

Broadband Networks in China

EE402A Seminar

H&Q Asia Pacific

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Outline

- I. Infrastructure
- II. Broadband Applications
- III. Impact: Economic & Regulatory
- IV. Broadband Market Growth
- v. Outlook
- VI. Opportunities



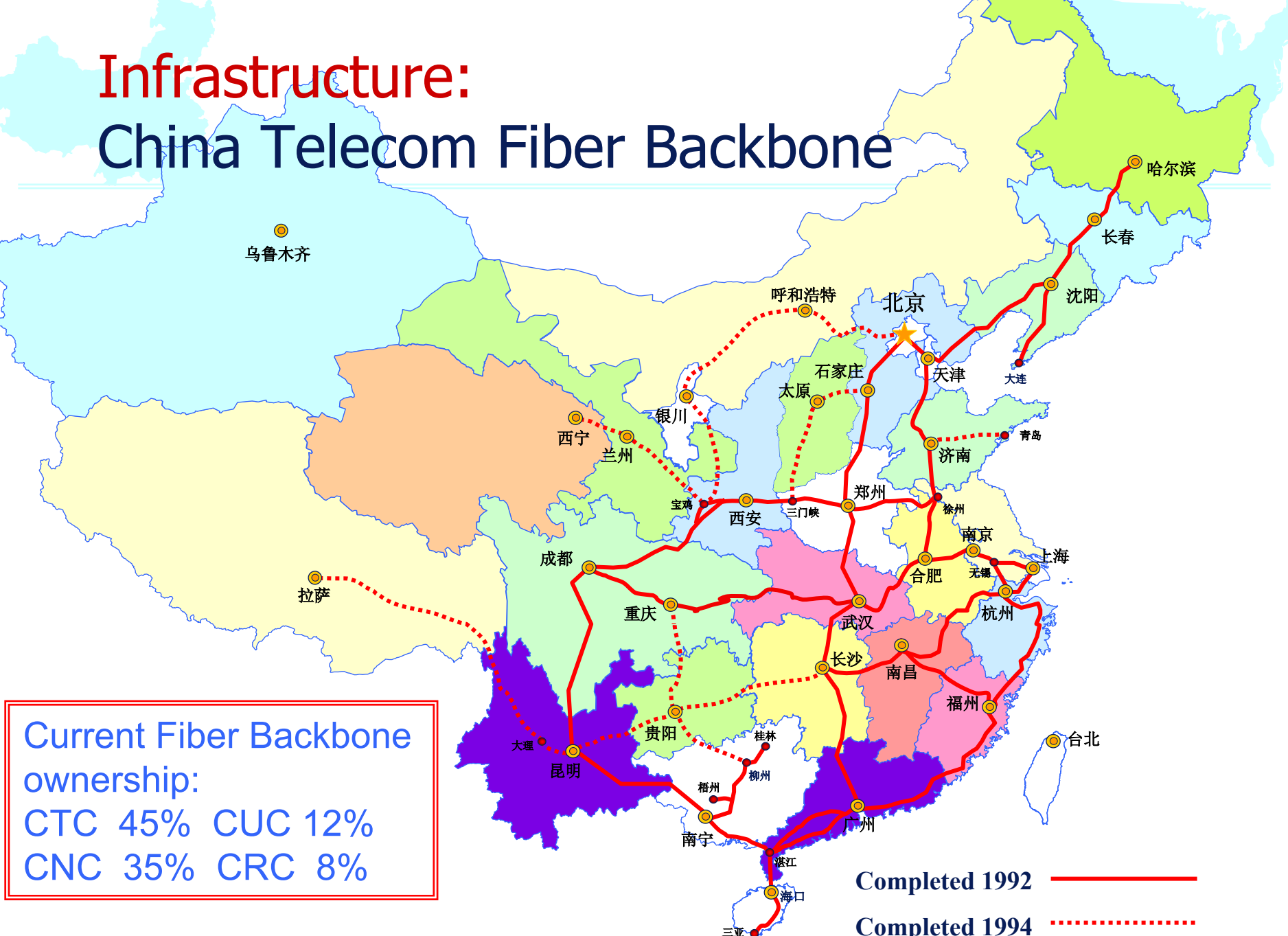
Infrastructure:

Major Technologies of Broadband Access

- **Fiber Optic Broadband Access**
 - DWDM, xPON (APON, EPON)
- **Twisted pair Broadband Access**
 - ISDN, E-1, E-3, xDSL (HDSL, **ADSL**, VDSL ...etc.)
- **Coaxial Cable Broadband Access**
 - **HFC**, CATV
- **Wireless Access**
 - **WiFi** (802.11a, b, g), MMDS
- **Mobile Access**
 - **GPRS 2.5G** and **3G**

Areas of greatest growth today shown in red

Infrastructure: China Telecom Fiber Backbone

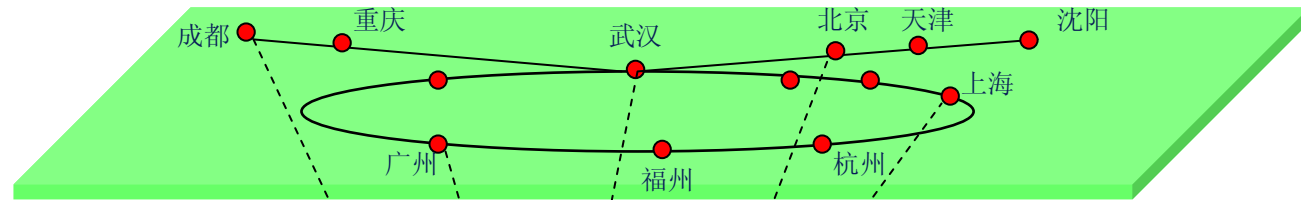


Current Fiber Backbone ownership:
 CTC 45% CUC 12%
 CNC 35% CRC 8%

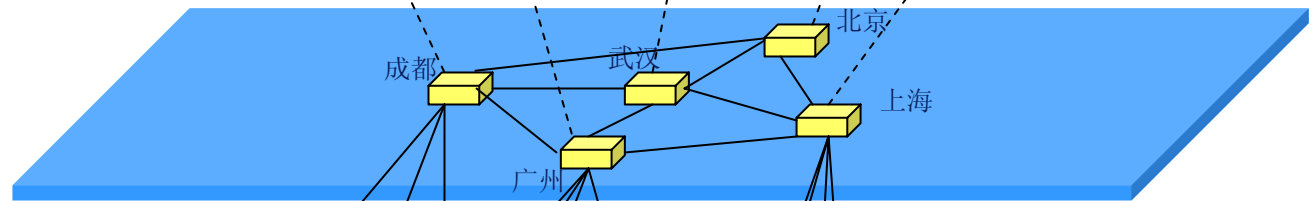
Completed 1992 ————
 Completed 1994 ······

Infrastructure: China Broadband Networks

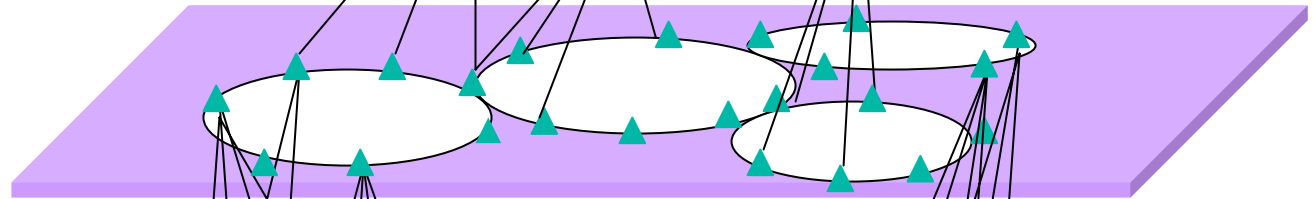
**Backbone
(General)**
2.5G ~ 10G



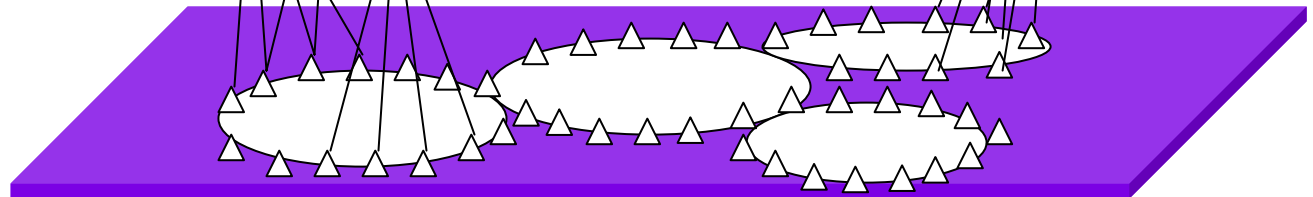
**Backbone
(major cities)**
10G ~ 40G (DWDM)



MAN
GigE, SDH
1G ~ 10G



Access
(ADSL, E-1, E-3)





Broadband Applications



• Buildings/Residences

- Rich Media Content
- Video/VoD/**Gaming**
- **Streaming/broadcast**
- e-Surveillance
- e-Commerce

• Service Providers

- Server Consolidation
- Data Center back-up
- Web Storage
- Hosted Applications
- **e-Government**
- POP Interconnect

• Multimedia

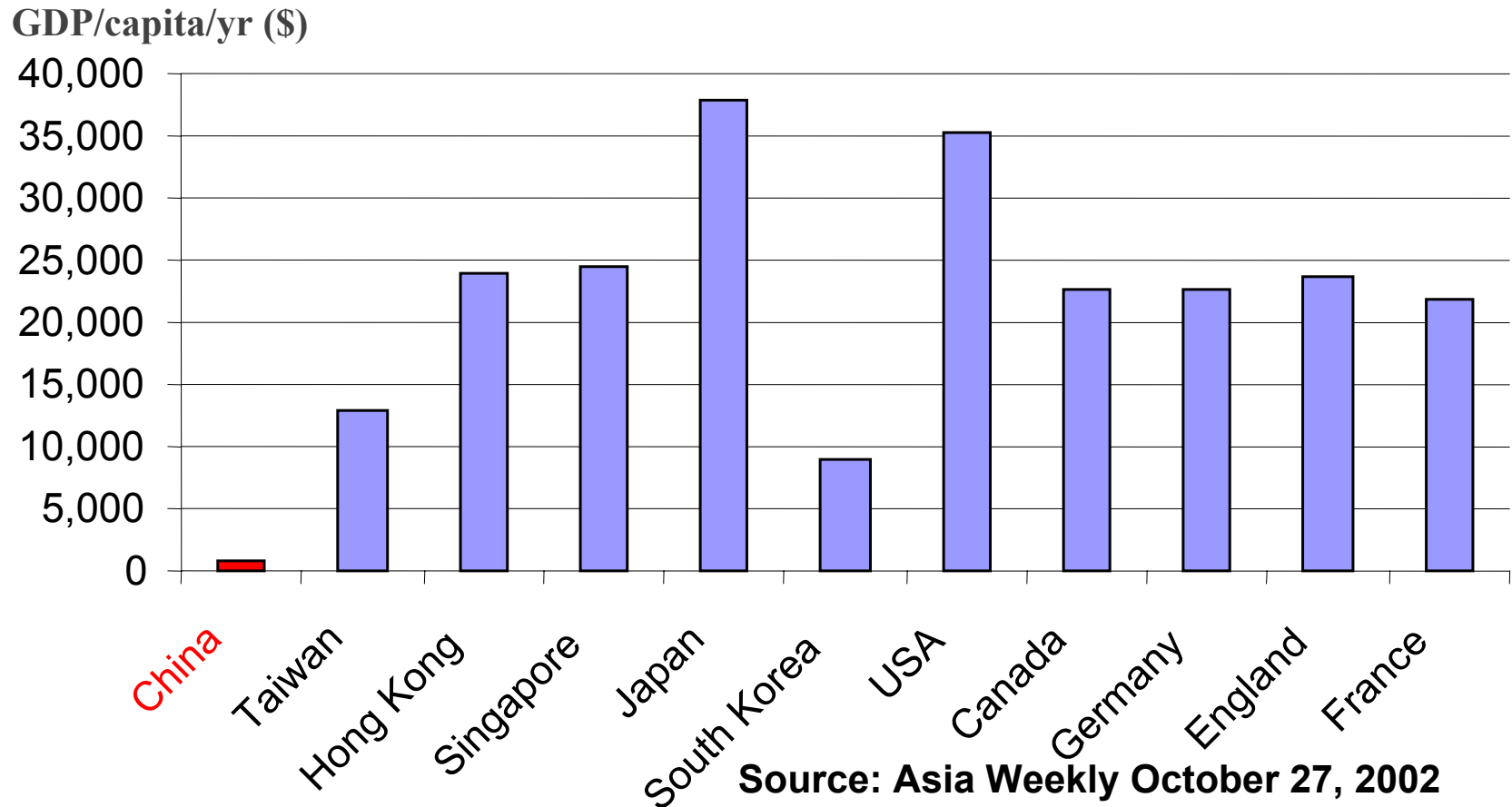
- **High speed internet**
- Access VPN
- News & Information
- Pay-per-view services
- Web Conferencing

• Universities/ Hospitals

- Imaging/Visualization
- **e-Learning**
- Telemedicine
- **Digital Library**
- Networked Computing

Areas of greatest growth today shown in red

Impact: GDP Information



China GDP/capita/yr \$910, China become worldwide MFG

Impact: City Leaders and key statistics

	Secretary of CPC	Mayor	Area Sq.km.	Population (K)	GDP /Capita/Person
ShenZhen	Huang, Li-man	Yu, You-jun	1,948.69	4,329.2	\$4,801.63
Xiamen	Hong, Yongshi	Zhu, Ya-yan	1,565.09	131.3	\$4,593.35
Shanghai	Huang, Ju	Chen, Liang-yu	6,300.00	1,674.0	\$4,173.65
Guangzhou	Huang, Hua-hua	Lin, Shu-shen	7,434.40	700.7	\$4,142.85
Zhuhai	Huang, Long-yu	Fang, Xuan	1,630.00	123.6	\$3,211.39
Beijing	Jia, Qing-lin	Liu, Qi	16,800.00	1,382.0	\$2,713.41

Source: China info-bank June 2002

Proper Ranking of leaders is important

Impact: Regulatory Time Table from MII

	2001	2002	2003	2004	2005	2006	2007
Value Added Services	25%		30%		50%		
Mobile Services	25%	35%		49%			
Basic Services			25%		35%		49%

Shanghai City

Other 14 major cities

Entire Nation

Source: BDA

Notes: Vodafone AirTouch has 2% stake in China-Mobile
 AT&T participate to Shanghai Telecom for value added Services

Max allowed Equity participation from Foreign Investors

Market:

The Increase rate of New subscribers

	Sep 30, 2001	Sep 30,2002	% Increase
Fixed Line Subscribers	170,370,000	207,000,000	17.7%
Mobile Subscribers	144,840,000	190,000,000	23.8%
Total Subscribers	315,210,000	397,000,000	20.7%

Source: China Economic Daily October 20, 2002

China is the only country with 20% growth in New subscribers



Outlook: China Market Drivers

- Greater **bandwidth needs** drive demand for broadband access
- **Government** thrust at all levels propels use of broadband access in the initial stages
- Lowering terminal equipment **prices** drives broadband demand
- Presence of **new HFC** infrastructure in selected regions drives Cable Modem broadband access

Source: Frost & Sullivan



Outlook: China Market Restraints

- No Consistency in Local **Government's Support**
- **Poor Quality** of Twisted Wires / HFC Networks
- **Low Awareness** of Internet Technology
- **Bottleneck** in Backbone Internet Bandwidth

Source: Frost & Sullivan

Opportunity: China Operators and Services

Services

Operators

Basic Telephone

CTC, CUC, CNC, CRC

Domestic Long Distance

CTC, CUC, CNC, CRC, CMC

International Long Distance

CTC, CUC, CNC, CMC, CRC, CSC

Data & Internet Backbone

CTC, CUC, CNC, CMC, CRC, CSC

Data & Internet Value Added

All 6 + Foreign Operators/Services

Satellite Communication

MII Plan bring Foreign Investor

Mobile Communication

2G/2.5G (CMC, CUC),
3G (CMC, CUC, CTC, CNC)

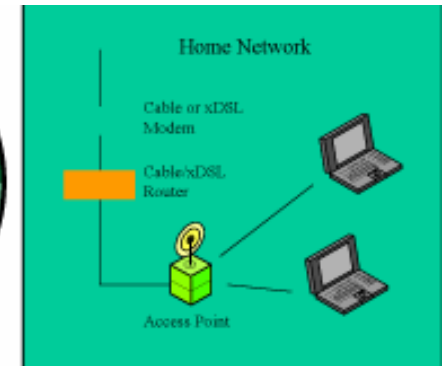
Areas of greatest opportunity today shown in red

Opportunity: Wireless (WLAN)

Business



Residential



Small Business/SoHo



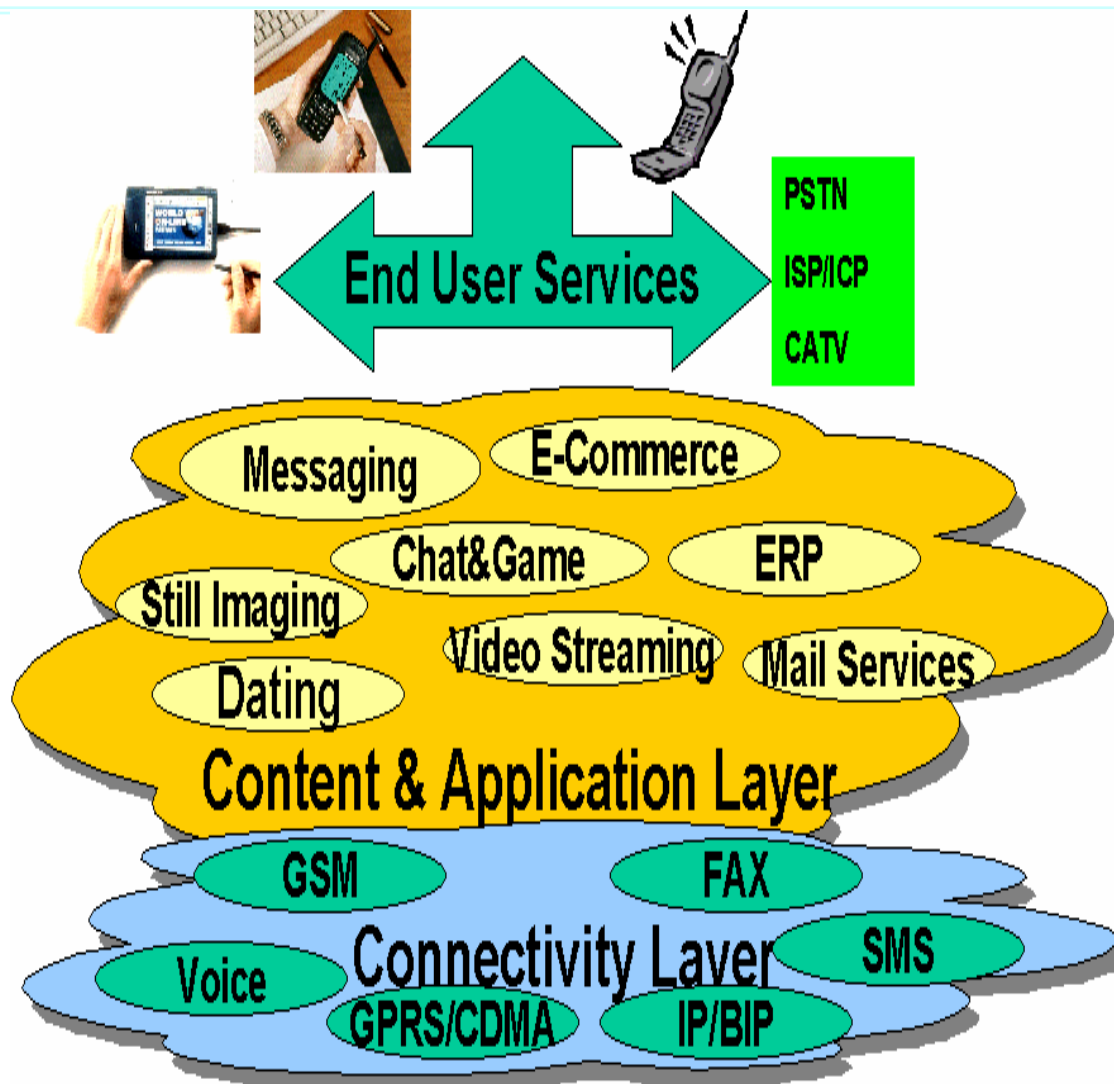
Public / Hot Spot

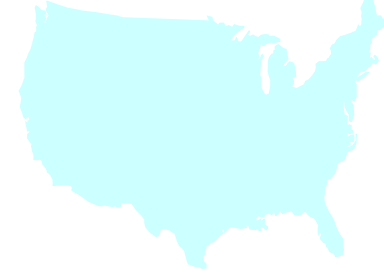


Poor Quality of Twisted Wires/HFC Networks
The High Cost to Renovate old network.

Opportunity: Broadband Services in China

- Content / ICP
- Video Streaming
- Gaming
- e-Banking
- e-Government
- e-Learning
- Telemedicine





THANK YOU

George Chen