

From ISP/ICP Business Models to Internet Economics

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Self introduction

- ~20 years in industry (Bell Labs, DEC, Sun Labs) in US
- and ~10 years as a professor in CUHK, Hong Kong
- interested in Internet economics, and have written some papers (mostly abstract)
- Will talk about trends and issues in practice
- not an expert of Internet businesses in China;
will use some examples for discussion



ISPs in China

The two giants:

- China Telecom
- China Unicom

http://www.gov.cn/jrzq/2011-11/11/content_1990914.htm

There are some local ISPs, much smaller scale

Education network:

- CERnet (20M users from universities)



Major Content Providers and OSNs

The big three Internet companies:

- Tencent – Instant messaging, games etc
- Baidu – Google of China
- Alibaba – eBay or Amazon of China

Social Networks:

- Renren, Kaixin – Facebook in China
- Sina Micro-blog – like Twitter

Portals:

- Youku, Tudou – like Youtube
- Sohu, Sina – like Yahoo



Major CDN and P2P platforms

CDN

- China Cache - <http://www.chinacache.com/>

P2P and indexing

- Xunlei - <http://en.wikipedia.org/wiki/Xunlei>
 - 290M active users (canceled IPO in 2011)
- PPLive etc – got US\$250M from Softbank (Feb 2011)
 - 105M active users
- Tencent – Instant Messaging, games, social network etc
 - 800M+ active users
 - Supports p2p downloading, and “cloud downloading”



Network convergence in China

- Convergence of telecom (including mobile), TV broadcasting, with Internet
- A lot of regulation issues - these industries are under different ministries
- Re-alignment of vertical businesses
- Important questions:
 - Who can keep the users?
 - Who has the right to manage contents?

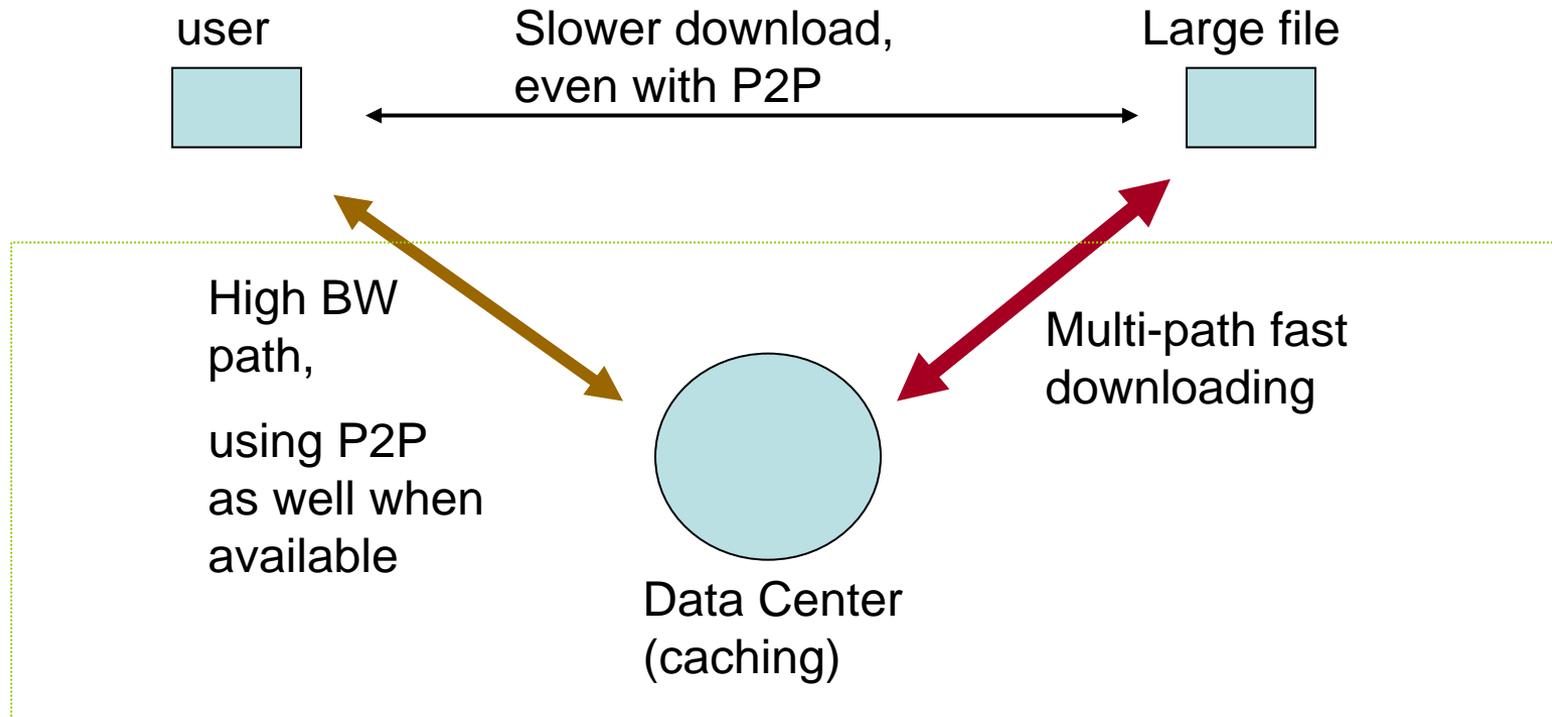


Case study: Cloud Downloading

- **Functionality**
 - User requests content (in WWW, BT etc), especially cold content
 - Cloud downloads, then informs user
 - User gets content at very high speed
- **Subscription based**
 - Provided for special Tencent members who pay
 - After one year, ~5M active users in a month
- **Operation**
 - Large data center to store downloaded content
 - High BW connection from data center to major city areas
 - Collaboration with local ISPs
 - Via private network
 - Via CDN



Illustration



cloud



Cloud Storage

- Allow user upload to cloud as well
- Supports large files, e.g. videos and games
- Content-based identity (via hashing)
 - Detects duplicates
 - authentication
- Is it also a networking service?



Cloud services from US

- Google YouTube, Gmail, etc
- Amazon Silk
- Netflix
- ...



Big idea 40 years ago

- To support dynamically arriving elastic traffic
 - replace **circuit switching** by **packet switching**
 - > **statistical multiplexing**
- >>>> Internet



New big ideas

- To support large scale content distribution
 - Use **multi-path** and **load balancing**
 - > **true congestion control**
 - Use **replication/caching** along the way
 - > **transport sharing**
 - Use **dedicated/private** network
 - > **qos**
- >>>> CDN, BitTorrent, Youtube, Cloud downloading...



Two roles for networking services

- Public good
 - Universal information access, and connectivity
 - Freedom of speech (?)
- For profit services
 - Content distribution
 - Social clubs
 - Indexing, search, recommendation...
 - Commerce, banking...
 - Business needs



Key ingredients for any business

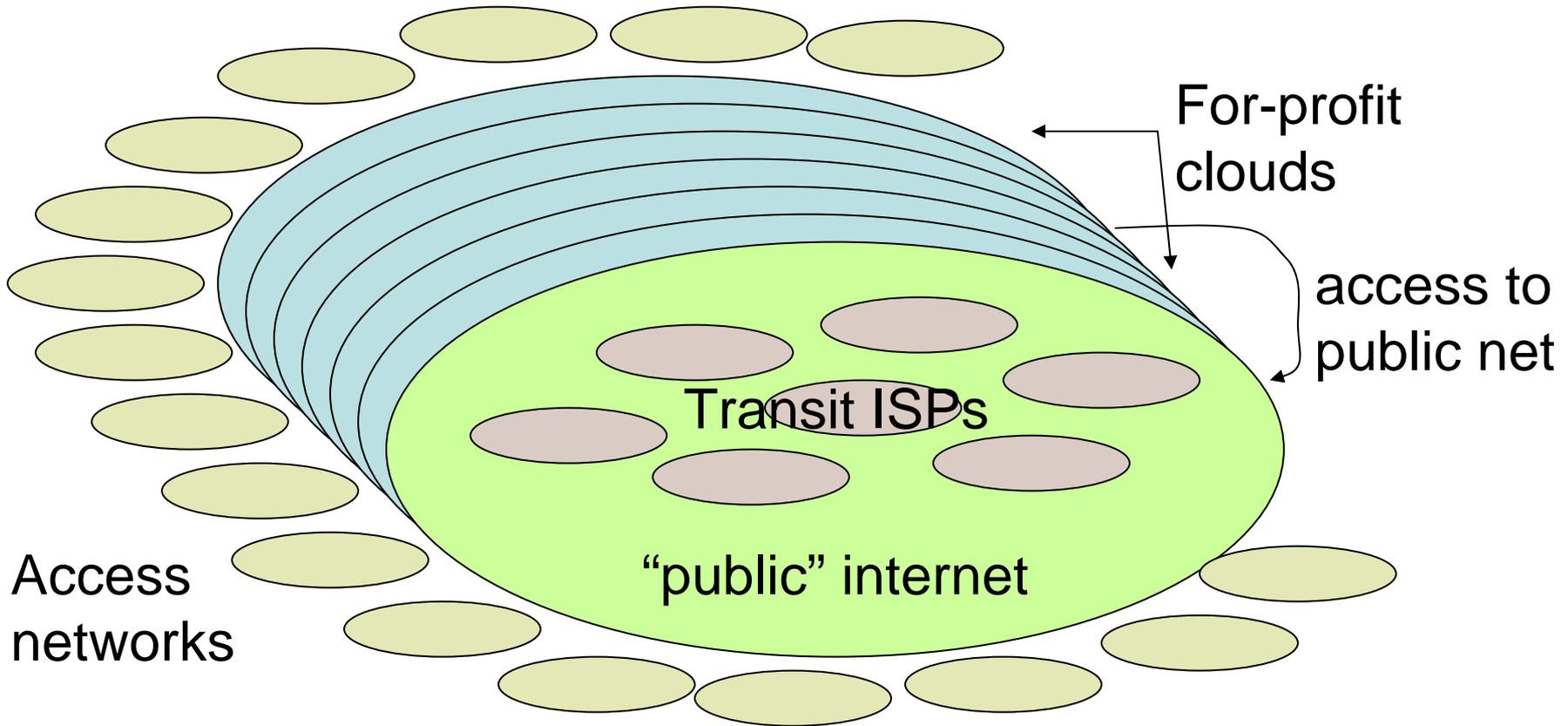
1. Good stuff to sell – e.g. content
2. Quality of service
3. Channels – to reach customers

Is Internet good at these?

- It is essential for (3)
- Surprisingly, it is also good at (1) to some extent where cometh the content in Youtube, Facebook?
- It is not adequate for (2)
that's why private networks, storage/cache etc added



Future Internet picture?



Access providers

- Access providers are the channels to users
- Ideally, users should have access to multiple providers
- Given wireless technology, this should become less a problem
- If an access provider is a monopoly in a local market, it should be subject to regulation



Transit providers

- They can play the role of transit ISPs; in this role, they need to deal with net neutrality type of regulations
- They can sell/lease fiber to cloud service providers for their private networks; in this business, there should also be equal access regulations



Peering

- Between Cloud services and access networks
 - Similar to relationship between any business and its channels
 - No clear conclusion of whether “content is king” or “eyeball is king”
- Between ISPs
 - Bilateral peering as today



Net neutrality

- Generic analysis of a “platform” in economics
 - Nice economic models of “two-sided” market
 - Showing benefits of network effect in users attracting applications, and vice versa
- Government’s control of monopoly practices
 - This is very complicated, probably not amenable to mathematical analysis



Summary

- Brief overview of ISPs and ICPs in China
- Examples of business models and implementation of user services in today's Internet
- Analysis of technology and business trends
- Discussion of roles and relationships of different players
- Concluding observation: Internet needs to fulfill two different roles, which necessarily leads to its public and private sectors.

