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The much-hyped Apple iPad finally hit the street in April and has been as popular as its predecessor the iPhone, heralding in the age of smart mobile devices. The device market gets another boost from Android smartphones that are increasingly available and affordable. In China, sub-US$140 smartphones are becoming common.

Strategy Analytics data shows that worldwide smartphone shipments rose by 43% to 60 million units during the second quarter of 2010, claiming 19% of the handset market. Such new smart devices are effecting changes in usage habits that cause a shift in the value chain of the operator industry. More importantly, the traditional telecom network has to adapt and change as a result.

This view is echoed by Mr. Rolv-Erik Spilling, CTO of Telenor Norway, who observed, “In the next three years, terminals such as the iPad will make business applications much more usable. Integrating everyday work and specific business into the terminals will boost the needs for business applications. Capacity driven and business services such as video, telepress and unified communications will be boosted. Our project is paving the way to realize this.”

Apart from the iPhone, iPad and various Android smartphones, mobile broadband dongles have been wildly popular over the past two years and contributed decisively to mobile Internet development. According to Andy MacLeod, Director of Vodafone Technology Networks, the majority of mobile data usage is from dongles on PCs, not smartphones, even though the iPhone, Android and other smartphones have attracted a lot of attention. In 2009 alone, Vodafone’s networks registered a 93% increase in data traffic, 85% of which came from mobile broadband dongles.

To address the dongle traffic, Vodafone has consistently invested in network bandwidth. Seeking to optimize capacity usage, Vodafone has come up with yield management techniques, which include: more efficient and effective network monitoring; better capacity usage; and offloading low-quality/high-volume traffic as early as possible.

The most fundamental change brought about by a wider array of smart devices is in business and operating models, rather than in usage habits and growing demand for bandwidth and network capacity. Leading operators like MegaFon and Vodafone are successfully pioneering smart operation through effective management of network resources, users, content, billing, and so on.

Without robust cloud computing infrastructure and network support, the iPad is merely an expensive toy for adults. In effect, mobile Internet growth calls for highly effective coordination between the terminal, pipe and service platform. It is in this coordination that actors on the value chain identify and leverage business opportunities.

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Telenor Norway
preparing for a new day

When customers become used to high quality networks in a matured market where traditional voice business does not contribute revenues as much as it did in the past, what is the next step? WinWin met with Telenor Norway’s CEO Ragnar Kårhus and CTO Rolv-Erik Spilling to find out the new day that the operator is heading.

Embracing the challenging task

In the winter of 2009, Telenor Norway decided to replace its entire mobile service infrastructure with multi-base stations for 2G, 3G/UMTS and 4G/LTE. The project attracted worldwide attention as the largest upgrade scheme ever carried out by the operator in Norway.

According to the CTO, Rolv-Erik Spilling, it is destined to shift the basic structure to next generation mobile networks, and, far from being just a local scheme, has emerged as a strategic focus of the Telenor Group. “Other Telenor OpCos see this as an opportunity to replicate what we’ve done in Norway and learn from our experience.”

Rolv-Erik Spilling elaborates on the project, “In six months, Telenor and Huawei set up a huge organization to get to grips with the heart of the project. Our maximum swap rate will be 40 base stations a day, or 200 a week. It will be done in a cluster by cluster model. This is our pace through 2010 to 2011.”

Though planning and preparations have progressed smoothly, the project involves a plethora of tasks that require both the operator and vendor to communicate on a daily basis. Broadly, the project comprises: swapping all the operator’s base stations in Norway; providing wireless coverage for one of Europe’s most sparsely populated countries, housing 4.8 million residents over 385,252km²; improving network quality for subscribers already used to good quality; constructing a unified platform ready for 2G, 3G, and 4G networks; deploying a new All-IP based backhaul structure; managing a huge organizational resource pool; and, of course, cooperating with new partners.

However, as Rolv-Erik Spilling comments, “if we do it correctly, we will come out very strong for the next phase, the new day.”

Renewing user experience

Exploiting MBB

Like other telecom markets over the past 5 to 8 years, Norway has witnessed fixed to mobile voice migration. According to Ragnar Kårhus, CEO of the company, “We’ve enjoyed significant growth in the mobile sector from that migration. Between 2010 and 2011, over 70% of all voice
The new network will make a jump in capacity from existing mobile access to a mobile broadband service that provides a comparable experience to fixed services.

— Rolv-Erik Spilling, Telenor Norway’s CTO
Our approach to mobile banking service differs from the ones in Pakistan or Bangladesh. In Norway, the banks provide the services, and we’re trying to build mobility as part of a security mechanism for Internet banking.

Our project is paving the way to realize this.”

Making revenue in new businesses

The market environment has forced operators to go beyond traditional telecom services. However, even if enriched services are provided, operators still face the challenge of meeting the revenue requirement. Telenor is a well known pioneer for reaching across industries. The CEO summarizes his philosophy regarding cross-industry cooperation models: finding the right position, providing a good connectivity platform, and elevating the role of mobile phones in life give you revenue.

Digital music: a revenue stream

According to the Telenor Group’s observations in the Scandinavian mobile markets, Sweden has the most developed mobile broadband services; Danes are the keenest SMS users, and have a growing interest in content services; while digital music is gaining in popularity in Norway.

Telenor launched a mobile music store in 2004 offering...
Reliable connectivity, first priority

A key question in the industry is a fundamental choice of role: A big pipe or a service provider? Ragnar Kårhus is convinced that, “in Norway, we need to ensure that we’re the preferred quality provider of network services and availability.”

Telenor enjoys a very strong position in the enterprise segment. “We can build connectivity into our customers’ own applications, or the products they sell to their customers. IT and communications technology are continuing to converge, and we now provide APIs that make traditional telecom services available in business; this does not necessarily bring ‘Telenor’ to PCs, but it creates click-to-call and so on. First, we’re part of that value chain. Then we can consider various forms of revenue division. The business model has to develop further.

“But we need to proceed step by step, focus on the basics, and utilize our extremely high quality network. The MBB is developing so fast to serve customer needs; I strongly believe in the value of good connectivity.”

Working with new partner

As the CTO of Telenor Norway, Rolv-Erik Spilling has worked with other vendors over the long term, and he feels differently about Telenor’s new partner, Huawei, “In the West, there is a lot of PowerPoint stating that we should fulfill what the customer wants, however, based on a short-term profit win/loss model.” He values Huawei’s philosophy regarding long term win-win partnerships, “From the procurement process onwards, Huawei has been flexible, despite its size. I can see this in small ways everyday. I hope you can retain that flexibility.”

Regarding the deepening cooperation between the two partners, Rolv-Erik Spilling is looking forward to the Joint Innovation Center currently under construction by Telenor and Huawei. “I tried to establish this kind of joint innovation center with Telenor before. I knew it was easy to give a PowerPoint presentation, but difficult to get the right resources to implement the right project. I think Huawei is more prepared to do that than Telenor.”

Rolv-Erik Spilling sees the Joint Innovation Center as a crucial partnership model for the coming 4G revolution. “It can address the challenges found in spectrum frequency, network management, and access network performance. We also plan to look at increasing Telenor’s efficiency in the multimedia domain, and implementing Business Intelligence to catalyze a smarter network. I hope the Joint Innovation Center can be an arena that we can stay ahead of the ongoing swapping project.”

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Mobile banking, different approach

Mobile banking is creating miracles in emerging markets such as Kenya and the Philippines. Comparatively, Europe already has a mature banking system, so what is the case for developing mobile banking services in this region?

Ragnar Kårhus explains Telenor’s thinking. “We’ve worked closely with large banks in Norway for many years and have tried different business models. Our approach differs from, say, the approach in Pakistan or Bangladesh. In Norway, we’re trying to build mobility as part of a security mechanism for Internet banking.”

Telenor provides an electronic ID and signature solution that saves security elements – the BankID – onto a SIM card. This enables online banking users to log on to an online banking service instead of using the code unit, as people have their mobile phones with them at all times, but not the code unit.

Ragnar Kårhus states that Telenor wishes to cooperate and not compete with banks. “This is a ground-breaking cooperation model. The banks provide the service, and we form part of the authentication value chain. Operators can be paid a certain amount per month or per transaction. Although it doesn’t return much, this is the beginning and we need to think long term. If Internet banking is more widely used or if banking is conducted using mobile phones, then mobile phones will increase in importance. That gives us opportunities.”

Mobile downloads in 2008 alone. In 2009, Telenor upgraded the store into a music streaming service called WiMP.

WiMP has signed agreements with 20 content providers (CPs) for streaming more than 6.5 million songs. These CPs include four major record companies and a number of smaller independent partners. Such a partnership between a telco, a technical solutions’ provider, and a music store chain is unique in Europe. Ragnar Kårhus recalls that when Telenor began exploring digital music in 2004, they did so alone, “But, we knew this was not our core business. We also saw that musical companies were trying to find ways to sell their music in the digital space.” So, the unique partnership was born.

More interestingly, Telenor does not directly split the revenue from this popular service. However, Ragnar Kårhus does not see it is negative. “We see the streaming service as something that makes our customers consume music through their phones, and raises our data traffic and revenues. We definitely get our customers to utilize increased bandwidth and enhance experience. Actually, it helps increase data ARPU by 10-20%.”
From the network perspective, customer satisfaction is determined by building a certain capacity, and then implementing yield management techniques that help you use that capacity wisely.

— Andy MacLeod, Director of Vodafone Technology Networks
Vodafone: what counts in MBB era?

While mobile broadband has enhanced the world of communications and delivered new growth points for operators, it has also stimulated the market appetite for fresh applications and caused data traffic to rise significantly. The resulting rise in demand for bandwidth and a dearth of killer applications continue to present challenges for operators. However, Andy MacLeod, Director of Vodafone Technology Networks, has the way out.

By Joyce Fan

The operator’s strategy

In 2009 alone, the data traffic carried by Vodafone’s networks experienced significant growth. Although the quality of voice in a mobile context still remains the major quality marker for customers, Andy MacLeod believes data services are now an important ingredient in the customer satisfaction mix.

According to Andy MacLeod, the majority of mobile data usage is from dongles on PCs, not smartphones, even though the iPhone has attracted a lot of attention. “Actually, the lion’s share of the data traffic in our networks is attributable to mobile broadband dongles, and this has driven our plans and investment strategies. Our network investment strategies are now predominantly driven by data demands rather than voice.”

Creating a big and smart pipe

“From the network perspective, customer satisfaction is determined by building a certain capacity, and then implementing yield management techniques that help you use that capacity wisely.”

Boosting capacity in the wireless and fixed domains

Vodafone has not reduced its investment over the last 2-3 years, even during the global economic downturn: “We kept investment pretty flat at our target level of around 10% of revenue, and prioritised expanding the capabilities and capacity of our radio access network, particularly for HSPA data throughput.” Given that 85% of its access network backhaul is self-built microwave, Vodafone has also invested heavily in backhaul, particularly in IP microwave backhaul, which forms an increasing part of the operator’s budgetary commitment.

In addition, Vodafone continues to focus on its fixed network footprint. “Again, we’ve invested fairly solidly in rollout and capacity expansion. We have started to invest in VDSL, ADSL and more extensive fibre to our DSLAM’s, alongside upgrading the whole underlying infrastructure,” Andy MacLeod commented.

On top of enlarging its pipes, Vodafone is also looking at techniques to manage capacity usage and optimise traffic.

Network yield management

Andy MacLeod defines “yield management” as “techniques that use capacity wisely”.

To achieve this, it is important to start with the ability of measuring services not from the network perspective, but in a way that more accurately reflects what is happening in the customers’ handsets, dongles, or other devices. “We’ve installed probes across our networks to measure the individual service experience that a customer receives. Doing this has allowed us to analyse and plan how to optimise access to the applications that our customers use. Our aim is to ensure our yield management techniques make a real difference to our customers.”

A second area of focus is on how to manage capacity utilisation, particularly during peak hours, “We need to ensure that our precious network resources are rationed and directed at the key services that really need them, and towards our highest value customers. One example is in Spain where,
using our Huawei equipment, we have implemented quality of service techniques over the radio interface. This allows us to measure the types of traffic that we carry through our network at peak times, and optimise the less valuable traffic that is not central to the quality of user experience.”

As a final example, Vodafone is seeking to offload as much traffic as possible from its mobile network as early as possible, particularly for Internet-related traffic. According to Vodafone’s statistics, 90-95% of mobile data traffic is generated indoors, not on the move. Andy MacLeod believes that, for this type of simple stationary traffic, mobile networks are far more sophisticated than necessary. “Generally, fixed networks are optimised to deal with low quality/high volume traffic, so we are focusing on the adoption of fixed offload techniques for this type of traffic.”

**Fully exploring the potential of HSPA**

During his presentation at the Huawei Global Analyst Congress in 2009, Andy MacLeod mentioned that HSPA still has much growth space. A year later, he believes that his statement is clearly supported by the subsequent developments in HSPA technology.

“Back at the Barcelona Mobile World Congress in 2010, Huawei gave an enormously powerful technological demonstration. You showed HSPA achieving peak speeds of around 84Mbps, which clearly showed HSPA is a highly competitive technology, even when compared with emerging technologies such as LTE.”

According to Andy MacLeod, Vodafone has already upgraded the majority of its footprint to 7.2Mbps. In 2010, Vodafone plans to upgrade most of its networks to 14.4Mbps capability, and to 43Mbps capability in hot spot areas. “Operators in markets such as China may deploy LTE earlier than us, as they lack our established 3G capability and footprint. Undoubtedly, we’ll end up upgrading to LTE in selected areas of selected markets as well, as it has some key benefits that we cannot ignore. However right now, it is very much about extending Vodafone’s HSPA capabilities.”

**A truly open network**

The battle for owning applications and occupying the dominant platform is palpably driving the industry. In this context, Vodafone firmly believes that the ecosystem needs a truly open environment.

The company has cooperated with other operators and the Wholesale Application Community, through initiatives such as JIL (Joint Innovation Lab), to achieve greater openness. In September 2009, the operator launched Vodafone 360, a suite of Internet services for mobile devices and PCs. The product provides seamless interfacing into social networks such as Twitter, and access to an application store for other developers’ products. “It’s definitely becoming more open. Our general view is to use as many open standards and channels as we can to boost momentum and take up of mobile data. Customers, for example, can already download applications from third party stores with Vodafone 360.

“It’s much like a shopping mall. There’s a place for the stalls, but generally people like the big shops that offer multiple brands, a reliable way to pay, and an open environment that provides choice. This is what we are looking to provide – a platform that houses applications from a variety of places and parties, that allows people to come together, and delivers a positive experience for our customers.”

**Accelerating service innovation**

Andy MacLeod believes that there are two main aspects to consider in the development of new services. One is developing it technically – for example on what platform or underlying technology you do it. The other aspect is about what the customers actually want from the service, and how they wish to use.

Creating the Application Innovation Centre (AIC) has helped Vodafone establish a richer connection with Huawei. Vodafone possesses a deep insight into the nature of service use, which is complemented by Huawei’s comprehensive understanding of network technologies and implementation challenges. “We have the potential to create a wide range of new products, in the same way that our Mobile Innovation Centre has driven a number of new capabilities (like QoS and Femtocells) that are now deployed in volume across Vodafone.”

In March, 2010, Vodafone and Huawei celebrated the second anniversary of the AIC. Andy MacLeod believes it is a key vehicle for making things happen both more creatively, and more quickly. “It is a distinguishing characteristic of the much richer relationship that we have with Huawei. In this context we have moved from a model where Huawei basically sells us technology, towards one where you are a real strategic partner.”

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Mobinil: from mobile in every hand to Internet in every hand

Maintaining the edge

WinWin: Can you give us a brief introduction to the Egyptian telecom market?

H. Kabbani: Egypt is the largest market in the Middle East region, with 80 million people and is full of vitality. Mobinil started operations in 1998 and has a vision of putting a “mobile in every hand”. When we began, it was regarded as a crazy vision, as the majority of people thought that mobile telephony would be limited to the rich and business people. Now there are 57 million mobile users in the 3 operators’ Egyptian market, out of which 25 million are from Mobinil. We are proud of this achievement.

WinWin: How would you describe Mobinil’s 3G operations? And what is 3G’s role in your future operations?

H. Kabbani: We made the decision to get into 3G in 2007, after making sure that 3G service and technology were ready and showing a real value. The 3G service created a new trend and we are excited about this. It helped us evolve in our position from “mobile in every hand” to “Internet in every hand”.

We want to democratize the use of the Internet in Egypt. This would help develop the society; therefore we are heavily investing in 3G. We embarked into this new adventure after accomplishing a rollout of 2G services.

Our aim is to make 3G available everywhere in our
Win-Win: Seeing decreasing voice revenues, operators are vying for enterprise customers as a reliable source of revenue. In this field, does Mobinil have any edge over its competitors?

H. Kabbani: From day one, we knew the importance and value of the enterprise market segment, and gave it special attention with dedicated structure and resources. We take good care of our professional and business customers by tailoring solutions for them. For example, we study the needs of a company or organization, and provide them with offers like the closed user group, in which they communicate to each other at an exclusive preferential rate and enjoy certain services tailored specifically for them. We always try to anticipate their needs, while listen to them and provide them telecommunications solutions to help them make their business more efficient and enjoyable.

Enabling Internet in every hand

WinWin: To develop 3G and enable Internet in every hand, have you encountered any challenges and if so, how do you tackle them?

H. Kabbani: The 3G technology is good only if we know how to make it serve the consumers, and not the contrary. Our know-how and market experience made us putting the customers at the center of our operations, which

Through partnerships, we are expanding our role in different domains like media, banking, Internet, payments, entertainment and information services, which brings new dynamic to our industry.

As the fixed penetration is roughly above 10% in Egypt, mobile with a penetration rate of around 70% will definitely contribute more to popularizing the Internet. Customers want to be connected whenever and wherever they are. Mobility has a lot of value and it’s now open for the Internet and other seamless applications. This is the importance of 3G and future technology.

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network. The more we make 3G services available to a large subscriber base, the more we can offer it at a lower price to all customer segments. Since we are the market leader with the largest customer base, we have a social responsibility to do that.

We are keen to keep the adequate balance between the value created for customers and the one created to shareholders. Though there is very encouraging growth in the 3G market, voice remains the major contributor to our revenue. We will have to manage in a smart way the network capacity, balancing 2G and 3G with quality voice and reliable data services.

Through partnerships, we are expanding our role in different domains like media, banking, Internet, payments, entertainment and information services, which brings new dynamic to our industry.
helped Mobinil provide always a real value to customers from the products and offers we put into the market.

The absence of local content and affordable devices are still the major challenges I see in the Egyptian market. For example, an Egyptian using a mobile would like to see a digital map of Egypt and not one of Europe. Unfortunately, we are not seeing lots of development in customized content in our region and we would like to see more of this.

Due to the fact that banking service has still a lower penetration in Egypt than in the Western world, mobile money and banking is more necessary in this important emerging market. Customers would like to have banking services 24/7 through their mobile phones. We are eyeing this service and hope to introduce it soon. We used to always follow what was happening in the developed markets, but now there are new services by which we could bring the emerging market experience to them.

We used to be only a telecommunications operator, but now we are at the center of different new activities. Through partnerships, we are expanding our role in different domains like media, banking, Internet, payments, entertainment and information services, which brings new dynamic to our industry. For example, we form a partnership with banks in Egypt to develop mobile payment services. Mobile advertising is also in the pipeline. More importantly, we will encourage and support the development of local content.

WinWin: As devices remain a key challenge for 3G in the market, how will Mobinil further diversify its terminal line-up and make them more affordable?

H. Kabbani: Being more than 100 USD each, smart devices remain expensive to the average Egyptian. 3G terminals are more like an investment to a customer, who would not invest if he or she is not seeing the real value or benefits. Winning the trust of 25 million customers is not an easy task and we need to live up to their expectations. Mobinil is always delivering the optimal offer and product to satisfy our customers.

We leverage the economy of scale by having the largest base of customers, thus we can provide solutions that are affordable to all market segments. Seeing that netbooks are good products, we were the first to introduce netbooks into the market, and use modes like long-term installment plans to make it affordable to customers like students. Our market consists of over 90% prepaid users, while the smartphone is more related to the postpaid users, professional people and corporations. We were the first to introduce a prepaid smartphone, in which customers can pay for the smartphone either by prepayment or monthly credit.

We believe in a smart and open environment for our operations and introducing new things to give more choices to our customers. Now our terminals boast data cards, netbooks, the BlackBerry, iPhones and even laptops. We also have the “fly box” that can provide data and broadband access for multi-users at the same time.

Future opportunities and cooperation

WinWin: Mobinil is showing its interest in the M2M application, can you elaborate on Mobinil’s strategy in this field?

H. Kabbani: We have some M2M applications, but it is still like a niche; we would like to further develop it in the future. As an operator, we may have great ambitions, but can not do it without a complete ecosystem through partnership. An open environment is needed to accommodate more partners. We need to have more cooperation between vendors, operators, content providers, and companies acting in different sectors. We can make the M2M technology serve our society.

Mobinil is an active company in Egypt, leading in corporate social responsibility. So M2M is not only about business, but also about really creating the value and development for the society in the field of health, education, green environment and public utility services.

My 20 years of experience in the mobile field has enabled me to witness how mobile communications has changed the life of people and societies. Mobile is a wonder, yet M2M would further help us improve our knowledge, access to information, expand businesses of different sectors and develop society.

WinWin: How do you envision Mobinil in the next 2-3 years and its cooperation with Huawei?

H. Kabbani: Regarded as a modern operation in the Middle East region, Mobinil is a leading company and a trend setter in Egypt. We will continue playing this role and proudly contribute to the development of the country. We will continue developing new services to satisfy the evolving needs of our customers.

The partnership between Mobinil and Huawei has brought us lots of value. From day one, Huawei understood what an operator like Mobinil needs. Huawei was a great support to our plans and operations, helping us to develop our position as the leader in the market. We would like to develop further this relationship by taking it to the next stage, where we can explore the possibility of further cooperation in different domains and deliver the right solutions for the Egyptian market.
Operators are facing many challenges in network operations management. Complexity is one of the issues, due to the rollout of several radio access technologies from 2G to LTE, in a multi-vendor environment and multi-deployment scenarios covering macro, micro, pico and femto. Network complexity and traffic increase require the ability of tuning network parameters dynamically to the pace and location of the traffic. In order to adapt network performance to time, location and volume of traffic, a real time monitoring of the network is required as well.

The scope of network operations enhancement is manifold: optimizing manual operations in network maintenance and configuration, reducing cost, and enhancing monitoring capabilities for localized problems like hotspot and indoor coverage. Convergence is also needed to unify different services, technologies and domains.

In detail, there are six major challenges facing operators in network operations: complexity management, dynamic configuration, real time performance, together with cost reduction, accuracy and convergence. Solving these challenges would help to improve procedural efficiency, increase network capacity and quality, and address new technological issues.

The evolution of the operations framework is based on two evolutionary steps: self organizing network (SON) and evolved O&M.

**SON is bringing changes**

The key innovations for SON can be summarized in three main keywords: self, dynamic and decentralized.

“Self” means that the network is able to configure and optimize configurations automatically. For instance, manual operation for simple but repetitive tasks such as installing new network nodes should require a minimal effort.

“Dynamic” means having automatic reaction capabilities when problems occur. When a fault is reported, a dialog between the network and the operation & maintenance center would be initiated to automatically help solve the problem.

“Decentralized” points to the fact that in a SON approach, network elements shall have the capability of optimizing operational parameters autonomously, without involving the rest of the network in local optimizations. Today upgrades usually require a physical presence at the site; in this case, it is not possible to adjust a network element as soon as it is installed on the cell, or remove a cell if it does not adapt or a failure occurs.

SON can help addressing these issues with features like automatic neighbor relation, handover optimization and load balancing, which can also help in improving the
The SON framework changes the approach to operations where operators do not have to define specific parameter values any longer but have to define optimization criteria and control policies to steer local SON functions. Operators have to check and coordinate the correct behavior of the SON functions, by monitoring the aggregate SON performance and network KPIs. SON has the potentiality of making the operators’ lives easier, but operational processes have to be re-thought and enhanced internally.

**Self-organizing is not enough**

To improve operational efficiency, the self-organizing concept is not enough. In order to handle a SON network in an efficient way, operators should be able to apply the same process to different network technologies and implementations. Implementing the policy control functions can not work without a common definition of the policies for every case of SON usage. Also, centralized control functions should be realized at the network management level and multi-vendor support is required. To help solve these problems, 3GPP is defining the standard O&M functions to control SON.

The traditional approach for KPIs and performance counters is no longer sufficient to control self-adapting networks in highly dynamic scenarios. The evolved performance monitoring shall be real time, relying on location information, independent from the implementation, and involving the user equipment as an alternative to drive tests. As an important part of these efforts, 3GPP and the Open Mobile Alliance (OMA) are standardizing the UE measurements for performance monitoring.

Though a large effort is devoted in developing management functions, the operational efficiency can be reduced, if there is a low degree of integration with operators’ processes and tools.

The definition of multi-vendor multi-technology control solutions requires the standardization of performance KPIs and O&M architecture, which includes the architectural solutions supporting the reuse of O&M functions for different OSS business processes. In addition, interoperability and flexible integration between the network element manager and the network management layer are also required. To improve the level of interoperability of the O&M interface and promote open management architecture, co-effort is required from different parties, including 3GPP, operators and vendors.

**NGMN plays an important role**

NGMN is playing an increasingly important role in enhancing the operational efficiency. NGMN activities are oriented to: 1) Identify the gaps and define the requirements based on an operator’s business and user cases; 2) Analyze technical frameworks and the feasibility of relevant solutions; 3) Contribute to standardization fora, including 3GPP, the OMA and the TM Forum; 4) Provide implementation requirements and guidelines.

From the first quarter of 2009 to early 2010, NGMN operators have started specific approach on operational efficiency, covering SON use cases and open O&M. Use cases have included currently standardized SON solutions like HO optimization, load balancing, optimization of common channels, etc. SON use cases also include energy savings, since this is a very important issue in managing traffic and energy consumption. The open O&M includes the standardized OSS architecture, as well as the standardized O&M supported by a standard 4G Itf-N interface and a specific use case.

In this context, the short term target on operational efficiency is to improve procedural efficiency and evolve the operational processes. This also includes increasing network capacity and service quality, while addressing new technological issues. NGMN will be committed to elaborating on the operators’ vision of operational efficiency, providing use cases and requirements, and promoting coordinated activity in relevant standardization fora. ngmn

*Editor: Michael huangzhuojian@huawei.com*
Revolutionizing BSS
making business smart and efficient

Susan L. McNeice is the Vice President of Software Research with Yankee Group’s Anywhere Network team. After monitoring and analyzing emerging trends, technologies and market dynamics in the OSS/BSS area of the global communications, media and entertainment (CME) industry, she believes that a revolution is needed in business support systems (BSS). WinWin met with her to find out more.

By Joyce Fan

Challenges to be solved

WinWin: What are the major issues facing operators in their BSS operations? What negative impact will they bring to an operator’s business development?

Susan L. McNeice: Even with all the improvements we have made in the last several years, there is still a problem of silos. The operators’ systems, databases, departments and business procedures are often fragmented and separated. They don’t always communicate.

First, take enterprise customers for example. A large company can not always see every single product that it has from the same operator, because they come out of different departments. It has many bills, orders and work centers to deal with, which is inefficient, slow and resource consuming. Definitely, it is not in the interest of the customers, nor of the operators.

Second, one of the weaker spots in business operations is partner relationship management. It is an immature process, but must be built for scale if we are to have robust, automated content distribution to customers. Operators have strong inter-connect and wholesale settlement capabilities today. However, they don’t have a very strong infrastructure to manage relationships with their content partners and media partners. This includes partner “on-boarding”, partners getting paid timely, and management of distinct promotional campaigns for content.

Sometimes these partners are big companies, but sometimes they are very small, such as application developers for the Apple or Android App Stores. These may be one or two person companies, and they cannot afford to wait. The partners may become upset and abandon the relationship. The next thing to happen is that the end customer will not get what they need. That really damages the relationship.

Another threat is that they lose money or market share to Google, Yahoo or similar providers. However, it is not the worst situation. The biggest threat is that they lose their place in the relationship with the customer. They
become invisible to the customers, and that is the worst thing.

Many operators launched iPhone jointly with Apple, and it's been good for both companies, with both having gains. Operator's ARPU for Apple iPhone users is much higher than the average ARPU. They are getting more money and stickier customers. But when was the last time when you heard one end user associated the operator's name with iPhone? Apple has succeeded in re-branding or is starting to re-brand the relationship. Is it one little incident, or a problem? No, it is the compound effect of all those little incidents that steer the brand equity away from the operators. That's the longer-term issue.

**How to bridge the gaps?**

**WinWin:** You've mentioned that the BSS must be revolutionized. How do you define the revolution and what drives the needs?

**Susan L. McNeice:** Currently, from the OSS/BSS perspective, operators are really focusing internally to make it efficient, low cost and convenient for themselves in terms of the ways systems are organized, software is written and departments are established. This is a good thing. However, it is not always what the customers want or what is best for customers. Indeed, efficiency is important, but customer experience is more of a concern. So, the revolution is all about making the system, the software, the departments, and business procedures in a way that helps the customers first and foremost.

Competition, emerging new business models, changes in laws and regulations, and technologies are driving a need to be more focused on customer-oriented offers and operations. This shifting of operators' focus, from the network to customers, both enterprise and consumers, is driving the need for a revolution in BSS.

**WinWin:** What would a post-revolution BSS be like?

**Susan L. McNeice:** The new BSS has to connect the operators' tremendous stores of capability to the customer any time, any place and according to the customer needs. That can be over the phone with the contact center, on the web, or in person at the store. Every transaction, every engagement with that operator should be seamless across all the channels. A customer may find some services from the web and he/she may need to call the contact center to order. The conversation should be continued without any disruption.

Also, the enterprise customers want a variety of ways to engage with the operator. A media business customer may need a managed services relationship in which the operator does virtually everything, while others only need the transport and the portal into the OSS/BSS. They will supply their own end equipment and do operational management. They can write their own orders, check on their trouble tickets, order status, manage bills and even manage the network right from this portal.

It's not easy, but minimally we should think about pointing our businesses in this direction.

**BSS partners**

**WinWin:** When selecting OSS/BSS partners, what criteria should operators use to find the right person for the job?

**Susan L. McNeice:** First, the partner has to understand the communications business in detail. But ideally, they would also understand the entertainment business. Second, they should have a successful track record. Third, a very strong project management capability is required to keep project risks as low as possible. Fourth, they should have a scalable platform that allows operators to bring in many kinds of content partners, application developers and offers, in terms of hundreds of thousands. The idea of having 20 or 30 partners is not the way media entertainment will exist on a very large scale. Think about how many app store developers there are.

**WinWin:** How do you regard Huawei's NGBSS (Next Generation BSS)?

**Susan L. McNeice:** What I like best about the NGBSS is the business intelligence layer that is integrated into every point of the architecture. You understand that business intelligence is not a separate and discrete function. It is a feedback mechanism and if we are going to improve operations, we need feedback.

Second, as I said, the important thing about BSS is an understanding of who the customer is, in depth. It has to allow the customers to engage with the operator seamlessly across all the channels, any time and according to their needs. That kind of channel integration is something I'm pleased to see in Huawei's NGBSS.

Also, I appreciate that Huawei recognized that rating and charging must come out of the IN and be put into the application. As in the case of China Mobile Guangdong, there is an ongoing effort to make that less about the IN and more about the application. That is essential, because that will give them the flexibility they need. It indicates that Huawei understands what the operators must do.
Mobile takes social computing beyond Web 2.0

Social computing applications like Wikipedia, Facebook and Twitter have met with tremendous success in recent years and are revolutionizing how people work and play together. Facebook has reached over 400 million users and now accounts for nearly 25% of web traffic. According to Pew Research, nearly 1 in every 5 web users uses Twitter or some other service to check status messages of their friends and 94% of enterprises plan to maintain or increase their investment in enterprise social media tools. For the telecom industry, it is important to note that social computing encompasses but goes much beyond Web 2.0.

By Liu Nan, Yang Qiang & Du Jiachun

What is mobile social computing?

Social computing in general refers to any technologies that involve either explicit or implicit computer mediated communication and interactions among people. In a shallow sense, social computing may refer to technologies that support social activities such as blogs, emails, instant messaging, wiki, etc. In the deeper sense, it could mean any technologies that allow computations carried out by groups of people, which is also known as the “prosumer” model where users not only consume an application but also produce value to the application via contributing content, tags, ratings, links or even software components. Despite some superficial limitations such as small screens, modest computational power, and unstable connections, we can foresee fast growth for social computing innovations in the telecommunication domain.

First, any social computing applications backed by the telecom operators can instantly tap into the huge existing social network of phone users rather than having to go through a cold start period as most web based applications. Compared with online social networks, the phone based social network could actually reach a broader population, including not only urban and youth population but also rural and elder populations, thanks to the much wide adoption of mobile phones in developing countries like China and India.

Second, the rich sensing capabilities and portable nature of the smartphone platform allow mobile social computing applications to interact with not only the digital information space but also the physical real world. A person’s mobile phone encounters almost all the physical parameters that the person experiences – it feels the same force, travels at the same velocity, exposed to the same temperature, sounds and pollution levels. By recording the states of all these sensors attached to a mobile phone, such as GPS, accelerometer and other information, we can effectively record its owner’s online experiences across a rich set of dimensions or features about the user’s physical context such as his location, or his activity such as whether he is working or entertaining, or his social context such as whether he is with colleagues or families. The hope is that powerful, personal mobile devices and related technologies will enable whole new classes of adaptive, context-aware applications, which can...
automatically serve the right information and functionalities to users at the right time and right place in support of the user’s desired goals and tasks.

**Four paradigms of mobile social computing**

There are four most widely adopted mobile social computing application paradigms. And their relationships with common design patterns and core principles for social computing, we will touch upon one by one in later paragraphs.

**Mobile collaborative filtering**

The success of web-based collaborative filtering lies in the ease of collecting user feedbacks such as ratings and clicks from an enormous user population, whose aggregated opinion provides a powerful mechanism for tackling information overload. Mobile devices are essentially wearable sensors, and they allow software applications to monitor a much richer set of user behaviors in not only the online world but also the physical world at very large scales. Petabytes of data about human movements, transactions and communication patterns are continuously being generated by mobile phones. By applying large-scale data mining onto such data, one can gain insights into the dynamics of both individual and group behavior by capturing communication, proximity, location and activity information and build models for monitoring and predictions.

Collaborative filtering technology has been greatly successful at helping people explore the digital information space, such as choosing books in Amazon.com or selecting restaurants at Dianping.com (a Chinese website providing services of comment & recommendation on restaurants and other recreational spots). An attractive application in the mobile domain would be to facilitate people’s exploration of the physical world and virtual world together. For example, the core technology of a recent start up company, Sense Networks, is essentially based on collecting and mining the massive number of people’s geolocation data from cellphones, GPS devices, Wi-Fi and even taxis. Using machine learning techniques, it then indexes all of this location data and ranks places in the real world much like a search engine ranks websites. It looks at how much data is moving between locations. One of the mobile applications built by Citysense on Sense Networks’ technologies allows people to visualize a heat map of where everybody in the city is at any given moment. It is supposed to help people figure out where the hottest clubs and nigh spots are. It also learns about where you like to go, shows you other people like you and makes personalized recommendations.

In the area of public health services, similar types of cellphone movement data are investigated by researchers at the Santa Fe Institute to improve existing computational
models on how infectious diseases like SARS or H1N1 spread. By collecting data such as where and with whom people spend their time, the spread of a disease could be measured at an unprecedented level of detail, thus enabling more accurate understanding of the mechanism of infection.

It is worth noting that geolocation traces are only one particular form of user behavior that may be detected from a mobile device. By taking advantage of other sensors such as microphone or accelerometers built into modern devices like iPhone, a much richer set of behaviors can be observed and used in novel ways, such as building a user context. For example, clues to depression, a common illness in today’s world, could be found from how people talk, as depressed people may speak more slowly than usual. By detecting such changes, the mobile device could warn people and give advice on precautions and treatment. Similarly, the speed of user’s movement told by accelerometers may indicate whether she is walking, running or driving and can be used for health care purposes such as tracking the amount of calories consumed.

**Collaborative mobile data sharing and annotation**

Mobile phones are quickly becoming the most popular platform for users to create and upload data in many existing social computing applications. For example, photo-sharing site Flickr has enjoyed more than 50% increase in traffic on its mobile site and over 100 million photos are geo-tagged. By leveraging the vast amount of such geo-tagged multimedia data, researchers at Google had developed technologies to automatically recognize landmarks that are popular tourist destinations and build their visual models from the photos. The mobile social networking site FourSquare allows users to share location and status with their friends and earn credits via sharing valuable information about places. Rather than just being social networking tool, many shops and restaurants recognize FourSquare’s value as a marketing platform and provide benefits such as free drinks or discounts to highly active users as a way to encourage visits to their venues.

The micro blogging service Twitter also heavily relies on the SMS services on mobile phones for users to conveniently send and receive status updates whenever and wherever they want, which is the key feature that distinguishes it from traditional blogging services and instant messengers. Social and psychological studies showed that the Twitter phenomena created a new type of lightweight but meaningful socialization by enabling the so called “ambient awareness” among people. An important implication of the success of Twitter like applications is that they provide strong evidence that people have a strong tendency toward sharing more and more personal data covering various aspects of daily life. We are expecting to see more diverse and interesting forms of user generated data and novel collaborative sharing services in the future.

**Collaborative mobile content creation**

Wiki-based systems are designed to facilitate quick and easy content generation, edit and distribution with large number of users. Wikis offer tremendous potential to capture knowledge from the minds of large groups of people and efficiently connect those with information to those seeking it, which is best evidenced by the tremendous success of Wikipedia. With the advanced data capture and sensing capabilities, mobile platforms would enable users to collaboratively produce more complex forms of data beyond textual knowledge as in Wikipedia.

For example, traditionally geospatial data are often very expensive to collect and maintain as maps can get out of date quickly in our fast changing cities. TomTom’s MapShare extends the wiki principle to allow users to actively provide error correction and data feedback while using their navigation devices. In addition to data collection, the in-car navigation system Dash also
uses the drivers as traffic sensors, who send GPS data to a centralized server for real-time traffic monitoring and prediction. In a spirit similar to Wikipedia, the OpenStreetMap project is even more ambitious and attempts to build a free and open database of the world’s geospatial information. Contributors from anywhere can use GPS units and open source software to collect, annotate and contribute road data.

Collaborative human computation

Perhaps the most interesting paradigm of social computing is that of collaborative human computation, which tries to involve humans not only as users but also part of computing power. In other words, human brains are treated as processors in a distributed social computing system, and each can perform a small part of very difficult computation. Such a “collaborative human computation” paradigm has also been called “virtual artificial intelligence”, as it provides potential solutions to hard artificial intelligence tasks including image and language understanding. Such potential has also led to a new production process known as crowdsourcing, which is pioneered by Amazon’s Mechanical Turk online market place. It takes tasks traditionally performed by employees or contractors and outsources it to the general public.

Businesses needing tasks done (called Human Intelligence Tasks or “HITS”) can use the Mechanical Turk APIs to access hundreds of thousands of registered workers, who would carry out the tasks on demand and return results that can be directly integrated into the business processes and systems. Mobile human computation represents a promising direction and is still in a very early stage, but it can already provide important services ranging from information giving to computational advertisement. The mobile crowd sourcing project Txteagle is similar to Amazon’s Mechanical Turk but distributes tasks to cell phones using text messages or audio recording to enable people complete the tasks. Examples of currently supported tasks include translation, transcription, market research and survey.

The potential applications for mobile crowd sourcing could be very diverse. By allowing people to carry out computation anywhere and anytime, it could greatly enlarge the scope of human computation tasks. Moreover, with a mobile platform, not only could we tap into the human brain power for processing digital information, but also utilize a mobile work force that could more intelligently process their surrounding real world environment than traditional technologies such as surveillance cameras. For example, news agencies can utilize such a platform to have citizens who are often the closest witnesses of news events submit first hand images and stories. It can also help localize search services by utilizing people in a certain area to help locate places or objects unknown to the search system, or provide answers to questions that require analysis of a particular physical environment, such as “are there a lot of people flying kites at Tiananmen Square right now?”

Patterns and principles of mobile social computing

Telecommunications companies, like most other software companies, must consider a set of core patterns that are typically adopted by social computing applications. Chief among all patterns, we will see a paradigm shift in which the user is at the center of all the business operations and computation.

Patterns

Harnessing collective intelligence: We can create architecture of participation that uses the network effects and algorithms to produce software that automatically gets better when more people use it.

Data are the next “Intel Inside”: We can use unique,
hard-to-create data sources (e.g. eBay’s auction data, YouTube’s video library, and Craigslist’s classified ads) to become the “Intel Inside” for this era in which data have become as important as functions. However, success does not always require owning the data itself but from the ability to derive knowledge from ranking, accessing, or formatting that data.

Innovation in assembly: By providing a common open platform to facilitate user innovations, a new phenomenon known as “widget economy” is emerging. The most prominent example is probably Facebook, which provides a social network application platform (SNAP), which allows any third party applications based on it to instantly tap into an enormous social network that is already in place.

Rich user experience: We can go beyond traditional human computer interfaces to deliver rich user experiences by combining the real time responsiveness of desktop application, ease of use of web applications and rich sensory inputs of smartphones. Deep and adaptive personalization could be enabled to optimize the experience of each user and increase both customer loyalty and revenue opportunity.

Leveraging the long tail: We can capture niche markets profitably through the low-cost economics and broad reach enabled by the Internet. Aggregation and filtering technologies would be indispensable for matching the supply and demand down the long tail.

Principles

There are also a set of principles to follow in order to best implement the above patterns:

Connected: The network effects move us from the one-to-many publishing and communication models of the past into a true web of many-to-many connections.

Decentralized: The bottom-up design principle now competes with top-down in everything from global information flow to marketing to new product design.

User centric: The user is at the center of mobile social computing. Network effects give users unprecedented power for participation, collaboration and ultimately impact. Consumers have become publishers with greater control, experiences are tailored on the fly for each user, and mobile users actively shape the product evolutionary trend.

Open: Open data, open APIs and reusable components form the foundation of social computing. Open means more than technology – it means greater transparency in corporate communications, shared intellectual property and greater visibility into how products are developed.

Emergent: Rather than relying on fully predefined application structures, popular structures and behaviors are allowed to emerge over time. A flexible, adaptive strategy permits appropriate solutions to evolve in response to real world usage. Success comes from cooperation, not control.

Technical challenges in mobile social computing

The management of user generated telecom data in various forms is the essential technology for social computing applications. This involves several types of technical challenges:

Systems must support real time content generation and sharing in order to support user communication and collaboration in real time. This requires a highly dynamic data management infrastructure. For example, data indexes must be updated continuously to provide real time retrieval of information.

The openness of communication and freedom to share information would raise new security challenges. The way users use social computing applications are often very casual. The system should provide mechanisms to help user automatically control privacy and security.
settings to reduce the risks of sensitive information being misappropriated.

The systems should impose minimum computational burden on the client side to ensure high performances on mobile devices. Designing thin client based architectures with distributed computing and cloud computing models will be the future trend.

Effective data mining technologies are essential for collaborative filtering and other personalization applications. The analysis of two types of data would be of critical importance. The first is social network data which comprise all forms of user communications and relations. Discovering patterns in such data could enable a system to more effectively support user’s social activities. The second type of data is user generated data including ratings, reviews, messages, etc. These data provide the core value of a social computing service. How to present, retrieve and summarize such data is directly related to user experiences. These data also provide the basis for modeling individual user’s behaviors, which is the key to successful personalized mobile online services.

Vision of the future

Imagine 10 years from now, a post 90’s youngster would probably have a day like this: On her way to her work, a car accident blocked the traffic. Using a social GPS system, she noted other drivers heading to the same direction were taking another route that had much less traffic. Thus she followed them as well and successfully avoided a traffic jam. As she passed a supermarket, a reminder on her mobile phone suggested that there was no milk left at home. Scanning the bar code of a new brand of milk, she instantly got its sales statistics and online reviews. Later, at a bookstore, a new book by her favorite author caught her attention. As she took a copy and flipped the pages, her mobile phone browser automatically loaded the book’s page on Douban (a Chinese Web 2.0 website providing review and recommendation services for movies, books and music) and showed the rating and list of reviews by other users. Through these reviews she found a book dealer on Taobao – China’s largest Internet retail platform that offered even lower price. She then decided to wait and buy the book from Taobao, to save some money.

At night, she went to meet with some friends for supper at a new restaurant, but she had difficulty finding the place. So, she opened up a social mapping site on her mobile phone to identify both herself and her friend’s current location on the map. At dinner, she took pictures with her friends and it was automatically labeled with location, time and her friend’s names. The dinner finished early so she decided to visit a local bar. It was crowded when she arrived, as it was weekend. She wanted to find some people to talk to by opening up the Hook-Me-Up application, which automatically searched for other nearby devices with this feature turned on. By checking the compatibility of different users’ profiles on Douban, it returned a list of three young men. After several rounds of text messages, she was approached by one of them and they had a great conversation that night.

Social computing will enter our lives faster than we think. It will soon become a single, cohesive experience embedded in our daily activities and technologies. As mobile platforms take center stage, we could foresee its application scope to quickly expand beyond Web 2.0 to become an indispensable component of users’ offline experiences. Emerging mobile social computing applications will introduce new dimensions to the meaning of “social networking” by taking us into a new era of connected experiences unbounded by distance, time, location or any physical constraints.

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American ingenuity
taking broadband
to new heights

In the United States, the broadband subscriber base is getting wider and broadband services more diversified. Creative American companies are catalyzing a new wave of broadband network construction and operations. Cable and satellite TV operators and Google-led IT pioneers are joining traditional telecom operators in exploring the broadband market and finding their niche segments that match their own resource bases for more promising business outlook.

By Zhou Jing

Despite concerns over an economic meltdown, the U.S. telecom industry has maintained a robust growth momentum breathing new life into the nation’s economic recovery. In 2009, tier-1 operators in the U.S. reported CAPEX of over 51 billion USD, and earned over 350 billion USD from telecom services including pay TV. Largely driven by broadband services and network construction under innovative business models, their combined earnings before interest, taxes, depreciation and amortization (EBITDA) soared 35% over the previous year.
Traditional telcos and network-based service growth models

Compared with other industry players, traditional leading operators continue to generate higher total service revenues from their existing network infrastructure and subscriber base. However, if only connections and access services are offered, they could plummet to the bottom of the industry chain. In response, they have stepped up efforts to consolidate networking resources and explore service growth models in addition to delivering high-quality, high-speed and low-cost networking services.

AT&T deploys Wi-Fi to facilitate service integration

As the leading integrated service provider and the operator that possesses the most Wi-Fi hotspots in the U.S., AT&T has established a network infrastructure that combines Wi-Fi, WiMAX and cellular capabilities that are adaptable to Internet services. The Wi-Fi network fuses the cost efficiency of IP networks with the enormous size of mobile networks while removing the access bandwidth bottleneck of mobile networks, and greatly enhances user experience.

By differentiating Wi-Fi subscribers through automatic access authentication software, AT&T has grown subscribers and improved their loyalty. High-speed bandwidth service subscribers get free access to Wi-Fi hotspots across the U.S. Second-tier subscribers can enjoy the Wi-Fi access service for 1.99 USD each month while non-subscribers have to pay 7.99 USD per day for hotspot access.

AT&T has also greatly eased its network burden by using Wi-Fi. Notably, mobile service revenue surged a substantial 10% in 2009 thanks to the increasing popularity of the iPhone. Though they account for only 3% of AT&T’s subscriber base, iPhone users consume up to 40% of the company’s total bandwidth. Furthermore, the growing application data traffic has triggered network congestion, blocking some subscribers from accessing the operator's network.

Seamless switching between 3G and Wi-Fi networks has come to the rescue, alleviating a lot of the blockages as iPhone users can automatically switch to the Wi-Fi network when moving within the coverage range, with transmission speeds of up to 11Mbps. The Wi-Fi network diverts and relieves 3G traffic loads, helping to improve network quality and download capacity and sharpen service competitiveness. In February 2010, AT&T doubled the download cap from 10M to 20M.

Enterprise services contribute 40% of AT&T’s total revenue. To better serve this segment worldwide, AT&T prioritizes personalized services over the mobile Internet as part of its enterprise service portfolio along with voice transfer and mass data transfer services. Business customers can now employ various technologies and develop software and applications for end consumers to download; AT&T shares in the profits.

Additionally, AT&T is accelerating its efforts to offer more cloud computing-based commercial applications for businesses to deliver powerful computing capabilities, massive storage and a wide selection of applications by utilizing IT resources flexibly. Therefore, the operator has developed a unique ability to send data from managed terminals to application desktops, while providing server and data center solutions.

Verizon seeks a new balance between voice and data

The U.S. probably has the world’s highest mobile minutes of usage (MoU) per person per month, in excess of 800 minutes. However, fierce competition in the voice market has seen prices swiftly drop and voice traffic growth slow down. Faced with this situation, operators can achieve steady revenues only when the contribution of data services to the average ARPU grows at a rate higher than 1.5%.

As a leading U.S. integrated service operator and also the nation’s largest mobile operator, Verizon is actively seeking to create a balance between voice and data services for sustainable revenue growth.

Although most mobile operators hesitate to waive charges for long-distance calls and roaming services, Verizon has looked to the future and partnered with Skype. As voice services are giving way to data services, the operator has begun to open its interfaces for subscribers to use Skype applications on nine bundled smartphones for mobile Internet communications at a lower price. This marks the beginning of Verizon’s role shift from a traditional mobile operator to a provider of communication terminal data service solutions.

By partnering with Skype, Verizon has gained access to a vast base of global social networking customers, and has swiftly entered the youth market and the enterprise market dominated by BlackBerry terminals, building a solid subscriber foundation for its future expansion into data services. Also, as a forerunner in the LTE market, Verizon is dedicated to meeting the ever-increasing user demand for higher bandwidth and lower latency. Utilizing its extensive experience in mobile broadband deployment and solid expertise in LTE wireless broadband, the operator also plans to move a wide array of applications from wired broadband networks to mobile networks.

The LTE wireless WAN delivers wireless connectivity
Win-Win / AUG 2010

to mobile phones and a broader range of consumer electronics and devices. This revolutionizes the revenue model where operators charge fees from subscribers only, and allows for increased profits from offering remote information-processing and M2M services to content and application partners.

Verizon focuses on three areas: consumer electronics products and applications; end-to-end information transfer between wireless devices like wireless medical care and security surveillance applications; and remote information processing, such as UPS vehicle tracking.

It is predicted that 70% of the services will be accessed indoors, and that 20% of this indoor coverage will provide 80% of the service revenue after the 3G network becomes fully operational. Market research reveals that 85% of U.S. home users potentially demand indoor coverage. As the operator that delivers the highest network quality in the U.S. with a continual focus on indoor coverage, Verizon introduced a Femtocell enterprise service plan for 199.99 USD in 2010. Femtocell technology has improved indoor coverage remarkably within an area of 5,000 square feet (1524 sq. meters), giving subscribers access to faster indoor mobile services via the traditional fixed broadband network.

Sprint Nextel harmonizes multi-technology networks

Among the U.S. mobile operators, Sprint Nextel supports the most network standards, such as its own brand iDEN and CDMA networks, and has invested in Clearwire's WiMAX network. The iDEN network targets industry and prepaid subscribers, while the CDMA network serves high-end subscribers. WiMAX and CDMA networks combine to offer best-in-class high-speed data services.

As the virtual operator of Clearwire's WiMAX network, Sprint became the first in the U.S. to deliver a faster wireless broadband network, as WiMAX had a two-year head start over LTE. The operator integrated WiMAX's 4G capability with the existing EV-Do's 3G capability. It unveiled the industry's first CDMA/WiMAX dual-mode service package to boost subscriber loyalty by delivering the highest mobile network speeds. With a 3G service package priced on average at 59.99 USD, subscribers can access unlimited 4G traffic in addition to 5GB of 3G traffic over Verizon's network, or 3G traffic of up to 300MB over other networks.

Since Wi-Fi capability is built into increasingly more consumer electronics, Sprint has launched its WiMAX network-based 3G/4G wireless routers, which allow multiple Wi-Fi devices to concurrently access the wireless broadband network. These routers enable subscribers to connect to a 4G mobile broadband network via a Wi-Fi-enabled device for 10Mbps downloads. When the 4G network is disconnected, the routers can automatically switch to the 3G EV-Do network, which supports a peak download speed of 3.1Mbps. Each subscriber is allowed to connect up to five Wi-Fi devices, such as laptops, cameras and game consoles. Moreover, multiple subscribers can access the Internet concurrently to watch videos, download music and play games while browsing the web.

Fixed operators look to home networking

Fixed network operators in the U.S. generally specialize in regional operations. Quest and CenturyLink lead the fixed network market, trailing behind the largest integrated service operators, AT&T and Verizon. Fixed network operators generate an ARPU of around 31 USD, which is far below the level for mobile and integrated operators as well as MSOs. To compete with mobile, VoIP and high-speed broadband access services, legacy fixed network operators usually initiate mergers and acquisitions (M&As) to achieve economies of scale and reduce costs through synergy. Speeding up broadband service access and service bundling helps increase market share by attracting subscribers. Entering the wireless market and launching
FMC to extend service range and build a cost-effective network infrastructure to lease network resources will also boost competitiveness.

Value-added broadband services provide the engine for revenue growth. These services include home networking support, security services such as firewall and antivirus protection, online games and entertainment for residential users, QoS-differentiated services oriented to enterprises and high-end users, and remote file storage.

As home networking continues to grow in the U.S., integrated services that combine voice, Internet and TV capabilities have increasingly led the trends. By 2011, the percentage of U.S. voice subscribers that sign up broadband service bundles is expected to climb to 82% from 40% in 2007. Despite a lower yield than voice services, TV video services generate a new revenue stream for fixed network operators as the growth of voice revenue slows.

Americans spend a daily average of 4.7 hours watching TV and telecom operators are competing for markets with cable TV companies by accelerating IPTV services. Up to 9 million homes are expected to subscribe to IPTV services offered by telecom operators by 2011. By serving subscribers through broadband access and set-top boxes, telecom operators outperform cable TV companies in terms of bandwidth, implement the same marketing strategy as these companies, and offer lower-priced services.

By the end of 2010, over 60% of U.S. homes are predicted to have HDTV. That translates into around 80 million TV sets, plunging HDTV into a new battlefield in the U.S. telecom market. HDTV generally requires 12MB network bandwidth for downloading, which is still way above the current U.S. average home downlink bandwidth of 7.12MB. Backbone network traffic will soar at an annual pace of between 50% and 80%, while access network traffic will grow exponentially. Therefore, telecom operators are investing aggressively in high-speed fiber networks, hoping to expand the home network market based on a high-speed network operation platform.

**MSO reaches beyond cable to multiple services**

Multiple system operators (MSOs) offer a wide variety of services such as digital video, VoD, high-speed Internet, VoIP, and voice. They generate an ARPU of 40 USD, a figure far below the revenue level for wireless operators. While increasing the residential and business subscriber base in the voice market, MSOs compete strongly with telecom operators by offering high-speed bandwidth based on robust video and content production and transfer capabilities, as well as entertainment. They are seeking to upgrade their networks to DOCSIS 3.0 to deliver higher transfer speeds.

MSOs are also making a foray into the wireless area through network construction or virtual operations as a way to offer Quad-play services that are more competitive. When Clearwire rolled out WiMAX services, for example, Comcast, the MSO market leader and a mobile virtual network operator (MVNO), launched WiMAX-based unlimited wireless Internet access service alongside Internet telephony and cable TV services.

Cox Communications, the No.3 U.S. cable TV operator, has extended its reach to the mobile area by building a CDMA EV-DO network, providing subscribers with one-stop services. While reducing the total communication service charge for subscribers, the combination of multiple services has considerably bolstered loyalty. For each additional service bundle, the churn rate has dropped 20%. This has helped Cox to differentiate itself from its rivals with a high-quality network and superior subscriber-centric services.

**Satellite service operators exploit spectrum resources to provide a competitive pipeline**

While increasing the residential and business subscriber base in the voice market, MSOs compete strongly with telecom operators. They are seeking to upgrade their networks to DOCSIS 3.0 to deliver higher transfer speeds.
Mobile satellite service operators enter the broadband market by partnering or merging with emerging mobile satellite service providers, moving to tap the broadband market by developing more powerful satellite capabilities and chipsets.

Google offers the world’s most popular search engine and a broad range of Internet services. This growing number of services includes email, file management, e-map, text processing, social networking, phone inquiries, and video distribution. By marrying superior services with a free-of-charge model, Google has built a huge user base on an increasing number of services, paving the way for the Internet giant to expand into network operations. In terms of mobile phone services, the terminal operating system, and network infrastructure construction, Google has launched a series of initiatives to hone its competitive edge in the application service market and direct users toward high-speed broadband services.

Expanding the mobile market with a service combination

Despite fat profits from PC application services, Google is expecting to profit more from target mobile subscribers. The company serves over 30 million mobile Internet users, which account for more than 60% of the total U.S. Internet user base. It has created a synergy between mobile searches and other mobile applications such as location services and voice inquiries. This has brought Google a long-term revenue stream from applications similar to telecom services, while at the same time attracting more users.

Users can dial 1-800-GOOG-411 for Google’s voice inquiry service free of charge that gives callers a computer response from Google. They are then prompted for a reply to these requests such as “Please comment on our service after hearing a tone” or “Please press a key to rate the service”. Besides giving users easy and free inquiries, Google identifies user behavior and requirements and has established a massive database of comments and recommendations. The database enables Google to get a clear picture of regional information, accurately target potential customers, and establish a focused marketing model in cooperation with ad agents.
Google has continuously invested in location services that have become its most profitable mobile application, accounting for 76% of its mobile service revenues. Based on its Google Earth platform and the Internet, Google has crafted a systematic database of e-map coordinates. As users increasingly use services like Google Wi-Fi, and correct and refine map coordinates, Google can offer more accurate map navigation and mobile location services.

During voice inquiries and location services, users inform Google of their locations as they connect to its network. This allows Google to provide users with search and advertising services by location, and search a huge amount of geographical information for accurate location information. This in turn helps ad agents accurately target ads to the audience likely to be most responsive.

Free operating system provides built-in service ports

Android provides a platform that keeps Google competitive in both the mobile operating system (OS) and mobile application areas. Android allows Google to extend its search services to the mobile world, consolidate and expand its user base. The OS also enables Google to accelerate expansion into the mobile application service market and is now the preferred platform for telecom operators. Google’s competitive edge has thus been sharpened in terms of open software sources, third-party development, and industry chain alliances. All this helps Google build a mobile data application service platform and boost the development of mobile network applications.

In October 2008, Google unveiled the first Android G1 mobile phone in the U.S. By early 2010, Android secured around 4% of the mobile OS market, putting it in a better position to compete against Symbian, Windows Mobile, and iPhone OS. The Android platform has greatly increased the use of Gmail, the mobile store, and Google Map services. In the future, Android will add needed muscle to terminal devices such as laptops, netbooks, and e-readers beyond providing a built-in service port for mobile phones.

Infrastructure construction promotes network openness

In addition to competitive services, low cost and high speeds are defining factors that shape the Internet landscape. In 2008, despite its leading position, Google failed to obtain spectrum in radio frequency bidding. However, the company prompted the FCC to open networks that operate within new spectrums, and then gained access to open wireless networks. Afterward, Google joined a number of telecom operators investing in WiMAX, which has extended its competitive advantages from the desktop search market to wireless.

In 2010, Google announced a plan to deploy FTTH access service in designated areas. Provided for up to 500,000 U.S. home users at a competitive price, the service delivers Internet access with speeds of up to 1Gbps. Google also posted video clips on its YouTube website, aiming to seek partnerships for network construction. The aim of this move is to steer users toward high-speed broadband services and drive operators to open their network infrastructure.

The booming U.S. broadband market has created opportunities and pressures that vary for different operators and looks set to be reshaped. To stay on top of the rising broadband boom, the operators mentioned above have differentiated their business models to align their resources with strategic visions while creating a market ecosystem that combines innovation and cooperation. This provides a role model for other operators that would like to benefit from the huge and highly competitive broadband market.

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International roaming capability for the next generation mobile services remains a big challenge even though many mobile operators are ramping up their LTE plans. As an essential part of customer experience and the key to future development, LTE roaming has always drawn industry attention and joint efforts have been made to find an optimum solution. Reinhard Kreft, Chair of GSMA’s Executive Management Committees, updates us on the major achievements and the future focus for LTE roaming.

**LTE speeds up, but roaming needs to catch up**

LTE comes with an IP-base architecture, which helps to substantially save OPEX in the long run. Though LTE has been adopted worldwide as the next generation mobile technology, operators can face different challenges when integrating LTE into their existing core infrastructure. The migration path for users and devices also needs to be considered. LTE networks can be rolled out, but roaming is still one of the outstanding challenges and we have to deal with it both commercially and technically.

By June 2010, there are over 100 operators around the world who have announced their plans for LTE evolution. LTE trails are taking place, while its maturity has to be testified by the commercial deployments.

In Europe, some operators with 2G and 3G networks are now moving into LTE, for example, Telenor and TeliaSonera, to meet the high bandwidth demand in metropolitan and hotspot areas. We also see the CDMA operators fully embracing LTE, driven by leading operators like Verizon and KDDI. China Mobile is a leader in TD-SCDMA and deeply involved in TD-LTE development. The Japanese operators will turn off their 2G networks in the coming years and they are going to bring their 3G networks into LTE. In some emerging markets, 3G may not be implemented and they will go directly from 2G to LTE.

So LTE needs to address these different markets in a global perspective, as customers want to make voice calls and use data services anywhere, anytime. However, the expectation of a seamless user experience is not easy for LTE, especially when the roaming capability of mobile voice and SMS remains a challenge. Good news is that lots of progress has been made during 2009.
Fruitful NGRAI project

Roaming affects the industry as a whole, and in November 2008 we started a project called, next generation roaming and interoperability (NGRAI) under the GSMA umbrella, with Vodafone as the sponsor of this important industry initiative. The project teams worked hard to get the supporting documents ready by April 2009, and then to orchestrate work across the GSMA with relevant working groups to establish the work packages within the 2009 timeframe.

As the project involves efforts from operators, suppliers and other parties, the relevant tasks are done by different work groups. The International Roaming Expert Group (IREG) does the most reference work to come up with a permanent document addressing roaming capability and technical requirements. Other groups are revising necessary parts of the reference document and contribute to topics such as billing, protocol choices, security, etc.

As a result, IREG delivered the LTE Roaming Guidelines and the technical specifications were approved in November 2009. Other groups were able to confirm that LTE data roaming was now covered in existing reference documents. We – the NGRAI project of the GSMA – are happy to report that LTE data roaming is now fully available in terms of technical documentation and the evolution of respective technology standards.

Leveraging GRX/IPX

Fundamental issues exist between LTE roaming and GSM/3G roaming. When moving to LTE, the first and most important thing is to revise the wholesale commercial model between operators. In terms of technology, LTE comes with new nodes at the radio and core network like eNode B and mobility management entity (MME). While components like Node B, RNC and GGSN will be replaced and new protocols introduced. For LTE, the location registration and the associated download of authentication and subscription details for customers are transported using a diameter application. Moreover, the GSM’s MAP-over-SS7, which has been used in telecom networks for over 20 years, will be replaced.

There is also increasing emphasis on IMS, because some IMS elements such as the home subscriber server (HSS) and the policy and charging rule function (PCRF) are also specified in the LTE core architecture. This can help to enable the end-to-end QoS and dynamic charging required for future mobile data services.

As the GPRS roaming eXchange (GRX) and IP eXchange (IPX) have evolved with steps forward in radio access capability, the industry has successfully leveraged the GRX/IPX to support LTE roaming. When we move to All-IP, we need to ensure QoS and solve problems like jitter, delay and packet loss. In this context, LTE roaming introduces new protocols to the GRX/IPX to support diameter applications and as an option to support proxy mobile Internet protocol (PMIP).

What is next?

Progress continues to be made based on achievements. As a network has various services being used by roaming visitors, we need to re-evaluate the level of application awareness. We will have the GSMA EMC Task Force to report on the applicability of the existing wholesale relationship between home and visited networks.

There will be more services without the need to route the traffic back to the home network. Also, we need to make sure that offloading such traffic can be done as early as possible to save resources. This means to evaluate the issues of optimizing the routing of media using methods like local breakout. The near future will drive the next stage of evolution of the roaming model, while delivering many future benefits such as a seamless and outstanding customer experience for both voice and new emerging data services.

Editor: Michael huangzhuojian@huawei.com
Profitability and harmonization of 4G

Is mobile broadband profitability really difficult to achieve? Will LTE and WiMAX technologies converge or diverge in the 4G era? Berge Ayvazian, Senior Consultant at Heavy Reading and Pyramid Research assesses the challenges operators are facing in developing their 4G businesses and shares his views on mobile Internet business models and 4G network evolution.

By Julia Yao

Monetizing mobile Internet services

WinWin: In your opinion, how should the 4G business model differ from 3G?

Berge: You can have a successful 3G business model in which voice and data co-exist on the common network. But when you go for an LTE network, where there really is no good voice solution today and it is not optimized for SMS, you need a new business model.

In order for 4G business models to be successful, they need to be different regarding the Internet than the 3G models that are working today. In the 4G model, the subscriber experience is much more nomadic. It is more similar to WiMAX than to HSPA and more data and content intensive like broadband Internet than mobile services. Yes, the business might be mobile and that’s a different kind of broadband. But, if you don’t build a model based on the Internet business, you will lose money.

WinWin: The 4G era will see the rapid growth of mobile data traffic widening the gap between network investment and mobile broadband revenue streams. This is already the case for 3G. What is your advice for operators when 4G arrives?

Berge: The difficulty is not that traffic growth is a problem. In fact, operators should embrace traffic growth in a way as to enhance customer satisfaction and they want to use broadband as much as possible. Outside of the mobile network, most broadband service is unlimited usage. The revenue associated with that usage can come either from the subscription fees or additional VAS or the content and applications sold over the same network. If what mobile operators are selling is connection, bandwidth and level of service or capacity, all they are selling is a pipe.
Win-Win: Rather than producing their own applications and content, some operators believe providing a big pipe can also be profitable. What do you think?

Berge: I don’t believe these are contradictory approaches. Actually within each case, there is an essential requirement – the operator must have a mechanism to extract revenues from service transactions. The structure of today’s 3G-based industry doesn’t place enough value on operator service. It places the most value on the third party to deliver the valuable content and applications.

The operators’ value goes beyond providing bandwidth. Data center platforms can host content and applications inside the network, and can be linked to the use of specific network information that makes an application work more effectively. Operators know how to keep these applications working, safeguard your privacy and provide security to keep spam away, stop account abuse or identity thieves. These are all potential value added revenue opportunities for the operator.

These are also things that can be used to protect the business of the third party. The third party is doing something very simple, namely marketing a service, yet the service lives on the operator network. This is the kind of new architecture in which hosted applications inside the mobile broadband network will bring the network to life, create new revenue streams and new business models.

More forward thinking operators, rather than blocking over-the-top applications, have established business relationships with the third parties who use their network as a vehicle to create a revenue stream for these transactions. For instance, some leading operators, such as Vodafone and China Mobile have opened up their own application stores. A consortium of 24 mobile operators have recently formed the Wholesale Application Community (WAC) as a joint venture to develop an application platform aimed at boosting their position in this value chain. The most important ingredient in this new model is an app platform that allows operators to participate in the revenue stream. Simply put, operators need a cash register.

Win-Win: What is the key network element needed for operators to make a cash register for mobile content and applications?

Berge: In my opinion, the key element is an evolved packet core (EPC). The EPC is used not merely to optimize performance or provide DPI policy and caching, but to monetize subscriber transactions on the network. The EPC has to be the cash register. It’s the key to monetizing mobile content and applications.

Let me give you an example. There is a new start-up company called mobile9, an online destination with over 6 million members that share and download free content for their mobile phones. mobile9 recently launched a new application, MYouTube, which means Mobile YouTube. With this application users are able to search the video library of YouTube and play videos in their mobile smartphones through Internet. This service also allows user generated content to be created on a mobile device and uploaded to YouTube from wherever a person might be at the moment. Certain kinds of EPC implementations will recognize this traffic, find it and block it or degrade the service, but the most successful EPC will establish a policy...
for someone using MYouTube. For example, MYouTube must pay for the uplink bandwidth, not the subscriber. The operator makes money, and MYouTube is given quality service and subscriber information.

Certain value-added services can also develop. One example would be, if I want to upload a video only for you, I can create my MYouTube video with my screen name along with a message to you, uplink it over the network, have it stored and send you an SMS that says, “There is a video message for you on MYouTube.” You can then go to the MYouTube site and immediately see the content. It is a very efficient and fun experience.

Another example would be that operators can monetize peak-time uploading as a value-added service. We know that uplink bandwidth is the most precious commodity for operators. When the user uploads the video to the network, a screen may ask, “Is it necessary to send it right now?” If the answer is yes, next is something like, “Are you willing to pay extra for the immediate delivery of this message? If not, the video will be uploaded at 3 AM.”

This is a way to monetize the new MYouTube application. This is a successful mobile broadband business model that is just waiting for entrepreneurs to jump on and make a new business. It is also an example of a new architecture in which hosted applications inside the mobile broadband network will bring the network to life, create new revenue streams and new business models.

Harmonizing 4G technologies

WinWin: WiMAX and LTE represent two primary technologies for 4G. Even without as many operators as LTE, we have certainly seen mobile WiMAX progress quickly towards 4G. Could you update us on the mobile WiMAX roadmap to 4G?

Berge: The WiMAX Forum has launched the WiMAX 1.5 initiative to accelerate features that enhance the average performance of the current WiMAX Release 1.0 by more than 50 percent while remaining compliant with the IEEE 802.16e Standard. Enhancements under development include 4/2 MIMO support, antennae on the base stations (4 transmit antennae), higher order (64 QAM) modulation on the uplink, downlink beamforming and improved fractional frequency re-use (FFR) to increase performance in reuse-1 deployments while ensuring multi-vendor interoperability. These new features have the potential to double peak data rates and increase average and cell edge end user performance by 50%. Based on the new accelerated schedule, certified products using these enhancements are expected in late 2010.

We think this is an important step on the WiMAX roadmap. Rather than eliminate this step, leading WiMAX vendors like Huawei should accelerate this initiative. Second, by having Release 1.5, we should not delay WiMAX Release 2 based on IEEE Standard 802.16m. In fact, the WiMAX Forum is trying to fast-track profiling and certification activities to prepare for WiMAX 2 product certification in late 2011. WiMAX Release 2 is designed to meet the ITU’s IMT-Advanced requirements. The standard provides for huge peak (zero path loss) transmission rates – for example, up to 300Mbps in a 20MHz downlink channel – and even lower latency. By enabling aggregation of multiple RF carriers, wider effective channel bandwidths of up to 100MHz are possible.

WinWin: The 4G technology family has another new candidate, TD-LTE. How do you see TD-LTE developing?

Berge: TD-LTE provides a fast track to 4G for un-
paired TDD spectrum. We have seen that China Mobile has emerged as a leader in the TD-LTE movement, along with a growing industry ecosystem of major telecom network and device manufacturers including Huawei, Qualcomm etc. With China Mobile’s commitment, TD-LTE has gained momentum, but it still remains uncertain where and how soon TD-LTE will be deployed in other countries. With a limited supply of appropriate LTE-FDD spectrum, a growing number of major operators with TDD spectrum, including AT&T, Vodafone, NTT DOCOMO, France Telecom, Deutsche Telekom and Korea Telecom, are closely monitoring the trials currently being conducted in China. Even leading WiMAX operators like Yota and Clearwire are interested in the possibility of using their 2.5GHz TDD spectrum to offer LTE services.

WinWin: You have backed the harmonization of 4G technologies on many occasions. Could you tell us your reasons why?

Berge: My preference is to find a way to harmonize the evolution of WiMAX and TD-LTE toward 4G. I would say also just because you harmonize with the standard, it does not mean you have integrated the technology. In fact, you have to take separate technologies and create a roadmap for convergence.

The 3GPP defines the evolution to LTE, and the WiMAX Forum and IEEE define how WiMAX is evolving. TD-LTE is deployed in the TD spectrum but uses LTE technology. The reality is that TD-LTE is more similar to WiMAX than it is to LTE-FDD. Because of the healthy growth of TD-LTE ecosystem and the leading efforts from China Mobile and Huawei, 3GPP has agreed to embrace TD-LTE and harmonize as much as possible with LTE-FDD and TD-LTE in LTE Advanced.

What is interesting is that there are chip vendors who have integrated TD-LTE and LTE in the same chip set, like Qualcomm. While 3GPP does not recognize WiMAX, TD-LTE is being already harmonized. There is a unique opportunity for convergence and harmonization of the IEEE and 3GPP standards.

I believe that the 3GPP, the IEEE and the WiMAX Forum should sit down together in front of the ITU and develop a common harmonized standard between WiMAX 802.16m and TD-LTE. That would take any uncertainty away from the evolutionary path of WiMAX and enhance the business case and value for existing WiMAX operators holding TDD spectrum.

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MegaFon, one of the top three operators in Russia, has been growing strongly in both revenue and customer acquisition, at a level far above local average. Amid 2009 financial crisis, MegaFon shined all the same.
MegaFon saw its subscribers reach 48.061 million in Q3 2009, accounting for 23.6 percent of the total Russian market. In contrast with Q2 2009, it increased 0.5 percent. Maximum concurrent online user number increased from 1200K to 2000K in 2009. And the volume of data service increased more than five-fold from 254.4 terabytes in January to 1,318.1 terabytes in December of 2009. The average monthly traffic per subscriber during the same period increased from 7 megabytes to 34 megabytes. Data service revenue in 2009 grew by 50% over 2008 to 361.65 million USD, accounting for 33% of total VAS revenue, compared to the figure of 28% in 2008. In Q4 2009, data service revenue for the first time exceeded that of SMS. Part of the success can be attributed to the package traffic charging platform (PTCP) which enabled MegaFon to smartly benefit from the mobile data growth.

Challenge facing data service development

With explosive growth of Russian telecom market since 2000, voice services finally reached a saturation point in 2006 and increasingly fierce pricing war among operators led them turn to data service for growth and profit.

With the development of mobile data services, operators are mostly worried about becoming merely a channel of data services. Increasingly, more and more operators begin to seek the transformation from pipeline operator to smart operator, providing intelligent, differentiated services in line with subscriber needs and habits in the context of recommended service offering.

It is clear to MegaFon that PTCP, being the foundation for operator transformation, is of vital importance to operators’ development. Traditional charging policy based upon traffic or duration inevitably leads to homogeneous competition and pricing war, which calls for a radical change. Additionally, with most of the Russian subscribers opting for prepaid mode, featuring high price sensitivity and poor credit, issues of high churn rate and bad debts are a natural result. All of these call for the transformation of operators toward smart pipe for data services.

Call for a new charging platform

Faced by the decline of ARPU, slow growth, high churn rate, increased bad debts, and other issues, MegaFon performed an in-depth analysis and found the following three constraints:

First was the single billing measure. Data services are mainly about providing content. The essence of content services is the content itself, and not the content carrier. The traffic or monthly billing models based on a uniform rate will not indicate the value of the content itself, and do not provide differentiated services to subscribers. This calls for content-based billing.

Second was quasi real-time billing. The original billing platform can only provide the real-time billing of voice services and prepaid model, and not real-time billing of data services. However, in
the development of data services, it is important to control the real-time consumption of subscribers. A billing platform must have accurate, real-time billing capabilities and clear consumption prompts.

Third was extensive network management. The key of data services development is to provide accurate content to the right target subscribers. Operators can improve the ARPU only through this method. On the contrary, when the provided content does not meet subscribers' requirements, it will easily lead to their dissatisfaction. In the past, MegaFon's network control was weak, and did not meet the requirements for accurate customer positioning.

In early 2007, MegaFon kicked-off a package traffic charging platform project throughout its entire Russian network. Among many participating vendors, Huawei was selected as a partner based on its test performance, accurate grasp of the available management, control of demands, and fitting in with MegaFon's concept of value-added development.

Content charging platform holding the key

With Huawei’s content charging platform, MegaFon could realize access via multiple technologies and separate service control from network access, which helps reduce investment considerably. The content charging platform boasts powerful DPI function, making it possible for fine-tuned management.

Meanwhile, MegaFon could utilize this platform to develop service statistics function quickly, like service ranking, bandwidth consumption distribution by service/subscriber, service quality ranking and log of subscriber survey, to realize operation visualization. With real-time subscriber follow-up and monitor system, MegaFon could easily follow up on services utilization by subscribers and interface status among network elements based upon subscriber's mobile phone number and thus guarantee the effectiveness of service operation.

MegaFon started service control gateway (SCG) deployment in 2008 and implemented different charging policies according to customer contracts and service attributes. Taking level-based charging for example, MegaFon has different charging policies to combine different traffic, duration, fixed rates and content. This helps ensure the growth of higher-value services like email, streaming media and music. Also, it helps prevent the use of insufficient balance accounts and has boosted MegaFon's mobile data revenue by 20%.

MegaFon deployed its operation analysis center and mobile advertising platform in early 2009 to measure customers and traffic by categories like sports, finance, automobiles, travel, and food. Through pricing and control policies, MegaFon developed high-value services, such as MP3, travel and sport offering. Then they delivered targeted ads to selected subscribers with special interests in music, film and sports. As a result, MegaFon actually increased its customer base and revenue amid the economic downturn.

Prepared for the future

With the content charging platform, MegaFon
realized rapid growth of data services and successfully transformed into smart operator, fine-tuning its management in terms of service control, content charging, subscriber behavior analysis, content optimization and customized security guarantee.

As a result, MegaFon is capable of focusing on segment market, and providing tailored packages at higher performance/cost ratio to subscribers of different groups or regions, like student, retiree, small business and large company. More new services are released for targeted subscribers after in-depth exploration into subscriber need.

In addition to the surging growth in subscriber number, MegaFon also saw its subscriber ARPU jumping to the top slot in Russia market.

As MegaFon Group CEO Mr. S. Soldatenkov remarked, “Huawei did well to help MegaFon analyze the complex network status and requirement, and completed all the integration works. Moreover, Huawei provided a wealth of new features and long-term product roadmap. PTCP platform occupies a very important position in MegaFon’s future-oriented strategic layout. We are confident that with Huawei’s support, this platform will become an important business growth pole in MegaFon.”

With the maturity of mobile voice service, mobile data service becomes not only the new area of focus in the industry, but also strong propelling drive behind society development toward smart networked society. For this, operator’s role in leading the industry chain and controlling the pipe via lean management is of instrumental importance. MegaFon provides a valuable reference and example for moving into the right direction.
CHINA MOBILE

Reading the Future

Keenly aware of its huge potential and strategic importance with the advent of 3G, China Mobile is going all out to promote mobile reading. The service provides a new choice of lifestyle through 3G and is a powerful rendering of the idea that “mobility changes life”.

By Yang Xin  Editor: Xu Ping x.ping@huawei.com
Mobile reading as a strategic focus

In ancient China, books came in the form of bamboo slips. Later, the written word moved to paper when the first pulp papermaking process was developed in the second century AD. Today, the reading population is gradually shifting online. With IT and Internet applications continuously improved, mobile reading is gaining ground and effecting a fundamental change in people's reading habits.

Despite a late start in China, mobile reading has grown rapidly. According to the statistics of iResearch, the Mobile Newspaper service was China Mobile's most popular mobile application in 2008, used by 68.3% of its total 549 million mobile subscribers, and its Mobile Novel application was the fifth largest, attracting 42.4% of its mobile subscribers.

The launch of 3G services in 2009 represented the dawn of the wireless broadband era in China and has been instrumental in creating a mature mobile reading market. As industry observers believe, mobile reading is a value-added service (VAS) offering the greatest potential, after mobile music. With its service impact and business model, it is likely to lead the mobile Internet and 3G services trend.

In this new market development, China Mobile has sensed the huge potential and strategic importance of mobile reading. First, the offering of mobile reading is another move of China Mobile to transform from a mere pipeline provider into an information service provider, and consolidate its leading position in the Internet field, especially in the mobile Internet. Second, by meeting the increasing customer demand for mobile reading, the operator can improve customer experience and loyalty to expand its customer base and minimize churn. Third, mobile reading terminals such as e-book readers can complement TD-SCDMA terminals, the shortage of which has hindered the full-fledged development of 3G services. By coupling rich services with a diverse range of terminals, China Mobile will create a new source of revenue and be better positioned in the market.

At the end of 2008, China Mobile set up its mobile reading base in Zhejiang and, in September 2009, announced plans to invest 500 million RMB (74 million USD) for the next five years in base construction and TD-SCDMA reader customization. The operator also unveiled its extensive plans to develop contents, terminals and channels.

Dive into the market

Piracy prevention effort

Piracy is a direct threat to electronic publications. To fight online piracy, mobile reading platforms must feature content protection technologies such as digital rights management (DRM) to ensure content security. To use the mainstream
DRM technologies, China Mobile has to pay prohibitively high fees, which inevitably add to the cost of mobile reading and hinder its growth. With the strong support of Huawei, China Mobile has developed its proprietary IPR protection technology to decisively end this issue.

The solution reduces the OPEX incurred by mobile reading, and allows customers inexpensive access to popular e-books, laying a solid foundation for China Mobile to build “China’s largest platform for copyrighted publications”.

**User experience guarantee**

From the inception of the mobile reading service, quality of user experience (QoE) is paramount to ensuring its initial and sustained success. In this sense, China Mobile has been highly responsive to customer requirements, and has constantly improved the user interface to maximize QoE.

To deliver support effectively, Huawei set up a rapid response R&D team to promptly handle problems raised by China Mobile’s Marketing and Customer Service people, and ensure that the service continues to run smoothly.

Since the mobile reading service was trialed on May 17, 2009, subscriber numbers and portal visits have increased drastically, though it remains a big challenge to balance response speed and mass user support. China Mobile and Huawei’s R&D team jointly worked out a plan for service network optimization, which has cut the average response speed of all mobile reading portals to an impressive one second or less.

**Gearing up marketing efforts**

According to a China Mobile survey, a customer spends about 15 RMB (2 USD) a year on mobile reading. Of the mobile reading customers surveyed, 52% are willing to pay about 3 RMB per book. At the stage of promoting its mobile reading service on a large scale, China Mobile began charging one RMB per book on a trial basis in several provinces and municipalities. The operator then made this standard practice on January 1, 2010. However, price sensitivity among customers slowed down subscriber growth, forcing China Mobile to “segment customers, conduct precision marketing, and reinforce user interaction” to retain and attract customers.

China Mobile has two payment modes for mobile reading – per e-book and per mobile bookcase – to meet the needs of different customer segments. The operator also offers information- and traffic-based packages in which additional traffic incurs no charge when a customer accesses the reading platform through a mobile phone or a mobile e-book to browse or download books.

China Mobile has also implemented various marketing and customer interaction strategies to enable customers to instantly comment on and recommend contents on the mobile reading platform. This brings the operator and readers closer together, improves customer experience, and reveals customer trends and requirements.

**Ambitious vision**

Launched jointly with Huawei, China Mobile’s mobile reading service is gaining in popularity. By April 2010, it attracted 35 million subscribers, with monthly hits totaling 1 billion. Service penetration reached 10% in just half a year, and a year after its launch, China Mobile included the service in its KPIs for assessing the performance of its 24 provincial branches.

On May 5, 2010, the commercial trials in eight provinces including Zhejiang and Guangdong were successfully completed, prompting China Mobile to announce the official launch of its mobile reading service. Its mobile reading platform provides nine product categories and functions and offers about 60,000 books. 403 models of terminals including mobile phones and e-book readers support the mobile reading client, of which 91 are TD-SCDMA terminals and 8 e-book readers.

“Mobile reading will be a priority of our upcoming service promotion campaign,” said Li Yue, General Manager of China Mobile. The operator plans to step up cooperation with the media, publishing houses, and professional websites to innovate a brand-new mobile reading platform with integrated content to make knowledge available to all.

China Mobile’s mobile reading service provides a new choice of lifestyle through 3G. It is a powerful rendering of the idea that “mobility changes life.” Following the Mobile Market and Mobile TV, China Mobile’s mobile reading service can help enrich culture by making it more readily accessible to society.
Aircel

renovates its core network for MBB boom

With timely execution of the packet-switched project, Aircel was able to quickly roll out services in new telecom circles that resulted in a fivefold growth of mobile data subscribers while supporting a 20-fold increase in traffic.
The hyper-competitive Indian mobile market is undergoing a boom in mobile data services. To ride on this boom, Aircel would have to invest in a core infrastructure that could intelligently handle the growth in data traffic. It chose the Huawei Packet-Switched (PS) solution, which allowed them to add capacity and throughput on a significantly smaller footprint than their existing SGSN and GGSN nodes. The solution also meant that Aircel was investing in infrastructure that has the flexibility to evolve from supporting the current 2G/3G network to future HSPA/LTE networks.

**A pan-Indian operator in the making**

With over 40 million subscribers, Aircel is India’s fifth largest GSM operator, providing services in 21 of the 23 telecom circles. It also holds a license to operate in the remaining two, preparing it to become a pan-Indian operator in 2010.

Aircel has won many awards for its services, including three World Brand Congress 2009 awards for Brand Leadership in Telecom, Marketing Campaign and Marketing Professional of the Year. Aircel was also honored by CMAI INFOCOM National Telecom Award 2009 for “Excellence in Marketing of New Telecom Service”. It was selected as the best regional operator in 2008 by Tele.net and was rated as the top mid-size utility company in Business World’s “List of Best Mid-Size Companies” in 2007. It also got the highest rating for overall customer satisfaction and network quality in 2006 by Voice and Data.

**Turning challenges into opportunities**

Amidst falling revenue per user from voice services and intense competition in all its telecom circles, Aircel was seeing an explosion of data usage amongst its subscribers since the inception of its EDGE network in 2008. Its existing packet switching infrastructure was rapidly reaching the limits with respect to throughput and capacity. Indiscriminate use of bandwidth by applications such as P2P, video streaming and VoIP was further compounding the problem by degrading the quality of service for all subscribers.

The challenge was to turn the situation into an opportunity rather than a problem by, say, implementing a solution that would help capitalize on the explosion of mobile data usage – one that would have the capacity and the longevity to meet the increasing demand for data services and one that would help Aircel transform itself from a voice-only service provider to a mobile multimedia operator.

**Enhanced core network**

Aircel evaluated solutions from numerous vendors. In terms of service capacity, footprint, service intelligence, and flexibility to adapt to network evolution, Aircel found that Huawei’s Unified GGSN and SGSN product was the one that fit the bill.

Huawei’s packet-switched solutions were deployed at two locations – Delhi and Chennai – to serve a total of nine new telecom circles. Data from the existing four SGSN and two GGSN nodes were migrated.
to just either of Huawei Unified SGSN and GGSN nodes. Even with the reduced footprint, Aircel’s overall packet handling capacity and throughput increased significantly.

The Unified SGSN and GGSN solution also provided Aircel the flexibility to support the current 2G/3G network while ensuring a relatively seamless evolution to future HSPA/LTE networks through software upgrades.

The installed solution also delivers powerful content filtering and service control capabilities that give Aircel the ability to manage their network resources more efficiently. In essence, applications that are detrimental to the performance of the network and that negatively impact Aircel’s service revenues can now be more intelligently managed.

Reaping the benefits

Since the deployment of the Huawei PS solution, Aircel has expanded into nine new circles and has achieved tremendous growth in terms of data subscribers and mobile data traffic.

Mr. Mallikarjuna Rao, Group CTO for Aircel Ltd commended, “Huawei’s cutting-edge Packet-Switched solution enabled Aircel to achieve fivefold growth in data subscribers and a twenty-fold increase in mobile data traffic within 1 year. This is a unique record.”

In addition to handling this dramatic increase in subscribers and service traffic, the Huawei solution has allowed Aircel to curtail certain services such as VoIP that were adversely affecting their service revenue.

It is a near certainty that the mobile broadband boom will continue for the foreseeable future and that Aircel will have to evolve other parts of its network to meet future demands. Specifically, its current 2G/3G radio access network will need to be upgraded to newer technologies such as HSPA and LTE. In this scenario, Aircel can rest assured that their investment in the Huawei PS solution will be able to evolve along with the rest of the network with respect to both capacity and standards.

“The Huawei Packet-Switched solution also provided Aircel the flexibility to support 2G and 3G networks ensuring a relatively seamless evolution as and when 3G comes,” added Mr. Rao.

And at a time where the operational overhead and environmental impact of managing an ever-expanding pool of network elements become a key concern, the reduced footprint of the Huawei solution will be invaluable to Aircel.

Mr. Ravneet Mehra, who heads the product portfolio of Packet Core and VAS, observed, “The Huawei PS solution not only enabled Aircel with a reduced footprint but also helped increase the overall packet handling capacity and throughput significantly.”

The explosion of mobile data usage and hunger for the associated new multimedia services can be a nice problem to have for mobile operators, but only if they have wisely invested in a network infrastructure that can capitalize on such tremendous growth. Aircel looked at numerous solutions with the right set of evaluation criteria and settled on Huawei’s PS solution as the one meeting and exceeding the requirements sought. The decision has already borne fruit, with Aircel capturing new markets, subscribers and service revenues. Huawei is proud to have been chosen for this important endeavor and succeeded in its implementation.
The World Expo is an unparalleled opportunity for countries around the world to showcase emerging technologies and applications. At the Shanghai World Expo 2010, China Mobile’s TD-LTE network allows users to enjoy cutting-edge mobile broadband services.
The TD-LTE network covering the Shanghai Expo not only provides an impressive array of mobile broadband services for users, but also exhibits China’s innovative capabilities. The network’s key concepts can be embodied by three simple adjectives: nascent, large, and stringent.

TD-LTE as a nascent technology, its debut at the Expo requires nothing short of a flawless network performance, especially given the high profile of the global event. As a conceptually verified technology, TD-LTE is still in its experimental stage and the Shanghai World Expo is the perfect platform for its first live performance.

The TD-LTE network offers wide coverage and high peak traffic volume. The network covers the entire World Expo Park and 11 pavilions over an area of 5.28 square kilometers. An estimated 70 million visitors will visit the 6-month expo, with the number of daily visitors set to be a staggering 400,000. Such concentrated user density demands high O&M capabilities and robust network deployment.

During network construction, China Mobile faced considerable pressure. As a key representative domestic technology, TD-LTE is expected to deliver a high quality of experience (QoE) during the Expo, with full availability and unfailing reliability.

Deploying a flawless network

Thorough planning

TD-LTE distributed outdoor base stations were deployed for the first time and tested live at the Expo. Operating in a complex radio environment that spans numerous buildings, the 17 base stations cover the whole World Expo Park and part of the Huangpu River to provide seamless coverage across the entire event.

As China Mobile’s strategic partner, Huawei supplied all 17 distributed outdoor base stations; it also provided the end-to-end TD-LTE solution, which integrates the radio network, evolved packet core (EPC), transport network, service platform, and terminals. Huawei has also delivered a range of innovative high-speed mobile broadband services, such as instant video transfer, high-resolution (HD) mobile video, HD mobile monitoring, and HD mobile conferencing.

During network planning, both parties identified various engineering difficulties, site access limitations, and uncertainties. The innovative use of technology emerged as the expedient solution to ensure a top quality network.

As a first step, Huawei applied its GENEX network simulation and planning platform to ensure comprehensive network planning, minimize site relocation, and ensure high quality and efficient network optimization.
Secondly, Huawei planned the network based on different application scenarios, including park-wide coverage and routes for demo cars, test cars, buses, and cruise ships. Different baseline parameters were set for different scenarios to reduce readjustment and guarantee a solid network and service performance.

**Efficient deployment**

The network construction period was lengthened as the pavilion construction limited site access, as well as transmission and power resources. To facilitate network deployment within tight engineering deadlines, Huawei has standardized its operational processes for hardware installation and software commissioning, which has significantly enhanced engineering efficiency and quality.

With centralized planning and management, Huawei classifies project tasks by level and priority, as transport network and service platform are deployed at the same time with other tasks like site deployment and network optimization. This weekly plan is then subdivided into a daily plan, which empowers the team to implement multiple project arms simultaneously and more effectively integrate site deployment, optimization process, and service development. For example, when a site is deployed, network optimization begins immediately for service launch.

**Strong R&D support**

Strong R&D support is a must for TD-LTE network deployment and also for preempting bottlenecks as network optimization requires deep network understanding and necessitates algorithm adjustments.

By closely integrating its R&D and maintenance staff, Huawei strongly supports field maintenance staff with powerful R&D resources. This cooperation mode greatly assists and expedites problem location and network optimization, bringing the power of the TD-LTE network into full play, and laying a solid foundation for service development.

**Outstanding services**

After deployment, the TD-LTE network has passed quality and load tests, and technological verifications organized by the China Mobile Research Institute and the China Mobile Shanghai R&D Center. Results reveal that the TD-LTE services are of high quality and reliability.

May 1, 2010 marked the formal launch of the Shanghai World Expo and the Oriental Pearl opens its arms to embrace visitors from around the world. Covering the entire World Expo Park, the TD-LTE network continues to demonstrate its outstanding high-speed mobile broadband services to users. The services include: HD mobile monitoring, HD mobile conferencing, HD mobile VOD, instant video transfer, and high-speed mobile Internet access. Users also have the chance to experience TD-LTE services in the TD-LTE demo car and on the cruise ship.

The innovative range of TD-LTE services has deeply impressed visitors. Feedback so far has been highly positive, including comments such as “amazing”, “excellent”, and “milestone achievement”. All eagerly anticipate the arrival of mobile broadband.
The brilliant debut

TD-LTE elevates experience at World Expo

The World Expo is a great event to showcase the best achievements of human civilization, including telecommunications advancement. At the 2010 World Expo Shanghai, TD-LTE was first introduced, pointing to the future of 4G mobile broadband in China.
Winners

TD-LTE’s global debut

As one of the world’s largest mobile operators, China Mobile is a global partner of the Shanghai World Expo. In 2009, it selected vendors including Huawei to deploy the World Expo TD-LTE Demo Network, the first of its kind in the world, signifying the debut of TD-LTE in the largest mobile communications market in the world.

Straddling both sides of the Huangpu River between the Nanpu Bridge and Lupu Bridge, the Shanghai Expo Park covers an area of 5.28 square kilometers and is the largest expo park in history. The Expo is also likely to be the largest World’s Fair ever in terms of visitor numbers as Expo organizers expect about 70 million visitors during its 6-month run.

To showcase the latest achievements in and promote the TD-LTE industry, China Mobile invited dozens of well-known vendors and providers to join in the demo project in 2009. Thanks to its outstanding overall test results, the strength of its end-to-end solutions and its rich experience in commercial/pilot LTE network deployments outside China, Huawei was selected as a key partner to exclusively build the outdoor TD-LTE network in the Expo Park and provide support and guarantees for outdoor service demonstrations.

For this largest TD-LTE demo network in the world, Huawei has provided an end-to-end TD-LTE solution including base stations, EPC core network equipment, CPE terminals, and a service platform. With 17 outdoor distributed TD-LTE base stations, the solution has delivered complete outdoor coverage for the entire Expo Park and even on the Huangpu River that runs through the Park.

Fabulous TD-LTE experience

On the Shanghai Expo TD-LTE Demo Network, a series of great mobile broadband services are demonstrated, showcasing the advanced TD-LTE capabilities and features, especially the diversified mobile high-definition (HD) video applications that require high-end network and even end-to-end system capabilities.

For various groups such as friendly users and security personnel, the Demo Network facilitates mobile broadband services such as HD video conferencing, multi-way HD video surveillance, portable video surveillance, instant shoot & transfer, and high-speed wireless network access. HD video conferencing, portable video surveillance, and instant shoot & transfer services are all carried over the mobile network for the first time, marking a major breakthrough in mobile broadband development.

Mobile HD conference brings people closer

Video conferencing is efficient while saving time and money. Its increased popularity means that video conferencing systems are expected to be reliable and render high-definition images.

Under normal circumstances, video conferences are held at fixed venues, where access is provided through fixed broadband to meet bandwidth and latency requirements. Yet, it is increasingly
desirable for professionals and businesspeople to do business on the move and they expect to have the same real-time communication experience with HD conferencing as they do face to face.

The China Mobile TD-LTE Demo Vehicle in the Expo Park cruises visitors at speeds of up to 40 km/h (speed limit for the Expo Park and nearby roads). Another TD-LTE test vehicle running on the Pudong South Road outside the Expo Park connects users to the Huawei Telepresence HD conferencing system and the TD-LTE network covering the Expo Park. Users are able to experience clear imaging (with delays of less than 1s and with no frame loss nor mosaic), and complete audio/video synchronization. Videoconference participants evidently can get nearly the same experience as in a meeting room and have been duly impressed.

**HD video surveillance ensures a “Safe Expo”**

The Shanghai World Expo has rapidly attracted visitors from home and abroad. Since the end of May, the average number of visitors has hit 400,000 each day with more than 500,000 per weekend day. All of the venues, roads, pavilions, combined with buses and Huangpu River ferries present major safety and security challenges. To ensure the safety of visitors, an HD video surveillance system has been put in place.

Traditional video surveillance systems are simply not enough. Buses, ferries and people move. In typical mobile video surveillance systems, image definition is often sacrificed for mobility. Mobile video monitors often adopt CIF or QCIF for code resolution and the image definition is usually 1/4 or even 1/16 of standard definition.

The introduction of the mobile HD video surveillance system over the TD-LTE network clears up the images. The system enables the images collected by mobile video monitors to reach the level of standard definition by improving the video quality up to 16 times, allowing for the display of 720P/1080P HD videos. The system not only renders videos with quality comparable to a fixed network but also satisfies other mobility and higher bandwidth needs in terms of end-to-end experience and application scenarios.

Real-time full-range monitoring contributes greatly to effectively ensuring visitor safety and the TD-LTE video surveillance system covers the entire Expo. The ferries on the Huangpu River, buses on the land, and surrounding high-rise buildings are all closely monitored with video specific for various scenarios.

During surveillance planning, China Mobile and Huawei ingeniously introduced portable video transfer. Both TD-LTE CPE (portable TD-LTE terminal) and devices such as batteries and video codecs are put into a backpack weighing about 3kg. Carrying the pack on his/her back, a single person can handhold a portable DV camera, shoot a scene and then transfer the video back to the surveillance center in real time over the TD-LTE network for evaluation. In this manner, the TD-LTE mobile HD video surveillance system perfectly serves the needs of the Shanghai Expo by equally emphasizing all aspects, large or small. General surveillance is thus maintained as more specific and detailed information is scrutinized. Furthermore, portable video transfer is so flexible that it can be deployed whenever needed.
Instant shoot & transfer revolutionizes news gathering and broadcast

Instant shoot & transfer is one of the featured TD-LTE services and it wowed the visitors to the ITU's 145th anniversary celebration at the Expo Park on May 17th and the Shanghai NGMN Industry Conference in early June. Hailed as a pioneering move at the Expo, it also represents a technical revolution and a turning point in the history of news video.

Mr. Bill Huang, General Manager of the China Mobile Research Institute, remarked that this service was regarded by the media as a revolution in news gathering and broadcast in his keynote speech at the “TD-LTE Demo Night” on June 2nd at the Shanghai World Financial Center.

Traditional live broadcasting requires the construction of live broadcast facilities like a newsroom or a live broadcast truck. That is often demanding and difficult to do on site, take time to set up and test, and is vulnerable in emergencies. Cost is another major concern, for a set of integrated equipment costs a million or more USD, and with the satellite transmission link, the system really costs an arm and a leg.

By comparison, the TD-LTE-based instant shoot & transfer service replaces the newsroom or broadcast truck with portable integrated equipment that is easy to operate and maintain and costs much less. If we take O&M into account, instant shoot & transfer can definitely save a lot of labor and transmission link costs.

The TD-LTE HD instant shoot & transfer service was jointly demonstrated by China Mobile, Huawei, and other partners, attracting wide attention at the NGMN Industry Conference in the Shanghai World Financial Center. The TD-LTE HD instant shoot & transfer equipment consisted of professional HD cameras, audio and video codecs, and TD-LTE terminals. China Mobile put a large screen in the booth, which played the scenes captured by HD cameras. Video content was encoded and decoded locally and the video code streams were up to the HD standard, with no blurry images, frame loss, or mosaic. The delay of images from the camera to the screen ranged between one and two seconds, and, according to the on-site presenter, the delay was mainly caused by the codecs and would be less than 20ms if the videos were transferred from LTE network equipment. If the codec capability was further improved or a more professional codec was adopted, the end-to-end delay would be so small that you would hardly notice it, said the interpreter. Through the indoor TD-LTE network, the system can directly upload and download HD video code streams without any server platform. News can be collected, edited, and broadcast even while mobile, without location restrictions.

All roads lead to Rome

Skype, YouTube, and Facebook are moving into mobile applications and services. Smart terminals such as the iPhone, BlackBerry, OPhone, iPad, and Kindle are leading the market. The app store has become a common model for mobile communications giants, and the entire industry is molding the mobile Internet era.

In the future, a more diverse range of mobile Internet terminals will be available for increasingly more users to enjoy better mobile Internet services. In addition, new-generation mobile broadband networks, mostly evolving toward LTE, will provide the infrastructure to guarantee that the mass users embrace the mobile Internet.

In December 2009, TeliaSonera, the largest telecoms operator in Scandinavia and the Baltic countries, launched the world’s first commercial 4G/LTE network in Oslo and Stockholm supplied by Huawei and Ericsson respectively. According to data released by the Global Mobile Suppliers Association (GSA), there were 110 operators committed to LTE network deployments in 48 countries and regions as of June 2010, and 22 LTE networks will be in commercial service or at trial stages by the end of 2010. These operators include traditional GSM/CDMA operators such as Vodafone, T-Mobile, and NTT DOCOMO, CDMA operators like China Telecom and Verizon Wireless, and GSM/TD-SCDMA operators like China Mobile. LTE has no doubt become the common choice for most mobile operators in their migration to mobile broadband.

From the Shanghai Expo Park, TD-LTE’s brilliant debut marks the beginning of China’s journey toward 4G mobile broadband.
China Telecom
IPv6 shines at World Expo

The music begins, lasers flash, and fountains dance. Fireworks illuminate the Huangpu River with spectacular color, and the whole dazzling event is relayed live on the world’s largest LED screen. Thus began the 41st World Expo in Shanghai, a six-month cultural and technological extravaganza. As one of the partners of this grand event, China Telecom’s subsidiary, Shanghai Telecom, is servicing the Expo with an IPv6 FTTx network and, through a flawless quality of experience, is adding its own touch of glamour to the event.
Covering an area of 5.28 square kilometers, the Expo Park is the largest venue in the history of the World Expo. Spanning the Huangpu River from Pudong (the East of Huangpu River) to Puxi (the West of Huangpu River), the park comprises an array of national, themed, and corporate pavilions; the Urban Best Practices Area (UBPA); and a wealth of homestay accommodation around the Park. To deploy a high-speed broadband network that covers such a large area is no easy task.

China Telecom Shanghai began planning the network a year before the Expo kicked off. After evaluating and testing the leading solutions, the operator selected fiber broadband access and next-generation Internet technology to service the Expo, choosing Huawei to employ its FTTx and IPv6 solutions.

On the first day of the Expo, Huawei’s FTTx devices had been fully deployed in the Pudong section of the Park, covering the national and corporate pavilions, the International Broadcasting Center (IBC), the Expo Performance Center, and the Expo homestays. By connecting to the IPv6 core backbone, the FTTx network provides IPv6 services to meet venue communication requirements, broadband access, mass video and information transfer, and Internet data services.

Perfect blend of IPv6 and Blu-ray

At 8 pm, April 30, 2010, the lavish opening ceremony began. Eight large newsrooms in the IBC accommodated key media professionals, including representatives from China’s top media CCTV, Xinhua News Agency, and People’s Daily. All eyes were focused on the opening ceremony, which was broadcast live on large LED screens with outstanding image quality. When the last firework above the Huangpu River expired and gave way to the night sky, the newsroom thundered with applause at the success of the opening ceremony and its flawless transmission.

Constructed by China Telecom Shanghai and Huawei, the IPv6 optical network and Blu-ray IPTV platform combined to enable the live broadcast via IPTV. The advanced IPv6 FTTH network covers the first floor of the IBC, which comprises 8 large newsrooms, 32 small newsrooms, and a media room that can seat 300. In addition to providing conventional private line technology, the network is designed to transfer massive videos and news data via the IBC. With the IPv6 FTTH network seamlessly connecting to the operator’s IPv6 CNGI core node in Pudong, the solution forms an E2E IPv6 network connection between the access and core networks.

China Telecom Shanghai has thus perfectly united IPv6, FTTH, and Blu-ray – the three most advanced broadband video technologies. Blu-ray delivers unparalleled clarity, while the IPv6 FTTH network guarantees basic ultra-broadband (UBD) services, making the network an industry highlight and a fitting technological achievement for the Expo.

IPv6/IPv4 dual-stack network access

Resonating with the Expo’s slogan of “better city, better life”, China Telecom Shanghai’s vision is of bringing cutting-edge technology into the ordinary home. With Huawei, this has been realized as part of the Expo project, following the launch of the world’s first IPv6/IPv4 dual-stack router terminal, bringing the most advanced network technology experience to household users in the Park area.

By deploying an IPv6/IPv4 dual-stack terminal, residents near the Expo Park now have access to an unprecedented surfing experience that not only inherits the features of IPv4 access technology, but also enables access to more IPv6 websites through the IPv6 network, expanding content offerings considerably.

Thanks to close cooperation between China Telecom Shanghai and Huawei, IPv6 is adding greater color to the 41st World Expo through cutting-edge technology that genuinely enriches life. China Telecom Shanghai has expressed the value it places on its “perfect” cooperation platform with Huawei, and anticipates that the two scale the solution to cover the whole of Shanghai, and thus truly realize the operator’s vision.
Build a simple world with our smart device.
Partnership. Customization. Value

Everything at Huawei Device is designed with one philosophy in mind: “Smart Device, Simple World”. Our creations shape your world, bringing communications, information and entertainment together seamlessly, smartly, simply.
The Huawei U8100, for instance, uses our new emotion interface to give you the most natural, intuitive experience. Based on the latest Android Eclair OS, it’s an icon of smart simplicity.

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Just like friends who help each other to reach for the sky, Huawei can do the same for your business. That’s because we pioneer innovations that are based on our customers’ needs: which is why 45 out of the world’s top 50 telcos choose Huawei as a partner. Proof that with good collaboration, the sky is the limit.

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