Introduction of China Unicom and Its Data Network

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China Unicom

November, 2005
Outline

- Introduction of China Unicom
- Data Network Overview of China Unicom
- Introduction of UNINET
- Migration of UNINET
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Profile of China Unicom

- Founded in July 19th, 1994
  - As a result of telecommunication regulatory reform in China.
  - Marked the break-up the monopoly and the introduction of competition in the telecom industry.
  - Speedily developed with the ever-deepening progress of China’s Telecom Reform.
  - The establishment and the development of China Unicom also accelerate the process of the reform and development of telecom industry in China.
Unique Integrated Operator in China

Main Business:

- Cellular Mobile Services (GSM-CDMA)
- National and International Long Distance Service
- Data Communication Service
- Internet Service
- IP Telephony Service
- Radio Paging Service
- Satellite Communication Service (Ex. satellite space sector)
- Local Telephony Services in Authorized Areas (Tianjin, Chongqing, Sichuan)
Milestones

- July 19, 1994 – China Unicom was founded.
- July 19, 1995 – GSM service was launched in Beijing, Tianjin, Shanghai and Guangzhou.
- April 1, 2000 – Launched 193 long distance telephony service.
- June, 2000 – Been listed both in NYSE & HKSE, IPO Proceeds: $5.65 billion.
- August 16, 2000 – Launched data communication service
- June 1, 2001 – Unicom’s share was incorporated in Hang Seng Index as a component share.
- January 8, 2002 – Launched CDMA telephone service
- Ranked as NO.7 in asset volume and No.10 in profit generation among all state owned corporation in China according to the list published by National Bureau of Statistics of China in 2002.
- Ranked as No. 390 in Forbes Top 500 in 2002.
Network & Business Conditions

• Cellular business (both GSM and CDMA) in 30 provinces, municipalities and autonomous regions in China.
• In terms of the number of subscribers, Unicom was ranked as the third largest mobile telecommunication operator in the world.
• The number of Unicom's CDMA cellular subscribers was ranked as the second largest CDMA cellular operator in the world.
• The backbone network adopted the most advanced transmission technologies, and the length of accumulative constructed fiber miles exceeded 550 thousand km. The long distance fiber backbone exceeded 110 thousand km, accessed to all cities ex. Tibet.
• Constructed an uniform broadband data network UNINET, providing integrated and characteristic service e.g. Data, VOIP, Fax, Video stream, VPN, Multimedia etc. Providing PDSN network for CDMA 1X.
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Long Distance, Data & Internet

Outgoing ILD & LD Traffic
100 Million Minutes

2000 2001 2002 2003

PSTN    IP

Market Share Growth

2000
1.5%

2001
7.7%

2002
11.7%

2003
14.0%

China Unicom Confidential
Long Distance, Data & Internet

Rapid expansion in the data and Internet business

![Graph showing growth in Internet Subscribers and Leased Line/ATM/FR]

China Unicom Confidential
Data Network Profile

- Coverage
  - 330 cities and HK&LA

- Services
  - Leased line (DDN/FR/ATM/IP)
  - VoIP, Video, CDMA 1X

- Trunk: STM-1/4/16

- Architecture
  - Convergence Layer
    - Core
    - Common
  - Regional Layer
Data Network Characteristic

- ATM+IP+MPLS
- Multi-service in one network
- All nodes under one NMS
  - Fast Service Configuration
  - Easy management
- Major award by MII

- We have
  - No.1 VoIP Network
  - No.1 Video Network In The World
- Seamlessly Upgrade to MPLS Network
- More Powerful
- More Expansibility
- More Availability
China Unicom Internet Profile

• Coverage
  – 330 cities&LA+HK

• Bandwidth
  – Trunk:53Gb/s
  – National NAP:8.6Gb/s
  – International:1.6Gb/s

• Architecture
  – Convergence Layer
    • Core
    • Common
  – Regional Layer
Internet Network Characteristics

• Network Support
  – 5 million broadband users
  – 20 million dial-up users
  – 15 million mailbox users
  – 200 VPN users

• services
  – Dial-up Internet access
  – MPLS IP VPN/VPDN
  – Private line Internet access
  – Mailbox
  – IDC, web-hosting, Co-location

• Internetworking with
  – VoIP network
  – Video network

• One of 3 carriers who have international service right

• Provide Peer-peer or transit service to international ISP
  – 16 countries and regions
  – Connect with 4 tie 1 carriers of US (Sprint, MCI, AT&T, C&W)
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Evolution and Migration of Network Signaling

Separated network

Unified network

One service, one network

One unified platform for Multi-service
Roadmap

1970's
- ISDN: Circuit based

1980's
- B-ISDN: ATM based
- Internet: Router based

1990's

Next
- NGN

???
Key Issues

- No mature technology

  **Router based technology**  Can not guarantee QoS
  **ATM based technology**  Can not accommodate to IP service

- One network platform provides multi service and every service has QoS

- National wide scalability

- Easy and flexible to provide new service
Our Solutions

Uniform Platform for Multi-Service

ATM/FR
Internet
VOIP
MIS
CDMA 1X PDSN
Video Conference

ATM+IP Backbone Network
UNINET Features

• UNINET=modified ATM switch (IP must be supported) + modified IP Router (OAM and TE must be supported)
• QoS and security guaranteed
• Enhanced routing algorithm (adding some QoS based constrained conditions in OSPF path computing)
• Enhanced LSPs (Multi Point to Point LSP, Point to Point LSP, Policy QoS LSP and QoS on Demand LSP)
• High performance
• Multi logic networks on one unified physical network
• Rapid service deployment

CCM (Call Control Module) plus SACP (Service Access Control Point) as Metro Integrated Service Network
- China Unicom started UNINET Since 1999

<table>
<thead>
<tr>
<th>year</th>
<th>Revenue (million)</th>
<th>Profit (million)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>1590</td>
<td>170</td>
</tr>
<tr>
<td>2001</td>
<td>4610</td>
<td>320</td>
</tr>
<tr>
<td>2002</td>
<td>7010</td>
<td>1260</td>
</tr>
<tr>
<td>End of June, 2003</td>
<td>3890</td>
<td>780</td>
</tr>
<tr>
<td>Total</td>
<td>17100</td>
<td>2530</td>
</tr>
</tbody>
</table>

- China National Scientific Progress Award (1st Prize)
Quality of UNINET

Practice proves that quality of UNINET is better than separated networks.

<table>
<thead>
<tr>
<th>Item</th>
<th>User</th>
<th>Operator</th>
<th>Rank of Unicom</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data Service</td>
<td>China Construction Bank</td>
<td>China Telecom</td>
<td>No.1</td>
</tr>
<tr>
<td></td>
<td>Institute of China Electronic Science</td>
<td>China Netcom</td>
<td></td>
</tr>
<tr>
<td></td>
<td>XINHUA NEWS AGENCY</td>
<td>China Unicom</td>
<td></td>
</tr>
<tr>
<td>VolP</td>
<td>Research Institute of Communication Standards</td>
<td>China Telecom</td>
<td>No.1</td>
</tr>
<tr>
<td></td>
<td>Guangdong Telecommunications Administration Bureau</td>
<td>China Netcom</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fujian Telecommunications Administration Bureau</td>
<td>China Unicom</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>China Jitong</td>
<td></td>
</tr>
<tr>
<td>Internet service</td>
<td>Ministry of Information Industry (Twice)</td>
<td>China Telecom</td>
<td>No.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>China Netcom</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>China Unicom</td>
<td></td>
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Economical, Convenient and Rapid

<table>
<thead>
<tr>
<th>Economical  to Invest</th>
<th>The construction of unified multi-service network platform costs only 7.2 billion RMB, while the similar size network constructed by traditional method costs 30 billion RMB</th>
</tr>
</thead>
</table>
| Convenient to Use     | Video-conference can be organized within 1 minute  
Video phone can be connected to the fixed phone and mobile phone |
| Rapid to Provide      | Video-conference and video phone system of all provinces around the country was established for Ministry of Public Health in 15 days |
## Comparisons with Foreign Operators

<table>
<thead>
<tr>
<th>Item</th>
<th>UNINET</th>
<th>AT&amp;T</th>
</tr>
</thead>
<tbody>
<tr>
<td>Network Convergence</td>
<td>Completed in 2000</td>
<td>Deployment in 2005</td>
</tr>
<tr>
<td>VoIP service</td>
<td>1 billion minutes/month (Year 2003)</td>
<td>300 millions minutes/month (Year 2003)</td>
</tr>
<tr>
<td>Video</td>
<td>52 MCU</td>
<td>8 MCU</td>
</tr>
</tbody>
</table>
Coverage: 330 cities and America, Hongkong

- VOIP service: more than 1 billion minutes/month
- Internet: more than 12.14 millions dial users, 36 thousands leased services, 3 billion minutes/month
- FR, CES: 14 thousands 2M E1
Recent Yankee Group interviews with service providers based in North America, South America, Europe, and Asia reveal 85 percent of the top 20 revenue-generating service providers have initiated IP/MPLS consolidation plans.

**The Three Phases of IP/MPLS Network Consolidation**

*Source: The Yankee Group, 2004*

- **Phase 1**: Initiation
  - Announcement of IP/MPLS consolidation plan
  - Initial investment in IP/MPLS core begins (first phase of core POPs upgraded or deployed)
  - New enterprise, residential, and IP-based services targeted

- **Phase 2**: Service Adoption
  - Core expansion continues; edge investment accelerates
  - Targeted services from Phase 1 experience high revenue growth
  - Limited number of legacy routers and switches decommissioned

- **Phase 3**: Profit Realization
  - Critical mass of traffic from overlay networks now converged to IP/MPLS core
  - Enterprise and residential IP-based services proliferate
  - Profitability goals of IP-based services achieved

- **China Unicom started UNINET Since 1999**

- **UNINET was honoured National Scientific Progress Award (1st Prize)**
Submit drafts to International standard organization actively

**Submit 8 drafts to ITU-T**
- “Requirements for Interworking between NGN and Other Networks”
- “NGN Service Supporting Environment Requirement”
- “Service Middleware Architecture of Next Generation Network”
- “Proposal for Service Framework in Y.NGN-SRQ”
- “Proposal for the Section "interoperability and interworking" in Y.NGN-SRQ”
- Proposal for the structure of functional architecture in Y.NGN-FRA
- General Requirements for Media Gateway Control Interface
- FMC for Fixed and Mobile Convergence

**Submit 4 drafts to IETF**
- Tunneling IPv6 with private IPv4 addresses through NAT devices
- Mobile IPv4 Home Agent Switch Message
- “Minimum TCP connections based anycast routing protocol”
- “Add anycast in mobile ipv6 router message”
Industrial value chain

**Core Networks:**

Lucent, Juniper, Huawei

**MAN:**

ZTE, Nortel, Cisco, Siemens, Datang, Alcatel, POLYCOM

**Video:**

Intel, POLYCOM, C&S, Vimicro, Aethra, TANDBERG, Nanwang, HAUI, Gongye, Lenovo,
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Phased Unicom MPLS migration

• Phase 1: before Jun, CY04
  - Introducing T640 as MPLS core in 7 super nodes, each with 10G POS trunk;
  - Multiple GE links connect with 165 network to carry internet traffic to bypass existing ATM network;
  - OC-12 ATM trunk to connect with existing GX550, and try some ATM base services in MPLS core.

• Phase 2: before Jun, CY’05
  - MPLS(M7i) blades inserted in about 40 existing CBX500 to enable MPLS based services; VOIP/VC/CDMA1X in new region and expansion will carried directly on MPLS blades instead of Cisco routers
  - T640 in other 5 backbone POPs.

• Phase 3:
  - Redundant T640 in each 7 super nodes and T640 in other new backbone nodes;
  - STM-16c ATM trunk;
  - MPLS(M7i) blades inserted in over 300 existing CBX500.
Technology Preparation

• **Softswitch Trial**: In Many Branches
  - Networks: NGN Architecture
  - Services: Provide traditional and new services

• **China Next Generation Internet (CNGI)**: In Seven Cities
  - IPv6 Trials
  - Explore Next generation Development Model
Actively evolve to NGN

- Large scale soft-switching technical trial shows that soft switching based NGN is successful, and migration and development of telecom services are achieved.

- China Next Generation Internet (CNGI) and IPv6 related technologies, services and operation model to reach the evolution of China Unicom Internet.
Fixed & Mobile Convergence

Service Platform

Core Network

ATM/IP Networks

Mobile

Fixed

IN, OSA/Parlay, APP Server

IMS

CSCF

MGCF

AAA

PDSN

MGW

SIP Signaling (IMS)
Integration of WiMax and CDMA network
Integration of UMA and CDMA network
Thanks alot!
联通的心让我们走得更近！