Interconnection and Services for Customers

Jianqiu ZENG

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Broadband service

- Considering the dominant operator development determination, broadband value lowering and other factors, broadband service will be developed with the users be faster growth, and payment or fee will be expected to decline.

Mobile service

- Considering consumer ability and huge number of customers, rural market is further expanding, the number of mobile users will present scale growth, and mobile service will focus on customer interesting and payment.
- Business is growing rapidly with internet mobile service, business transformation by voice, video and other applications
- Continue to strengthen the network construction with fixed and wireless and convergence services and payment will be done as well.

The Internet of Things

•NB-IOT is in application for business mainly based on the agreement held on 16th, June 2016, which will provider a lots of new services and fees will be considered in order to satisfy customers. China is now in a initial stage for this developing chance, need to be actively catch up and be realized not only for business but for customer interesting, meanwhile networking has made great achievements.

Cloud computing

•Cloud computing industry is considered the fourth IT industry revolution after the large computer, personal computers and Internet.
•Cloud computing industry vigorous development with big data in China, cloud computing data center around industrial park (hereinafter referred to as "cloud base") springing up growth, which will provider many services and low or free payment for customers.

Interconnection and Internet Traffic

◆Internet backbone interconnection is a way for cooperation at network construction.

Internet interconnection is a policy throughout the world.

◆Internet backbone interconnection faces several challenges:

Multi-layer Interconnection

Traffic-load sensitive peering

Government intervention

Internet traffic has become globalized

◆Many countries and regions have expanded their Internet traffic to exchange capabilities through one or more local IXPs. The development of IXPs (Internet exchange points) around the world has benefited backbone providers by facilitating distributed interconnection between peers and transit customers, which improves the quality of service and reduces traffic carrying costs.

◆Today, about 100 countries possess their own IXPs to exchange national and regional Internet traffic, and thus lower the costs associated with international Internet access. It is interesting to note that this evolution does not require specific regulatory intervention, but the result of commercial solutions adopted by national and regional networks.
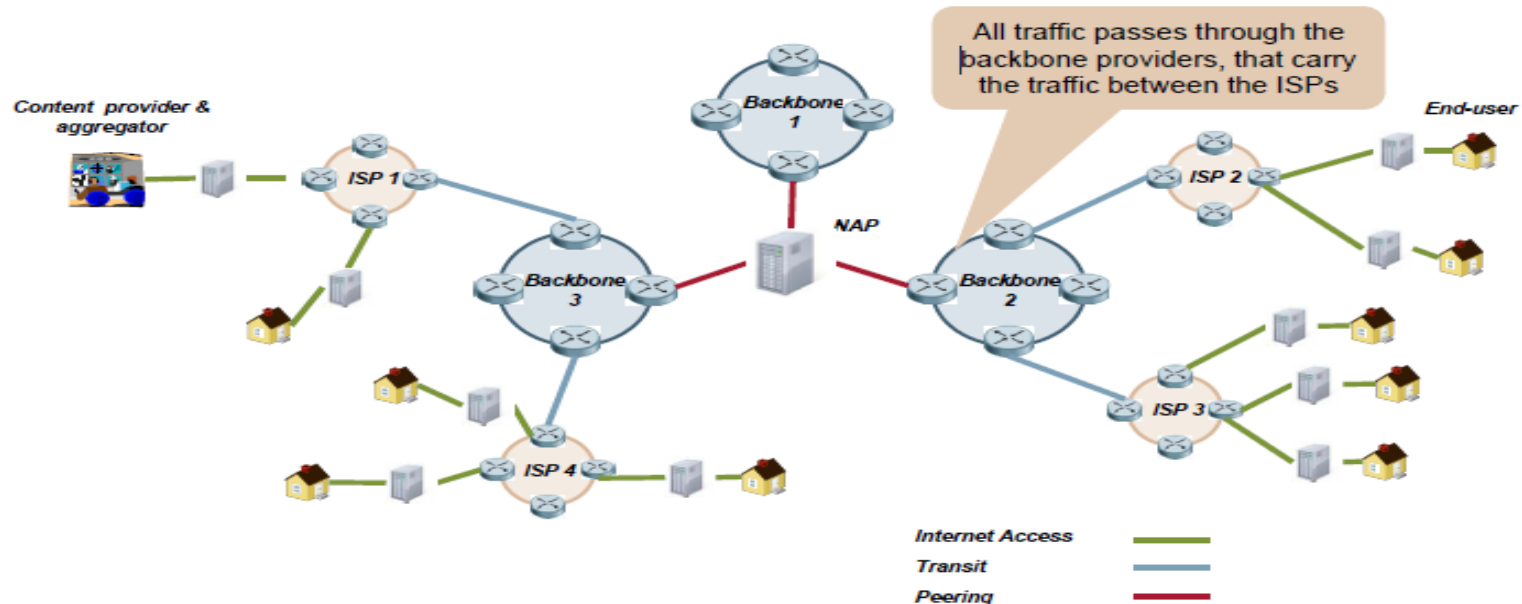
Peering arrangements are almost uniformly insensitive with traffic-load and situations are better because of the traffic-sensitive settlement system, construction of NAP and new technology.

Interconnection and Internet Traffic

Global internet is interconnected by thousand of independently owned and operated networks. There are two basic form of interconnecting links :
- Transit
- Peering

Internet Interconnection – a diversity of arrangements

All traffic passes through the backbone providers, that carry the traffic between the ISPs

Legend:
- Internet Access
- Transit
- Peering

▪ The typical mode of interconnection internationally

| MODE		
Peering	**Public Peering**	This mode refers to peering way between multiple networks, which is generally applied to public exchange points.
	Private Peering	This mode refers to the interconnected relationship between two network operators.
Transit	This is a typical "provider - user" business relations. Users (usually smaller network operators) pay a transfer fee to the Internet provider (usually a large network operators) to buy the business and achieve access to other Internet.	
Partial Peering	One ISP operator only establishes peering with other ISP operator by part of the network. Both sides need a considerable size and strength in the open network routing area.	
Paid Peering	The two sides share the cost of a physical connection on settlement and measure flow difference between the two networks by agreement, then one operator pays the other by traffic difference according to the pricing.	
Partial Transit	ISP operator does not provide peering but only transfers traffic destined for a particular direction, it is suitable for the condition that there is a large gap between the two sides in terms of network size, traffic, etc.	

Interconnection and Payment

China

Interconnection and Mode (payment) : Among operators, direct and indirect, IXPs (Internet exchange points),NAP points.

▪The main approach of backbone interconnection in China is peeing , which includes direction connection and connection through NAP points.

▪All interconnected units has a direct connection in Beijing, Shanghai and Guangzhou . Meanwhile, there are government-led national NAP points in these three cities as well.

▪Nowadays , China is accelerating the layout of international communications for interconnection. Based on OBOR, more than ten countries with China have launched cross-border fiber optic cable. China Telecom and China Unicom are basically achieved direction connection with the top international operators.

Diagram of backbone direct connection points in China
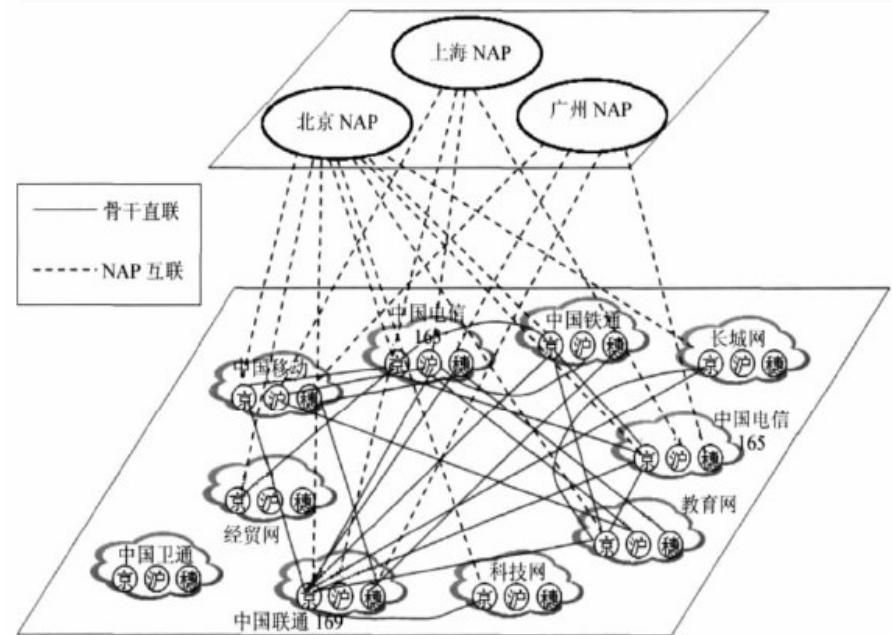
China is adding more NAP points around the country to relieve stress of the original NAP points.
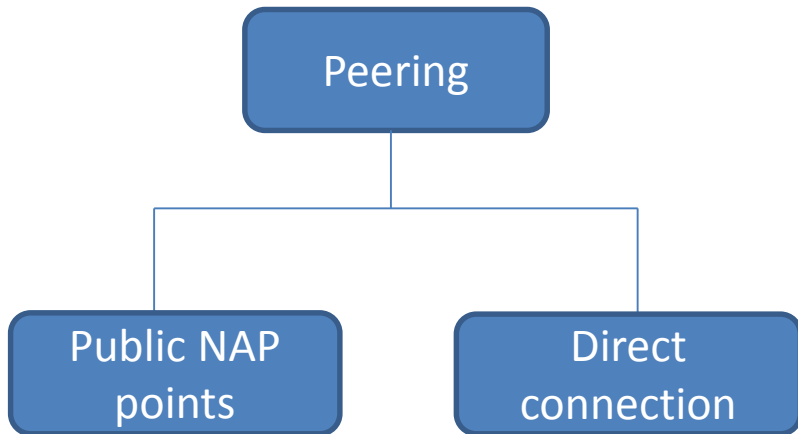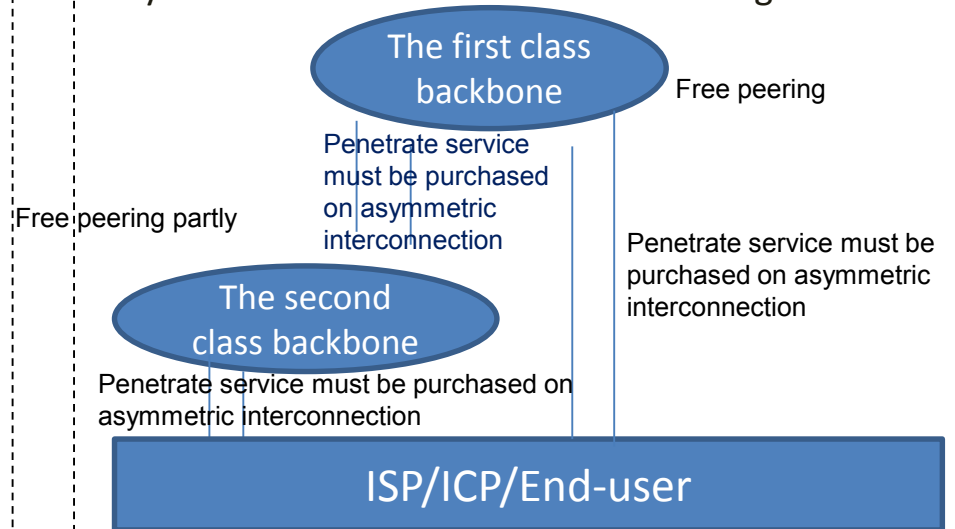
Interconnection and Payment

America ▪ America operators based on backbone for interconnection and peering is the main form.

◆Peering is the main form of interconnection between the backbone operators in the U.S.A. For example , the largest one UUNet uses peering model with 75 operators worldwide.

Peering
Public NAP points
Direct connection

◆The first-class backbone operators sell asymmetric interconnection and provide penetrate service to the second-class backbone operators. Content providers do not establish peering but purchase asymmetric interconnection from the higher.

The first class backbone

Free peering

Penetrate service must be purchased on asymmetric interconnection

Free peering partly

Penetrate service must be purchased on asymmetric interconnection

The second class backbone

Penetrate service must be purchased on asymmetric interconnection

ISP/ICP/End-user

Internet system hierarchy of America

Japan

▪There are four top backbone operators in Japan which include NTT、Japan Telecom、KDDI and Power Edcom .

▪The secondary backbone network providers of Japan has a relatively large size.
▪There are only two NAP points(Tokyo and Osaka) in Japan , all the first- class backbone operators exchange the Internet traffic through the NAP points.
▪Japanese operators reach interconnection agreements by launching bilatera negotiations .

Designing The Future
KDDI

Korea

▪The internet architecture of Korea is two-tier.
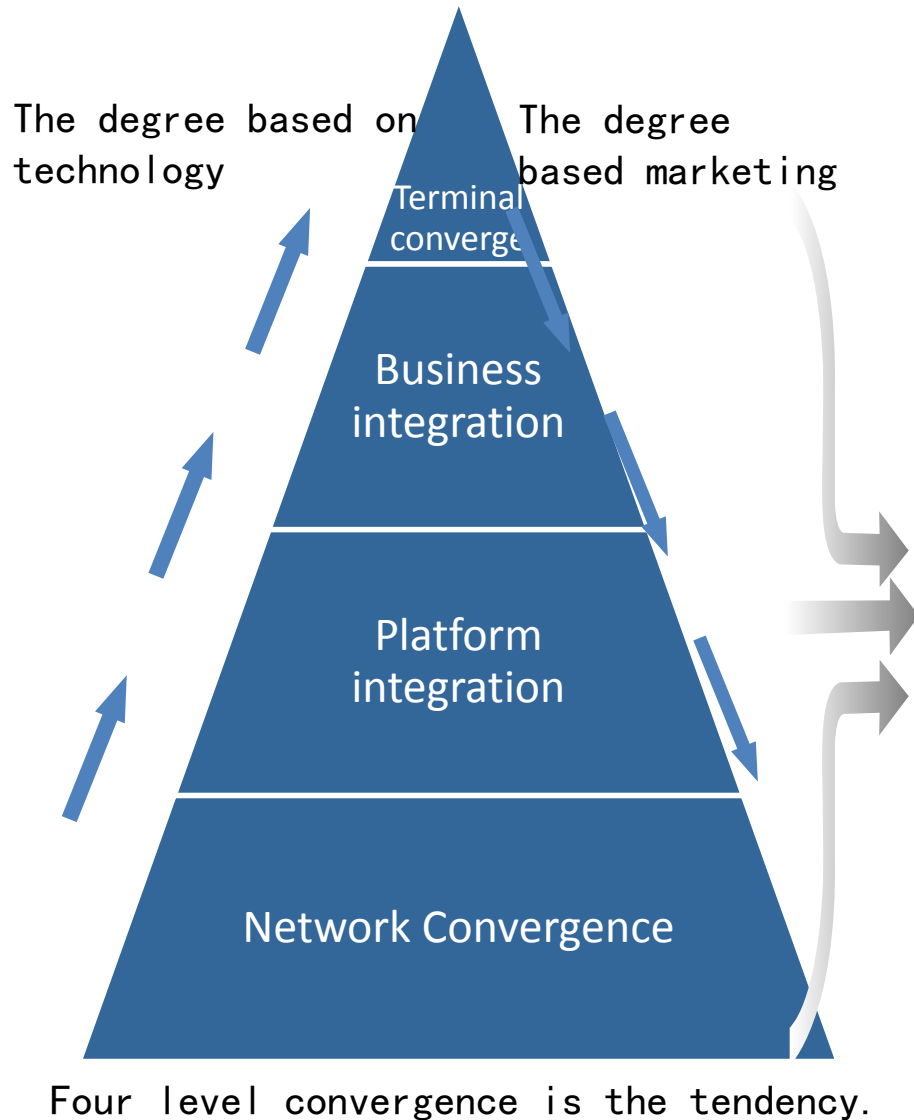The first-class backbone operators include Korean Telecom and Dacom.

▪The government implements "the Internet Networks Interconnection System" rule which stipulates that the first carrier must provide routing information to the small one.
▪The first-class operators may not do bunding, which means that the second-class operators can purchase transit service and transmission lines separately.

KT WIBRO

The degree based on technology   The degree based marketing

Terminal converge

Business integration

Platform integration

Network Convergence

Four level convergence is the tendency.

Targets of Network Convergence

➤ Terminal converge：Mobile, TV computer and other terminal service for customers

➤ Business integration: Different services integrated for business.

➤ Regulatory convergence：From regulation ,deregulation to reregulation.

➤ Platform integration：Construct three-dimensional digital information platform system.

➤ Network convergence The next generation of broadband communication network and the next generation of broadcast networks convergence.

➤ The main reasons why network convergence are that technology development and service for customers.

"We use the telephone call someone before ,but now we can play games, listen music, read book and so on with our mobile phone or terminal."

Customers are from "thumb era" to "forefinger era"， from "voice era" to "data era", from "two dimensions era" to "three dimensions era"; From "calling by phone" to "play phone", from "watch TV" to "apply TV" and from "search Internet" to "develop Internet" yet the payment will be from this decline to another decline.

Thanks For

Sincere Listen

Thanks Everyone

Friendship help