The Internet in China

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Internet Society of China

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- CNGI – China Next Generation Internet
- Why China is enthusiastic in planning CNGI?
- What is the most important for China as next step?

CNGI - 1

- Initiative was proposed to Chinese government by S,T&E communities from 2002
- Approved and adopted as national project by Chinese State Department in 2003
- National Reform and Development Committee plays the leading role; other participants: MOST, CAE, CAS，MOE， MII，SCIO (State Council Informatization Office), NSFC，
- Planned investment by central government:170M USD

  -75M USD for backbone

  -95M USD for technology dev. and applications

  -Industrial sector investment as additional resource

CNGI - 2

- CNGI Demonstration Backbone
  - 6 nation wide core networks and 30 GigaPOPs composing the CNGI demonstration backbone covering at least 39 major cities of the country
  - At least 2 switching centers (IX) in Beijing and Shanghai for the interconnection of the 6 core networks
  - Over 300 campus networks
  - International links

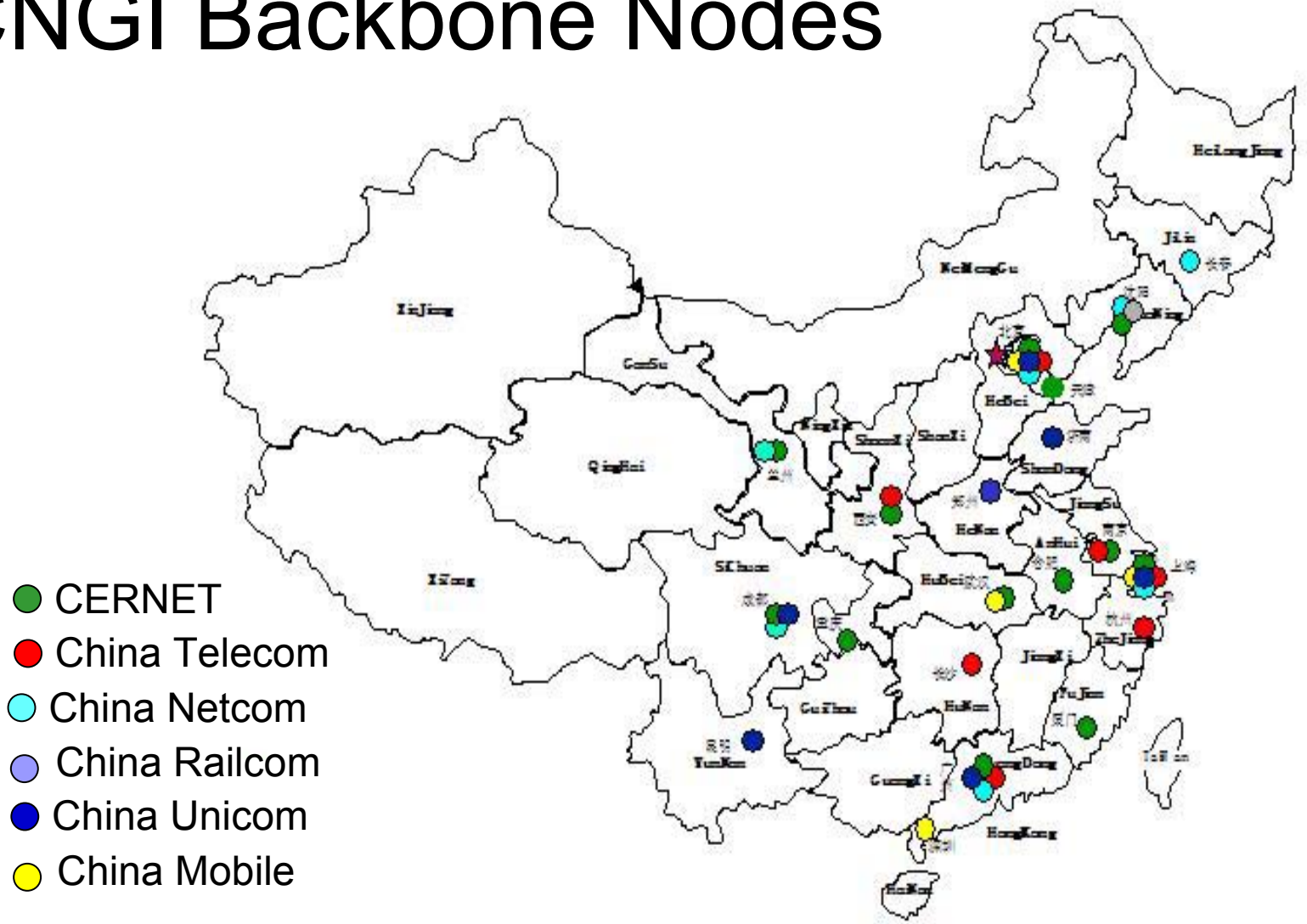
CNGI-3

- Network technology and applications
  - Development and experiment on next generation network technology
  - Middleware
  - Applications
- Delivery to information industry
  - Major software and hardware industrialization
  - Application

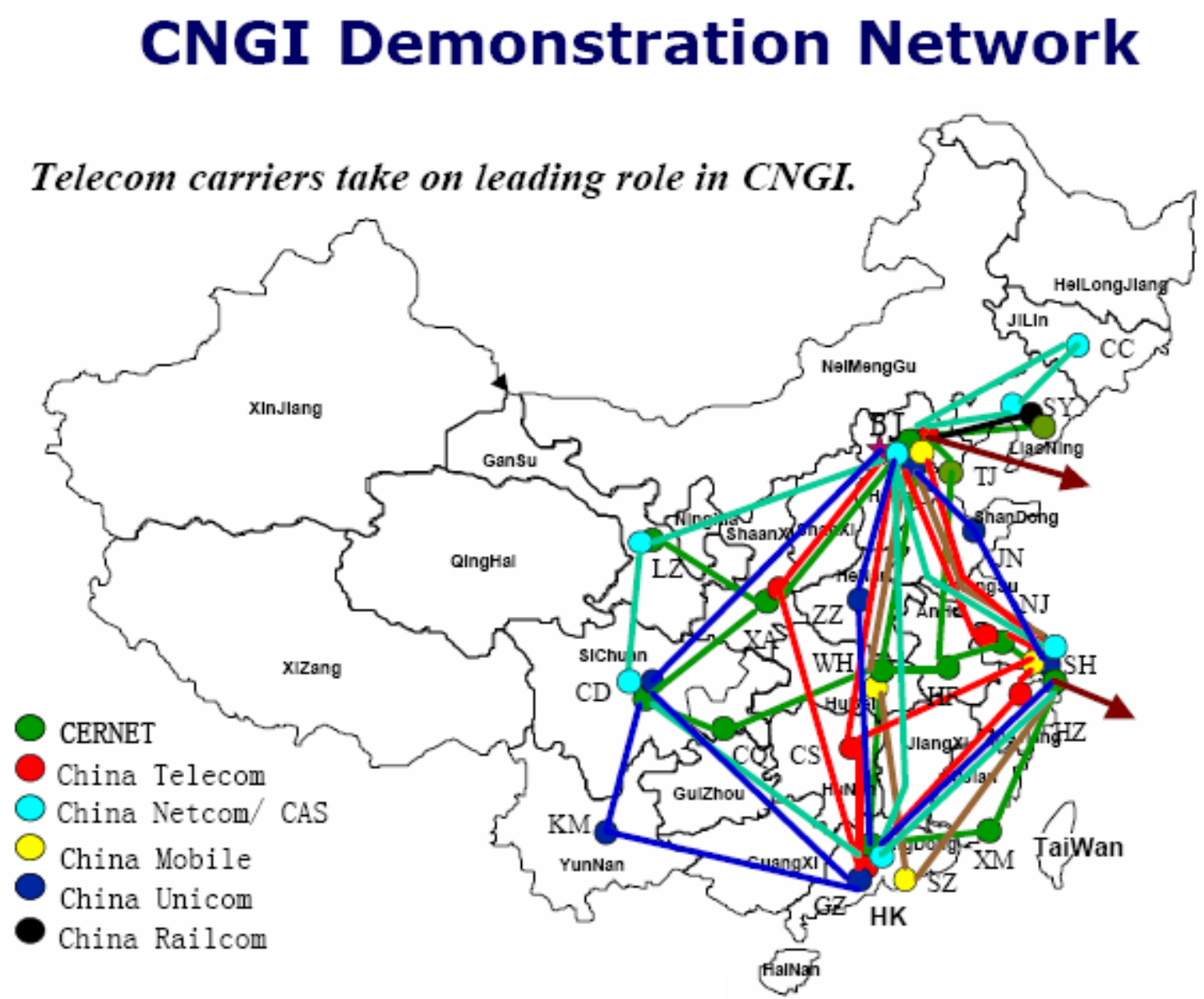
CNGI - 4

- 5 top carriers in China are playing major role in the implementation: China Telecom, Netcom, Unicom, China Mobile, China Railcom.
- The carriers take charge for construction of 5 core networks in the backbone
- CERNET (universities) is responsible for construction of the only one core network that is for science and educational purposes among the 6 of the backbone

CNGI Backbone Nodes



CNGI Demonstration Network



CERNET2 - 1

- CERNET2: The Next Generation Education and Research Network in China
- CERNET2 Backbone connecting 15-20 GigaPOPs at 2.5G-10Gbps
- Connecting 200 Universities and 100+ Research Institutes at 1Gbps-10Gbps
- Native IPv6 and Lambda Networking
- Support/Deployment of the following technologies:
  - Multicast
  - E2E performance monitoring
  - Middleware and Advanced Applications

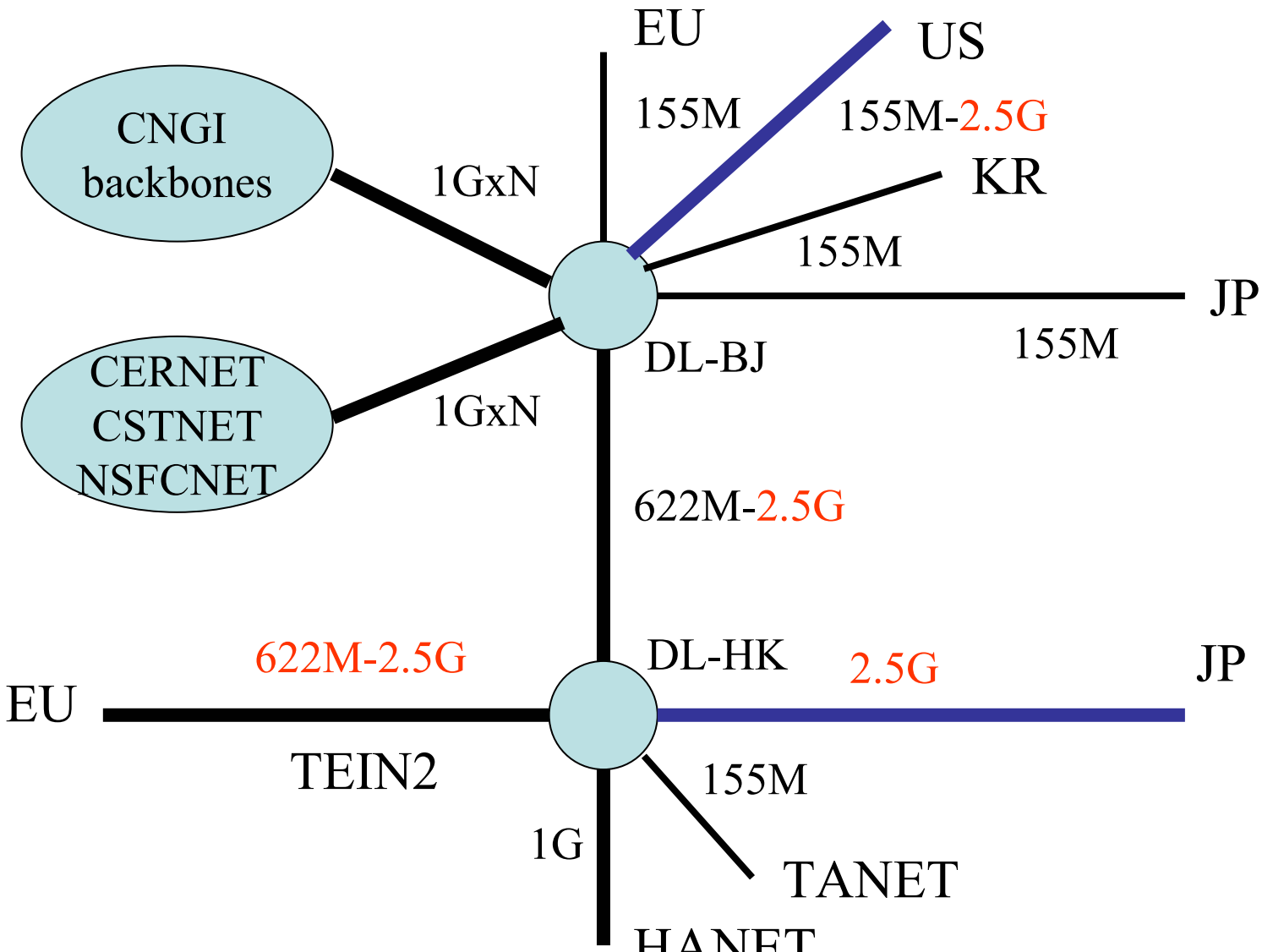
CERNET2-2

- CERNET2 is the largest one in scale and the only one for S&E purposes among the 6 core networks of CNGI backbone
- It is a trunk test network infrastructure based on pure IPv6
- Provides HS connection to international NGI nodes through CNGI-6IX
- Provides service for study, test and development of applications on NGI, also for international collaboration on NGI

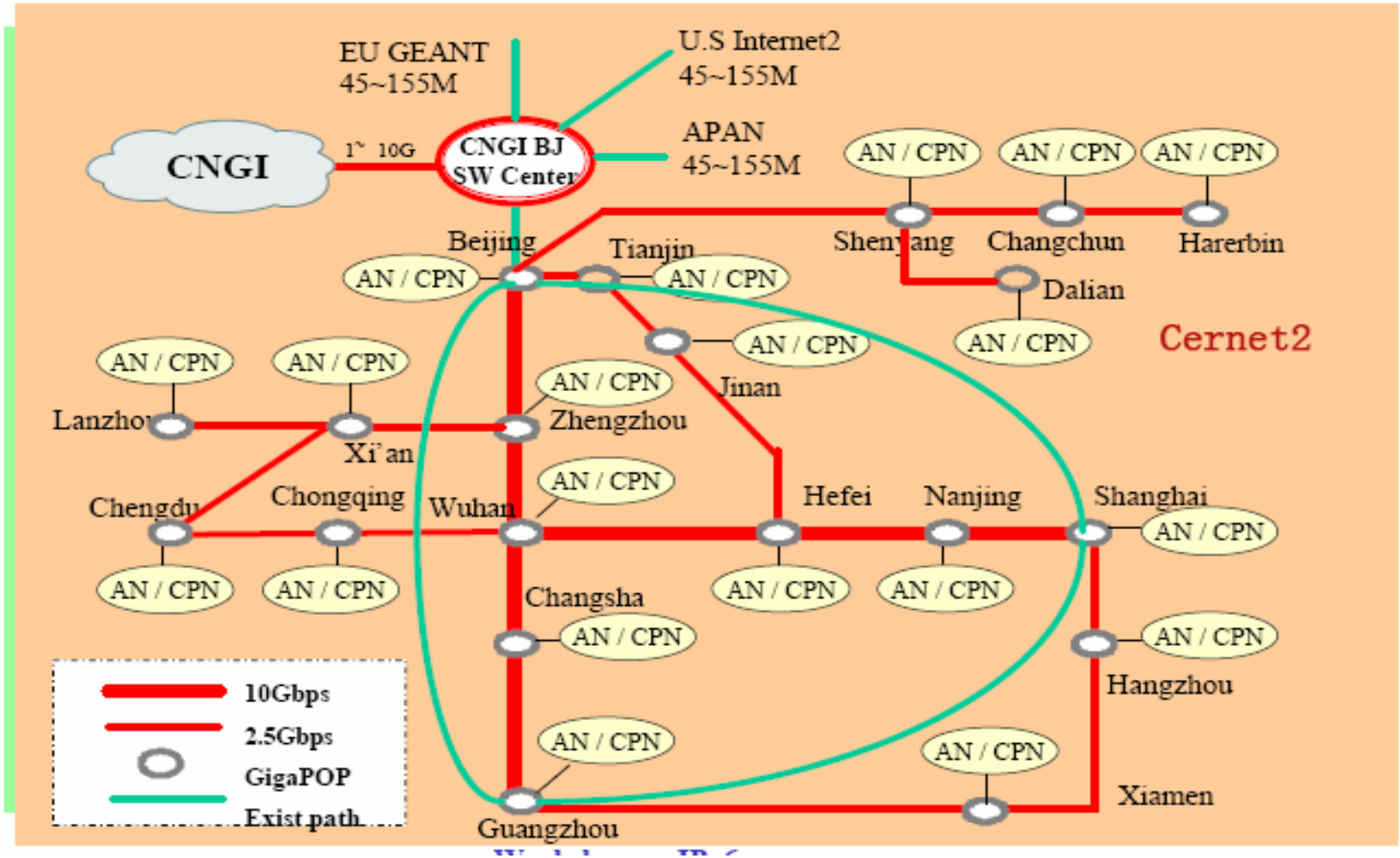
CERNET2 - 3

- Over 50% of the key equipment that CERNET2 trunk network used is produced in Chinese originated companies (Huawei etc.), so it plays a role as test bed for the Chinese companies to develop their networking equipments particularly the core routers,
- Routers produced by overseas companies (Juniper etc.) work cooperatively on CERNET2, so it provides an open environment for testing and measurement which is helpful for elevating the level of Chinese products on NGI

Dragon Light: CNGI-IX



CERNET2 – A Core Network of CNGI Backbone



CERNET2 - 4

- CERNET2 was launched in December of 2004, the 10 years' anniversary of the CERNET, in Beijing.
- CERNET2 applied to join the IRNC program of NSF, U.S. which is supporting the high speed link of international scientific networks
- High speed link between CERNET2 and academic network of Tokyo.
- Trying to build HS link to GEANT.
- Trying to join in the TEIN2 program and to be the Asian interconnection center with 622M~2.5G

CNGI R&D Projects-1

- IPv6 system and network
  - Network intelligent storage system oriented NGI
  - CNGI network supervisory system
  - Network security architecture IPv6 based
  - Wireless sensor network and its nodes 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

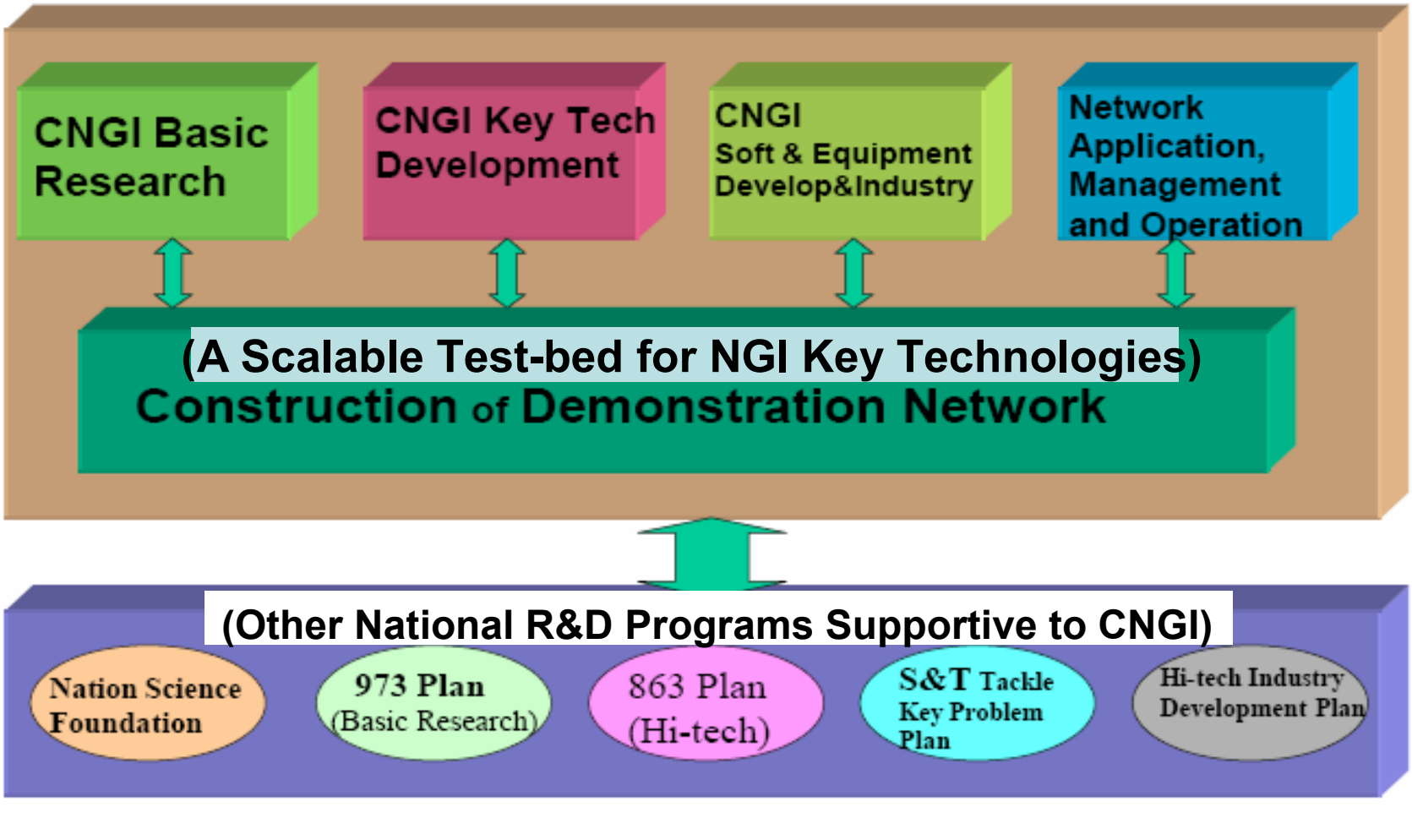
CNGI R&D Projects-2

- CNGI Service application demonstration system
  - Video conference
  - Multimedia VoD system
  - Common distance learning 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 HP grid application based on IPv6
  - HP video transmission and share VR based IPv6
  - Research and test on large scale wireless and mobile roaming

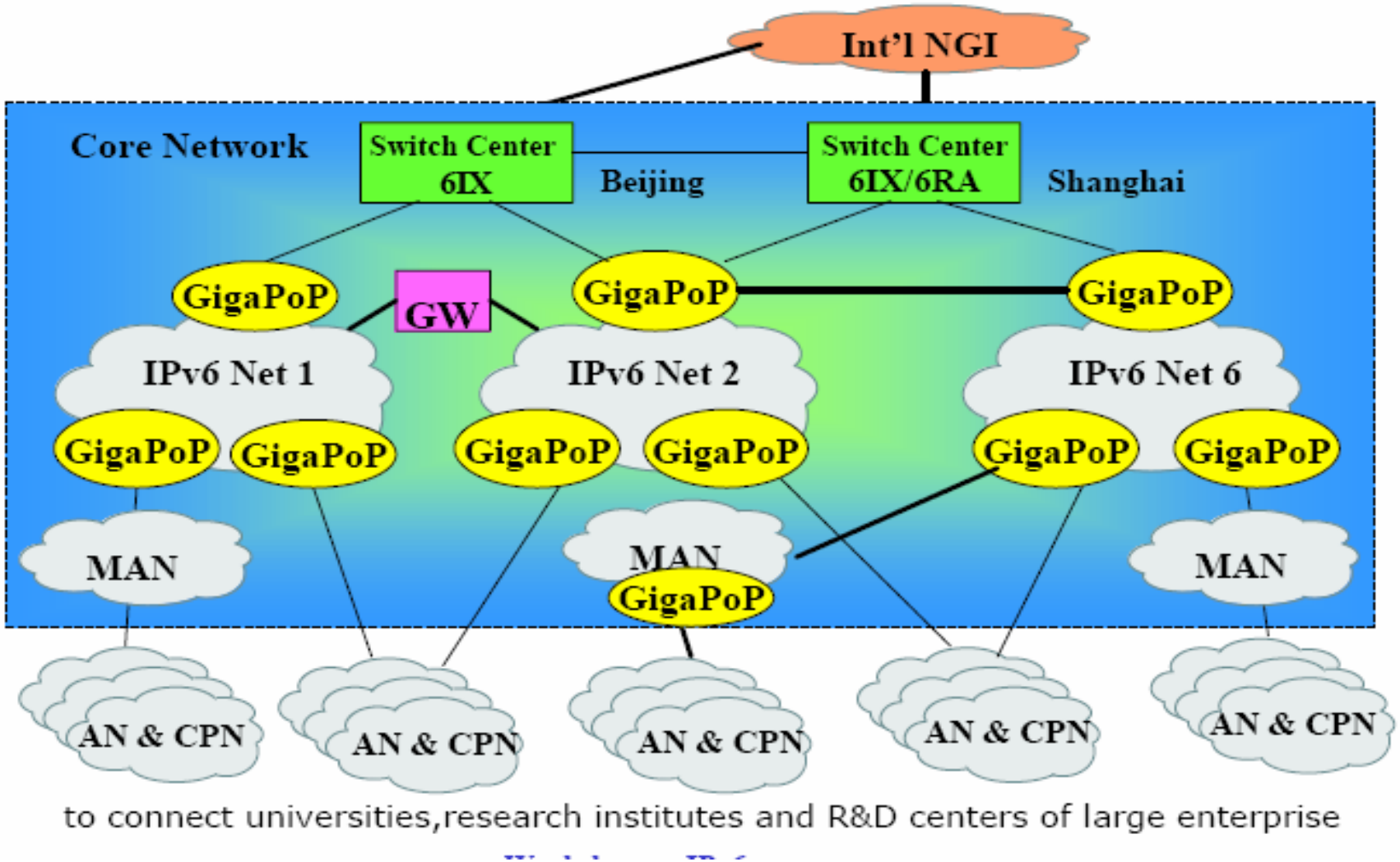
CNGI R&D Projects-3

- Key technologies study
  - CNGI QoS technology
  - Study and experiment on large scale routing and multicast technology
- CNGI standard and specification study
  - Study on CNGI general technology requirements and architecture
  - Study on IPv6 address plan
  - Study on technology specification for demonstration systems

CNGI R&D Projects Related to Other R&D Programs of the Country



CNGI Demonstration Network



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

The Emphasis of CNGI Target

- Construct demonstration platform for NGI technology
- Field trial and experiment on the platform for development of NGI technologies. applications and further study
  - Protocol, standardization, network architecture
  - Mobile access and roaming service
  - Transmission and multicast
  - Billing mode and technology
  - Middleware and application underlay technology
  - Grid application
  - Convergence of video, voice and data service
- Promote competence of Chinese originated companies in the NGI technology,
- Promote international cooperation on NGI

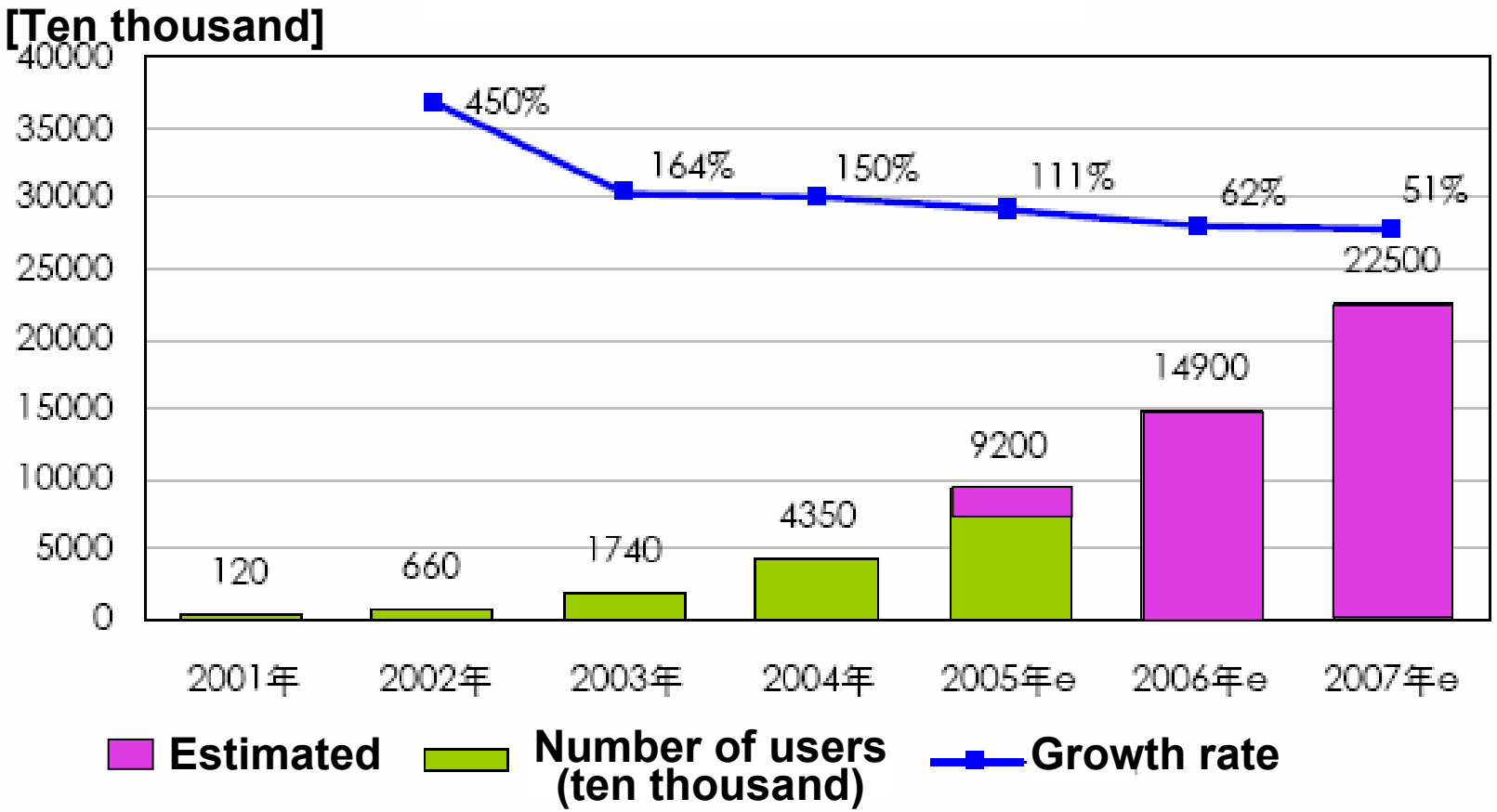
The motivation for CNGI

- Internet has grown to indispensable factor for the nation to develop further
  - Growth of Internet in China
  - Mobile, the future of Internet
- IPv6 is the only choice for China
- Security concern
- NGI and NGN – the reform of traditional telecoms and the convergence
- R&D requests for trial environment

Growth of Internet in China-1

- In **2005** number of broadband users achieved **64.3 Million**, starting to exceed that of narrow band (51.0 Million);
- The future growth is sustainable and potential as far as the average price for broadband (about 20 US$ monthly, 2005) is acceptable by dominant users
- A new market of broadband wireless is emerging rapidly
- Starting from 2004 a number of portals and ISPs have become profitable, and have successfully come into market;

Development of broadband users in China



Source: CNNIC

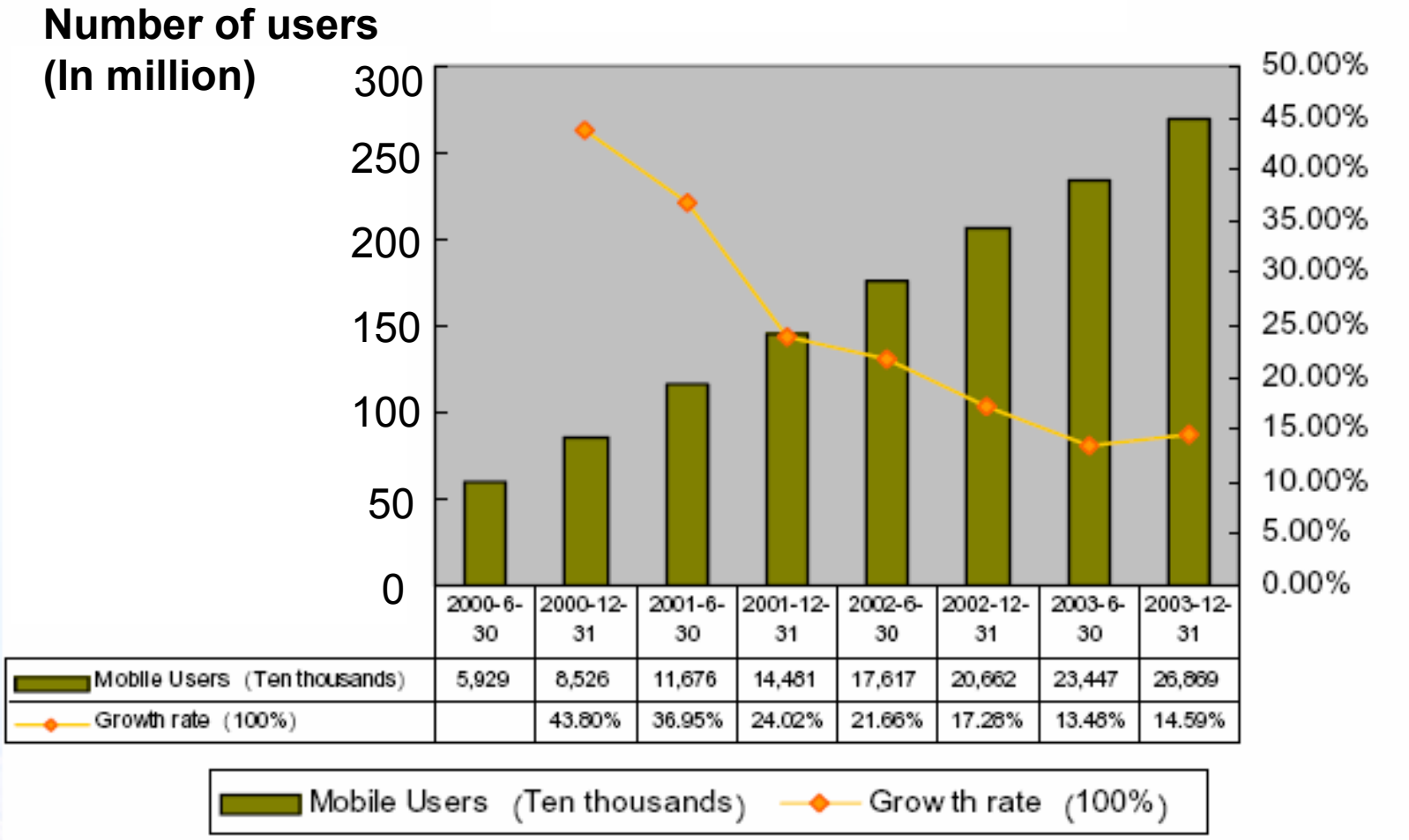
Growth of Internet in China-2

- First-position usage has shifted from email to: news, search engine, and email; Internet application is deeper interwoven with people's life;
- The average weekly online hours have increased from 9 to 16 in last 2 years;
- International venture capitals are greatly interested in Chinese Internet market and the successful Internet companies

Mobile, the future of Internet

- China owns the biggest amount of mobile phone user in the world and the mobile handset penetration rate is still increasing rapidly; while it is becoming main terminal for Internet access instead of PC in the near future

Growth of Mobile users in China



CDMA 1X: CU; GPRS: CM; WLAN: CT, CNC, CM, CU…

Data source: MII, Dec.2003

For China, IPv6 is the Only Choice

Distribution of IPv4 Addresses at Dec. 2004

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%

IPv4 number for China is including that of HK, Macao and Taiwan

Explore the Reformation of Traditional Telecoms

- Traditional Telecom is evolving to IP based technology rapidly
- ITU chose to develop NGN on the basis of IMS, pushing the convergence of mobile and Internet, and providing further opportunity to expand new market for telecoms
- Increasing impact of the Internet payment model (monthly fixed rate) to the Telecoms
- China Telecom and others announced to launch their reformation from basic telecom service provider to that of comprehensive information service

Field Trial of NGI and NGN Conducted in China

- NGN Trial
  - Telecoms operator soft-switch trial (China Telecom, Unicom, Railcom, Netcom, China Mobile and Chinasat)
- NGI and IPv6 Test-bed
  - IPv6 field trial of CERNET
  - China-Japan IPv6 Network Test-bed
  - China-US-Russia science trial network
  - IPV6 MAN demonstration network of ChongQing Information Port
  - Hunan Province IPv6 Test-bed of China Telecom
  - CNGI Demonstration Project

Summarize-1

- The Internet as a pillar industry is fast maturing for China viewing from the network infrastructure, service innovation, venture capital market and the growth of requirement for various applications
- CNGI is a nationwide demonstration platform and test bed for future network, promoting the international cooperation on NGI R&D

Summarize-2

- IPv6 is the only choice for China
- The QoS architecture and technology is stressed by CNGI, wireless and mobile service is also the focal points of CNGI.
- CNGI attaches importance to the technology that promotes NGI and NGN convergence, facilitating a manageable network.
- The construction of a nationwide broadband IPv6 network for trial is underway.

The future of Internet in China

- Internet users in China is over 100 million, but the penetration rate is only 8% while the world average is 12%. The firm target of China is to raise the penetration rate of Internet.
- If in 2020 the penetration rate in China can achieve 40%, the growth of market will be about 500 million new users
- The growth of Internet and the sustainable economic development of the country are supplement and supportive to each other.

The key for the future

- In China the dominant population is living in poor area
- The key factor for a prosperous future is the **cost** for Internet access, including the cost of terminals, network infrastructure, hard and soft products.
- Whether we can succeed to develop and commercialize low-cost technology and products for the future network?

The future: Internet for everyone

- To develop low-cost, secure and reliable network technologies is set as the first-line target and mission of Chinese national research institutes in ICT field for the future 5 to 15 years.
- Promote the convergence of fixed and mobile, and the convergence of telecommunication, TV and Internet, to provide ubiquitous and HS network that is accessible, affordable and usable for everyone, including those of rural area and poor villages.
- China seeks for strengthened international collaboration in undertaking this historical task

Thank you

for attention!