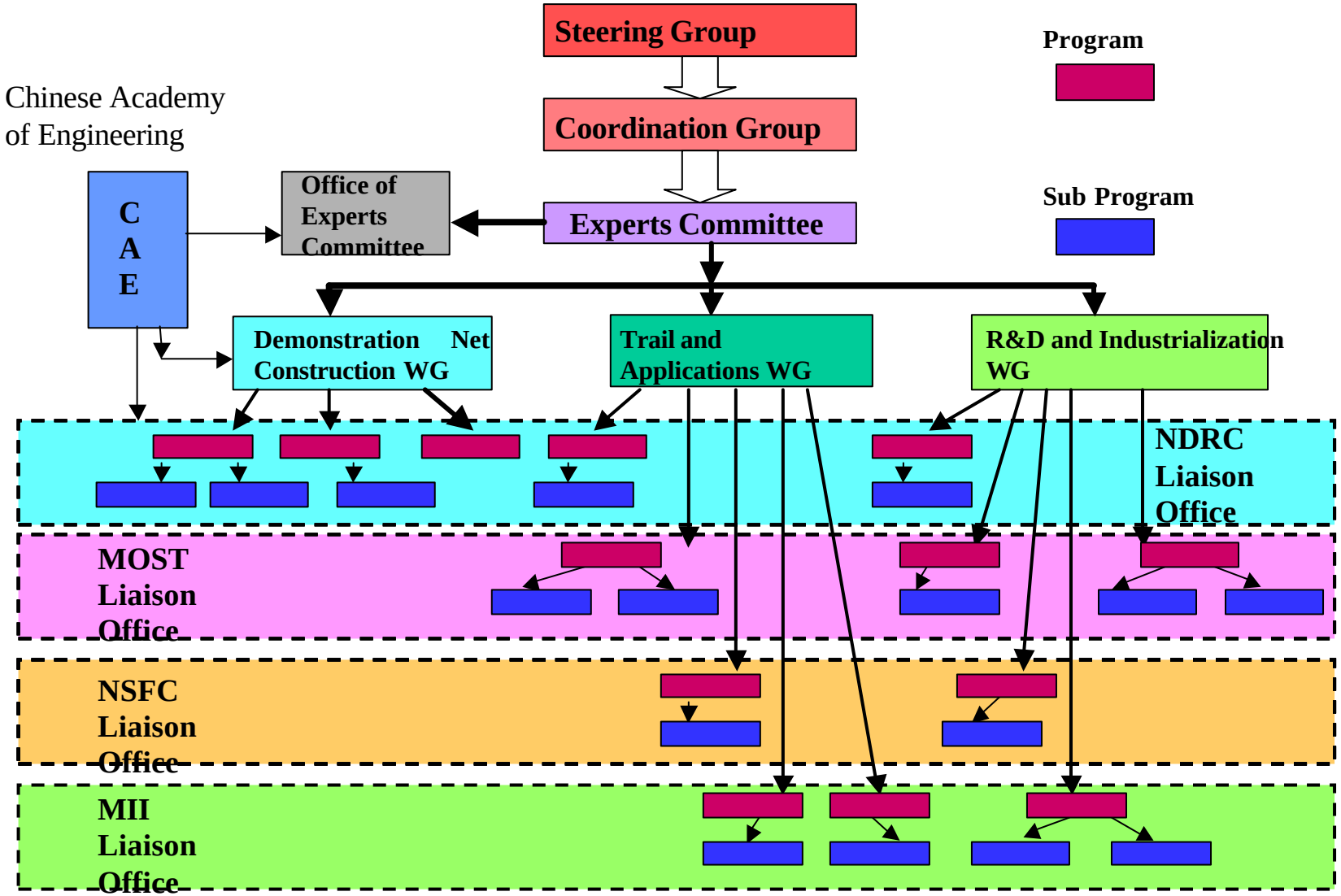
@ CNGI attaches importance to QOS architecture and technologies.CNGI takes care of wireless and mobile service and pay attention on administrable network and controllable service with the object of commercial application.

@ Research and trial coordinating NGI and NGN technology development direction was put forward and encouraged by CNGI project.

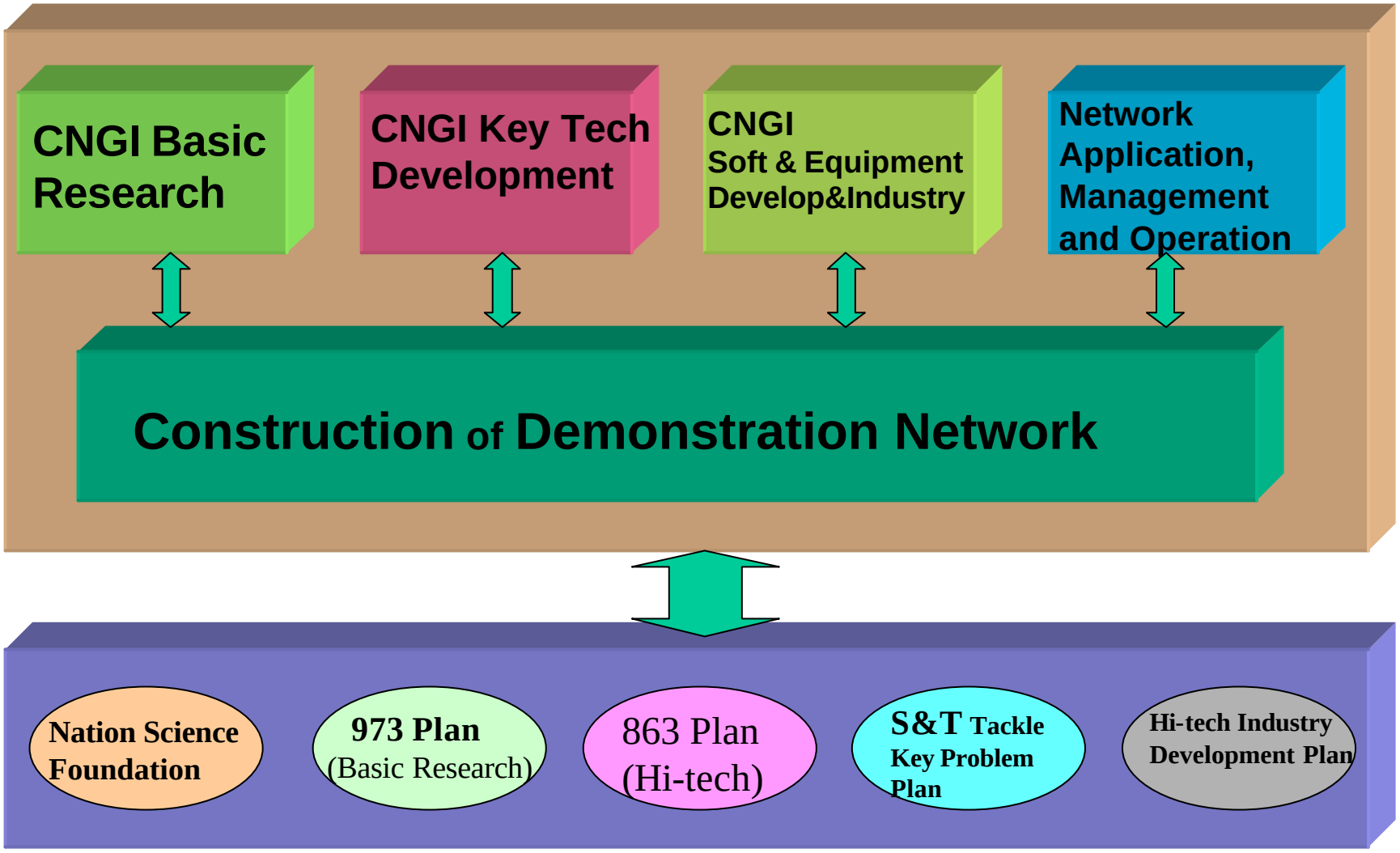
@ CNGI develops network hardware,software and application to possibly use to NGN.

@ CNGI explores the road to converge NGI and NGN.

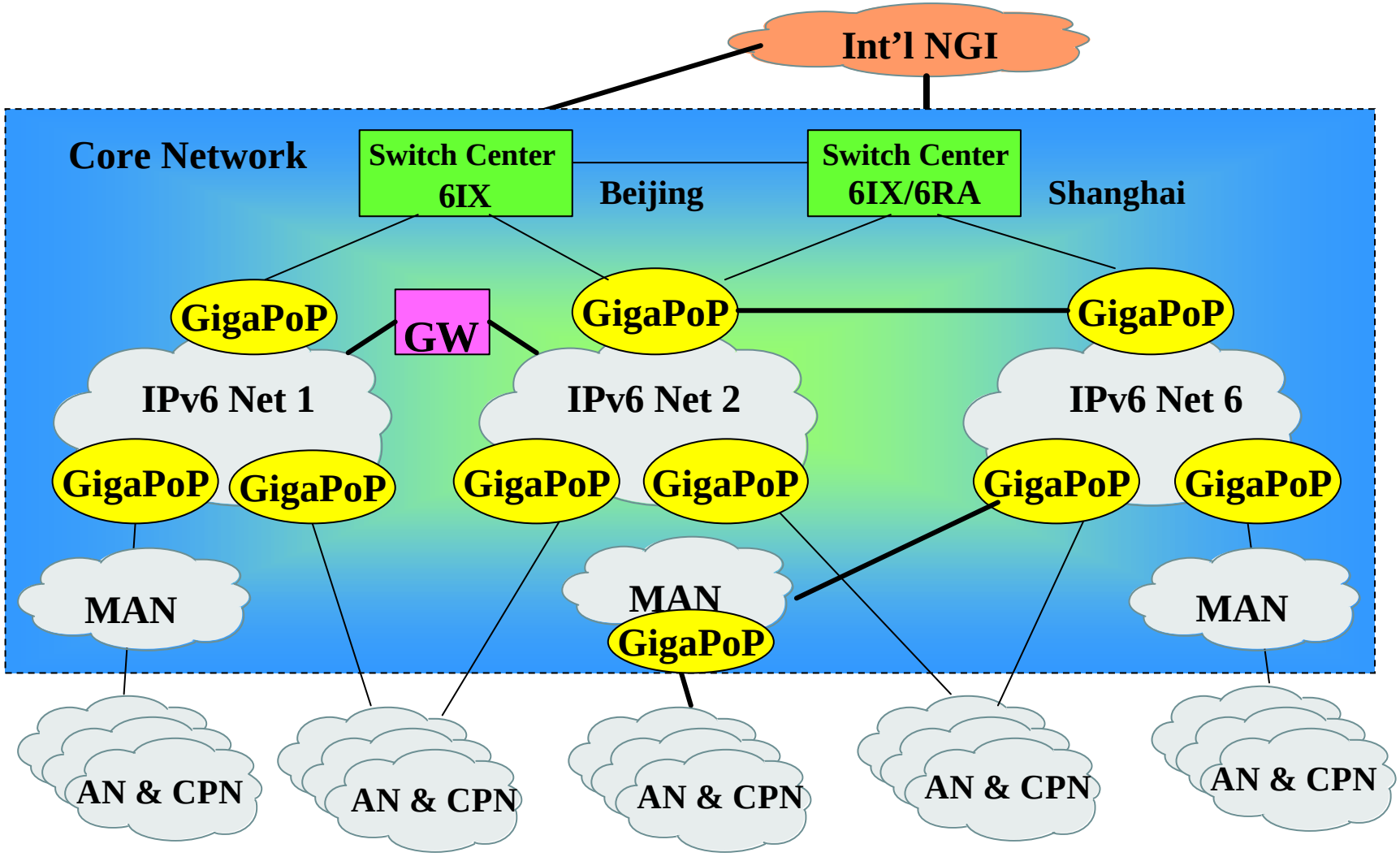
CNGI Project Organization



R&D sub-Projects in CNGI



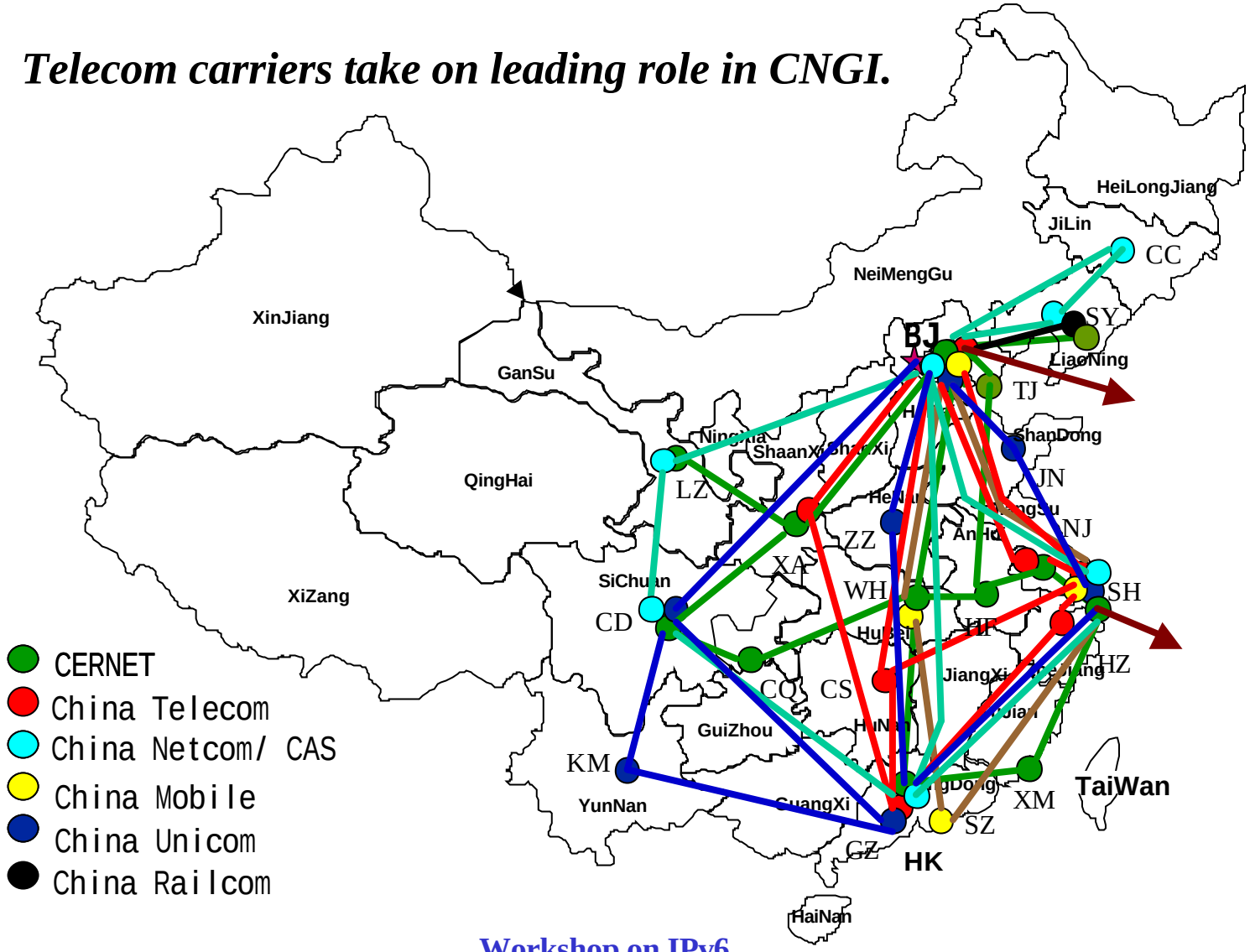
CNGI Demonstration Network



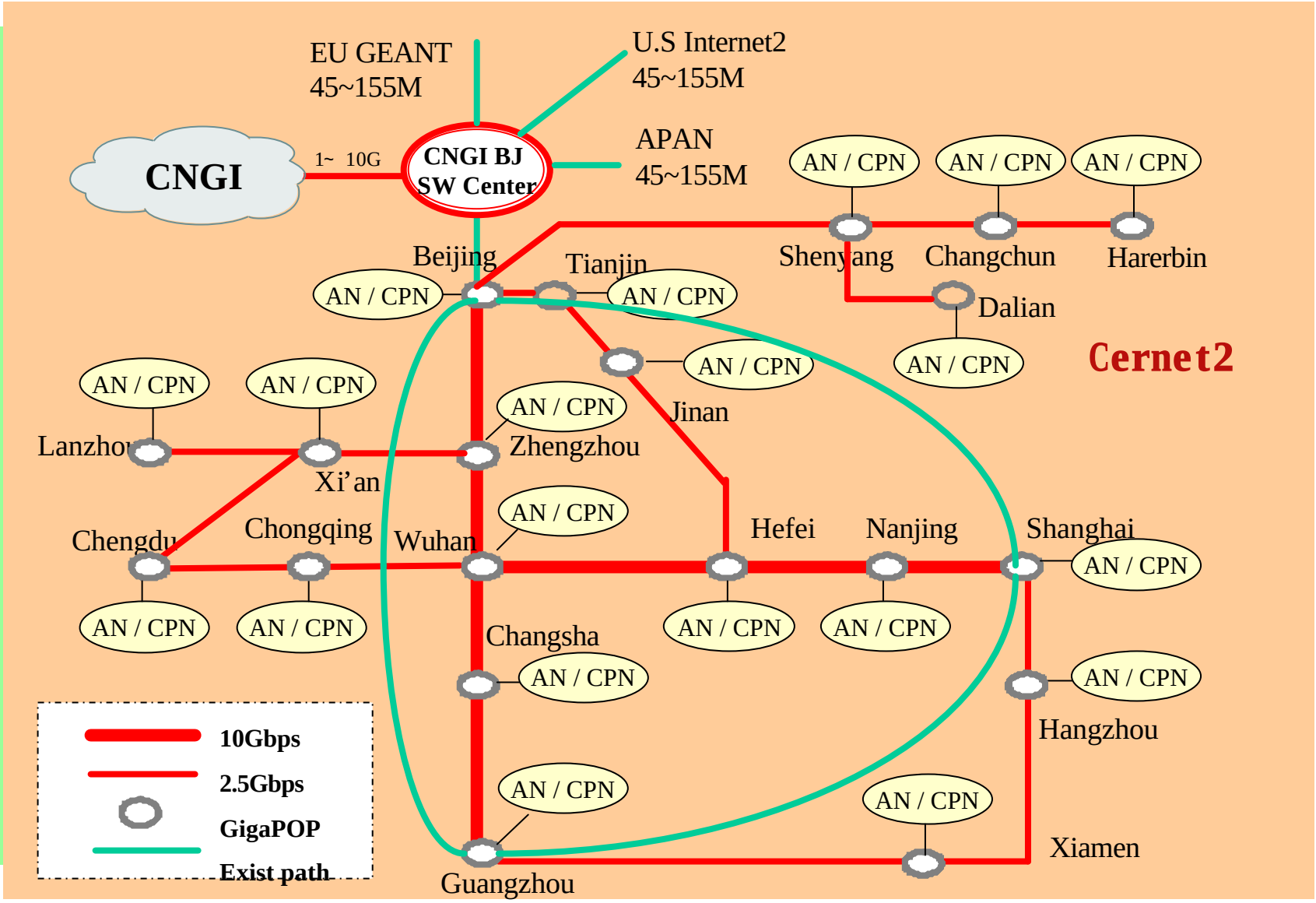
to connect universities,research institutes and R&D centers of large enterprise

CNGI Demonstration Network

Telecom carriers take on leading role in CNGI.



CNGI Core Network



Main R&D program for CNGI

@ IPv6 system and network

- Network intelligent storage system oriented NGI
- CNGI network supervisory system
- Network security architecture IPv6 based
- Wireless sensor network and its node to support IPv6
- Home network: chip, GW and applications demonstration
- P2P elasticity overlay network and its intelligent storage node
- P2P content access system IPv6 based
- University service platform
- Network measuring / analyzing platform and tools oriented NGI

Main R&D program for CNGI

@ CNGI service application demonstration system

- Video conference
- Multimedia video on demand system
- Common distance learning communication platform system
- Multimedia session service system to support mobile and roaming
- Supervisory and management system for ITS
- IPTV service system and key equipment development
- Large scale high performance grid application IPv6 based
- High performance video transmission and share VR based IPv6
- Research and test on large scale wireless and mobile roaming

Main R&D program for CNGI

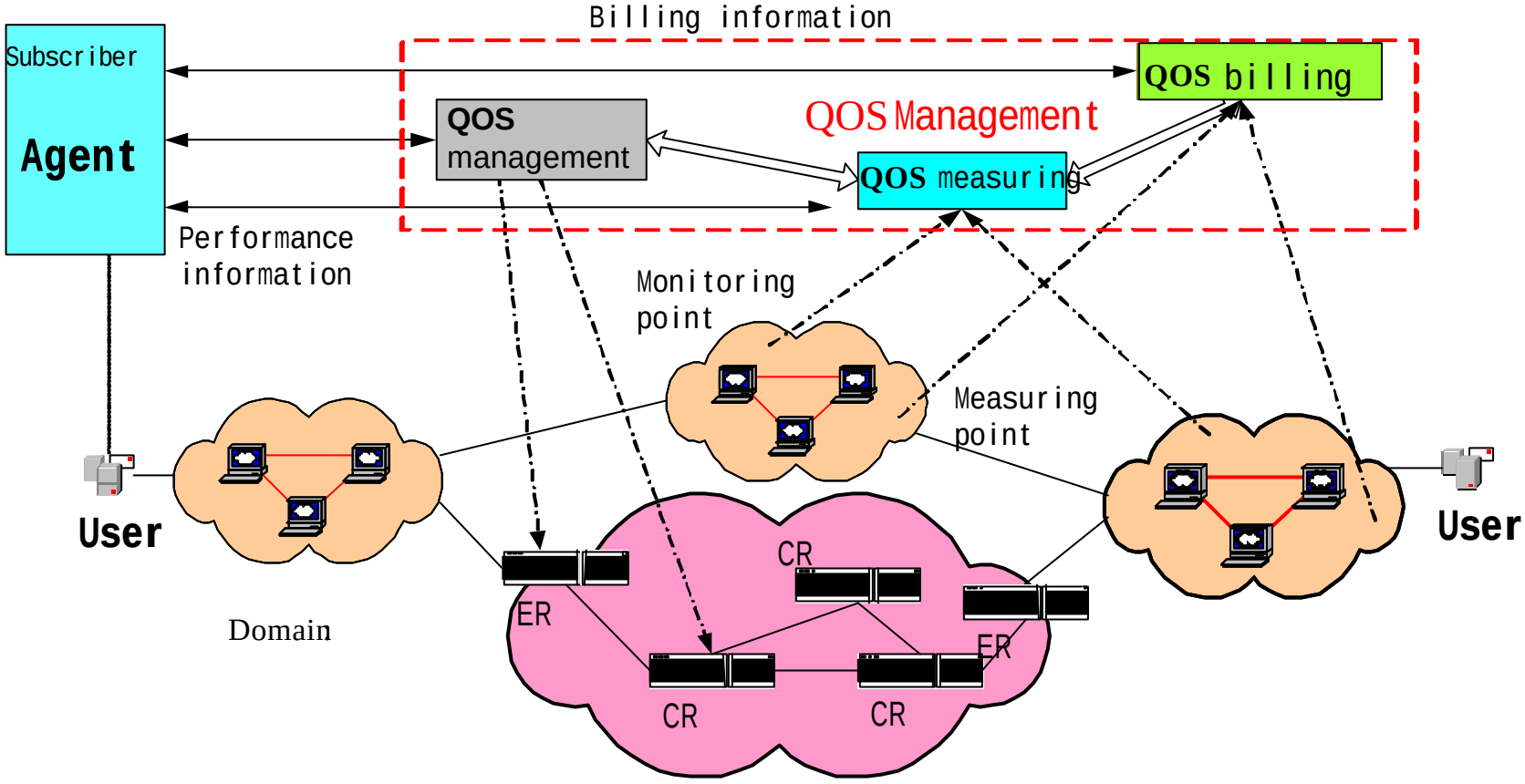
@ Key technologies study

- CNGI QOS technology
- Study and experiment on routing and multicast technology for large scale route

@ CNGI standard and specification study

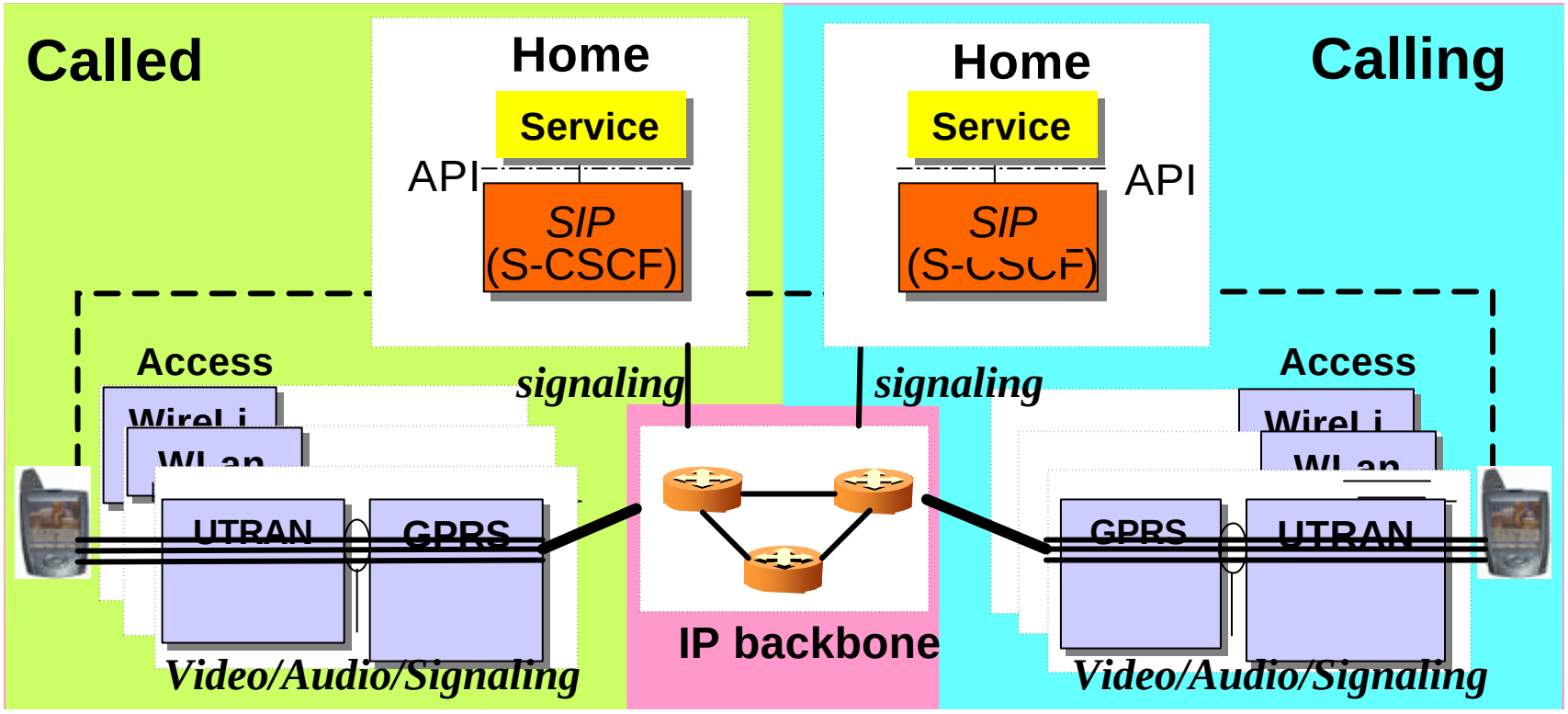
- Study on CNGI general technology requirements and architecture
- Study on IPv6 address plan
- Study on technology specification for application demonstration systems

QOS scheme


Billing information
Subscriber
Agent
QOS billing
QOS management
QOS Management
QOS measuring
Performance information
Monitoring point
Measuring point
User
User
Domain
ER
CR
CR
CR
ER

Universal service platform

- Universal service platform implements that service-related functions are independent from underlying transport technologies.
- To utilize SIP capability to support addressing , AAA and encryption key exchange functions and provide billing information



Summarize

- China's economy development provide prosperous market for telecom service.
- Internet traffic has been become dominant factor for network resource in China.
- IPv4 address for China is so scarce that it is indispensable to update to IPv6.
- The construction of broadband network and NGI / NGN trial in China is in process of underway.
- CNGI project----constructing China's future network platform

CNGI

THANK YOU

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