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VIP Voices

Telefonica:

Increased Data Traffic Is a Good Challenge

An interview with Ian Miller, Director of Radio Access Networks for Telefonica

Special Topic: Professional Services

Service Enables Value Creation

Tech Forum

From Traffic Management to Traffic Operation

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ZTE TECHNOLOGIES

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A technical magazine that keeps up with the latest industry trends, communicates leading technologies and solutions, and shares stories of our customer success

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ZTE Launches **4G Cloud Radio** Solution at MWC

25 February 2013, Shenzhen — ZTE launched its 4G cloud radio solution at the Mobile World Congress in Barcelona, Spain. ZTE's cloud radio is a flexible solution that can adapt to existing transmissions for operators. This adaptability improves network performance. Moreover, cloud radio enables dynamic coordination and guarantees a smooth user experience, especially on the cell edge.

"ZTE never stops innovating for our customers, and we are proud to announce our cloud radio solution," said ZTE Vice President Dr. Wang Shouchen. "We expect cloud radio will bring a plethora of benefits to operators as 4G progresses."

Cloud radio is an emerging solution and aims to help operators solve a series of key problems during network evolution progress to 4G, such as unbalanced load in 2G, 3G and LTE networks, and uneven cell edge user experiences.

E-Plus planning **LTE** network deployment with ZTE

21 February 2013, Shenzhen — ZTE, a publicly-listed global provider of telecommunications equipment, network solutions and mobile devices, and major European mobile operator E-Plus are to extend their partnership, with ZTE taking a more substantial role in the operator's forthcoming LTE network expansion in Germany.

The E-Plus Group has been successfully working together with ZTE in the expansion of its UMTS network, the modernization of its core network and the current LTE field trials. This cooperation will now continue with the deployment of the first phase of the next generation of E-Plus's LTE network. In addition to the delivery of LTE base stations (eNodeB) and supporting E-Plus with the LTE network upgrade, ZTE will now implement its evolved packet core (EPC) technologies, to more effectively enable LTE roll-out across the E-Plus network. ZTE's highly advanced LTE technologies in the access and core networks will play a major part in managing the anticipated significant increases in mobile data volumes across the E-Plus network.

Telenor Launches Hungary's Nationwide LTE Network with ZTE

26 February 2013, Shenzhen — ZTE announced that it has successfully deployed an LTE network for multinational telecoms operator Telenor in Hungary.

The first phase of the network covers 76 towns in Hungary and highlights that Telenor Hungary's Hypernet high-speed data services strategy has reached a new milestone and laid a solid foundation for its ambitious plan of a 'digital Hungary'.

ZTE provided Uni-RAN total network solutions based on SDR technology for the project. The customized mode 2T2R RRU for LTE deployment provided flexibility and helped achieve smooth spectrum reforming to provide LTE services in 1800 MHz frequency without increasing the RF module.

ZTE has worked with Telenor Hungary for a number of years to construct its GSM/UMTS/LTE three mode four band network. At the end of 2011, ZTE and Telenor Hungary jointly launched the first nationwide DC-HSPA+ mobile broadband network. In the first quarter of 2012, Telenor Hungary's pretax income and ARPU per user value showed the first signs of growth following the economic crisis.

ZTE to increase smartphone revenues by 30% in 2013

25 February 2013, Barcelona, Spain — ZTE announced at the Mobile World Congress that it expects to increase smartphone revenues by 30 percent in 2013, and maintain its position as one of the top four global handset manufacturers.

ZTE's handset business has seen steady development and profit growth during 2012. Industry analyst IDC reported that ZTE had shipped 65 million handsets in 2012, accounting for 3.8 percent of the global handset market and confirming ZTE as one of the top four handset producers.

"We know that our future success means we have to build the ZTE brand, and another target for us is to be a top five vendor in terms of brand awareness and reputation within the next three years," said ZTE EVP and Head of the Mobile Devices Division Mr. He Shiyou. "2013 is the final year of our three year transformation into a high-end smartphone brand, but we have a lot of building still to do. As I have said before, we aim to be a top three handset manufacturer by 2015. This target has not changed."

ZTE Launches Magic Series RRUs **58% Smaller than Industry Standard**

25 February 2013, Shenzhen — ZTE has launched the Magic range of RRUs based on ZTE's SDR series base stations, offering smaller size, lower power consumption, multi-mode and multi-sector performance.

The smallest RRU in the Magic series, the 80 W module, has a size/weight of 9.9 L/12 kg, a new record in the industry. This is 58% smaller than the average RRU. The small but high-performance Magic RRUs can be installed in just five minutes.

ZTE FDD/TDD Converged Solution **Wins GTI Innovation Award**

27 February 2013, Shenzhen — ZTE announced its FDD/TDD converged solution has won the Global TD-LTE Initiative (GTI) Innovation Award at GTI Night at the Mobile World Congress in Barcelona.

GTI Night is held each year to honor outstanding achievements in the telecommunications space. This year's innovation award winner was selected by a GTI steering committee of multiple operators. GTI Night 2013 was attended by more than 30 global operators and several industry partners.

"This integrated networking solution enables FDD operators to circumvent bottlenecks," said ZTE Senior Vice President Zeng Xuezhong as he accepted the award. "This is important as the technology becomes more prevalent and ZTE is pleased to be a contributor to the prosperity of the GTI and TDD ecosystems."

To date, ZTE has built TD-LTE networks for 42 operators in 30 countries across the globe, and 12 of these networks have been put into commercial operation.

GTI is dedicated to the development and promotion of the TDD ecosystem and was founded in 2011 by a consortium of operators, including China Mobile, SoftBank, Clearwire, Bharti Airtel, and Vodafone. It currently has 51 operator members and 44 industrial partners.

ZTE's UMTS Radio Performance Solution Improves Spectrum Efficiency by 40%

26 February 2013, Shenzhen — ZTE unveiled its new UMTS radio performance solution at the Mobile World Congress in Barcelona, delivering a 40% improvement in spectrum efficiency to help operators enhance network performance. ZTE's UMTS radio performance solution is comprised of four sub-solutions: En-performance, capacity SON, multi user detection (MUD) and CRAN RRU solutions.

The En-performance solution offers capabilities for signaling storm suppression, CP/UP resource sharing, bearer pre-configuration, and concurrent handover function, improving RNC performance by 30% to 100%, and enhancing the control plane processing performance of base stations by 60%.

The capacity SON solution utilizes ZTE's patented power control technology in the uplink, increasing uplink capacity by 35% to 50%. For the downlink, the power optimization feature for common control channels will increase downlink capacity by 10%.

The MUD solution, based on interference cancelation, significantly increases system capacity by reducing interference between users. Result from laboratory testing shows that this technology is capable of delivering a 30% to 60% gain.

The CRAN RRU solution is an upgrade of existing multi-RRU technology, improving network coverage in complex scenarios such as indoor and street corners in urban areas. The transmission power of RRU is increased from previous 80 W to current 120 W.

ZTE Launches Full-Outdoor Microwave System with Patented Technology

27 February 2013, Shenzhen — ZTE launched a new full-outdoor microwave transmission system based on patented technology at the Mobile World Congress in Barcelona, offering substantial performance enhancements to meet the needs of today's ultra-fast LTE networks.

The design advantages of ZXMW NR8950 enable operators to overcome the challenges of building high-density small-cell networks for large-capacity data transmission, while site installation space is limited. The industry-leading 1024QAM modulation mode on ZXMW NR8950 uses high modulation and multi-level data compression technology to increase throughput substantially, with a theoretical speed of 1.6 Gigabits per second.

ZXMW NR8950 is equipped with a patented storage solution pioneered by ZTE that is remotely configurable. A built-in MicroSD card can store data on configuration set-up, license, and log information, enabling customers to quickly transfer settings from existing equipment to new equipment, greatly cutting operation and maintenance costs, and reducing the time of network interruption.

ZXMW NR8950 can also interchange with the indoor units of ZXMW NR8250 for hosting operation mode, reducing the difficulty of commissioning and maintenance, and can be simply deployed by operators.

ZTE Reveals Strategic Collaboration with Intel **on Next Generation Smartphones**

5 March 2013, Hanover, Germany — ZTE announced a strategic collaboration with Intel focused on the new Intel® Atom™ Processor Z2580 platform recently announced at the Mobile World Congress in Barcelona. The platform will bring significant performance enhancements to the next generation of ZTE smartphones with Intel Inside®.

The collaboration with Intel is an important part of ZTE's strategy for product development, both in terms of time-to-market and in providing customers with a great handset experience. ZTE is currently working with Intel to develop unique smartphones based on the Intel Atom Z2580 processor. The platform's dual-core processor with Intel® hyper-threading technology provides double the compute performance and up to 3x graphics capabilities over the previous generation Intel® Atom™ Z2460 processor while delivering the same competitive battery life.

This latest engagement builds on the multi-year relationship between ZTE and Intel that has already produced the successful ZTE Grand X IN, ZTE's first smartphone with Intel Inside. The ZTE Grand X IN was one of the best-selling smartphones in Austria during 2012. The Android*-based device is also available in Germany, Poland, Hungary, Romania, Serbia, Macedonia, Slovakia, Moldova, Greece, Sweden and Norway. It will also soon be available in France.

ZTE Selected by STC Group as **Preferred Global Vendor**

28 February 2013, Shenzhen — ZTE was selected as one of the preferred global vendors by STC Group, the largest telecom services provider in the Middle East & North Africa.

The agreement between ZTE and STC Group, announced at MWC 2013 in Barcelona, will allow ZTE to offer its portfolio of network infrastructure equipment through a global price structure based on total business located in Bahrain, India, Indonesia, Kuwait, Malaysia, Saudi Arabia, South Africa and Turkey.

ZTE Delivers **New IPTV Experience** to Mtel Customers in Bulgaria

4 March 2013, Shenzhen — ZTE is pleased to provide its market-leading IPTV solution to Mobitel (Mtel) and offer customers in Bulgaria a ubiquitous television viewing experience.

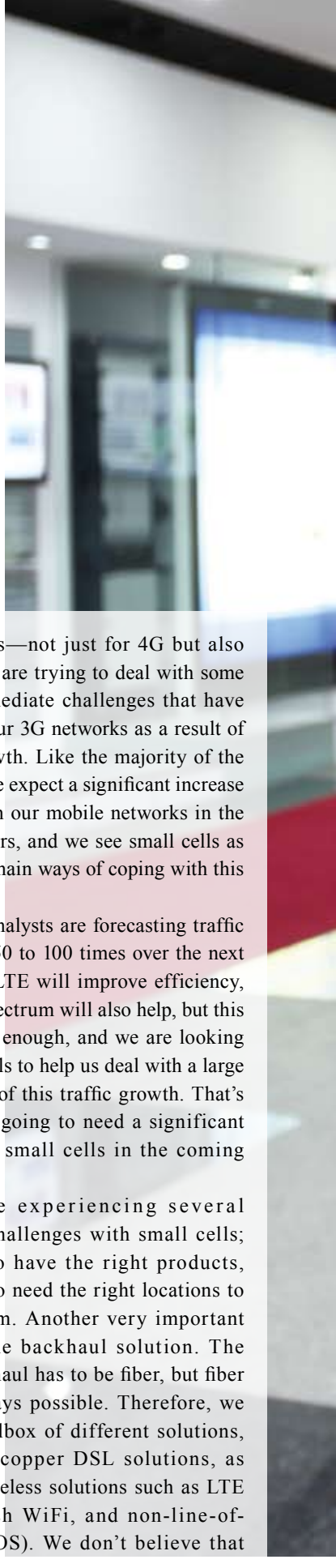
Mtel's IPTV platform, powered by ZTE technology, is now in commercial use delivering television services to TVs, PCs, tablets and mobile phones across Bulgaria. The multi-screen service provides a superior interactive video experience to users over fixed or mobile broadband connections, enabling Mtel to deliver significantly greater value to broadband subscribers.

Mtel is the biggest mobile operator in Bulgaria, and is a wholly-owned subsidiary of Telekom Austria Group (TAG). Mtel jointly constructed an IPTV pilot with ZTE in September 2011 and signed a five-year cooperation agreement in December of the same year for ZTE to provide customized end-to-end solutions for IPTV middleware, digital rights management (DRM), a content delivery network (CDN) and set top boxes. The network was expanded over several phases.

The multi-screen integrated IPTV service enables subscribers to watch videos anytime and anywhere such as in the study, in the office or on the way to work, not just in the front of the TV. The commercial use of the platform will help Mtel attract more customers.

Telefonica:

Increased Data Traffic Is a Good Challenge



Reporters: Liu Yang and Jin Ping

Telefonica is one of the world's leading integrated telecommunications operators. It provides communication, information, and entertainment solutions and it has presence in 25 countries. As of September 2012, Telefonica had 313.8 million customers. *ZTE Technologies* recently interviewed Ian Miller, Director of Radio Access Networks for Telefonica. He believes that the rapid growth in data traffic is a good challenge and brings opportunities. He talked about Telefonica's LTE strategy and speculated on beyond 4G. He also shared his experiences in multinational operations and his impression of ZTE.

Rising to the Mobile Data Challenge

Q: Is the rapid growth in mobile data traffic an opportunity or pitfall for operators? How do you profit in the big-data era?

A: I think it's definitely an opportunity. The rapid growth in data traffic is clearly a challenge, but it's a good challenge to have, not a bad one. It's good in the sense that customers want to use more of our services and want to transmit more data across our networks. That brings opportunities. It would be a much worse scenario if customers wanted to use fewer of our services. We would see declining traffic, and that would be a much bigger issue.

One of the key challenges we have is how to monetize this growth. We need to find new ways of converting data traffic into revenue by providing new services that customers truly value. One of the ways we are doing this is by establishing Telefonica Digital. We are looking at how to bring to the market new products and services that benefit our customers.

Q: Telefonica has adopted small-cell technology in its 3G and 4G networks. How do you solve the backhaul issue? Do you think the small-cell market will explode or is small-cell technology just hype?

A: No, I don't believe it's just hype. We've been actively working on small-cell technologies and solutions for many years—not just for 4G but also for 3G. We are trying to deal with some of the immediate challenges that have arisen on our 3G networks as a result of traffic growth. Like the majority of the industry, we expect a significant increase in traffic on our mobile networks in the coming years, and we see small cells as one of the main ways of coping with this growth.

Some analysts are forecasting traffic growth of 50 to 100 times over the next ten years. LTE will improve efficiency, and new spectrum will also help, but this will not be enough, and we are looking to small cells to help us deal with a large proportion of this traffic growth. That's why we're going to need a significant number of small cells in the coming years.

We are experiencing several difficult challenges with small cells; we have to have the right products, and we also need the right locations to install them. Another very important issue is the backhaul solution. The ideal backhaul has to be fiber, but fiber is not always possible. Therefore, we need a toolbox of different solutions, including copper DSL solutions, as well as wireless solutions such as LTE TDD, Mesh WiFi, and non-line-of-sight (NLOS). We don't believe that

Ian Miller, Director of Radio Access Networks for Telefonica

any one solution alone is ideal.

We have been investigating small cells for quite some time with a range of different projects, including paper-based analysis, joint activities with industry, simulations and field trials such as the one we ran at Barcelona MWC in 2012. We want to ensure Telefonica's leading position within the industry in this space.

LTE: The Right Strategy for Telefonica

Q: LTE is gaining momentum across the world. What is Telefonica's LTE strategy?

A: Telefonica is committed to LTE as the next technology for future mobile data evolution. We will deploy LTE in a number of businesses over the coming years. We predict significant benefits for our customers because LTE provides faster speed, lower latency, higher capacity, improved spectrum efficiency, and access to new spectrum bands. Regulators are making more spectrum available for LTE.

Over time, we expect that all of our mobile businesses will move to LTE, but the timing will depend on spectrum availability and market demands and drivers in each country. We have been trialing LTE for many years; however, the opportunity to deploy LTE in a commercial environment has been limited by spectrum availability. We are acquiring spectrum in many of our markets and have secured spectrum in Germany, Spain, Brazil, Chile and Nicaragua. Over the next couple of years we expect to acquire LTE spectrum in most of the main markets in which we operate, then we will start to deploy LTE services in those markets. LTE is the right technology strategy that Telefonica and probably most mobile operators will focus on.

Without a doubt, ZTE's strong point is its flexibility to meet Telefonica's needs in each operating business in the pre-commercial phase. That's very beneficial for Telefonica.

Q: What do you think is the most difficult thing in your move to 4G? Is it spectrum availability?

A: I don't foresee major issues. LTE technology is already proven and is known to work well. Spectrum availability and the timing of that spectrum determines how quickly we move to LTE. Beyond that one of the bigger challenges is backhaul. To fully capitalize on the speeds and capabilities possible with LTE requires upgrades to the backhaul at base sites. This is one of the longer lead time items in the rollout process and is something that we have been working on for some time.

Q: Telefonica is a top multinational company with presence in 25 countries. Could you tell us your experience in global operations? What challenges has Telefonica confronted and how has it overcome them?

A: From a personal point of view, working in global operations for Telefonica has been very positive. I previously worked for Telefonica UK, but working in a global team has given me great insight into the extent of the Telefonica Group's activities outside the local market. It can be quite tough working in global operations though. Our role is to drive synergies and best practice across the group. At times, that can be quite difficult because the local businesses also have their own particular challenges.

One of the key ways we try to address this is through building trust and good relationships with the local businesses. We work very closely with them to understand their specific needs. We usually find that their challenges are not unique and that often other businesses have already solved these challenges beforehand. Therefore, we work hard to foster collaboration across the different businesses—getting them to work together and not re-invent the wheel.

A good example of this is LTE. Telefonica Germany was the first business in the group to deploy and launch an LTE network and services, and they are now sharing their experiences with other businesses that are just starting to deploy LTE. With these mechanisms, we drive collaboration and best practice across the Telefonica Group, and that leads to efficiencies and improvements for our customers.

Telecom Future Beyond 4G

Q: What is the future of telecommunications beyond 4G?

A: Today, most communications are person-to-person communications or person-to-internet communications. I think we will see massive growth in connected "things," that is, device-to-device and machine-to-machine communications. GSMA is predicting 24 billion connected devices by 2020, 50 percent of which will be mobile devices.

We will start to see many everyday appliances that will have wireless elements for communicating with each other and common control systems. Things from cars to cameras will automatically download information back to central repositories. Heating and cooling systems, even fridges and washing machines, will connect back to a network. I think that will be one of the main ways that communications will develop.

This will bring new challenges to our networks. We will have to cope with a large number of connections that may have very different requirements—from high volume HD video streaming through to very small quantities of telematics type data. We need networks that can efficiently carry these different types of data.

As our lives become more dependent on these connected devices, the fundamental demands and network requirements we have today will be ever more important. By this I mean that excellent coverage deep into buildings, sufficient capacity to support the high volume of devices, and good quality will be expected. These are the things customers will take for granted. If many devices and machines are connected, people will expect them to work wherever they are, at any time of the day or night.

We believe that LTE will be around for a very long time, and we are more likely to see continual improvement in LTE rather than any radical shift towards

a new technology.

Q: Do you think that 3G and 4G will coexist for a very long time?

A: I think that's debatable, but we do expect to support legacy technologies for many years. I think a lot will depend on how quickly new devices enter the market and how many customers adopt those new devices. At the moment, there are still a large number of legacy GSM devices in our networks. Therefore, we expect to support these legacy networks for many years.

Face Challenge Together with ZTE

Q: Telefonica began cooperating with ZTE in 2008 on wireless products. What is your opinion of this relationship? What are its strong points? What is your advice?

A: Without a doubt, ZTE's strong point is its flexibility to meet Telefonica's needs in each operating business in the pre-commercial phase. That's very beneficial for Telefonica.

ZTE can provide a good product at a competitive price, and we are pleased with the technology that ZTE offers.

We also feel that ZTE is very good at introducing products rapidly into the market. The time-to-market for new ZTE products is shorter than for other solutions. Overall, things have been going quite well.

Q: Telefonica chose ZTE to reconstruct its wireless networks in Panama and Ecuador. Can you update us on the progress of projects with ZTE?

A: These projects are going reasonably well now. There were some challenges in the beginning, particularly on the technical side. We had some interference issues because of local market conditions, but we have worked through these with ZTE. There are often challenges when introducing a new vendor; in particular, you have to get the local teams familiar with the new products, equipment, and support people.

Telefonica would like to encourage ZTE to continue to strengthen its relationships with its local teams by sharing as much information as possible. In this way, local teams will better understand ZTE's products and solutions and also Telefonica's requirements and businesses. The key to a long-term relationship is building strong and consistent local support teams that can cooperate with Telefonica's local teams in Panama and Ecuador.

Q: What will future cooperation with ZTE look like?

A: We'd like to develop the relationship with ZTE. We're going to continue to share Telefonica's views on how we see radio networks evolving, and we'd very much like ZTE to continue working with us to evolve our networks.

We think ZTE has some very innovative ideas. We're keen to work with ZTE to bring those ideas and concepts to fruition. Together, we will address the challenges brought about by data traffic growth in our networks. ZTE TECHNOLOGIES

Viettel: Step to Global Business

Reporter: Tang Mengjia

Viettel is the largest mobile operator in Vietnam—a country with nearly 100 million people. The company provides GSM, 3G, wireless, fixed, and broadband services to nearly 60 million individual and enterprise subscribers. With a view towards expanding internationally, Viettel has established itself in Laos, Cambodia, Haiti, Peru, and Mozambique. Viettel is seeking more overseas market opportunities, and more countries will be included on this list. In the future, Viettel could be a global symbol of Vietnam. How has Viettel developed globally? And how have they addressed issues in their global expansion? *ZTE Technologies* interviewed Tong Viet Trung, vice president of Viettel Network, at the Viettel headquarters in Hanoi. Trung is in charge of IT infrastructure, marketing, and business policy at Viettel.

Q: Could you give an overview of the development of Viettel in Vietnam and explain how Viettel has achieved success?

A: We were the fresh guy in the commercial telecom market at the beginning of 2003. In the first two to three years, we explored our business mode, marketing policy, and position in the market, and we constructed our fixed and mobile networks. At the end of 2006, we started accelerating our penetration and development of the local market. We promoted a lot of new products and services to attract subscribers. We doubled our subscriber base in 2007 and gained another 10 million subscribers by 2008. At the beginning of 2009, we had around 40 million subscribers and were the largest mobile operator in Vietnam. However, we thought we could do even better when the Vietnamese government released 3G licenses that year. New 3G products opened up more possibilities to attract new subscribers and increase the ARPU of existing subscribers. At the end of 2010, our 3G subscriber base was around 60 million, the largest in Vietnam. That is our brief story. It has not been easy going, but we are definitely proud of our achievements.

If we talk about the reasons for success, I would say the most important is to be different from your competitors. There are eight operators in this country of less than 100 million people. You need to come up with marketing and service

policies that are different from others and that are easily identifiable. Then, you need to realize that difference quickly and provide your customers with constant experiences and attractions. Fortunately, we have the most efficient team in this market, and our rhythm is always faster than our competitor's. This is the key to bringing all policies to fruition.

Q: Viettel has penetrated into many countries. What has been your policy on global expansion during the economic recession?

A: The global economy is in winter, but Viettel, is looking for opportunities amid the danger of depression. In a crisis, some gates are easier to open. Of course, you need to be more careful in a depressed global economy and really think about your target country's background, your marketing policy, and the potential profits. To date, we have chosen the right country at the right time and have used the right marketing policies. Our overseas branches usually capture a lion's share of the market within two to three years, and profits soon follow.

Q: There can be many problems when expanding a business in different countries. How does Viettel deal with such problems?

A: When expanding a business globally you encounter a lot of problems. From our experience, one of the biggest problems is different infrastructure. Not every country has the same power, traffic, and logistics infrastructure as Vietnam. Another headache is regional differences in telecom regulation. You need to understand the regulations in each country and apply them to your operations very carefully. Cultural difference is also a problem, especially in countries that are far from Vietnam. Our solution is to prepare well and make a very detailed plan before we enter a country. Leveraging previous business experience in new markets helps us reduce this risk. At the beginning of a project, we use our own Vietnamese team, and then we set up a local team to maintain the network in the later phase.

Q: How does Viettel win new subscribers and increase ARPU in a new market?

A: A new operator wins subscribers by providing something different and more attractive things than their competitors. Fortunately, we have much experience in exploring markets. This allows us to rapidly customize our services in line with changes in the market. After we have won over subscribers, we increase ARPU by analyzing the requirements and desires of our subscribers. We determine their consumption habits. Here, we have the advantage of business intelligence (BI) provided by ZTE. We obtain business data from each country and feed it to the Vietnam BI centre. We achieve a lot from analyzing such intelligence and knowing our customers. By comparing the consumption styles in different countries, we gain hard evidence that informs our policy making.

Q: How have you constructed your IT system for a global business?

A: This is a very important part of our global policy. An IT support system is the infrastructure for providing differentiated services and unique customer

experiences. We unify the IT systems at global sites and reduce maintenance complexity. Another key point is to keep the IT system flexible so that it can cope with challenges that arise from fast-changing market requirements. We have established our own team to develop our billing and customer care system (BCCS) independently. This will make our IT system more flexible and controllable. It is also critical to choosing an experienced vendor with good products and solutions. This is why we have adopted ZTE's flexible charging solution for most of our overseas sites. We have cooperated with ZTE in Vietnam for many years, and both teams have accumulated considerable experience through this collaboration. ZTE is excellent in implementing overseas projects, and this significantly reduces risk.

Q: How does Viettel innovate with IT infrastructure to be competitive?

A: We have a special team dedicated to researching new technology and finding ways to apply this technology so that we gain commercial value. The team are excellent at their job. After a technology has been researched, we encourage our R&D team to trial it in new ways. ZTE is one of our partners that help us innovate with our IT system. The ZTE team exchanges ideas with our engineering team on a regular basis. This year we have begun innovating on our charging and billing platform. This is exciting.

Q: How do you plan to evolve your IT system?

A: We have used ZTE's online charging platform and BI product to develop our own BCCS system, and this has been very successful for both sides. We are now exploring a convergence evolution. We want to establish a unified, converged billing platform to support all services, networks, and prepaid and post-paid subscribers. We want to bundle our networks and services as an enhancement to our product catalogue. If that is successful, we will consider applying this to other overseas branches. We also have plans for a self-developed IT system. We want to make the IT system more flexible and manageable.

Q: Finally, what are your thoughts on future cooperation with ZTE in the IT domain?

A: ZTE is one of our most important partners in this domain. We have many success cases with ZTE. We will continue this partnership in more branches and on more projects. We are looking forward to more cooperation. ZTE TECHNOLOGIES

From Traffic Management to Traffic Operation

By Bao Jie

Bao Jie, chief engineer of service planning, ZTE Corporation

Internet service providers and terminal manufacturers such as Google, Baidu, Tencent, and Apple are directly or indirectly deriving profit from data traffic on an operator's network. Faced with the new competition, operators need to rethink their contractual relationships with internet companies and users in order to be at the top of the new internet industrial chain.

First, operators need to monitor traffic in communication pipes. They need to clearly determine traffic volume and trends in different services to maximize their value. Communication pipes are the infrastructure, but traffic is the source of revenue and will be the cornerstone of profit in the future.

Traffic Bubble Triggers Demand for Better Traffic Management

Increasing network capacity and bandwidth can be a solution to service applications, but it's not the ultimate solution. Regardless of how high the bandwidth is, it can be occupied by inefficient or low-value traffic. This is called a traffic bubble.

Traffic that can truly improve customer experience and create profit is squeezed out by inefficient traffic. At present, the real challenge is not expanding bandwidth but intelligently managing bandwidth consumption in the network. Only a manageable network is a good network that benefits both operators and users.

The effect of increased network bandwidth is that value is shifted to over-the-top applications. As such applications proliferate, operators need to upgrade their networks to satisfy customer expectations, and this widens the gap between income and cost. Increased traffic doesn't necessarily mean increased revenue, so the answer lies in better traffic management. Higher-value traffic and better service quality will deflate traffic bubbles and bring the revenue sought by operators.

Exporting bandwidth and connecting between networks are costly for telecom operators. Has the internetwork link met requirements? Who are the main users

*Traffic management is fundamental for traffic operation. Only through **traffic operation** can operators transform themselves.*

of internetwork bandwidth? What are the usage levels during different times of the day? Which users and what types of services are consuming bandwidth? Does the export bandwidth capacity really need expanding? To answer these questions, operators need a clear traffic chart that can be used as the basis for network planning.

Traffic Monitoring and Management

An intelligent traffic monitoring system must be able to view, manage, and control network traffic. It must have multidimensional perception, in-depth analytics, and smart control.

Visualizing network traffic means collecting, classifying, and counting traffic on a multidimensional basis. This allows an operator to identify and differentiate both services and users. Network traffic visualization is the basis of intelligent traffic management. Information about network traffic can be collected in real time from user groups, service applications, and network interfaces and can then be sent to an intelligent traffic management and control system for analysis.

Managing traffic involves managing network performance, configuration, billing, faults, and security. By correlating collected traffic information, managers can clearly identify traffic types, bandwidth occupation, time and space distribution, and service flow. Precisely identifying traffic allows operators to bill according to service features, and this balances the profit relationship between the operator and its commercial partners. Managers can also set thresholds for key indexes. The network sets off an automatic alarm when resource occupation approaches or exceeds the threshold. Managers can then adjust the traffic flow to ensure reliable network operation.

Controlling network traffic means dynamically allocating network resources according to specific policies. Bandwidth is allocated on demand; traffic is offloaded appropriately; high-priority applications are guaranteed; and abnormal traffic flow is controlled to save network resources. With such policies, operators can greatly improve network resource use and optimize customer experience.

To meet the pressing need for effective traffic management, ZTE has launched UniCare, a solution for monitoring fixed-broadband network traffic. UniCare can collect information about traffic in a fixed-broadband network. It can then send this information to CRM and resource systems through northbound interfaces, SNMP interfaces, NetFlow/sFlow protocols, and network probes. The solution provides customized, multidimensional traffic statistics and analysis in the form of various types of charts. It can show development trends and side-by-side comparisons, and can also rank the resource use for different traffic flows. This gives operators a complete picture of their network traffic so that they can optimize OAM and transform their networks if necessary.

From Traffic Management to Traffic Operation

Traffic management is fundamental for traffic operation, which involves using an open service convergence platform to proactively expand traffic volume and generate revenue. Only through traffic operation can operators transform themselves.

Flat-rate monthly billing plans have flat-lined operator ARPU, and various technical bottlenecks have not allowed operators to adequately scale their operations to achieve the necessary revenue growth. A transformation from voice traffic operation to data traffic operation must take place. An operational

mode based on a single business is no longer sufficient; operators need to extend the scope of their businesses; work on differentiated and value-added businesses; and expand as well.

Operators often use a forward-charging model, which involves charging end users. Internet service providers often use a backward-charging model, which involves charging advertisers and partners. These two charging models require a large user base—the biggest resource an operator has. Operators should make full use of this resource by establishing a converged application platform where internet service providers and users are the target customers. Data traffic is currency of transactions on the platform. In the internet age, users are not only information receivers but also information producers. All the traffic on a network will be covered by B2C, B2B and C2C business models. An operator can leverage the advantages of its traffic platform to provide personalized service and information support for everyone conducting transactions on the platform. In this way, the operator can be involved in the traders' pricing processes and gain more revenue. Implementing both forward- and backward-charging models allows an operator to generate revenue from all traffic flowing through the platform. Traffic management is essentially the unified management of traffic interactions between information producers and receivers. By creating and managing a sufficiently large platform for conducting such transactions, operators are engaged in traffic-based operation. A simple analogy is a chain supermarket where producers sell their products quickly and promote new products through the supermarket platform. Supermarket operators can pick different products from producers to meet individual demands of consumers.

As CT and IT converge and competition diversifies, operators are in crisis mode and are aware that they need to transform their businesses. However, such transformation is challenging and demands wisdom. Making the pipe smart is one way an operator can deal with the challenges. Managing traffic is the first step to building a smart pipe that can provide differentiated traffic management and controllable traffic allocation to meet the requirements of individual services.

With traffic management as its base and traffic operation as its core, an operator can create a brand-new business model and find new growth areas in the value chain. ZTE TECHNOLOGIES

Service Enables Value Creation

By Li Zheng

In 2012, telecom operators didn't benefit from thriving OTT businesses. As mature markets have become saturated with communications services and technologies, growth in core telecommunications businesses has stagnated and demand for network capacity has skyrocketed. Operators have been forced to invest in upgrading their infrastructure in order to satisfy this demand but have not reaped any of the financial reward from the services that their infrastructure hosts. Declining revenue and increased costs have weighed on the profit margins of operators. How, then, should an operator react, and should professional service providers adjust their strategies?

Strategic Transformation in the New Economic Environment

In October 2012, OVUM published its annual *Telecoms Trends for 2013*. The report indicated that in the sluggish global economic environment, operators will invest modestly but will come under greater pressure in terms of opex. To optimize costs, operators should strengthen network QoS and customer experience management. Suppliers should also change their roles from traditional equipment suppliers to network management service providers. To counter challenges from OTT businesses, operators should develop new business models and unearth new revenue sources by analyzing customer data.

In December 2012, Deutsche Telekom revealed its corporate strategy for the next three years. DT's operations will be divided into sustainable blue ocean business and shrinking red ocean business. The company plans to increase capex and opex for blue ocean businesses, and it plans to cut down opex for red ocean businesses by improving efficiency. Over the next two years, DT estimates a compound annual growth rate of 6% for its blue ocean businesses and -6% for its red ocean businesses.

DT has incorporated mobile broadband, connected home, and corporate ICT services into its blue ocean

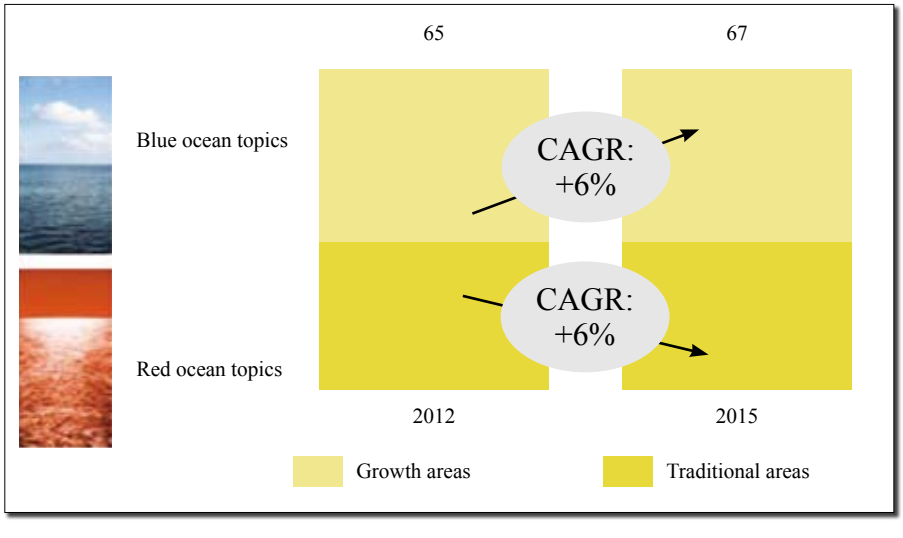


Figure 1. Deutsche Telekom's business development strategy in Europe.

business. Traditional voice and SMS have been incorporated into its shrinking red ocean business.

Value Creation Is the Core of Professional Services

Increasingly, operators have been offering professional services in conjunction with their basic network infrastructure to create value for upstream and downstream customers.

To improve customer experience management (CEM), operators need to deploy related CEM platforms and data probes. Management methods, work flows, and employee skills also need to be upgraded in the transformation from network-oriented to customer-

oriented operation. Equipment suppliers cannot merely provide software and hardware systems; they should provide professional services to help operators perfectly combine systems and processes for effective CEM.

Professional services are an important catalyst for the development of blue ocean business.

CEM Professional Services

In the mobile internet era, customer experience has become a new driver of business growth, and traditional approaches based on optimizing network KPIs are no longer adequate. The focus has shifted to the customer and continuously improving customer experience. This strategy is fundamental for blue ocean business and allows operators to retain old customers, attract new customers, and increase revenue.

When building an end-to-end customer experience assurance system, operators should consider system, process, management, and personnel. First, the right tools should be used within an OSS/BSS environment to acquire, manage, and improve customer experience KPIs. Second, standard processes, such as ITIL and eTOM business processes, are required to re-orientate an operator from network KPIs to customer experience. Third, CEM involves every department: Only through concerted effort can customer experience be guaranteed. Last, the biggest hurdle in an operator's transformation may be organizational culture. Key employees within the company need to be focused on the customer; only then can the company as a whole move in this direction.

Service providers should consider these four aspects and refer to their best practice experience when providing end-to-end customer experience assurance solutions to operators. An isolated solution cannot help operators maximize benefits.

CEM professional services for mobile networks should include consulting on the value of network traffic, managing the improvement of customer experience, managing the improvement of mobile quality, and managing the improvement of network performance. For fixed broadband, a multilevel, integrated service solution should be provided. Such a solution includes managing fixed terminals/family network, improving overall performance of fixed broadband network, providing OAM based on traffic value, and improving QoS. These help operators create a smart, highly efficient broadband network.

DC Professional Services

The data center (DC) is the foundation of an entire modern IT system and is the key to an operator's core competitiveness. Marketing and branding tend to be overtly tied in with the company's core values, in a way that engineering and maintaining DCs is not. An operator needs assistance to develop IT strategies that align with the company's core values. According to the OVUM 2012 Global Telco Data Center analysis, as operators expand their businesses globally, time-to-market (TTM) demands become more urgent, and there is an increased need for partners who can provide DC services.

DC service providers should provide quick TTM, reduce overall energy consumption, downsize IT facilities, consolidate the data center, and provide flexible network capacity. All these things help reduce costs. Service providers should develop

Professional services *are an important catalyst for the development of blue ocean business.*

core competencies in power usage effectiveness (PUE), DC design, modularization, safety management, and visualized management.

Reducing Costs Requires New Approaches

As networks expand rapidly and traditional business revenue shrinks, operators need to explore new approaches to optimizing opex and increasing profit margins.

- **Managed Services**

Traditionally, the scope of telecom business has been network engineering, OAM, marketing and branding, and charging. These areas comprise most of the entire vertical value chain.

Five to seven years ago, reducing opex and boosting management efficiency meant outsourcing the end part of the value chain, which includes OAM and construction of network infrastructure. With global network operations centers and by virtue of their size, a service provider could cut OAM costs and quickly acquire technical experts. Service providers and operators achieved good results together in this first period of service outsourcing.

Now, new technologies, such as LTE, IMS, CDN and PTN, are being used and may even co-exist in the network. This makes network OAM, troubleshooting, and timely provision of services more difficult.

In light of the successful first period of outsourcing, operators are seeking to outsource all network resource and business related activities. Supplier and contract management can be outsourced to a service provider, and the operator is the end-user's single point of contact with the service provider. This helps operators simplify internal management and makes their operations leaner.

- **Energy Management Services**

According to statistics from Detecon, operators worldwide consumed about US$21.6 billion work of energy in 2012, about 10% of total worldwide network opex. To strengthen competitiveness, operators seek to reduce costs by better managing their energy consumption. Energy management accounts for a big chunk of opex, but it's not the operator's core business. Therefore, partners should think about how to provide better professional energy management services that align with market demands.

Energy planning, monitoring and optimization, including the management of KPIs, SLAs, equipment, and fuel chain, must be fully integrated. In the early stages of network construction, service providers should be focused on energy consumption over the network's full lifecycle.

ZTE's Service Business Is Growing Rapidly

Despite shrinking investment in the global telecom industry in 2012, ZTE's service business grew 28% year-on-year. Over the past five years, ZTE's service business has achieved a compound annual growth rate of 40%. ZTE's managed service business maintained an impressive compound growth rate of 58% over this period.

Over the next two or three years, operators are very likely to continue reducing investment in network equipment because of the sluggish world economy. However, driven by the demands for updated technology, internal management, and business expansion, operators will increase their investment in service outsourcing. ZTE is a reliable partner that can help operators give their customers real value by providing customized solutions, global distribution channels, and fast delivery.

With global resources and solid marketing strategies, ZTE is optimistic about its service business and expects that the professional service business will grow more than 40% in 2013. ZTE TECHNOLOGIES

Monitoring and Improving Customer Experience

By Yao Xiaobing and Liu Juan

Mobile broadband has boomed over the past few years, and its momentum will continue. It is estimated that the number of terminals connected to mobile broadband networks will be at least 1 billion more than the world's population by 2017. By 2020, mobile data traffic will be 1000 times higher than that in 2010.

However, the surge in mobile data traffic has not resulted in significant revenue growth for operators. GSMA research indicates that worldwide mobile revenue will merely grow from USD 1.5 trillion in 2011 to USD 1.9 trillion in 2015, far slower than the growth in data traffic. Converting increasing data traffic into revenue is a new challenge for operators.

People are becoming more and more concerned about coverage, speed, and experience when using mobile broadband networks. An increasing number of people are willing to pay more for guaranteed quality of experience (QoE). In some developed countries, more than 20 per cent of customers have such demands. Monitoring and guaranteeing customer experience is the key to improving network value, and it's becoming critically important in network operation.

High Network KPIs Do Not Mean Good QoE

Traditionally, network OAM has been vertically structured. A dedicated network, such as a radio access network (RAN), core network (CN) or bearer network, has its own proprietary element management system (EMS) to ensure network availability and quality of service (QoS). However, good network KPIs do not necessarily mean good customer experience.

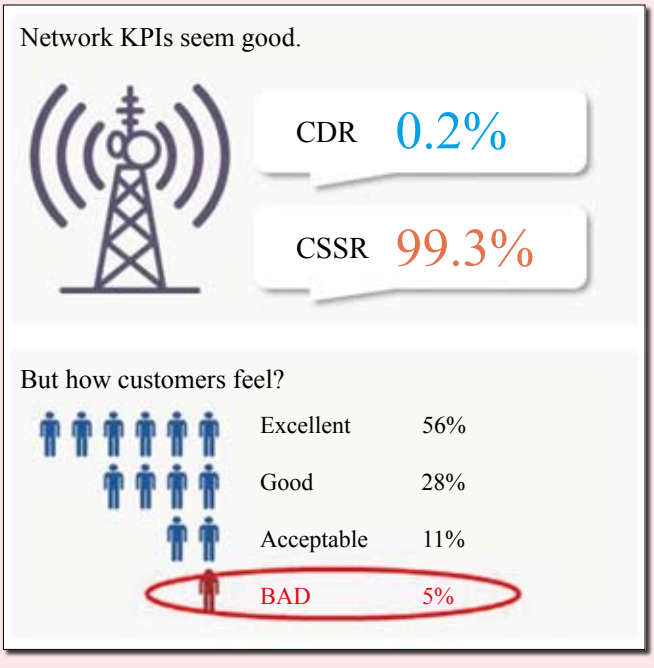


Figure 1. Network KPIs do not necessarily reflect good customer experience.

In Fig. 1, the network KPIs are quite high, which means that network quality is excellent; however, call quality is still low. This may be because calls are dropping in an abnormal cell. Customers in this cell may be experiencing very bad service, but the poor performance of this low-quality cell is hidden by other cells with high KPIs.

Therefore, network KPIs do not necessarily reflect end-to-end QoS. Especially with services based on new technologies, decentralized network management limits the visibility of actual QoS, and customers may have a very poor experience even when the network resources are exceeding KPIs.

End-to-End Customer Experience System

It is therefore necessary to create a full set of customer experience indexes (CEIs) that are used alongside existing network KPIs and service KQIs.

A customer experience index (CEI) is used to describe how customers feel about services.

A key quality index (KQI) indicates the performance of products and services. KQIs can be calculated using multiple KPIs and are divided into product KQIs and service KQIs.

A network KPI relays a specific piece of information about an end-to-end service. KPIs are very important for network OAM and provide data references for KQIs and CEIs. There are KPIs for alarms, network management system, active and passive probes, sniffer analysis, and billing.

ZTE's Customer Experience Assurance Solution

Customer experience monitoring is at the core of network operation and is the key to improving the experience of customers using mobile broadband. ZTE's customer experience assurance (CEA) solution is used to monitor and evaluate the end-to-end service experience of every customer and pinpoint problems such as traffic congestion and poor mobile network coverage that negatively affect customer experience. With ZTE's network optimization tools and methods, operators can guarantee good customer experience.

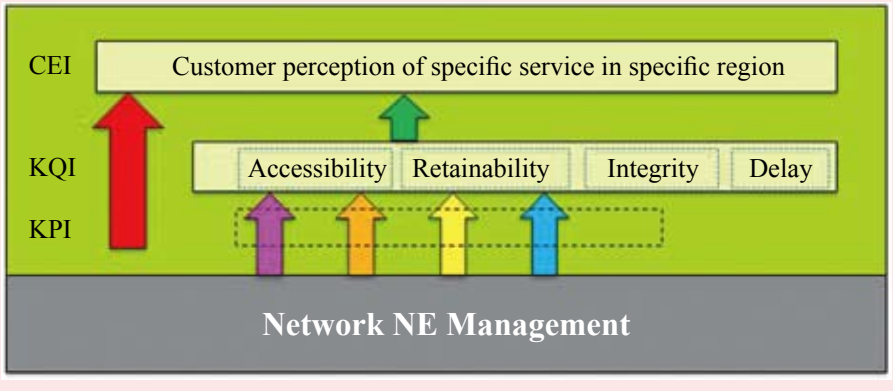


Figure 2. Customer experience system.

Monitoring and Analyzing Customer Experience

ZTE's CEA solution is an integrated platform for monitoring, analyzing, and evaluating customer experience in a visual and quantitative way. Operators can understand how customers are experiencing networks and services and quickly identify unsatisfied customers. This is particularly important for VIP customers and to prevent customer churn.

Using ZTE's solution, an operator can respond quickly to customer complaints, pinpoint problems, and compare customer experience graphs before and after problems are fixed.

ZTE's CEA solution also allows for customer churn analysis. Operators can analyze historical customer experience graphs to determine the reasons for the loss of a high-end client, reduce churn, and devise marketing strategies.

Improving and Guaranteeing Customer Experience

ZTE's CEA solution covers the whole network operation system and helps operators form more effective customer care mechanisms and provide guarantees in SLAs. Using this solution, marketing, sales, and customer service departments can interact with network planning and optimization, OAM, and information support departments. This creates a coordinated, interdepartmental system based on customer experience, which is visualized, controllable, and traceable.

The true value of mobile networks has not been tapped. The core of network value is customer experience. ZTE's CEA solution is the best way for operators to monitor customer experience and optimize network operation. ZTE TECHNOLOGIES

A New Era for Network Energy Development

By Zhang Zheng and Huang Weiyang

Energy consumption accounts for a big part of a telecom operator's opex and can reduce cost competitiveness. As the big-data era approaches, operator networks are becoming increasingly large and complicated and require more energy to operate. Efficient, visualized management of energy consumption is the most effective way to reduce opex.

Energy Management Challenges

Traditionally, not enough attention has been paid to energy, and there is no systematic way of planning energy consumption. Energy is being wasted during network construction and operation, and this affects how an operator copes with the rapid growth in data traffic. Challenges to energy management include lack of professional consulting services, lack of systematic planning in network construction, lack of effective network monitoring during operation, and lack of unified professional management processes.

Energy Consumption Challenges

A full energy lifecycle is divided into four parts: production, transformation, transmission, and consumption. The challenges mainly lie in energy supply and energy saving.

Challenges in Energy Supply

Where mains supply is limited, operators generally use diesel generators to produce power. Diesel fuel is expensive, as is the cost of buying and maintaining diesel generators. The refueling process needs to be properly managed, and there are also the problems of pollution and fuel theft.

Challenges in Energy Saving

Energy efficiency can't be improved with a single solution. An integrated end-to-end service solution includes process management and use of highly efficient equipment. Energy management is being accepted by more and more telecom operators across the world.

There are many challenges to energy saving in day-to-day operations. Enterprises have traditionally not invested much in energy-saving solutions and product lifecycle management, both of which can reduce TCO. Management service contracts usually only include an OAM interface but no energy-saving interface. There is no overall, integrated energy-saving solution for telecom networks. There are no effective methods and tools for calculating and reporting on energy consumption. Operators and equipment providers also have little experience cooperating in engineering, procurement and construction (EPC) mode.

There are unique challenges in special scenarios. The use of batteries in extreme weather conditions can be challenging. When building energy facilities, limited space sometimes means that the necessary requirements for saving energy cannot be met. Technologies for controlling multi-use batteries are not yet mature. Energy facilities need to be secure, and power supply should be guaranteed over the long term.

ZTE's Energy Service

ZTE provides energy service that conforms to the operator's network energy guidelines and that has well-though-out processes. ZTE's sustainable,

integrated energy-management solution is designed to reduce an operator's opex. The solution includes consulting and evaluation, design and planning, optimization, and visualized management and control.

Consulting and Evaluation

ZTE's consulting and evaluation service includes energy development consulting and evaluation on energy applications. Operators are provided with comprehensive, professional suggestions on energy development from a third party. ZTE has developed highly professional methodologies and technical tools for energy consulting and evaluation.

ZTE can provide advice on how network energy requirements will evolve in the network and where future investment will be needed. ZTE can also plan the construction and optimization of network energy infrastructure; evaluate the rationality of energy investment and use, and assess the safety of network energy use.

Design and Planning

Energy design and planning affects safety and consumption across entire network well into the future. Whether it's for a newly built network or optimized network, ZTE can provide comprehensive, professional energy design and planning for site power supply, overall energy storage, thermodynamic model, and site safety.

Optimization

Network energy optimization involves reducing energy consumption and the overall TCO. ZTE considers energy scenarios in terms of energy production, energy transformation, environmental assistance, and energy storage. Four different energy optimization services: designing site power supply, improving power efficiency, devising integrated schemes for mixed energy storage, and reforming temperature control.

To optimize the supply of network energy, ZTE chooses a power supply scheme that best meets on-site demands and meets the operator's requirements in terms of offline rate, energy costs, and other factors.

ZTE's power efficiency improvement scheme improves the efficiency of switching power supplies during operation. ZTE's scheme involves improving overall power efficiency by optimizing on-site technology or swapping inefficient technologies with highly efficient ones.

ZTE's integrated scheme for mixed energy storage is a reasonable back-up solution for mixed storage batteries when there is mains power failure or large fluctuations in temperature. It makes full use of the storage battery and extends its life.

ZTE's temperature control reforming scheme is designed to reduce the necessity of using air conditioners. Energy can be saved by intelligently controlling air flow and burying batteries underground.

Visualized Management and Control

Energy consumption in a telecom network is continuous, and energy management and control must likewise be continuous. ZTE's energy management and control service helps an operator distribute energy across the entire communication network. ZTE's energy management service includes equipment management, personnel management, and integrated site management, operations and cost management, and front-line OAM management. ZTE's energy control service includes energy consumption monitoring, energy production monitoring, and creation of energy statistics.

ZTE's four energy services cover all parts of network energy development, from design and implementation to management, control, and continuous improvement. ZTE provides operators with a loop-locked integrated service solution and gives direction on how an operator can explore and improve network energy. In the future, energy service providers such as ZTE may be the driving force behind the take-up of new and alternative energy. ZTE TECHNOLOGIES

A Suitable Infrastructure Is Critical to a Profitable IDC Business

By Yu Jian

In his paper "Operator's Dilemma (And Opportunity): The 4th Wave," telecom analyst Chetan Sharma says that the telecom industry has experienced three revenue waves: voice, messaging, and data services. Now operators are facing the fourth wave: over the top (OTT) services and value added services (VAS).

Operators worldwide need to consider how they will profit from the fourth wave and how they will expand their ICT services to avoid being left behind. The internet data center (IDC) is critical to expanding services and increasing profit. It should be easy to deploy, energy efficient, inexpensive, and capable of offering diverse services.

ZTE aims to help operators solve some of the problems with traditional IDCs, such as time to market, high cost, and coping with the demand for a variety of services. ZTE has introduced integrated, highly efficient IDC solutions that focus on ICT services. These solutions are modularized for quick deployment; they are inexpensive and

Figure 1. ZTE's M2DC series.

energy efficient; and they allow for cloud-based service expansion.

Modularization for Quick Deployment

To cope with the fast growth of global data center services and the special requirements of certain application scenarios, ZTE has developed a mobile modular data center (M2DC) that integrates IT architecture with the infrastructure of a traditional IDC equipment room, which include power distribution, air conditioning, integrated wiring, and monitoring systems. The M2DC modularizes the data center.

ZTE provides class A, B and C data centers that comply with the GB50174-2008 national standard of China. ZTE also provides tier II, tier III, and tier IV data centers that comply with the TIA-942 international standard.

ZTE's M2DC features:

- on-demand capacity expansion. Modules and other capacities, such as power and air conditioning, can be added to M2DC.
- quick deployment. M2DC can be deployed within one to three months.
- flexibility. M2DC can be used for quick-response military, disaster relief, and live broadcasting scenarios.
- safety and reliability. M2DC is often deployed in permanent buildings, so safety and reliability are guaranteed.
- modularization and standardization. All parts of M2DC, including interfaces, screws, fasteners, supports, cables, switches, power supply, and air conditioners, are modularized according to uniform standards and can be easily installed or replaced.
- high quality and cost-effectiveness. Because all parts of M2DC are modularized and standardized, they can be mass produced. Operators receive a cost-effective, quality M2DC.

Energy Saving and Low Cost

Traditional data centers consume much energy. Making the data center more environmentally friendly reduces opex, which is crucial for making profit from the data center.

ZTE's IDC solutions lower energy consumption by taking advantage of local climate and natural resources, such as solar energy. An efficient air flow design also allows for natural air cooling.

According to the Green Grid industry group, the power usage effectiveness (PUE) for a green data center should be less than 1.6, preferably less than 1.5. Green data centers are an inevitable evolution of current data centers, which now suffer bottlenecks, and they are also required for corporate social responsibility.

A site with sufficient energy, cooling sources, transmission resources, and convenient transport should be selected. The vulnerability of the site to natural disasters should also be taken into account.

When planning and designing a green data center, the following should be considered:

- building materials. Energy efficient, environmentally friendly materials should be used in the equipment room to reduce heat conduction and protect against radiation from outside the data center.
- power density. The power density of the rack should not be less than 6 kW in order to save space and reduce maintenance area.
- power distribution system. A modularized, uninterruptible power system (UPS); high-voltage DC system; or flywheel energy storage system is recommended. These systems are highly reliable and perform much better than traditional UPSs.
- cooling system. The cooling system should have good air flow and be highly efficient.
- temperature and humidity. China's

*All things that are closely related to our daily lives can be gradually offered through **the cloud**. What is needed now is a platform to embrace **the fourth wave.***

GB50174-2008 national standard specifies that the temperature of an equipment room should range between 22°C and 24°C, and the relative humidity should be between 40% and 55%. In practice, a server can work in temperatures up to 40°C and with a relative humidity of 20% to 80%. Therefore, the American ASHRAE-2010 standard can be used to expand the temperature and humidity ranges in order to reduce power consumption that results from cooling and dehumidification.

- management system. ZTE's iSteady system can be used to manage both IT devices and infrastructure. With built-in integration policies, the system can automatically start or stop devices in the data center. This saves energy and improves efficiency.

When constructing a true green data center, designers, planners, and contractors should cooperate closely, adopt new technologies, and seek appropriate ways to save energy.

Cloud-Based Service Expansion

With the development and application of mobile terminals, almost all services, including shopping, payment, downloading, ticket booking and patient card querying, can be delivered through the cloud. All things that are closely related to our daily lives can be gradually offered through the cloud. What is needed now is a platform to embrace the fourth wave.

IDC is the basic platform needed to deliver more new services and to adapt to the fourth wave. IDC is also needed for traditional space and virtual resource renting.

ZTE's IDC solutions integrate fundamental cloud service models, such as infrastructure as a service (IaaS), platform as a service (PaaS), and software as a service (SaaS), to meet operator demands for flexible service combining and packaging.

- **IaaS**

With virtualization technology, IaaS forms a resource pool by combining multiple servers and storage resources. It offers the computing resources necessary to carry service applications. It is a new way of carrying services that maximizes resource use and is energy efficient. IaaS provides computing resources quickly to meet unexpected user demand, and it is also the basis for flexible resource renting services. IaaS includes virtual machines, storages, and networks.

- **PaaS**

With a distributed and parallel computing algorithm, PaaS fully integrates the computing and storage capabilities of many servers to provide massive data processing capability for special applications. A highly efficient software development, application, and management platform is created to attract third-party software developers and terminal users. As a result, high-performance computing is achieved through low-cost PC server clusters, and computing capability is expanded almost linearly. PaaS includes development platforms, running environments, and databases.

- **SaaS**

SaaS allows software and computing operations to run at the IDC side so that users can obtain necessary software through the internet without spending much time and money constructing and maintaining their own IT infrastructure. This relieves terminals from the burden of computing and drives the growth of mobile internet services. As computing operations are transferred from terminals to data centers, the computing requirement place on terminals is lowered. SaaS includes office, information, communication, and internet applications. ZTE TECHNOLOGIES

KPN Mobile International

Partners ZTE for Network Development

By Li Na

KPN is the leading telecommunications and IT service provider in the Netherlands and one of the most important transnational operators in Europe. KPN's history can be traced back to 1852 when the Dutch government constructed telegraph lines. From 1994, the government gradually privatized KPN and in 2006, sold its remaining stake in the company.

In the Netherlands, KPN offers wireline and wireless telephony, internet, and TV to customers. It also offers complete telecommunications and IT solutions to business customers. Outside the Netherlands, KPN operates mobile phone services as a MNO in Germany (E-Plus Group) and Belgium (KPN Group Belgium). KPN has followed a multibrand strategy in its mobile operations and holds number three market positions through E-Plus and KPN Group Belgium. Through iBasis, KPN provides wholesale network services to third parties and operates an efficient, global IP-based infrastructure.

Historic Overview

The strategy in 2008–2010 was devised to tackle challenges in the telecom markets of the time. KPN set new strategic priorities that led to increased growth from 2008 to 2010. The objective for KPN Mobile International was to continue along the profitable

growth path that it had begun as part of its successful challenger strategy. In particular, its network strategy was an important part of achieving profitable growth. E-Plus centered this network strategy around investing in the right technology at the right time according to customer demand.

In 2010, KPN Mobile International created a roadmap for accelerating the rollout of high-speed data networks in Belgium and Germany. These networks would be designed to capitalize on the mobile data opportunities that had arisen as a result of spectrum acquired in the German auction in Q2 2010 and as a result of various operational, technological, and commercial partnerships. The partnership with ZTE also played an important role in ensuring a fast, low-cost rollout of mobile broadband.

Building an All-IP Modernized Network with Cutting-Edge Technologies

ZTE provided complete Uni-RAN and Uni-Core solutions for KPN in Germany and Belgium.

- **SDR-based high performance network for smooth evolution**

Cost effectiveness and high performance are the keys to business success in mature European telecom markets. To reduce the cost of acquiring new sites, ZTE proposed a distributed Node B solution that involved building an overlay network at E-Plus's and KPN Group Belgium's existing sites. Distributed Node Bs can reduce the network deployment time, and installing RRUs near antennas decreases feeder loss and improves coverage. BBUs can be inserted into legacy racks to save space.

For high performance, ZTE uses the MicroTCA platform in the design of Node B baseband. The MicroTCA platform minimizes a base station's physical dimensions and optimizes system performance. Baseband processing resources are pooled more efficiently on the MicroTCA platform than on other platforms. Another advantage of MicroTCA is multimode baseband processing. ZTE provides GSM, UMTS, and LTE baseband processing in a BBU based on MicroTCA with different BP boards. This greatly reduces operator capex and saves the transmission to RRUs. For operators that run radio network with different standards, this design can be used to construct a deeply converged network.

End users demand the benefits of the latest technologies, and continual evolution is the only way to win. ZTE's Node Bs are built to be compatible with and evolve to HSPA+, smart phone storming solutions, and other technologies.

ZTE also provides advanced technologies to KPN Mobile International for lower opex. Multicarrier power amplifier (MCPA) technology allows for easier expansion of network capacity compared with radio products with legacy architecture. The native IP-based solution minimizes transmission cost.

ZTE provides KPN Group Belgium

Phone Booth

"ZTE is a challenger in the European market and fits very well with E-Plus' Challenger strategy," said Thorsten Dirks, CEO of E-Plus Group

Thorsten Dirks

with a 900 MHz UMTS network solution based on re-farming. The solution can support 900 MHz GSM, 900 MHz UMTS, or two technologies in concurrent modes. A 900 MHz UMTS solution has better radio propagation than a 2100 UMTS solution. A 900 MHz UMTS Node B also has better coverage than a 2100 MHz UMTS Node B. A 900 MHz UMTS solution is also cost-effective because most of the deployed 900 MHz GSM infrastructure can be reused.

- **Large-capacity platform avoids operational bottleneck**

ZTE provides E-Plus with a Uni-Core solution that supports seamless evolution from 2G/3G packet core to evolved packet core (EPC). It also helps E-Plus provide unified 2G, 3G and 4G access. ZTE's intelligent packet core network is based on ETCA and a high-performance router platform that can build a future-proof data network. The intelligent packet core network greatly reduces equipment footprints and saves investment. It also satisfies data throughput requirements for the next several years and greatly improves the processing capability of the legacy network.

- **Optimizing operations for more revenue**

ZTE Uni-Core solution provides a powerful user behavior analysis system (UBAS) that helps KPN build a smart pipe that supports service differentiation, smart traffic distribution, and flexible policies. E-Plus can now provide more innovative services and compete on the strength of its network.

- **Reliable implementation and engineering sourcing**

ZTE cooperates with appointed engineering vendors. ZTE's efficient, streamlined project management has been critical to rolling out a 3G network in Germany based on all possible equipment configurations.

Achieving Better Experience for Customers

With ZTE, KPN has been improving the quality and capacity of its mobile networks in Germany and Belgium, ramping up the average speed even further. ZTE successfully swapped over a large number of sites in Germany for KPN. E-Plus covered more than 85% of the population with HSPA+ (speeds of up to 21 Mbps) by the end of 2012 whereas KPN Group Belgium reached HSPA+ coverage of more than 95% of the population. The current focus is on HSPA+ and rollout of LTE will depend on customer demand for data capacity and will begin somewhere between 2013 and 2014.

KPN's goal is to enable all customers to enrich their work and leisure time with a range of communication services. Together with ZTE, KPN is accelerating the rollout of the best regional mobile broadband network. KPN continues to grow and create long-term value for its customers.

Milestones

Dec. 2009: Contract officially signed
Mar. 2010: First site installed
Dec. 2010: High-speed data services initially launched in nine urban areas in Germany
Dec. 2011: A large number of swapovers finished and new sites installed in Germany and Belgium
Dec. 2012: HSPA+ rollout: more than 85% population coverage (with speeds of up to 21 Mbps) in Germany and more than 95% population coverage in Belgium by the end of 2012
2013–2014: First commercial LTE will be launched ZTE TECHNOLOGIES

Orange: The Road to Multinational Operations

By Tan Qiaoyong

France Telecom (FT) is the third-largest operator in Europe and one of the largest in the world. Orange Group, a subsidiary of FT, has become a renowned telecom brand and now has 200 million subscribers throughout Europe, Asia, the Middle East, and Africa. Its multinational strategy has involved acquiring operators in undeveloped but promising regions. This allows Orange to control some resources and underlying revenue. After acquiring Telkom Kenya, Orange badly needed to solve the problem of an inflexible billing system. They selected the OCS supplied by ZTEsoft for this purpose. The new system had to be put into service within two months. ZTEsoft overcame difficulties that had plagued Orange during the early stage of project integration and completed the upgrade on time.

With flexible deployment, a unified billing platform, and a strong billing engine, the new OCS helped Orange Kenya quickly launch innovative service packages and rates. With the old system, it would have taken more than two months to launch a new package, but with ZSmart OCS this was lowered to between a week and a month. Orange's subscriber base grew substantially as a result.

FT's project in Cote d'Ivoire also demonstrated the distinct advantages

of ZSmart OCS. Cote d'Ivoire is an important market for FT in Africa. FT's common platforms, such as service-development platform and integrated alarm-monitoring platform, are deployed in Cote d'Ivoire but are shared by other African countries. Because FT's data business is developing rapidly in Cote d'Ivoire, the original billing system that provided independent prepaid and postpaid billing as well as independent voice and data billing could no longer meet user needs. ZTEsoft used ZSmart OCS to help Orange Cote d'Ivoire deploy a combined voice and data billing solution.

ZTEsoft deployed this billing system in two steps. First, combined voice and data billing was implemented for prepaid subscribers. Ensuring the system could support all kinds of billing policies was a significant challenge. ZTEsoft took a record fast eight weeks to integrate the entire data billing system into the existing OCS for combined voice and data billing. Second, combined prepaid and postpaid billing needed to be realized. The whole project was completed successfully in February 2012. The combined billing system has also helped FT Cote d'Ivoire significantly reduce its capex and opex.

The strong performance of ZSmart OCS has paved the way for its wider acceptance by FT. In later years, ZSmart OCS was deployed successfully in Cote d'Ivoire, Senegal, Guinea, Mali, Bissau, Cameroon, Congo, Slovakia, and Poland.

Dealing with the Data Explosion

Data traffic has increased rapidly in recent years, and operators risk becoming pipe providers. To help FT Cote d'Ivoire control data traffic, ZTEsoft has deployed a ZSmart policy manager (PCRF) that can control policy and charging for data traffic in the IT domain. This allows FT Cote d'Ivoire to adapt to ever-changing data needs by flexibly implementing policies.

ZTEsoft has also helped FT Senegal implement part of the PCRF by upgrading the existing OCS. This has allowed FT Senegal to control their data traffic in a much more cost-efficient manner.

Operators are compelled to avoid being pipe providers and to work towards IT transformation. At the end of 2011, FT acquired Congolese operator CCT, which had 4.5 million subscribers. To improve its brand image in Congo, Orange had a pressing need to reconstruct the original CCT network infrastructure. The IT system needed to be optimized to support data.

Before the acquisition, CCT's BSS/OSS contained a prepaid ZSmart OCS and an internetwork settlement system; however, there was no IT system. Through IT transformation, FT Congo could provide IT support for all services. ZTEsoft built on the existing ZSmart OSS to expand systems associated with business handling, inventory management, product sales management, payment collection, agent management, postpaid billing, account and revenue management, international roaming, and fault management. ZTEsoft also strengthened the existing prepaid billing functions. All this helped FT Congo meet the growing data traffic demands brought about by 3G networks.

To speed up the time to market for new Orange-branded services, FT required ZTEsoft to complete the upgrade project within 80 days. ZTEsoft finished the project ahead of schedule and put it into operation within 50 days. The project passed the acceptance test, and FT Congo was satisfied with ZTEsoft's ability to deploy an integrated IT project.

Software as a Service

After completing the IT transformation in 2011, FT Congo has now turned its attention to maintaining such a huge network and IT system efficiently and reducing its opex. ZTE has provided FT Congo with managed services that include ZTEsoft's IT service product ZSmart AnyCare.

A local service team has been established to operate and maintain the network and IT system. As a result, FT Congo has been freed from complex maintenance work and can now focus on marketing to reduce opex.

With further cooperation, FT and ZTEsoft have learned more about each other. For seven years, ZTEsoft has been walking with FT Orange on the road to multinational operations. ZTEsoft's products have been deployed from Africa to Europe in small-capacity scenarios and big-platform scenarios involving millions of subscribers. ZTEsoft's products range from a single OCS to integrated IT transformation solutions. By helping FT expand their business ZTEsoft has also transformed itself. ZTE TECHNOLOGIES

FibreCo Builds a National Optical Backbone in South Africa

By Kong Jia

FibreCo was founded in 2009 and is a joint venture between Cell C, Internet Solutions, and Convergence Partners. FibreCo aims to build an optical backbone network that can cover the whole of South Africa and provide convenient, high-speed network access.

Backbone transmission resources in South Africa were previously monopolized by a large operator, which meant that fiber and bandwidth rental fees were expensive. This led to high communication tariffs that stymied the growth of the South African telecom industry. The contrast between the rapid economic development in South Africa and the sluggish development of its telecom industry was stark.

In this context, FibreCo planned to build a national open-access optical network extending about 12,500 km across South Africa. The project would be completed as fast as possible in three stages so that government, operators, internet service providers, and banks could benefit from better access. The network is expected to significantly reduce communication tariffs and drive the development of the telecom industry in South Africa.

Choosing the Right Supplier

ZTE has built a series of quality networks for Cell C that has significantly reduced Cell C's OAM costs. The two companies have maintained a strong relationship for a long time. Cell C is a shareholder of FibreCo and proposed that ZTE build the backbone transmission network in South Africa.

FibreCo has even stricter customization standards than the latest European standards, and this needed to be taken into account when choosing a supplier. ZTE invited a professional subcontractor to join its team during the first round of bidding. FibreCo was greatly impressed by ZTE's leading bearer network solutions and rich experience in global turnkey projects. It was also impressed by the local engineering experience of the subcontractor. ZTE presented FibreCo with a reasonable logistics plan, strict purchasing procedure, professional construction scheme, and excellent delivery plan.

ZTE cooperated well with UWP, the consulting company of FibreCo. Microduct was suggested for the plant exterior to make engineering easier and to save construction costs. Hybrid fiber was deployed to meet various application scenarios. FibreCo also used ZTE's total reconfigurable optical add/drop multiplexing (ROADM) solution to improve service provision, simplify network OAM, and allow WASON functionality in the future.

FibreCo President Andile Ngcaba (L) attends the groundbreaking ceremony for the optical backbone project

In September 2011, FibreCo President Andile Ngcaba and ZTE Senior Vice President Chen Jie signed the project contract. ZTE was chosen as the exclusive supplier for South Africa's biggest optical transmission network.

"This landmark investment will provide affordable, reliable and fast internet access for ordinary South Africans," said Andile Ngcaba. "ZTE is committed to supplying effective solutions for its customers," said Chen Jie. "We are proud to assist with improving telecommunications for South Africans."

High-Capacity Long-haul Transmission Solution

ZTE provided FibreCo with a new-generation OTN solution. A high-capacity, long-haul, highly-reliable ZXWM M920 unit was used for the network. The ZXWM M920 unit

- supports 10G/40G and can evolve into 100G for high-capacity transmission
- has open architecture for smooth network expansion. This protects operator investment
- uses ROADM for fast service provision, flexible traffic grooming, and simple network management
- uses ZTE's leading optical technologies to offer long-haul coverage
- provides a protection mechanism at both equipment and network layers to ensure network stability.

ZTE's intelligent ZXTOP510 software was also used for network planning and design. ZXTOP510 can identify and analyze network bottlenecks and optimize configuration.

Creating a Bright Future

In May 2012, FibreCo launched the optical backbone project at Bloemfontein. In attendance were government officials including the governor of Free State Province, the mayor of Bloemfontein, the FibreCo president and CEO, and the newly appointed CEO of Cell C. The project is of great significance to the South African government and operators.

The main operators in South Africa once considered working together to build an optical transmission network to address the transmission resource shortage. However, they failed to reach a consensus, and the plan was shelved. FibreCo's open optical transmission network will be an important resource in South Africa's future communications industry.

Upon completion, the FibreCo optical backbone network will provide sufficient infrastructure for operators in South Africa and will significantly reduce tariffs. Completion of the network will trigger a new round of fiber network construction, and this will allow South Africans to enjoy high-speed networks.

ZTE is the sole contractor in FibreCo's optical backbone project and will complete the project in three to five years. FibreCo has begun considering extending the network to cover neighboring countries. This future network extension will significantly benefit the communication industries and economies of those countries.

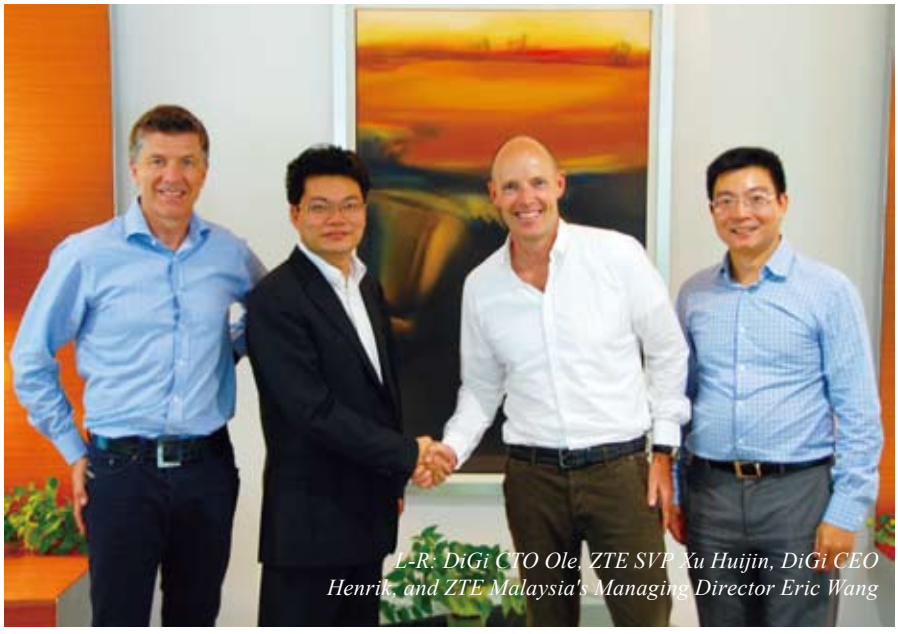
D'Nemo: Interview with ZTE's SVP Global Customer Service Xu Huijun

January 2013
Source: DiGi (Telenor)

DiGi recently concluded a very important discussion with ZTE to plan and set the tone for the rest of its modernization exercise. The outcome was the introduction of a new operating model which includes a refreshed commercial agreement that clearly defines roles and responsibilities, and outlines risk ownership and accountabilities for both parties.

Today there are around 760 ZTE employees working hand-in-hand with DiGizens to deliver on our network modernization targets. Leading the charge here in Malaysia is Xu Huijun, ZTE's SVP Global Customer Service. Read what he has to say about the evolving industry landscape and our collaboration:

Q: What are your views on the internet and the telco industry



L-R: DiGi CTO Ole, ZTE SVP Xu Huijin, DiGi CEO Henrik, and ZTE Malaysia's Managing Director Eric Wang

landscape as a whole in Malaysia?

A: Although the mobile industry is saturated, it still has potential to grow. This is fueled by the increase in mobile usage particularly mobile internet as more customers realize its potential. As more jump on the bandwagon there is a need for operators to work even harder to deliver good quality experience to customers.

It is encouraging to see healthy competition amongst operators here in Malaysia where each of the key players has equal opportunity to continue growing its business.

Q: Tell us more about DiGi's partnership with ZTE?

A: We started our partnership in 2011 covering deployment of the radio access network, core network, 2G/3G roll-out, network operations, VAS, to name a few. It has been a big learning curve for us and I believe together with DiGi, we have made good progress, particularly now that we have reviewed and agreed on a refreshed way of work to deliver on our joint targets. With the right foundation in place and the right focus, I am confident we can deliver a better quality network and customer experience.

Q: How has the working level cooperation been?

A: I have to admit that it has not been without its fair share of challenges. There is the inevitable differences being two distinct companies; cultural and language differences for example. It took us more time than we expected to integrate, develop trust and to find a common ground on expectations and deliverables. By establishing mutual trust and respect in each other's professionalism and performance over time, we are able to communicate and work together more effectively today.

Q: What is your message to DiGizens on the "New Network" ZTE is delivering to DiGi?

A: We can do it if we work together as one. DiGi is our main partner here in Malaysia and we want to assure you that we will do whatever it takes to ensure we achieve the goals that we have set for ourselves. I have seen a much improved working relationship now and hope DiGizens will continue to lend us their support. We are confident that upon completion of the network modernization exercise, the DiGi network will be the most advanced and best network in Malaysia.

About DiGi

DiGi is a leading mobile communications company in Malaysia providing a comprehensive range of affordable, convenient and easy to use wireless services to simplify and enrich the lives of its customers. The company creates value for its customers by selecting the most appropriate cutting edge technology so that they benefit from products and services that give them choice, convenience and control.

DiGi has an established presence as a leader in voice and data prepaid services with a number of firsts that have set industry benchmarks for creativity and innovation. These services are offered under the DiGi Prepaid brand name. Its postpaid service under the DiGi Postpaid brand name delivers high quality voice as well as value-added mobile content and data services to both individual and corporate customers. ZTE TECHNOLOGIES

ZTE OSS: An Effective Solution for Managed Services

By Yang Guangjun and Zhou Xueyin

Challenges to OSS

With the rapid evolution of network technologies and convergence of networks, operators are transforming into full-service operators. As a result, they have had to come to terms with more specialized networks and more complicated OAM technologies. In networks constructed during the early stages of competition, there is a range of equipment and devices provided by different vendors. Each vendor has their own operation support system (OSS) for their devices, and in a converged network, several OSSs may coexist. This creates great challenges in quickly responding to market demands and solving end-to-end faults.

To reduce OAM costs, increase efficiency, break down barriers between OSSs, and improve coordination between vendors, operators must upgrade or reconstruct their existing OSSs and focus on customer service innovation.

Having developed, produced, and managed a full range of telecom equipment for many years, ZTE is highly experienced in managing integrated network resources and OSS optimization. ZTE has launched its own OSS, which has an integrated architecture to help operators quickly respond to market demands, empirically predict opex, control operation risks, and lower TCO.

ZTE's End-to-End OSS

The core elements of a service product are tool, process, and human resources. The tool provides technical support and core competitiveness. It plays a critical role in reducing costs and improving efficiency and is the main source of profit.

Integrated OSS architecture

ZTE's end-to-end OSS is based on the enhanced telecom operations map (eTOM) model, which comes from the telecommunication industry, and the Information Technology Infrastructure Library (ITIL) model, which comes from the IT industry. ZTE's OSS has sets of NetNumen, ZSmart, and UNIPOS tools that are used for end-to-end network management—from planning and optimization to OAM and OSS/BSS management.

NetNumen includes a fault management system (FMS), performance management system (PMS), unified site management system (USMS), customer experience management center (CEMC), and easyservice system (ESS). ZSmart includes electronic operation and maintenance system (eOMS), investment management (IM), smart optical distribution network (eODN), and business intelligence (BI). UNIPOS includes network planning, MR call

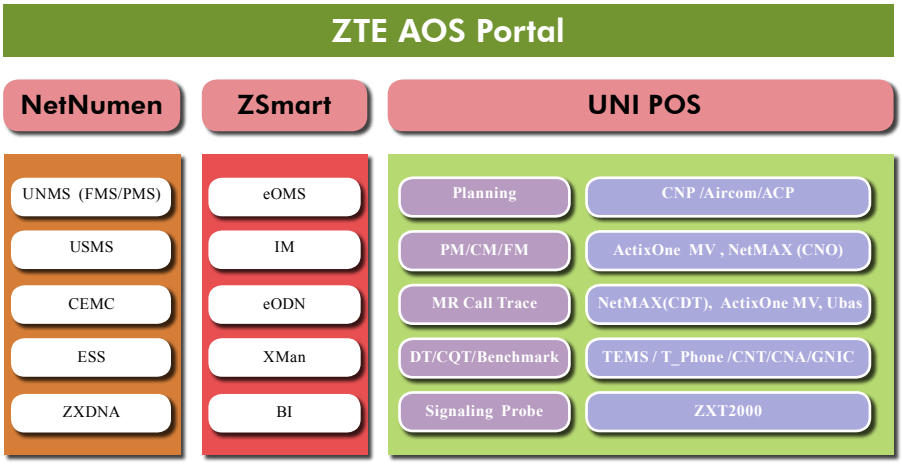


Figure 1. ZTE's end-to-end OSS.

trace, and signaling probe.

ZTE's end-to-end OSS features

- end-to-end tools. These are related to wireless access, core network, transmission, and services. They are used for network optimization, management, maintenance as well as service operation support.
- support for equipment of multiple vendors. The OSS supports network OAM for equipment provided by third-party vendors such as Huawei, Ericsson, Cisco, and Nokia Siemens.
- support for multiple networks. The OSS provides managed services for CDMA, GSM, UMTS, IMS, LTE, IPTV, GPON, and VAS products.
- scalability. With modular design, the OSS architecture is scalable. It can be easily upgraded to support cloud services.

To date, ZTE's end-to-end OSS has been successfully deployed by operators worldwide, including China Mobile, Ncell Nepal, PMI Canada, TTSL/Aircel, India, and ETC Ethiopia.

ZTE has also established partnerships with IBM, HP, BMC, and CA. ZTE is trying to transform its OSS into an integrated NGOSS architecture.

Visualization of managed services

To allow an OSS to provide managed services for devices of different vendors, services must be standardized. The first step in standardizing managed services is to make the services visual.

Service visualization can be realized by using visual tools, which allow maintenance personnel to better understand the status of a network. A tool must clearly and visually show the status of each device and key information about the network. This is particularly important for maintaining complex systems.

Visualization involves visualizing process and data. In process visualization, the tool promptly reports operational progress and results based on the status of each service and gives instructions on how to proceed. In data visualization, key service information and statistics are presented visually. Data is displayed visually in an easy-to-understand way so that user experience can be improved.

Visualization helps clarify logically abstract concepts and can also be used to oversee local or remote and centralize managed services. This saves human resources, money, and space.

ZTE's OSS solution includes visual tools for reporting, alarm presentation, end-to-end SLA management, and customer experience management in order to meet diverse OMA demands.

Rebuilding the automatic standard process

Today, managed services must go beyond service visualization. An important issue is how to integrate all sub-processes effectively to form a complete automatic standard process.

ZTE's OSS solution can rebuild an automatic standard process. In a specific managed-service scenario, the OSS first analyzes the problems experienced by the customer, then it connects all OSS nodes and incorporates various self-developed and third-party tools. In this way, efficiency is improved and opex is reduced.

ZTE also includes IT maintenance experience in its OSS solution and provides low-cost, highly efficient process configuration and management tools that meet the demands of the managed services. ZTE's OSS is scalable and supports various interfaces.

Method for ZTE OSS Projects

The method for OSS construction includes consulting, OSS swapping, OSS improvement, and managed service optimization.

- consulting. This involves determining the customer's architecture requirements, strategically planning the network, and setting prices. Then, a highly efficient OSS/IT system architecture or a reconstructed OSS/IT service process is worked out.
- OSS swapping. This involves swapping existing OSSs for new ones. Detailed investigation, planning, and training, should be done before swapping.
- OSS improvement. This involves customizing functions, deploying the OSS, transitioning systems, and providing OSS training.
- managed service optimization. This includes configuration management, skill transfer, and service optimization.

When constructing an OSS, customer demands, property rights, and maintenance costs should all be considered. Advantages and disadvantages of self-developed products, outsourced products, and purchased products should also be considered.

ZTE's integrated OSS solution is designed to address customer difficulties. It has the three most important features demanded by operators: unified managed services, tools to visualize process and data, and transparent management of the entire network in the whole process.

ZTE's integrated OSS solution is the result of years of innovation in OSS products. It overcomes traditional OSS limitations and transfers OSS services from the customer to MSP. ZTE OSS is poised to bring new revenue growth and competitiveness to operators in managed service markets. ZTE TECHNOLOGIES

Bringing you Closer

Cloud Radio™ enables optimal radio performance adaptive to a variety of network availability. Through a series of key technologies breakthrough, Cloud Radio™ realizes sophisticated radio coordination empowering higher network performance for operators and better QOE for users. Operators win with Cloud Radio™ two core values: diversity and boundlessness. Cloud Radio™, delivers 4G promise and helps you to excel in 4G era.

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