

New Internet Trends and Technologies and Their Impacts on Telecom Industry

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Abstract:

With never-ending changes and improvements and an increasing industrial scale of the Internet, the emerging new application trends, such as social networking, network video, intelligent search and mobile Internet, and new Internet technologies, such as Mashup, artificial intelligence, grid computing and open platform, are significantly influencing the Internet industrial structure. Moreover, the rapid development of the Internet and the convergence of the Internet and telecom networks, especially the development of mobile Internet, are giving the telecom industry a shock. This shock will certainly change the structure of the telecom industry, gradually break the monopoly status of telecom operators, shift the telecom emphasis to services and contents, and enhance the importance of terminal vendors in the industrial chain.

1 New Internet Application Trends

New Internet applications not only have great influence on the Internet development, but also help push the telecom transformation. Several significant application trends are discussed here.

1.1 Social Networking

Social website MySpace, whose members increase from 20 million in 2005 to 225 million today, has an annual growth rate of 513%, while its rival Facebook has an annual growth rate of 550% and another rival LinkedIn has a rate of 182%^[1]. The huge increase in user number has brought these social websites generous advertisement profits. Yahoo! has recently acknowledged that it plans to reshape its website into a social networking center through collecting and adopting other online service application programs, which is expected to create more advertisement opportunity.

Social network refers to a relationship network among people, and social website is based on the mentality of social network relationship^[2]. Now many Web 2.0 websites belong to this type, such as Instant Messaging (IM), dating, video show, blog, podcasting, network community, and music sharing. The social network is a media with the most potential, full of cohesion. In addition, it provides effective communication channels, and becomes a culture bearer and leader.

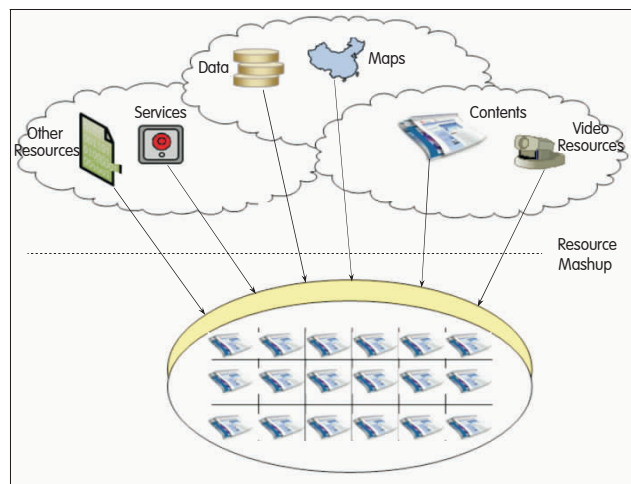
1.2 Network Video

With the fast development of broadband networks and the continuous emerging of new high-quality video compression technologies, higher compression rate and wider bandwidth have been technologically promoting the development of network video. With the rapid increase in the number of global Internet users, the Internet has become the main source for information and entertainment. This brings increasing demands for video, which also promotes the development of network video.

Network TV and online video have developed in an explosive way. Google bought YouTube for USD 1.65 billion in October 2006. Janus Friis and Niklas Zennström, the founders of the two famous P2P websites Skype and Kazaa respectively, also announced entering network TV market. They initiated the Venice Project, which was later named Joost^[3]. All the major TV stations in the world follow the trend by providing video services like Video on Demand (VoD) and network TV. Several Chinese portal websites, such as Sina and Sohu, have cooperated with TV stations to provide network live broadcasting services. Of course, IPTV is also part of network video. According to the newly released report from iSuppli, the global IPTV user number will increase by 12 times from 2006 to 2010.

1.3 Intelligent Search

Search is the important driving factor for the rapid development of the Internet. In fact, without search, the Internet could not reach today's scale. Search makes full use of the sharing characteristic of the



◀ Figure 1.
Resource Mashup.

Internet. Through searching, we can find useful information in massive web pages, and share our own articles, video and images. Moreover, Internet search contributes to the accomplishment of plenty of Internet companies such as Google, Baidu and Yahoo!.

Now text search cannot meet people's demand anymore. They also want new searches for pictures, music and video. Intelligent search, which can intelligently match related search results with users' search habits and intentions, is becoming a development direction. Although traditional search engines become more precise and extensive, but they still cannot surpass human intelligence, and can only match words without understanding people's true intentions. Combined with artificial intelligence technology, intelligent search improves information retrieval from current key word matching to a level based on knowledge or concept matching. It has certain ability of understanding and handling knowledge, and enables text segment, synonyms identification, concept search, phrase identification and machine translation^[4].

Larry Page, the founder of Google, said that the final search engine would understand everything, and that it would understand any questions you ask and would immediately give you the correct answers^[5].

Yahoo! IMatch, the first search engine with highly-intelligent fuzzy matching function in China, has been launched online. It was created by the experts from Yahoo! China, Yahoo! global and Alibaba after one year of hard work. The

great characteristic of this search engine is that this system can intelligently match related search results to users' search habits and intentions, and therefore the search results are closer to users' real demands.

1.4 Mobile Internet

With the development of both the Internet and terminal equipment, people in the future will access the Internet through mobile terminals besides computer. Mobile terminal equipment is more important to business travelers, and it will be one of the main ways to access the Internet in the future. People will use their handheld terminal equipment to check email, transact stock and conduct other interactivities anytime and anywhere.

People have fully realized the success of the Internet industry, and will definitely copy the development model of the Internet to mobile Internet step by step. The biggest mobile phone vendor Nokia has realized that the voice communication is only the basic function of mobile phones, and that the mobile Internet is the future of mobile phones. Therefore, in the Global Mobile Conference 2008, Nokia released four products aiming at mobile Internet, and showed multiple positioning and mobile multimedia functions, such as Navi Walker, geography markup, movie browsing, and video and photo sharing^[6].

Actually, iPhone from Apple has brought the mass fever for mobile Internet. iPhone handheld equipment integrates functions of both mobile phones and PCs. It has a revolutionary user interface to make it easier for users

to browse on the Internet through image scaling and other methods. The to-be-launched iPhone 3G retains all the revolutionary iPhone functions and supports 3G networks, which may make a big stir in the mobile Internet field.

2 New Internet Technologies

Technology often plays a significant role in the development of the Internet and telecom networks. For instance, P2P technology has extensively been used in the Internet, but has great impacts on telecom business and operation. The following new Internet technologies not only influence the development of the Internet, but also catch the eyes of the telecom industry.

2.1 Mashup Technique

Since there are diversified contents scattering on the Internet, Mashup technology is developed to enable the integration of Internet data and services. Figure 1 shows scattered Internet resources integrated by Mashup.

(1) Service Interface Mashup

It was predicted several years ago that Web Service would be one of the most promising technology, and today it really plays an important role in the Internet, being extensively used in B2B applications. Comparing with Web Service, Rest is a light-weight web service technology with extensive light-weight applications. Nowadays many websites get used to opening their network capabilities through Web Service or Rest service interfaces with which users can search and discover services through Universal Description, Discovery and Integration (UDDI) or other means, and finally fulfill service mashup.

(2) Application Programming Interface (API) Mashup

There are also many websites opening their network capabilities through the API. Being a good example, Google has offered a set of Google Map API, with which users can conveniently integrate Google Map onto their own web pages. The integration of Google Map with location messages of mobile phones can create a new application of dynamically showing the location of an appointed person on the map. Google Map, if integrated with news, can fulfill

the inquiry of local news at a certain location.

(3) Content Mashup Based on Really Simple Syndication (RSS)

RSS technology makes the content mashup in Internet easier. It is a very tedious task to search for information through hundreds of emails and decades of websites, but a RSS reader can put various data sources into one view, simplify the task by showing everything in one view. The RSS reader can mashup all the briefings your have selected, and list them in an easy to read way.

(4) Content Mashup Based on Service Oriented Architecture (SOA)

The SOA is usually used for inter-system data syndication, service syndication and service logic arrangement in enterprise application environments. It can also be used in the Internet to fulfill service mashup and to arrange services from different websites to form new functions.

2.2 Artificial Intelligence

Artificial intelligence makes a machine act like a human. With the development and popularization of the Internet, artificial intelligence has been energetically applied in it, such as the semantic network, network intelligent robot, and intelligent search.

The semantic technology can improve computers' understanding of data. It is very useful for integrating large-scale data sets. Moreover, it enables a computer to infer the relationship between undefined data elements, so it facilitates searching applications. The semantic Internet, where machines can have conversation, makes the Internet more intelligent. With it, computers can analyze all the data, contents and links online, and then interaction between humans and computers^[7]. The core idea of semantic Internet is set up Metadata for data description, enabling computers to handle meanings. As long as computers are equipped with semantic functions, they will implement complicated semantic optimization.

China has developed network intelligent robots, who can provide users with various personalized services through binding instant messaging software such as MSN and Yahoo!

Messenger. The robot can not only chat, brag, joke with users through a dialog window, but can also obtain service information on map, stock, weather, tickets and more.

Internet search and data mining is dedicated to the integration of "data mining, machine learning and knowledge discovery" technology and "information analysis, information organization and information retrieval and visual" process. It will bring an advanced new Internet search.

Internet is a huge, heterogeneous and dynamic network, and advanced Internet search technologies absorb and utilize achievements from different fields, including information retrieval, data mining, machine learning and database. The biggest difficulty of intelligent search lies in how to effectively and quickly dig out information and knowledge understandable for machines from non-organized and non-structured data on the Internet. To solve the problem, a study is carried out on automatic structure discovery and subject extraction from web pages.

2.3 Grid Computing

Grid computing connects the computers in the Internet to share their resources, such as processing ability and data. This computing model uses the Internet to form a virtual super computer by all the computers scattered in different locations. As shown in Figure 2, every computer in the network is a node, and the computing is completed by thousands and thousands of the nodes in this grid network. Therefore, such computing is called grid computing^[8].

Grid computing is regarded as the new-type basic architecture in the 21st century, and expected to be a mainstream IT commercial application in the coming ten years. Grid computing has extensive application, especially in the fields requiring large-scale computation, such as weather forecast, financial analysis, science study and military.

Well-known domestic and international enterprises like

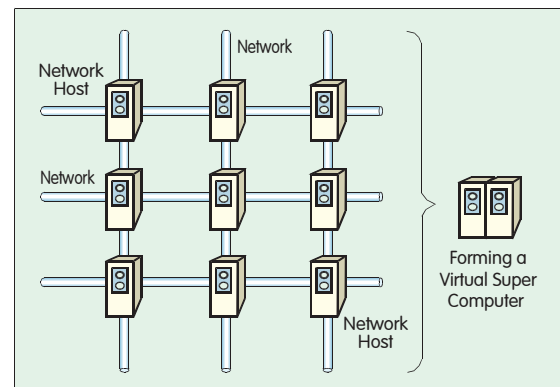
Oracle, HP, Intel, Microsoft, CA, Sun, SGI, Platform, Lenovo, Inspur and Dawning have all invested in the commercial application development of grid computing. Moreover, Chinese government thinks its application can enhance the national competence and strength, and has been paying high attention to it.

2.4 Open Platform

Websites, big or small, or even some enterprise platforms, try to maximize openness of their own interfaces to the public, especially to the developer community. For the developer, an open platform provides a running environment for applications, just like the PC operating system provides a running environment for desk application programs.

Open Social, a global open platform project initiated by Google, aims to provide unified application program developing standards for social websites. The project has gained the support and participation of such websites as MySpace, Yahoo!, Orkut and Friendster. Open Social includes plenty of standardized APIs. Developers write an application program through Open Social, and then they can run the program in different social networks.

Following Google's Open Social, Facebook has opened its platform, allowing a third-party developer to promote its products and applications on its platform. Moreover, Apple released its iPhone Software Development Kit (SDK) in February 2008, by which every programmer in the world can develop programs for iPhone. Yahoo! China has also launched its open New Commerce Platform (NCP), providing a running



▲ Figure 2. Grid computing structure.

environment for applications.

The contest between Web 2.0 websites has been developing into a struggling for platforms. Platform opening can help websites attract users and cooperation partners. However, it will be fulfilled by a series of technologies and standards, rather than by single technology.

3 Impacts on Telecom Industry

The abovementioned new technologies and application trends not only promote the development of the Internet, but also influence the telecom industry. The Internet, especially mobile Internet, is pushing the telecom industry into a new developing stage. With more convergence between the Internet and telecom networks, many new looks appear in the telecom circle, such as Google, Apple and Microsoft. On the other hand, telecom operators, under the pressure of traditional voice service saturation, are eager for new profit growth points. A revolution in the telecom industry is unfolding, which is driven by the convergence of the Internet and telecom networks. Without the emerging of any decisive new technology, this revolution is unlike previous telecom changes that were always driven by technical progress.

Monopolistic and blocked telecom operators are gradually opening up, along with the convergence of the Internet and telecom networks. Mobile Internet copies the traditional Internet model and has made great progress. However, mobile operators are not involved much in the user experience, because users in the mobile Internet have little connection with them except using the data channels they offer. Internet P2P services take much bandwidth, but telecom operators can earn little from it. All these facts have great impact on the telecom industry, and telecom operators have felt the threat from the Internet. Dissatisfied with becoming "pipe" providers, they have begun to look for their way of strategic transformation. Contents and data are the transformation direction, but these are the strengths of Google, Yahoo! and Microsoft. Platform opening might be

another choice for telecom operators, and they may learn from Facebook that opens the platform API to enable users to develop application programs for Facebook. Creative applications have brought Facebook vitality. Such opening capability can only be utilized by the third party, but not be taken away from telecom operators; in this way, the operators' core competence will be strengthened and enhanced.

The telecom industry's tomorrow will be content dominated, and those enterprises who own core contents and services will be the most valuable ones in the industrial chain. Though voice service is still the main revenue source for operators, it is just the basic function of the Internet. Users will be more attracted by such new services as social networking, video and entertainment. Equipment vendors are paying more attention to service research and development. Nokia has launched its network service brand Ovi, which can provide a series of services including Global Positioning Service (GPS), music, games and more. On the Global Mobile Conference 2008, Nokia released the "Share on Ovi" service, which implements users' social networking, interaction and cooperation. Ovi has opened the door to mobile Internet services, implying Nokia's marching into the Internet service field. China Mobile's plots and actions on mobile Internet in recent years have shown its high attention to services. Concentrating on mobile phone media, it has obtained the tender offer from Phoenix TV, cooperated with multiple music record companies, and launched its Fetion service.

The booming of mobile Internet will break the monopoly of telecom operators on services. The operator-oriented business model will change to client-oriented, and the influence of terminal vendors, who are the closest to users on the value chain, will be more significant. Mobile Internet will be the mobile phone's future, and it will change the current weak position of terminal vendors in the telecom industrial chain. Apple's iPhone shocked the world; it offers brand new mobile Internet experience, and has gained numerous and increasing fans. iPhone is content-binding and has plenty of users,

which forces operators to accept its harsh conditions for cooperation.

4 Conclusion

The Internet and telecom networks well complement each other on their way of development; they have many things in common. New technologies and business models having promoted the rapid development of the Internet are the reference for telecom operators. Both the Internet and telecom networks are built based on IP technology, and their businesses are moving towards overlapping and integration. Therefore, their development direction must be network convergence. However, the convergence will not simply integrate the telecom networks into the Internet, or vice versa, but will create a new all-IP based basic network instead.

References

- [1] 《连线》杂志[EB/OL]. http://www.wired.com/techbiz/it/magazine/16-04/bz_socialnetworks.
- [2] 百度百科网[EB/OL]. <http://baike.baidu.com/view/8258.htm>.
- [3] 新浪新闻网[EB/OL]. <http://tech.sina.com.cn/roll/2007-01-16/1202219133.shtml>.
- [4] 赛迪媒体网[EB/OL]. http://media.ccidnet.com/art/2647/20061205/968119_1.html.
- [5] 新华网[EB/OL]. http://news.xinhuanet.com/newmedia/2006-05/24/content_4592353.htm.
- [6] 吴颖. 终端崛起[J]. IT经理世界, 2008, 3(5): 65-67.
- [7] ReadWriteWeb[EB/OL]. http://www.readwriteweb.com/archives/10_future_web_trends.php#.
- [8] IT专家网[EB/OL]. <http://whatis.ctocio.com.cn/searchwhatis/183/7332683.shtml>.

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