Vitality of mobile broadband

At the beginning of 2007, Huawei set up a goal, “In the next five years, Huawei will be committed to leading telecom networks and services to the All-IP FMC era, and thus becoming a reliable partner of operators in their transformation and development.” The Wireless Network Product Line of Huawei chose “Leading Mobile Networks to IP” as its theme. What are the significance and value of IP to mobile operators? How do overseas operators view the IP-based network evolution? What changes will IP bring to operators’ network operation and maintenance? With these questions in mind, a journalist with Communications Weekly interviewed Zhao Ming, Vice President of Wireless Marketing Dept, Huawei Technologies Co., Ltd.

By John Lee from the Communications Weekly

Reporter: What are the significance and value of IP to mobile operators?
Zhao Ming: First of all, the future development of mobile broadband is sure to be integrated with IP, which is the source of vitality of mobile broadband. There is a more and more obvious tendency for wireless mobile communications to evolve in the direction of broadband, and for GSM to evolve into GPRS and EDGE. More and more mobile data services will be introduced during the process of such an evolution.

In terms of 3G, the peak uplink/downlink rate was only 384Kbps when the 3GPP launched the R99 version. However, after HSDPA is introduced at the R5 phase, the maximum downlink rate will amount to 14.4Mbps. The year 2007 has seen widespread applications of the 7.2Mbps downlink rate worldwide. After HSUPA is introduced at the R6 phase, the actual and the theoretical maximum uplink rates will reach 1.92Mbps and 5.76Mbps respectively. At the HSPA+ phase, the maximum downlink rate can reach 42Mbps and the maximum uplink rate can reach 11Mbps. In the 4G era, the peak downlink rate may amount to 140Mbps or even higher, with the peak uplink rate exceeding 50Mbps.

Under this circumstance, it becomes harder and harder for the traditional transmission mode to meet the requirements of the evolution of mobile networks in the direction of broadband. The annual rental fees for one E1 in Europe are about EUR5000, and one E1 only provides a bandwidth of 2MB. If HSPA is to support a downlink rate of 14.4Mbps, a transmission resource of about 20MB is required even if the average traffic is about 6Mbps in a community and 3x1 base stations are deployed. In this case, 10 E1s have to be rented, incurring total annual rental fees of EUR50,000 to EUR60,000. In view of this, if the problem with transmission is not solved, it will be very hard for mobile broadband to become a reality.

Second, viewed from the mobile communications platform, the core network and the bearer network are already IP-based. The IP-based platform of the wireless access network is conducive to the improvement of the overall efficiency
of mobile networks.

Last but not least, viewed from the trend of service development, all services in future will be carried over the packet switched domain. Thus, the network will eventually evolve in the IP direction. There is no longer such a concept as “circuit switched domain” in Long-Term Evolution (LTE), which best illustrates this point.

**Reporter:** What is Huawei’s advantage in leading mobile networks to IP?

**Zhao Ming:** Currently, competition in the mobile communications field is no longer limited to power amplifier and baseband processing technologies. Instead, the focus of competition has shifted to the overall capabilities in transmission, integrated products, IP, radio frequency, algorithm, and understanding of the networks.

Compared with other vendors, one of the advantages of Huawei is that it has the most comprehensive range of communication product lines in the industry. For example, in products like base stations and controllers, we have integrated advanced technologies in fields like broadband, transmission and data communications. Huawei is capable of integrating technologies, experiences and capabilities from different fields into our base stations.

This also reflects another trend of the industry: Instead of being a mere pipe, the access network should be perceptive to services. In other words, the access network should be optimized to cater to the voice service, broadband access, instant messaging, and the various mobile multimedia services according to the characteristics of different services. The access network in future is required to be perceptive to services.

After mobile communications has developed to a certain degree, more and more fields will be involved. Future competition in the mobile communications field is surely not specific to one product line; instead, it will involve multiple fields such as broadband, transmission, data communications and even services. Basically, Huawei is among the top 3 in each of these fields. By integrating all these fields, we will be able to provide the most competitive products and end-to-end solutions.

Currently, we have become fully aware of where our core competitiveness is.

**Reporter:** Just now you mentioned “perceptive capability to services”. How can this capability be developed?

**Zhao Ming:** The access network is required to be perceptive to key parameters of relevant services, and give top priorities to the guaranteeing of these parameters as much as possible during the service access. For example, the index for the end-to-end delay should be guaranteed for the voice service.

Besides, the access network gets to know about the status of the service by identifying system information at the network side. Currently, Huawei has made relevant optimization oriented at many services at the access side. Our main focus is user experience. We need to focus on customers other than technologies in network construction and optimization. That is also the direction of future development.

**Reporter:** Will early investments in IP technologies increase operators’ CAPEX?

**Zhao Ming:** In the long run, application of new technologies will help reduce costs. Though investments in a single site or single equipment may increase a little in a short period of time, the CAPEX will actually be greatly reduced if you take into consideration saving of costs in transmission and services as well as future evolution.

Currently, more and more services are carried over the Internet. In future, more and more such services will appear. As mobile networks evolve in the direction of broadband, all services will be carried over IP networks. Thus, IP is beneficial to operators’ overall investments.

If IP has already been in place, there is no need to invest more in the ATM of the transmission network. If operators fail to construct future-oriented networks earlier, they may find problems with their initial investment in the foreseeable future.

**Reporter:** When Huawei communicates with overseas operators about All-IP, what are their concerns?

**Zhao Ming:** Since the end of 2004, we have started to discuss with operators the issue of saving transmission resources. After HSDPA appeared in 2005, we put forward the concept of IP transmission. However, we were facing a very big problem then: QoS of IP of the entire network is hard to guarantee.

Under this circumstance, we put forward the concept of “mixed IP”, that is, voice services are still carried over the TDM but data services are carried over IP. In 2005, we put forward such a “mixed-IP” transmission solution, which was successfully put into commercial application in countries like Japan, the United Arab Emirates, and Singapore.

IP networks in Japan are All-IP-based, with guaranteed QoS. But we adopt “mixed IP” in the United Arab Emirates and Singapore. Currently, one base station of Huawei can support two protocol stacks; and Huawei is now the sole vendor worldwide to provide such base stations.

Through communications with operators, we find their top concern is the QoS issue brought by IP. Generally, top operators require long-time tests and trial applications, as they have too many worries: whether the existing services will be affected, whether security will be guaranteed, how to evolve into the IP-based public network, and how to avoid being attacked, etc.

**Reporter:** What changes has IP brought to operation...
and maintenance of mobile networks?

Zhao Ming: The IP technology has brought revolutionary changes to network optimization and maintenance. For example, before softswitch was adopted, the number of MSCs of a mobile operator amounted to several dozens, or even hundreds. If new services are deployed, every MSC has to be upgraded and uploaded with services. And one MSC involves hundreds of thousands of users, which makes remote operations impossible. Consequently, several months is needed for service deployment at a time.

After IP is introduced, the MSC server is just deployed at the regional level; and each province just needs to upgrade several MSC servers, which makes operation and maintenance of the entire network much simpler.

Besides, IP has also flattened the network, and thus reduced the system delay, which will in turn greatly improve user experience. Meanwhile, the network has become much more secure. After the IP technology is adopted, the network can support the N+1 backup and the “pool” functions.

For example, if a certain controller is faulty, data packages on it can be routed to other controllers, thus guaranteeing the reliability of the entire network. However, even though the “N+1” backup may be realized in theory in the TDM era, the cost of doing so is too high, thus making the “N+1” backup hardly feasible.

Reporter: Have any operators raised any special requirements for IP?

Zhao Ming: When discussing a 3G network construction with EMOBILE, an operator of Japan, we’re required to put RNCs only in several key cities in Japan, thus raising very high requirements for delay.

We conducted a test by putting RNCs in Tokyo and Osaka and base stations in Hokkaido. We also tested HSPA by configuring an IP transmission simulator in the system, which can be used to change the delay.

We and EMOBILE spent quite a long time in verifying our system, and finally proved that our system could fully meet service requirements. Besides, EMOBILE has no traditional networks. Thus, how to realize the clock function is another issue concerned about by EMOBILE.

Reporter: What is the goal of Huawei at the next phase in leading mobile networks to IP?

Zhao Ming: At the initial phase, we mainly solved the deployment issue of IP-based mobile networks. In future, we will pay attention to the performance of IP-based mobile networks. We will focus our attention mainly on quality and stability of IP-based mobile networks. Our goal is to guarantee the basic network performance even if the QoS of some networks is not so good.

Besides, IP will still be a topic frequently discussed in the development of mobile networks. How to realize finer management and how to provide networks to cater to requirements of the various services will be our main focus in future. In future development of the entire Wireless Network Product Line, Huawei will take into full consideration the evolution into the All-IP era rather than limited to WCDMA.

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