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TECHNOLOGIES

VIP Voices

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But Need to Focus on Right OSS/ BSS System

Special Topic: IT Services

Survival in “Tiny Times”:
Telecommunications Equipment
Manufacturers Transitioning to
ICT Services Providers

Tech Forum

The Value of Green Data Centers

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Ross Cormack, CEO of Ooredoo Myanmar



Ooredoo: Leapfrogging Myanmar into the Future

Ooredoo is one of the world's largest multinational telecom companies. It operates in 17 countries across the Middle East, North Africa, and Asia. At ITU World 2013, Ross Cormack, CEO of Ooredoo Myanmar, talked about Ooredoo's global operations, how it won a license in Myanmar, and how Myanmar is set for a telecom boom.



Equatorial Guinea: Communications Change Lives

Equatorial Guinea's telecom industry emerged relatively late in the game, but in recent years, has rapidly developed and greatly changed people's lives. *ZTE TECHNOLOGIES* interviewed Francisco Mba Olo Bahamonde, telecommunications minister of Equatorial Guinea. Olo Bahamonde talked about the telecom market in Equatorial Guinea, communications technology, and projects with ZTE.

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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 Two New Firefox OS Phones in the ZTE Open Series



24 February 2014, Barcelona — ZTE launches two new innovative Firefox OS phones in the ZTE Open series with the Open C and Open II, and expects to ship over one million Firefox OS phones before the end of 2014. This furthers ZTE's strong relationship with Mozilla that started with the first ZTE Open which was launched at the Mobile World Congress 2013.

The Open C is one of the first devices to operate on the latest version of Firefox OS and is designed to deliver a better user experience and a higher cost-performance ratio. Also running the Firefox OS, the Open II is the evolution of the popular ZTE Open, which was launched in 2013 in six countries by Telefónica and being sold through eBay in the US and UK markets.

ZTE Launches the World's First Virtualized **Cloud NF** Solution

24 February 2014, Shenzhen — ZTE has launched the world's first virtualized Cloud NF solution for multi-radio access technology.

The evolution of mobile networks to flat, cloud-based networks will improve operator competitiveness and simplify operations, administration and management. In response to this trend, ZTE has developed the Cloud NF solution, which integrates the functions of core networks and controllers through network functions virtualization (NFV).

The Cloud NF solution uses virtualization technology to separate hardware from software in the

architecture and integrates all network element functions of the mobile network. In addition, it applies the software-defined networking (SDN) concept to separate the gateway forwarding function from the core network, which improves forwarding efficiency.

In collaboration with Intel, ZTE has used a common Intel® architecture hardware platform to build the entire system. ZTE is one of the leading developers of software for wireless system solutions provided by Intel. Through the use of this software, the ZTE Cloud NF solution achieves outstanding performance.

ZTE Launches the Revolution Operation Platform

25 February 2014, Shenzhen — ZTE has launched the revolution operation platform (ROP), a top to bottom operations and maintenance (O&M) system.

The platform is based on the customer experience management (CEM) concept and is oriented towards delivering commercial value. While traditional maintenance concepts have focused on equipment and networks, ZTE's ROP is centered on data, and integrates O&M organization, process flows, tools, IT and networks. As networks expand and multiply and competing 2G, 3G and 4G networks cause congestion, it becomes

increasingly difficult to improve O&M efficiency. Using a CEM-based ROP makes O&M much easier.

As a way of dealing with the explosion of data services, what is needed is a comprehensive O&M evaluation system that centers on service quality and customer experience rather than on networks. After analyzing the challenges faced by operators, ZTE has put forward the concept of "next-generation O&M" in the internet age, as opposed to O&M in the voice communication age, as a means of increasing service quality, customer experience and commercial value.



ZTE Makes a Grand Entrance to MWC by Launching Ultra Slim Grand Memo II LTE

24 February 2014, Barcelona — ZTE presents the Grand Memo II LTE, an ultra slim and high performance LTE smartphone. With its 6" IPS display that takes up 80% of the handset, users can view high quality images, HD videos and movies with a 178 degree viewing angle. The device utilises ZTE's brand new innovative MiFavor 2.3 user interface with a range of new icons, offering an intelligent but easy-to-use handset experience. The Grand Memo II LTE also combines stylish design with a practical 7.2 mm ultra-slim frame.

"The Grand Memo II LTE is designed to meet the increasing user demand for stylish design with an intuitive user experience. High

performance technology must be met with a simplistic user interface which allows users to customize their experience based on personal preferences," said Zeng Xuezhong, CEO of ZTE Mobile Devices and EVP of ZTE Corporation.

"We are thrilled to continue our collaboration with ZTE to introduce the new high performance Grand Memo II LTE," said Raj Talluri, senior vice president of product management, Qualcomm Technologies, Inc. "Powered by a Snapdragon 400 processor with integrated LTE connectivity, the Grand Memo II provides quality multimedia experience with seamless connectivity for users to be constantly connected on the go."

Jazztel and ZTE Ready for 10G PON Commercial Launch

25 February 2014, Madrid — ZTE has completed the first commercial 10G PON full-service test for Spanish operator Jazztel. The GPON and 10G PON co-existence test demonstrated that ZTE's 10G PON solution is both backward and forward compatible and capable of supporting any service under all foreseeable scenarios. The 10G PON network was commercially tested using ITU-T G.987-compliant test schemes.



CSL Switches on Hong Kong's First LTE-A 300 Mbps Network

24 February 2014, Hong Kong — CSL, the first operator to launch dual band 4G LTE/DC-HSPA+ network in Asia, joins hands with ZTE to announce the deployment of first LTE Advanced 300 Mbps cell site in a commercial network at the Mobile World Congress 2014. CSL is also collaborating with Qualcomm and ZTE on testing a new LTE-A CAT6 modem using the Qualcomm Gobi 9x35 chipset, which is expected to be available commercially by the second half of this year.

This is an important milestone in the evolution of LTE and the mobile industry since it signals the initial rollout of LTE-A 300 Mbps on the CSL commercial network, which will continue throughout the year and beyond. CSL has combined its existing licensed 20 MHz LTE carrier at 2600 MHz with another licensed 20 MHz LTE carrier at 1800 MHz, to achieve a maximum theoretical speed of 300 Mbps. ZTE's industry-leading carrier aggregation technology helps CSL leverage its unmatched spectrum to deliver game-changing 4G connectivity for consumers in Hong Kong. CSL is the only operator in Hong Kong with sufficient FD-LTE spectrum to achieve an optimal theoretical speed of 300 Mbps with LTE-A.

ZTE Announces New High-Speed LTE Advanced CAT6 Mobile Hotspot Device



25 February 2014, Barcelona — ZTE announced the ZTE Flare, a 4G LTE unified Wi-Fi mobile hotspot device that is the world's first commercially announced data device to feature Qualcomm Technologies, Inc.'s fourth-generation Qualcomm® Gobi™ 4G LTE Advanced modem. Qualcomm Technologies is a wholly-owned subsidiary of Qualcomm Incorporated. The ZTE Flare utilizes the Qualcomm Gobi 9×30 chipset, which is capable of supporting peak LTE Category 6 downlink speeds of up to 300 Mbps, making the device an ideal choice for global users looking for the fastest mobile broadband experience.

The ZTE Flare offers several notable improvements over ZTE's previous generation device, including lower power consumption and lower heat generation—enhancements derived largely from using the latest Qualcomm Gobi and RF360 technologies.

“High-speed mobile broadband connections are increasingly important to today's users, and we are excited to have Gobi technology enabling 4G LTE Advanced CAT6 connectivity in ZTE's newest and best mobile hotspot product,” said Alex Katouzian, senior vice president of product management, Qualcomm Technologies, Inc. “We're looking forward to seeing many more devices take advantage of the speed, reliability and global connectivity that Gobi chipsets deliver, enabling consumers to access mobile content anywhere, anytime.”

ZTE Launches 4K p60 Ultra HD STB

25 February 2014, Barcelona — ZTE has launched its 4K p60 Ultra HD set top box (STB), the ZXV10 B803, at Mobile World Congress 2014 in Barcelona.

The ZXV10 B803 is designed based on the Broadcom BCM 7252 chip, and supports the 4K×2KP60 decoding capability, which can decode Ultra HD video with the maximum resolution of 3840×2160. In comparison to traditional HD Internet STBs, the 4K UHD STB can display more vivid and precise images to significantly enhance user experience.

4K video technology (also named as 2160p) is a new type of resolution standard. Its UHDTV specification can deliver a resolution of 3840×2160 pixels, and the maximum Full Aperture

4K specification reaches 4096×3112. In comparison to the current mainstream 1080p resolution of 1920×1080, 4K can provide over four times the image definition quality. In the future, 4K HD TV sets will be very popular, and the 4K HD and HEVC decoding technologies will help raise the HD market tide. However, in the current market, 4K chips are mainly 4KP30—only a few chips can support 4KP60. The ZTE ZXV10 B803 STB uses a 4KP60 chip, making it one of the first HD STBs to support 4KP60.

The ZTE ZXV10 B803 also supports H.265 format—the next generation super HD code transmission specification that delivers encoded video using half the bandwidth of the previous generation



(H.264), with the same quality. It has a powerful CPU with a processing capability of 10k DMIPS, enabling faster processing and a better user experience in comparison to current mainstream HD internet STBs.



ZTE Wins Two Great GTI Awards

25 February 2014, Shenzhen — ZTE has won the Innovative Solution and the Fastest Market Development awards from the Global TD-LTE Initiative (GTI) in Barcelona, Spain.

The GTI awards recognize the successful deployment of ZTE's cloud radio solution in Chinese TD-LTE commercial networks and ZTE's leading position in the global TD-LTE market. The two awards highlight ZTE's capabilities in sustainable innovation and its contributions to the booming global TD-LTE market.

Commercial 4G networks are being formally launched in China, and ZTE has successfully deployed its cloud radio solution in China Mobile's existing 4G

networks. Cloud radio is a generic term for IP-based cross-station collaboration solutions, which effectively improve the average capacity of existing 4G networks and offer the best user experience.

Through continuous research and tests, ZTE discovered that the industry and 3GPP had underestimated the gain produced by inter-station collaboration and had not addressed potential delays. Based on the above two concerns, ZTE has developed the necessary corrections to make its cloud radio solution as effective as possible. The results show that the ZTE cloud radio solution not only offers a higher transmission rate in edge areas but also greatly improves transmission rate in central areas.

ZTE Successfully Takes over Network Operations for E-Plus Group in Germany

26 February 2014, Barcelona — ZTE Services Deutschland GmbH, a ZTE Group company, has taken over the responsibility for roll-out and network operation of the E-Plus mobile communications network as part of a comprehensive managed services contract signed last year. ZTE completed a smooth and trouble-free transition of network operations in early January 2014.



ZTE's Intellectual Property Defenses Strengthened by U.S. ITC Ruling in TPL Case

3 March 2014, Shenzhen — ZTE welcomes the final determination of the United States International Trade Commission rejecting the claims of Technology Properties Limited LLC ("TPL"), which strengthened ZTE's defenses against other intellectual property-related complaints.

The ITC terminated an investigation into TPL's complaints alleging violations of Section 337 of the Tariff Act of 1930, after rejecting TPL's claims of patent infringement. TPL initially filed the complaints in July 2012 against more than 10 respondents including ZTE, Samsung, HTC, LG and Huawei. The decision in the TPL case followed the ITC's decision in December 2013 to reject the patent claims made by InterDigital Inc. against ZTE and other respondents.

"We are pleased by the ITC's decision, as ZTE has refuted claims by the complainants for more than a year," said Shen Jianfeng, Chief Intellectual Property Officer of ZTE. "We face an increasingly complex market environment, prompted by rapid changes in the global telecommunications industry and the intellectual property landscape. ZTE is committed to our principles of openness and mutual benefit as we continue to work with all stakeholders to promote benign competition and development of a healthy industry ecosystem."



Ooredoo:

Leapfrogging Myanmar into the Future

Reporters: Liu Yang and Zhao Rujing

Ross Cormack, CEO of Ooredoo Myanmar

Ooredoo is one of the world's largest multinational telecom companies. It operates in 17 countries across the Middle East, North Africa, and Asia. *ZTE TECHNOLOGIES* talked to Ross Cormack, CEO of Ooredoo Myanmar at ITU World 2013. We talked about Ooredoo's global operations, how it won a license in Myanmar, and how Myanmar is set for a telecom boom.

Q: The theme of 2013 ITU Telecom World is "Embracing Change in a Digital World." What

are the most important changes in today's digital world? How is Ooredoo embracing these changes?

A: We're seeing a very fast changing world. As you know, we're thrilled that Myanmar has been through this competition process and that we have been selected as part of it. So this is a major change in our world. What I see is a huge interest in Bangkok, a very high level of engagement of senior industry people in grappling with the current issues. Clearly, technology



changes all the time but consumer and corporate demands are changing faster and becoming more sophisticated. The industry is talking about how to work better with OTT players, how to look after customers in a more cost-effective way, how to connect the people on the planet who still aren't connected to the internet. These are all big issues for this conference and exhibition.

Q: Qatar has won the bid to host ITU Telecom World 2014, and Ooredoo was selected to organize it. What will be the

focus of ITU 2014?

A: It's hard to put a finger on what will be the challenges in 2014 except to say that there will be accelerated demand in the world for digital services and we will be engaged in even wider-reaching discussions. The telecommunications world has seen convergence with many other worlds, such as banking, media and marketing.

Q: Ooredoo has presence in Qatar, Kuwait, Oman, Algeria, Tunisia and Myanmar. What is the biggest challenge in multinational operations?

A: I am responsible for one country. Generally, you have to decide how you're going to manage your operations. I think Ooredoo has been very smart in this respect. We have a group that keeps us in touch with the latest world demands, trends, and best practices and comes up with thinking that we don't have time to come up with in the operations that are responsible for looking after the customers in individual countries. So we try to be the best both globally and locally. The challenges are distance and travel. Of course, we're part of the solution because communications can help people in distant countries stay in touch simply with a webcam.

Q: Will you use the Ooredoo brand in other local markets?

A: At MWC 2013 in February, we unveiled Ooredoo as the group brand. Apart from our global company, the first company to adopt the new brand was the operation in Qatar. It became Ooredoo Qatar in just 10 days. So that was a very fast take-up. We started our life in Myanmar as Ooredoo. Algeria just changed this week. The brand launch coincided with a football match that Algeria won to take them into the World Cup. So I think everybody can see the value of Ooredoo in Algeria. It was a brilliant launch for Algeria's rebranding. The group has promised to rebrand the nine controlled companies by the end of 2014.

Q: What was the key factor in winning a mobile network license in Myanmar?

A: Actually, 92 companies expressed interest, which is the biggest competition in our industry ever. One of the reasons was that the government promised an open, transparent process, including publishing everything we needed to know. There was an invitation to tender, draft telecommunication license, and draft regulations. We were even informed about the strategy of the country. The success factor is actually delivering what they have asked for. They challenged us to leapfrog in technology and bring services to the country to help them accelerate the resurgence of Myanmar as the jewel of Asia. As you know, over the past

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Actually, we basically established a tender process, and ZTE absolutely satisfied all our specified needs. In fact, we challenged ZTE to do what the government challenged us to do.

decade, they've had a very different economy. They've obviously not had the benefits that the rest of Asia has had. This is an opportunity to leapfrog Myanmar into the future. So what we've promised is the latest technology; fast rollout; and affordable, available communications. But we've promised not just communications; we've also promised applications and of course a fantastic customer experience.

Q: Why did you select ZTE as your partner to build the network in Myanmar?

A: Actually, we basically established a tender process, and ZTE absolutely satisfied all our specified needs. In fact, we challenged ZTE to do what the

government challenged us to do, which is to roll out the latest technology very fast and have really credible plans to provide local employment and to create successful services. Part of that was based on ZTE's knowledge and experience in Myanmar. You've already got a local employment base that understands the country, and you know how to work with Myanmar Posts and Telecommunications (MPT) and all the other telecommunications players. All of these factors played a part. But really, you promised to partner with us to achieve fantastic success in Myanmar.

Q: What do you think of ZTE as a partner?


A: We're just getting to know you, but we're very pleased with what we've seen so far. We've just met ZTE CEO Shi Lirong. This is the first time you had a chance to meet with Dr. Nasser Marafih, our group CEO, and Ahmed Al Derbesti, our group COO. He brought a big team to give us the confidence that we are working together well as partners, which is great news.

Q: What makes Ooredoo Group stand out in the industry?

A: It's about our people and our customer focus. That's what our brand stands for. It's about caring; it's about connecting people; and it's about challenging. We challenge our people to serve our customers better, to go beyond what we can do ourselves to look after customers, and to be part of the community. That's what Ooredoo does everywhere it operates. It's not just a telecom company; it's part of the fabric of society. **ZTE TECHNOLOGIES**



An interview



EQUATORIAL GUINEA: Communications Change Lives

Reporters: Zhao Rujing and Li Mingfang

Equatorial Guinea is a small country on the Gulf of Guinea, west central Africa. Most of the country is a large plateau covered by tropical rainforest. Equatorial Guinea's telecom industry emerged relatively late in the game, but in recent years, has rapidly developed and greatly changed people's lives. *ZTE TECHNOLOGIES* interviewed Francisco Mba Olo Bahamonde, telecommunications minister of Equatorial Guinea. Olo Bahamonde talked about the telecom market in Equatorial Guinea, communications technology, and projects with ZTE.

Q: Would you tell us about

the communications market in Equatorial Guinea?

A: Generally speaking, it's pretty laudable. Thanks to ZTE, we are making great strides in developing our communications, which have been undeveloped and isolated for a long time. We have started constructing a communications infrastructure. We are participants in the Africa Coast to Europe (ACE) submarine communications cable project. The cable begins at Portugal, runs along the Atlantic coastline of European and

African countries, and ends in South Africa. Equatorial Guinea is playing an important role in this project and is connected to the cable. The cable does not meet all our demands, but it is a great improvement. Equatorial Guinea comprises the mainland and five inhabited islands. We have laid our own submarine cables to connect the mainland with the islands. Our national optical backbone network has also been completed.

Q: What has been the impact of telecommunications development in Africa?

A: Mass access to telecommunications

has improved significantly and continues to improve the lives of our citizens. Today in many African countries, people can make payments

Agenda Horizon 2020. In recent years, the Ministry has focused on integrating Equatorial Guinea's main international telecommunications infrastructure.

Today our focus is on getting these benefits to citizens and businesses by improving the quality of services provided by operators, making prices more

affordable and ensuring proper competition between operators, extending coverage across the country, strengthening regulations, improving telecommunications and ICT training, and promoting the development and takeup of new applications and services within different sectors of the economy.

Q: What are your thoughts on ZTE's projects in Equatorial Guinea, for example, the African Union Conference and African Cup of Nations projects?

A: These are the earliest and best communications services that Equatorial Guinea has had in its history. We did not have any infrastructure on this level before—ZTE has helped us from scratch. Sipopo is the smart city where the African Union Conference Center is located. This center is our nerve center. The Africa and South America Cooperation Summit, African Union Summit, and Regional Summit of Central African Union are held there, so high-quality real-time services are required. Many foreign leaders attend these conferences. Our own citizens

are also satisfied with the pioneer project completed with ZTE. With these services, Equatorial Guinea is now recognized internationally and regionally. Close cooperation between ZTE and our Ministry of Telecommunications has meant that Equatorial Guinea can hold major sporting events and provide real-time, high-definition broadcasts. ZTE also provides us with an optical transmission backbone network, and a communications training school is

“ *The benefits that ZTE has brought are obvious to all citizens in Equatorial Guinea and to foreigners who come here.* ”

through e-commerce and mobile phones. Communication is the gateway to services that were previously impossible to have, like a bank account, and is a new opportunity for growth and development.

Q: How has the telecom industry changed in Equatorial Guinea?

A: Equatorial Guinea is working with operators to catch up with other telecommunications markets in Africa. More than a year ago, we were connected to the first international optical fiber and our traffic increased tenfold. However, this is barely adequate for today's needs. Our challenge now is to provide access to affordable broadband across the country. Our longer-term challenge is to integrate these technologies so that they really benefit the companies in our country.

Q: What is the development plan for Equatorial Guinea's telecommunication industry?

A: The Ministry of Telecommunications is working to fulfill the goals set out in Equatorial Guinea Government





Francisco Mba Olo Bahamonde, telecommunications minister of Equatorial Guinea

under construction. Equatorial Guinea has benefited a lot from its relationship with ZTE. When the training school is finished, we will enjoy even better services. ZTE always helps us complete projects that benefit us and suit our needs.

Q: ZTE has been building networks in Equatorial Guinea for many years. What benefits has ZTE brought local governments and citizens? What social

responsibilities does ZTE have?

A: I say it again: The benefits that ZTE has brought are obvious to all citizens in Equatorial Guinea and to foreigners who come here. We do not think any other communications companies are needed in Equatorial Guinea right now. The projects that ZTE has completed for the Ministry of Telecommunications have provided the best service we have ever enjoyed. The network in the Sipopo African Union Conference

project is operating well. We can hold video conferences and monitor Sipopo through cameras. All these things are innovations for us. In the past, we never even imagine we would have them. These innovations have a positive impact on people's lives. ZTE has helped us build a nationwide optical transmission backbone network that will provide our citizens with more services. This network has completely passed the acceptance test.

Q: What are your expectations and suggestions for ZTE as it continues to construct networks in Equatorial Guinea?

A: I have a request more than a suggestion. ZTE is a great company and renowned as one of the top five telecom equipment manufacturers and solutions provider. I visited the ZTE headquarters and was quite impressed. I hope ZTE itself will get better and better. In an era of change and innovation in the telecommunications industry, ZTE offers good services to Equatorial Guinea and customers worldwide. I request that ZTE continue to provide technical training for personnel in Equatorial Guinea. I want ZTE to remember the requirements of the government employees working in Equatorial Guinea's Ministry of Telecommunications. I want to have a team within the government telecommunications department who have outstanding ability and clearly understand their roles and responsibilities. I hope ZTE will assist us in achieving these two goals and help us move forward on the right path. **ZTE TECHNOLOGIES**

Operators Eager to Create New Services to Meet User Needs, **But Need to Focus on Right OSS/BSS System**

Source: Global Telecom Business (September/October 2013)

With a rich background in the telecoms industry and having more than 13 years of experience in telecom professional services management under his belt, Yang Jiaxiao has been the vice president of ZTE's service business division since 2007, in charge of ZTE service products management.

He has a key focus on global markets, while keeping a firm eye on ensuring the competitive capability is close to customer demands and promoting high-speed development of the company's products in this sector.

GTB: In what direction are managed services developing?

Yang Jiaxiao: The traditional focus of managed services is on maintaining proper network operation and fixing faults of devices and networks. An operator lowers cost of operation and maintenance and strengthens its competitiveness through outsourcing network OAM.

With the development of the next-generation network, traditional OAM cannot any longer effectively monitor the operation of a single service in

the network, and the impact of a network fault on service income is hard to estimate.

In addition, because of fast growth in the number of users, along with intensive competition in telecom markets and popularization of intelligent user equipment, data services are enjoying a boom.

Besides basic call services, users pay more attention to service quality and experience, which is a new challenge to operators, equipment providers and service providers.

A managed-services provider has to ensure proper operation of basic network key performance indicators. But it must also focus on monitoring and management of service quality and user experience. It must combine technical research achievements and OAM experience.

The managed-services provider should help an operator build a service-oriented and user-oriented OAM system by reforming the operator's organisational structure and service flow. This will help the operator overcome rivals and make profits.

GTB: What do managed-services

providers need to do for network integration of operators?

Yang Jiaxiao: The existing telecoms networks are experiencing technical and structural reforms. An operator must think about how to effectively and comprehensively support all-service operation as a result of network integration.

Changes and new OAM requirements are also the concern of both operators and managed-services providers.

A managed-services provider should centralise OAM of each subnet to implement centralised monitoring and management. Relying on abundant practical experience and complying with international standards—such as eTOM and ITIL—the provider should sort existing workflows, establish a new standard OAM system and build the end-to-end network management capability.

With a professional platform, the provider can accomplish OAM automation and informatisation. The OAM management level and efficiency are enhanced, while cost is reduced. The management and operation of the operator are perfectly supported.

GTB: How do the SOC and BIC

motivate service innovation of operators?

Yang Jiaxiao: Thanks to the development of 3G and 4G networks along with mobile internet, data services have developed fast and they contribute greatly to operators' profits.

But OTT services are bringing them great challenges and traditional services are challenged. Operators are eager to create new services that satisfy user needs—for example, cloud services and M2M services.

In this case, the service operation centre and business intelligence centre will provide end-to-end service quality evaluation and enhancement for these new services.

The user experience lifecycle management solutions provided by the SOC includes a VIP/VAP care solution, an end-user behaviour analysis solution and analysis and retention of user churn. It can assist operators in data service quality management and user experience management.

In the BIC, a big-data platform can be deployed to dig down into service data, which helps operators fully exploit service potential and increase profits.

Precision marketing is a typical application of big data, which has been proved in the IT and CT domains. Making use of network data and BOSS data, precision marketing filters and analyses data by using big data technology to obtain precise information about users, such as age, gender, vocation, address, preferences for user equipment and contents, and time schedule.

Precision marketing policies can be formulated based on this user information. Relying on existing



Yang Jiaxiao, vice president of ZTE's service business division

marketing channels, operators establish the precision marketing capability and attract more partners for advertisements for goods, movies and apps stores. Value-added profits are greatly enhanced.

GTB: What reforms will be made for the next generation network management system (BSS/OSS)?

Yang Jiaxiao: Service innovation contributes the most in terms of enhancing operators' profits. Operators need a flexible BSS/OSS system to innovate new services and user experience and to achieve marketing targets.

The evolution and flexibility of the BSS/OSS system determine whether

an operator succeeds in market competition. Each new service needs the support of an integrated BSS/OSS solution.

In order to successfully and properly reform the BSS/OSS system, the managed-services provider must investigate the operator's networks, supporting devices and systems, especially the existing BSS/OSS system, and learn about the operator's service innovation plans.

The provider must then communicate with the operator to analyse the existing BSS/OSS solution and identify the strategy for reform. This will help them formulate a better solution for future services. The operator should collaborate with

device providers and service providers to formulate the most suitable solution.

In general, providers are involved in the implementation of new products and services of the operator and the OSS/BSS system reforms are more likely to succeed with the collaboration of the providers.

Because the OSS/BSS system is intrinsically comprised of IT systems, OSS/BSS system reforms need involvement of systems integrators.

A device or service partner with a powerful OSS/BSS integration capability can ensure successful reforms of the OSS/BSS system. Conversion and reforms of the OSS/BSS system greatly affect telecom market changes and service provision.

I hope successful OSS/BSS system reforms will bring more opportunities to operators and help them win market competition.

GTB: The development of mobile network greatly enhances consumption of data traffic, but the profits of operators go down. Traditional services, especially the SMS service, are seriously affected. How do you think operators should cope with this trend?

Yang Jiaxiao: The fast growth of smart phones and mobile applications changes user habits, dramatically expands data consumption, and speeds up the arrival of the mobile internet age.

Communication is not targeted for a pure user but internet of things based on personal services. The statistics indicate that mobile phone users do not reduce the number of calls they make or answer—or the duration of their mobile phone communications.

Mobile phones play a greater part in everyday human life and demand far more bandwidth.

However, there is no obvious connection between the growth of data consumption and that of profits. The profits from the pure channel-charging mode increase or decrease slightly.

Though channelisation is an inevitable trend, operators can still play an important part. First, operators need to know channel details, including the services in operation, characteristics of each service, frequency and requirements for the channel. The answers to these questions prove the value of the channel.

Second, operators must make full use of channels to create added value for users. Services vary in quality-of-service requirements and future prospects.

Operators should provide different channel applications for different services. Take an express delivery company as an example: for urgent and important materials, the company can deliver by plane; for materials that are large and not so time-dependent, the company can deliver by train or ship.

Differentiated services generate value, which can be shown by the collaboration of Google and Orange.

After learning and controlling the services, operators obtain a larger development space. On one hand, operators can attract users to access a service more frequently through ensuring quality of key services and enhancing user satisfaction. On the other hand, operators can collaborate with over-the-top providers on promising strategic services to implement win-win.

Being rich in its experience of traffic operation, ZTE can ensure

operators high service quality and user experience and help them learn and control channels that can contribute great profits.

GTB: Operators have enormous user data. How do they make full use of user data after ensuring user privacy?

Yang Jiaxiao: Operators own enormous amounts of user data. However, the value of that user data has not been exploited. Based on the premise of protecting user privacy and the target of satisfying user needs, operators and related enterprises will certainly make profits from data digging when user requirements are met.

Operators must dig down into big data themselves. There are many potential applications:

- Relying on the cloud storage technology, operators can permit users to access, query and analyse data. New products and services can be embedded.
- Through user data analysis and digging, operators can perform better user care and enhance user satisfaction. User loss can be reduced by data analysis and corresponding strategies.
- Through analysis of user consumption habits, operators can perform precision marketing, which can not only enhance service consumption but also help users find suitable services and products.

If user privacy is protected and user authorization is obtained, operators can construct a data platform and provide third-party developers with open interfaces to data. This will help the development of more creative and valuable applications. **ZTE TECHNOLOGIES**



Liu Qiang, senior architect of data center, ZTE Corporation

The Value of Green Data Centers

By Liu Qiang

Background Analysis

Data centers have become the cornerstone of enterprise business development worldwide, and many more enterprises will build data centers in the future. According to Gartner, there are more than three million data centers worldwide, and the global IDC market will increase from USD2 billion in 2010 to USD4.46 billion in 2015. Upgrades of traditional data centers and saturated business markets are contributing to a boom in the construction of large-scale cloud data centers in Europe and the US. Asia-Pacific is the world's fastest growing market for data centers, especially Japan, Singapore, Hong Kong, and Australia (which has the largest number of data centers in Asia-Pacific). In the near future, this region will likely become the world's leading communications

service center.

The IDC industry is developing rapidly in China and has great market potential. Over the past decade, the number of servers installed has increased 600%, and storage capacity has increased 6900%. According to statistics from the website www.china-consulting.cn, sales of Chinese data-center products reached RMB84.14 billion (approximately USD13.87 billion) in 2010. The overall IDC market is expected to reach RMB180 billion (approximately USD29.7 billion) in 2015. Telecom, energy, finance, internet, and third-party IDC companies all have important roles in China's IDC industry. In recent years, more and more industrial parks have opened in China to accommodate large data centers, most of which are located in developed cities such as Beijing, Shanghai, Guangzhou and Shenzhen.

“ *Over the next few years, the focus will be on promoting and building next-generation green data centers and conserving energy within traditional data centers.* ”

These cities have growing needs in terms of data-center backup, disaster recovery, and energy efficiency.

China's traditional data centers are often unreasonably designed, costly, and environmentally unfriendly in terms of construction and usage. They are also often unreliable, unmanageable, and unscalable. One particular telecom operator in China has more than 300 star-rated IDC buildings. The data centers within these buildings handle more than 40,000 customers and 160,000 devices and consume a combined 1 billion KW of electricity each year. Declining telecommunication charges and rising electricity prices have eaten away this operator's revenues.

The forward momentum of data centers and rapid increase in energy consumption are hot issues for industries and governments in China. Over the next few years, the focus will be on promoting and building next-generation green data centers and conserving energy within traditional data centers.

Next-Generation Data Centers: Development Trends Market Size

A next-generation green data center will be a global cloud computing data center, a data-aggregation industrial park, or an international information hub. The scale of super data centers will be several hundred thousand square meters.

Functions and Services

Next-generation green data centers will be built according to IEEE802.3ba 40/100Gbit/s. With the development of cloud

computing, next-generation green data centers will have integrated resources to deliver highly integrated, personalized services. Systems will be more flexible, intelligent, secure, and reliable.

Layout and Construction

Next-generation green data centers will gradually be developed in places with suitable climates; that is, in places with cold climates, abundant water, nearby power stations, and low-cost land. Facebook, Google, and Apple have built their new data centers in Oregon, North Carolina, Lulea and Sweden, all of which have cold climates. In 2010, HP established its first data center with a direct natural wind cooling in northeast Ireland. Glacier wind from the north Irish Sea is used to cool IT equipment and computer rooms.

Hosting data centers is part of China's national strategic plan, and proposals have been made to build data centers in inland China, where the climate is favorable, there are adequate resources, and land is cheap and vast. Layouts for remote data transmission networks have also been proposed. These layouts save a lot of energy and space, protect the environment, and reduce costs.

Construction Mode

Next-generation green data centers will break through the limitations of traditional data centers. There will be cloud computing data centers, supercomputer centers, container data centers, modular data centers, warehouse data centers, and ship-based data centers.

Green and Energy Efficient

Energy efficiency and low carbon emissions will be a central theme of next-generation green data centers. Environmental friendliness will be an integral part of planning and design, material selection, construction and implementation, and OAM. Energy efficiency and emissions reduction will be achieved both technically and administratively. Efforts to make traditional data centers more energy efficient will be focused on communication rooms, data rooms, and base station rooms. Networks will be more quickly evolved, and energy-intensive equipment will be removed or reconstructed. Infrastructure reconstruction



programs that save considerable energy will be implemented on a large scale. The growth of energy consumption will be controlled by management and technology innovation.

Operation, Maintenance and Management

The next-generation green data center will have high energy efficiency; it will be highly reliable and intelligent; it will have high density; it will be flexible; and it will be highly scalable. It will also have an active defense information security system. The next-generation green data center will also have a highly reliable power supply, energy-efficient cooling system, and intelligent, centralized management system. These will reduce carbon emissions over the life of the network and facilitate smooth expansion in the future.

Operating Environment

In 2008, the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) released a white paper that the recommended room temperature of a data center should be between 18°C and 27°C, and the relative humidity should be 60%. ASHRAE members include AMD, Cisco, Dell, EMC, Hitachi, HP, IBM, Intel, and SGI. In practical applications of customers within China and from abroad, technical means have been successfully used to reduce the operating temperature of a data center.

High-Thermal-Density Data Centers

ASHRAE forecasts that the average power density of a single cabinet within a data center in China will be 3.7 KW in 2014. The average power density of a single cabinet within an overseas data center will be about 6.5 KW. In the future, much more attention will be given to cooling systems for high-thermal-density data centers. Intel uses vertical exhaust ducts (VEDs) for cabinets and ancillary cooling systems in its 30 high-thermal-density data centers. The average power density of a single Intel cabinet can reach 32 KW without the cabinet overheating.

The Significance of Developing Next-Generation Green Data Centers

Promoting the construction of green data centers is of utmost importance. A green data center is an integral aspect of an enterprise's social responsibility and helps an enterprise optimize OAM and reduce costs.

ZTE is leading global ICT company that provides governments and enterprises with end-to-end, next-generation green data center solutions. ZTE can provide planning, construction, implementation, and OAM services for green data centers. ZTE helps customers build resource-saving, environmentally friendly, integrated data centers. In its 12th five-year plan, China has a policy of building green data centers as a path towards sustainable national development and energy security.

Survival in "Tiny Times"

Telecommunications Equipment Manufacturers Transitioning to ICT Services Providers

By Liu Yangqian

Under the background of information age, telecom equipment manufacturers have experienced periods of rapid growth, stable development, and struggle for survival. These periods are known as the Golden Age, Silver Age, and Iron Age.

Golden Age: Services Supplement Equipment

Since the beginning of information society in the 1980s, communication technologies have been developing rapidly. Beepers were introduced to Shanghai in 1983 and began an era of instant messaging in China. Beepers were popular in China more than two decades. The Guangdong Postal Administration signed a mobile equipment contract with Ericsson in March 1987 and launched the first commercial analog mobile network in November 1987. In October 1994, the first provincial digital mobile communications network was deployed in Guangdong. It had a capacity of 50,000 subscribers. In May 1998, Beijing Telecom CDMA trial networks into use in Beijing, Shanghai,

Guangzhou, and Xi'an. By the end of 2000, the number of mobile phone users in China was 75 million, which increased tenfold in five years.

Ericsson, ZTE, Huawei, Alcatel-Lucent, and Nokia Siemens all experienced a glorious Golden Age in which customers placed orders even before equipment had been manufactured. Manufacturers put all efforts into production and did not need to worry so much about sales.

Silver Age: Transitioning to Services, Creating Additional Value

The Golden Age ended when the IT bubble burst in 2000, and telecom equipment manufacturers suffered. To get through the hard times, manufacturers started to transition to services. Ericsson announced its transition to services in 2000, and now believes it was one of the company's most important strategic decisions. Hou Weigui, president of ZTE Corporation, proposed obtaining profits by providing services to operators. Huawei also placed great importance on providing services; in fact, they placed the same level of importance on services as they did on equipment and software.

Because of this transition to services, telecom equipment providers recovered and developed rapidly within six to seven years. This was the period of the Silver Age. In 2007, Ericsson's stock rose to US\$20 on the NASDAQ, and net sales revenue reached SEK187.8

billion. In the professional services sector, Ericsson's annual growth reached 16%. Meanwhile, ZTE's revenue reached RMB34.777 billion in 2007, an increase of 50% year-on-year. In 2006, Nokia Siemens Networks and Alcatel-Lucent were established to get through the hard times while Motorola and Nortel Networks lagged.

Iron Age: Breaking Border Between IT and CT

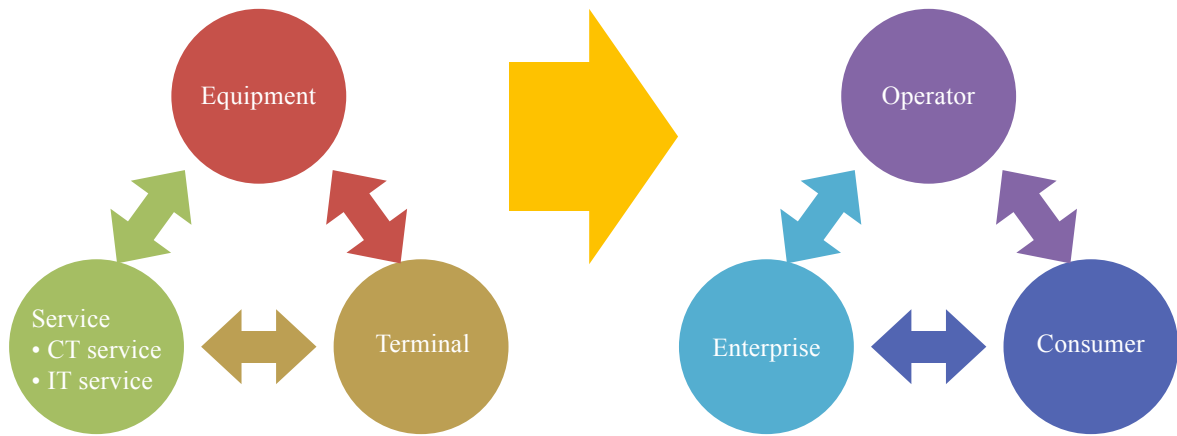
The U.S. subprime mortgage crisis in 2008 pushed telecom equipment providers into the Iron Age. The key theme in this age is cross-border convergence. With increasingly intense market competition, industries penetrated each other, and it was difficult to clearly define the attribute of an enterprise. Cross-border business became the trend. An unexpected competitor is the most formidable, and Apple Inc., founded as a PC company, broke onto the mobile phone market. With its flagship iPhone, Apple got on top of other leading mobile phone manufacturers within five years.

Convergence in the Iron Age means ICT convergence. Mobile internet is a product of ICT convergence. Relations between internet enterprises and operators changed gradually. When telecom operators dominated the industrial chain, the internet was considered a value-added telecom service. In the initial stage, the ICT industry placed greater importance on CT than IT. At

present, incremental introduction of services is failing to generate profit for operators, and this is also limiting telecom equipment manufacturers.

Over the past several years, annual investment in global telecom industries has been steady at around US\$130 billion. The market has become saturated, and equipment providers have not been able to significantly increase their market share. Although investment has remained relatively stable, the scale of the global information industry has grown exponentially. The number of mobile phone users worldwide has increased to 5 billion, and the number of internet users has increased to 2 billion. The telecom industry had been more like a traditional manufacturing industry than a high-tech industry.

Telecom equipment manufacturers thus changed face again to survive: They transitioned to IT services. Equipment manufacturers have intrinsic advantages in this area: Their experience in large-scale integration projects can be transferred to other industries. Long-term cooperative relationships between equipment manufacturers and operators enable both to explore enterprise and consumer markets together. The experience of equipment manufacturers in the CT field also lays a solid foundation for providing ICT and IT services. With the advancement of cloud computing, traditional IT industries are facing the pressure of market reshuffle, and traditional IT service providers are also seeking development in the ICT and



CT fields. Cross-border competition is emerging.

Alloy Age: Convergence of IT and CT, Services and Equipment

The Iron Age will be followed by the Alloy Age, which involves the convergence of IT and CT and the convergence of industries. Equipment, terminals, and services will drive operators, enterprises, and consumers and this will have a flow-on effect for telecom equipment manufacturers.

Towards Alloy Age, CT Equipment Manufacturers Are in Action

ZTE has established a specialized IT service team to explore IT services. ZTE's IT service solution revolves around data centers, that is, providing services that cover the whole lifecycle of a data center. The solution also involves smart city management services and enterprise information mobility services. ZTE has extensive experience in CT services and has a global service platform for providing customers with high-quality IT services.

Whole Lifecycle Data Center Services

ZTE's whole lifecycle data center services involve consulting and planning, construction and deployment, and operation and management for physical and IT infrastructure.

● **Consulting and Planning**

ZTE analyzes a customer's strategic objectives in terms of service development as well as the customer's existing business environment and formulates a three-to-five-year plan. ZTE designs the data center architecture so that the data center can support new and existing service systems.

● **Construction and Deployment**

ZTE can take full charge of all civil engineering, electric engineering, cooling engineering, weak current engineering, and fire protection engineering in the construction of a data center. ZTE has an excellent data center project management team. ZTE also has standard flows and methodologies for construction, quality control, security, civil construction,

and environmental protection.

● **Operation and Management**

ZTE has many years experience in data center O&M and project management. ZTE has well-developed, verified methodologies for controlling and improving services. ZTE's data center O&M service objects includes physical infrastructure, IT infrastructure, and basic software. System monitoring tools and O&M management tools are used to

- monitor system operation, performance load, and alarms in real time
- sort system faults and provide warnings
- handle monitoring-platform, alarm messages, user alarms, and fault report calls
- create, dispatch, transfer and close relevant worksheets.

Smart City Managed Service

Smart city is the trend for future cities and the focus of city planning in China. A smart city is a comprehensive

solution that includes smart park, smart traffic, safe city, and other solutions. A smart city makes use of cloud computing and M2M technologies. Large-scale smart city construction is currently underway worldwide. However, little attention is being paid to the stable operation of smart city information systems. Therefore, ZTE proposes smart city service solutions to guarantee stable information systems. ZTE proposes using intelligent tools and platforms to provide high-quality services for urban

enterprises and residents.

Enterprise Information Mobilization

ZTE's enterprise information mobilization solution is a mobile application development platform guided by BYOD policies that are based on a customer's strategic IT planning. In addition, ZTE provides a comprehensive solution for deploying and integrating mobile applications, releasing enterprise application stores, and managing mobile platforms and

mobile tariffs. With this solution, ZTE helps customers quickly build a mobile enterprise information platform that is secure and provides excellent user experience.

ZTE provides IT services based on a customer's actual needs and maximizes the value of a customer's existing IT assets. ZTE provides standardized service products and flows for improved service quality and provides flexible service portfolios and secondary development of products. **ZTE TECHNOLOGIES**



Cloud Services

for Enterprise IT Transformation

By Huang Tao

Revolution in the Global IT Industry

The global virtualization and cloud computing industry is starting a revolution in the IT industry. The traditional ICT industry is now placing greater emphasis on social services, and the market value of this industry worldwide is expected to reach \$176.8 billion in 2015. Cloud computing is the main strategic direction of big IT companies. Cooperation and purchasing related to cloud computing is booming, and players such as IBM, HP, Microsoft, Amazon and Microsoft are busy exploring related businesses.

International companies are now able to launch large-scale cloud computing services and are influencing the development of cloud technology. Traditional IT giants are leveraging their advantages to promote

virtualization and cloud products and solutions.

Gearing Up for Cloud Services

In China, businesses related to cloud computing are developing quickly, yet there is still a long way to go before they catch up with their overseas counterparts. With a large user base, it won't be difficult for internet companies to promote cloud services. Big internet companies are also the main providers of cloud computing services. IaaS + PaaS is a dominant service mode, and IaaS is relatively mature. The three main telecom operators in China are leveraging the advantages of their networks and data centers and are using IaaS as their flagship service to tap into the cloud computing market. More and more cloud hosting and storage services are coming onto the market. Smart

city and smart campus solutions based on cloud computing are being heavily promoted.

R&D on cloud services is in full swing. Chinese ICT manufacturers have invested heavily in cloud services and are developing related hardware platforms. They have taken domestic market share and are penetrating the international market. In addition, big software vendors are developing software for cloud services. More and more virtualization and cloud-related software is being launched onto the domestic Chinese market.

Deploying Cloud Services to Boost User IT Value

The attention placed on cloud services can be attributed to the fact that cloud services help users integrate resources, make the network



Innovation
Branding
Solution
Marketing
Analysis
Ideas
Success
Management



architecture more flexible, and increase enterprise competitiveness. ZTE has rich experience in virtualization and cloud applications for enterprise. ZTE has integrated the virtual data center, data center cloud-management platform, desktop cloud, and virtual applications into its own service system. In addition, ZTE takes advantage of its consultation, research, architecture planning, engineering, and after-sales maintenance to provide virtualization and cloud-management solutions that are stable, safe, easy to maintain, and have a better cost-performance ratio.

By integrating IT infrastructure resources and automating operations,

the following can be achieved:

- hardware utilization can be improved and data center operation costs can be lowered. Because service systems run independently in the same physical environment, fewer servers are needed. This reduces the cost of purchasing hardware.
- service stability and continuation can be guaranteed. Operation is guaranteed over the long term, and data storage is optimal. Strong data backup ensures business data is safe.
- IT architecture can be made more flexible and expandable so that new servers and services can

be quickly deployed. Resource growth is planned in advance, and there is no need to go through purchasing procedures. User and service demands can also be quickly addressed.

- new service development can be supported and IT value can increase. New services, such as mobile office and MDM, are supported. Flexible architecture guarantees that organizational structure can be quickly changed. **ZTE TECHNOLOGIES**



Changing Data Center Requirements in the Post-Information Age

By Chen Hongyu

As China's enterprise IT industry develops, enterprises will turn their attention from software and hardware infrastructure roll-out to system maintenance. They will enter a post-information age—the age of focused operation and maintenance management (OMM).

According to CCID data, the Chinese IT OMM market reached RMB2.98 billion (US\$492 million) and grew by 24.1% in 2009. This jumped to approximately RMB5 billion (US\$825 million) in 2010 and RMB6 billion (US\$990 million) in 2011. Market growth was 28.7% in 2012. Enterprise users are analyzing IT OMM service and its value in depth, and great importance is being placed on IT services in the enterprise development

lifecycle. The IT OMM market is expected to grow by 20% in 2014.

As IT OMM develops, users are beginning to demand more in terms of OMM service assurance, troubleshooting, and experience. IT OMM involves construction of IT infrastructure as well as passive and active OAM. It is also a source of profit for enterprises focused on creating service value. IT OMM will play a crucial role in enterprise development and will determine whether an enterprise grows or even survives. Only when they understand the difference between service value support and service value creation can enterprise IT departments create value in their IT services and enter

the era of next-generation intelligent IT OMM services.

Data Center OMM in the Post-Information Age

ZTE has developed an integrated intelligent IT OMM system based on ITIL best practice, ISO20000, and ITSS standards. The IT OMM system supports multiple platforms and devices from different vendors, and makes possible visual, measurable, and standardized IT OMM.

ZTE's integrated, intelligent IT OMM system is highly recognized for its stability, usability, and

integration. It has been widely used by telecommunications, finance, government, power, education, tobacco, healthcare, media, and transportation enterprises. It has complete functions and a closed ring to cover all aspects of data centers. The system gives reliable service assurance through equipment management, business service management, user access management, in-depth traffic monitoring, extensible acquisition architecture, rich and intuitive visual view, perfect virtualized resource management, multiperspective user terminal management, and complete IT software and hardware monitoring. OMM service is implemented from the bottom infrastructure layer and covers every aspect of operation and maintenance.

The IT OMM system provides intelligent fault management, including all kinds of alarms and alert notifications, embedded Trap and Syslog resolutions, and various event handling policies. Alarms are obtained from the data collection layer, and maintenance tickets are automatically dispatched and handled on mobile phones. A variety of remote handling tools, instant equipment snapshot, fault recovery mechanism, and flexible event cause analysis are used for fault diagnosis. This enables intelligent fault management in data centers.

The IT OMM system also enables efficient IT service management. Through effective information transfer, complete asset management, standard OAM flow management, multilevel management, distributed deployment, role-based OMM, and full-view IT service management, the system

provides references that enable IT OMM personnel to assess performance. It converts individual OMM experience into enterprise knowledge and focuses on personnel, flows, and technologies to build an efficient data center.

Building an Excellent Data Center OMM System

OMM means comprehensive IT service management at the monitoring, operation, and management levels. It enables monitoring and management of infrastructure resources and service applications.

ZTE's IT OMM system optimizes the OAM flow in compliance with ITIL standards and enables standard flow management of events, faults, changes, and configurations. It provides a unified portal interface based on single sign-on technology and a unified management portal to display application status and performance of all equipment and software related to services. The system also provides the most practical OMM views to help engineers efficiently carry out OMM work.

ITIL best practice and ITSS standards are used for service management, and rapid CMDB-centered flow customization is available to help customers improve service capability and quality. Equipment operation status, virtualized resources, and equipment room resources are managed to guarantee services. Efficient troubleshooting mechanisms are also established.


The scope of IT OMM covers terminal user access and IT infrastructure ranging from traditional hardware and software to virtualization, links, and power environment. ZTE's IT OMM

platform also provides mobile terminal OMM interfaces, ITSS interfaces, and third-party system interfaces to interconnect with other platforms.

Improving the Value of Data Center

The primary goal of IT departments is service assurance: This is the basis of enterprise activities. Therefore, the IT OMM system must be service oriented. ZTE's intelligent IT OMM system integrates IT management and services and enables service-relation analysis, service support assessment, and service system health management. It creates value for IT departments.

IT management goals come from service goals, so IT management serves the services. ZTE's intelligent IT OMM system can perceive service state and risks, troubleshoot service faults, rapidly recover services, and ensure high service availability. The system has quantifiable indicators for QoS optimization and reporting. It manages the weighting of the influence of different IT components on the service system, estimates the capacity of all IT components, and monitors their availability. The system can also analyze the operational trends of all ZTE's equipment and service systems and provide early warnings for management decisions if necessary.

ZTE's IT OMM system focuses on data centers and enables visual, measurable, automatic, intelligent, integrated IT OAM. The system continues to enhance overall IT service levels while supporting IT OAM for enterprises. It serves as a new starting point for potential future green and efficient OAM. 

ZTE's

Information Security Services

By Chen Zhiming



debit card numbers, email addresses and phone numbers, of millions of customers.

Massive Market for Information Security

China's information-security industry is growing rapidly. The information-security market is moving out from the central government to the provinces, cities, and even counties. Information security is being extended from core-business security to all-business security, and more emphasis is being placed on network security maintenance. From 2006 to 2010, China's information security market grew from RMB5.538 billion to RMB10.963 billion and had an annual compound growth rate of 18.62%. In 2013, the market grew to RMB19.43 billion. In 2015, the market is expected to grow further to RMB29.35 billion.

Hackers can counterfeit or tamper with the websites of businesses, banks, or online payment sites and expose users to malicious code that steals their private information. Hackers can also build massive botnets that spam users or mount dangerous cyber attacks. Governments, enterprises, and individuals have paid increasing attention to creating trusted information security environments, and this has

Grim Situation of Information Security

IT applications typically associated with small business systems are being extended to larger, business-critical systems. More and more enterprises and government agencies are integrating their own IT networks into the internet. Information systems are becoming

more globalized and fundamental to the operations of business, governments and organizations. Security for IT systems has thus become a much more pertinent issue. A recent example is the case of US retailer Target. Hackers used malware to penetrate Target's point-of-sale and IT systems to obtain personal information, such as credit and

contributed to increased demand for various information security services.

ZTE's Information Security Services

ZTE has a great deal of experience in incorporating information security into every aspect of network planning, construction, and OAM. ZTE uses scientific, standardized information-security practices and can help an enterprise better understand IT, assess IT risks and weaknesses, improve system architecture, and create a secure operating environment.

Secure Architecture: Consulting and Planning Services

ZTE provides comprehensive consulting and planning services on secure architecture. ZTE can help a customer analyze their security requirements in terms of policies, standards, and management practices and can tailor security solutions according to the customer's needs. ZTE can create appropriate programs to help the customer implement security specifications and standards.

Creating a secure architecture involves classifying information assets, devising an enterprise-wide information security strategy, using information security specifications, and implementing information security processes and audits. It also involves assessing information system architecture, network architecture, and related security tools. Holistic planning is the first step in creating a secure architecture.

Information Security Assessment Services

ZTE surveys a customer's business objectives and requirements, assesses information security risks, performs a difference analysis, and devises an information security policy. ZTE provides two levels of assessment for a customer's critical information security infrastructure: quick or full. By assessing information assets and risks, ZTE helps a customer improve

solutions according to their budget, resources, and security requirements.

ZTE's information security reinforcement services include reinforcing the security of network equipment, infrastructure, host system, application system, databases, and security equipment itself.

ZTE takes into account all security requirements, from business level to technical level, when devising security policies and strategies. ZTE helps

“ ZTE has a great deal of experience in incorporating information security into every aspect of network planning, construction, and OAM.

their information security and get more out of their investment in information security.

ZTE can also customize enterprise-wide information security plans and blueprints.

Information Security Reinforcement Services

ZTE can detect and audit networks, host systems, applications, and databases through benign intrusion and use of third-party tools. ZTE can make security proposals for the existing enterprise network architecture, system architecture, data architecture, application architecture, system operation, and physical environment. Customers can choose appropriate

the customer define clear security objectives and requirements and ensures staff to implement these. ZTE also develops core processes for managing information security. ZTE's information security reinforcement services enable a customer to improve their architecture blueprint and roadmap so that the customer better understands the strength of their information security and identify potential threats. ZTE works with the customer to assess security policies, standards, and guidelines and ensure these are implemented by staff. ZTE strengthens information architecture against attack and makes it less vulnerable. **ZTE TECHNOLOGIES**

Jiangsu Telecom: Lean Network Management

By Cheng Lili and Yang Yi

The rapid development of mobile internet has spurred demand for faster access and better network experience. Operators need to establish a real-time network evaluation and optimization system in order to understand user perceptions of the service they are receiving.

When evaluated using traditional methods, Jiangsu Telecom's network performs almost perfectly. However, user behavior is ever-changing, and Jiangsu Telecom needs comprehensive, more refined network management and optimization methods to determine what factors are affecting network performance and user perception. With ZTE's UniCare customer experience assurance (CEA) solution, Jiangsu Telecom was able to conduct multidimensional research on lean network management. They constructed a global benchmark CDMA network, implemented a scientific evaluation

system, improved equipment capacity and overload protection, upgraded air interface capacity, and improved maintenance efficiency.

Jiangsu Telecom ran a pilot project in Yangzhou that included three phases: implementing an evaluation system, multidimensional optimization, and improving future-oriented network capability.

Establishing a Scientific Evaluation System

A scientific evaluation system provides a solid theoretical basis for network development, just as protocols do in the communications industry. Jiangsu Telecom's benchmark network evaluation system is based on scoring user perception and has the following characteristics:

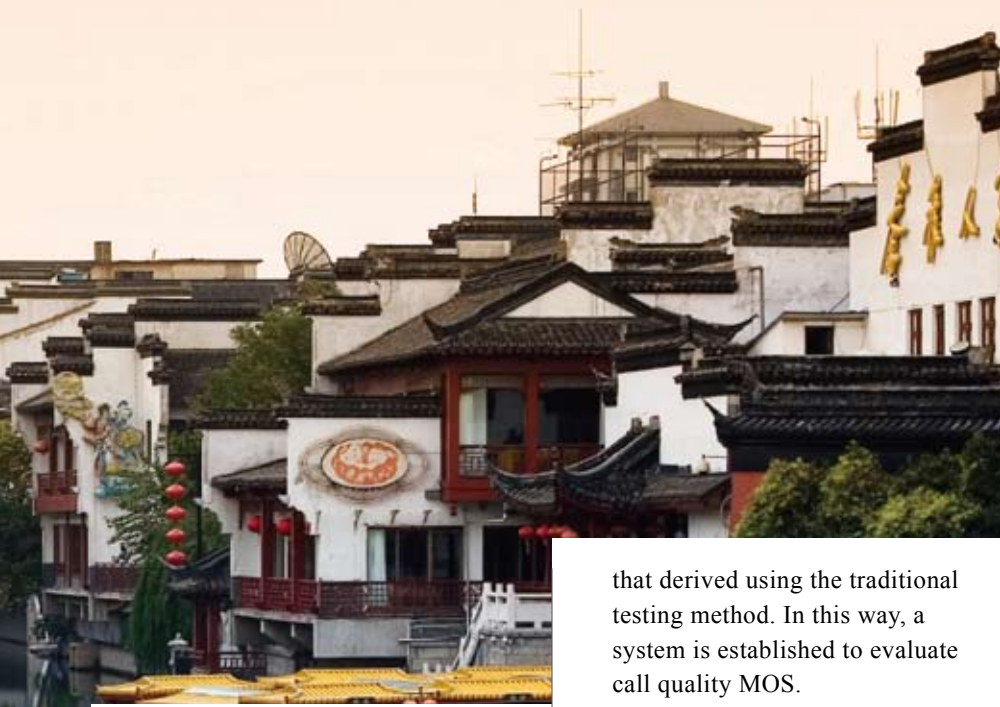
- comprehensiveness. The evaluation system covers the whole end-to-end process and multi-dimensional

user perception.

- operability. The system is based on the network-optimization platform, which ensures convenient and quick access to data.
- flexibility. The weighting of different performance perceptions can be adjusted to reflect the focus of the user.
- objectivity. Visible KPIs quantify user perception.

Jiangsu Telecom established four benchmark systems:

- voice service perception system. This has indicators for coverage, access, stability, and integrity. A reasonable weighting is set for each indicator to reflect user perception of voice services and to help locate network problems.



By weighting the key indicators of user perception, actual user perception can be gauged. This is particularly useful for determining the experience of VIP users and for identifying VAP users.

- data service perception system. This system manages user perception and has indicators for coverage, access, stability, and integrity. A reasonable weighting is set for each indicator to reflect user perception of data services and to help locate network problems.
- network resource load-evaluation system. Network load indicators detect resource overload in the air interface, BSS equipment, and core network. This is helpful for network optimization and expansion.
- MOS evaluation system. ZTE's proprietary testing method is used to collect signaling field information and calculate a mean opinion score (MOS) for call quality. Through statistical comparison and algorithm adjustment, it also works out an MOS evaluation similar to

that derived using the traditional testing method. In this way, a system is established to evaluate call quality MOS.

Improving Network and User Management Capabilities

With lean network management, Jiangsu Telecom is capable of:

- monitoring KQI: extracting KPI, KQI and QoE according to service categories, supporting diverse businesses such as HTTP, instant messaging, and microblogging, and supporting scoring from multiple dimensions including region, web page, user group, and terminal
- monitoring network services in real time: displaying network service indicators dynamically in the form of curve chart, line chart, or pie chart
- module monitoring and scoring: scoring service quality from dimensions of region, user group and NE
- VIP/VAP user care: monitoring VIP user perception and obtaining service experience of specific users or user groups for more detailed customer care and VAP user identification
- associating service perception

with CDT indicators for quick positioning

- terminal analysis: analyzing terminal type, manufacturer, operating system, region, and other elements to provide suggestions for terminal customization
- improving traditional network indicators, including call drop, connection, handover, and busy hour indicators, and resource utilization indicators

Jiangsu Telecom will continue to pursue lean network management based on user experience management and continuous real-time monitoring of network quality. Jiangsu Telecom will continue to research new network features, improve equipment capacity, and optimize 1X/DO interoperability with the overall goal of improving the quality of benchmark networks.

ZTE's UniCare CEA is a new method for managing future networks. It can be used to establish a new user-experience evaluation system based on traditional KPI evaluation and optimize the network using the new system and corresponding user experience management services. This improves network quality and guarantees user experience. UniCare CEA also provides an accurate network quality GPS navigation map for operators. User experience management makes marketing, maintenance and construction departments more efficient, increases ARPU, and reduces opex. **ZTE TECHNOLOGIES**

Viettel:

Building a Quality Broadband Network

By Fang Qin

Vietnam is located on the eastern seaboard of Indochina and is bordered by Laos to the northwest. Vietnam has a population of 88 million and is one of the top ten countries in terms of potential for IT development. The Vietnamese are relatively young, well-educated, and fond of the internet. Since broadband was popularized in Vietnam in 2003, the number of broadband users has

increased sharply, from 3.09 million in 2003 to 32.2 million in 2011.

Vietnam Military Telecommunications Group (Viettel) was founded in 2001. Headquartered in Hanoi, Viettel is the largest network service provider in Vietnam. It provides telecom services for six countries and has a subscriber base of more than 60 million people. Although Vietnam's economy was affected by the global financial crisis and faced many difficulties in 2011, Viettel's turnover growth rate was still

up 28%. Viettel is the most profitable enterprise in Vietnam's telecom market.

Reconstructing the Network to Expand Broadband Services

After 10 years in the telecom market, Viettel has improved its telecom infrastructure and is now the largest mobile service provider in Vietnam. However, Viettel's fixed-line FTTx broadband services are still inadequate. With the promotion of broadband services in Vietnam in recent years, Viettel has invested heavily in developing its fixed-line broadband.

At present, Viettel has nearly one million broadband users. Traditional DSLAM is used for broadband access, and most broadband remote access servers are still based on the 10G platform. Insufficient port capacity, system capacity, and equipment performance are limiting Viettel's ability to promote FTTx services. Viettel urgently needs to reconstruct its broadband remote-access servers. To attract VIP customers and give them a better experience, Viettel requires more from its broadband remote-access servers.

In early 2011, Viettel invited manufacturers of broadband remote-access servers to conduct tests and commercial trials. Viettel had strict requirements in terms of equipment performance. The peculiarities of Viettel's network and special requirements on broadband remote-access servers meant there were two main challenges: 1) On individual boards, CPU occupancy was high when there were few users, and 2) broadband remote-access servers could not implement 1+1 hot standby (except 1:1 backup). Viettel hoped that manufacturers could support 1+1 hot standby to improve equipment utilization and reduce TCO.

Focusing on User Experience and Increasing Network Value

Viettel had never used ZTE broadband remote-access servers, so ZTE wasn't invited to participate in the early tests. However, in September 2011, an invitation was extended to ZTE to participate in formal testing and commercial trials. Viettel's requirements were stringent in the case of ZTE.

To facilitate Viettel's broadband service development over the next five years, ZTE recommended M6000 BRAS on a large-capacity 40G



platform. This solution had been commercially used on a large scale in China. M6000 BRAS is not only a broadband remote-access server but also a service router (SR) with a bandwidth of 40G for a single board. It supports IPv4/IPv6 transition technologies, such as DS-Lite, NAT444, NAT64, Smart6, and 6rd. This eliminates Viettel's bandwidth bottlenecks and helps Viettel smoothly evolve its network to IPv6.

ZTE developed solutions and optimized processes to overcome two main problem processes encountered by Viettel in the previous tests and commercial trials. Viettel's strict requirements were finally met: A single board was designed to bear 10,000 users, and the CPU occupancy rate was only 31% when a single board bore a large number of broadband users. ZTE passed Viettel's test between September and October 2011. In November 2011, ZTE M6000 BRAS was commercially trialed. ZTE has also conducted a

number of M6000 BRAS hot standby trials for major operators in China.

In Viettel's broadband remote-access server 1+1 hot standby trial, ZTE boldly modified the preliminary hot standby solution and customized new solutions to meet Viettel's requirements. ZTE is the only manufacturer that has implemented BRAS 1+1 hot standby in Viettel's existing network environment and has won the trust and appreciation of Viettel. At the end of 2011, ZTE M6000 BRAS was put into commercial use.

Viettel has deployed ZTE M6000 BRAS in Hanoi, Ho Chi Minh City, and Dalang. The main bearer services include PPPoE VIP broadband service and static FrameRoute service. The large-capacity M6000 BRAS has brought users smooth and instant access to their applications, and hot standby makes the network more stable and reliable. User satisfaction has increased, and Viettel strengthened its reputation as a quality broadband operator. **ZTE TECHNOLOGIES**



VoLTE Leads the Way to 4G Voice

By Zhang Jian

Since 2013, operators all over the world have been busy deploying voice over LTE (VoLTE).

Infonetics Research predicts that there will be 12 commercial VoLTE networks and 8 million VoLTE subscribers worldwide by early 2014.

VoLTE is based on IMS and supports voice and multimedia services. Both GSMA and NGMN have specified VoLTE as the only end-to-end solution for voice over LTE. To ensure voice continuity, operators need to provide full LTE coverage or deploy single radio voice call continuity (SRVCC),

which enables ongoing voice calls to be smoothly handed over to 2G/3G networks.

Driving Force Behind VoLTE

Voice and SMS are still the basic communication needs of users. It is estimated that voice revenue will account for about 65% of total operator revenue by 2015. Therefore, LTE voice solutions are important and significantly affect overall user experience.

VoLTE deployment involves:

- relinquishing the circuit-switched (CS) domain for LTE air interfaces. In their preliminary research on

LTE R8 standards, 3GPP and NGMN defined a next-generation mobile network as an all-IP network that supports real-time multimedia. VoLTE will replace traditional CS services, and traditional CS domain networks will be ended.

- preventing traffic being offloaded by OTT providers. Mobile internet applications such as Google Voice and Skype siphon off a great amount of revenue from operators. VoLTE prevents voice being offloaded by OTT services. With rich communication-suite enhanced (RCS), VoLTE creates a new service experience. It enables users to keep their original numbers without notifying others that they have changed number. VoLTE is based on IMS architecture and provides mechanisms that facilitate roaming, interoperability, bandwidth, QoS, and service continuity.
- improving air interface efficiency. Utilization of VoLTE air interfaces is three times higher than utilization of R99 UTRAN air interfaces. If CS services are migrated to VoLTE architecture, more high-value, low-frequency spectrum is released.
- converging with the core network. VoLTE easily supports innovative fixed-mobile convergence (FMC) services. Subscribers can access VoLTE from different networks and have the same service experience.

Current Deployment of VoLTE

In the initial stage of LTE

deployment, operators enhance data experience. Voice services are still provided by the CS domain, and circuit-switched fallback (CSFB) is used in the interim. LTE only provides data services: when a voice call is made or received, it falls back to the CS domain. An operator only needs to upgrade the MSC instead of deploying the IMS in order to provide services quickly. However, the drawback is a greater call setup delay.

Some operators already offer VoLTE HD voice and video within LTE coverage areas. Outside these areas, the same services are provided using traditional CS domains.

Key issues in deploying VoLTE include:

- wireless coverage and service continuity. As with 3G network construction, LTE network construction also involves first providing hot-spot coverage and then progressing to full network coverage. When a subscriber moves out of an LTE area, the IP voice call is interrupted. SRVCC smoothly hands over an IP voice call in the IMS domain to the CS domain of a 2G/3G network. The R8 SRVCC architecture has drawbacks such as complex signaling flows and long handover time. ZTE has joined hands with China Mobile and come up with an enhanced SRVCC (eSRVCC) solution using the 3GPP standard. This solution significantly shortens voice handover time to less than 300 ms and improves user experience.
- immature terminal industry chain.

Mainstream vendors have launched LTE terminals that support CSFB. However, only about ten types of LTE terminal support VoLTE. Therefore, operators need to consider selecting, testing, and recommending more VoLTE terminals.

- network evolution. In terms of user roaming, operators must ensure their network devices are compatible with CSFB and VoLTE. ZTE provides solutions for CSFB/SRVCC proxy and CS/IMS convergence. These solutions have fewer requirements in terms of equipment upgrade, and they enable CS subscribers to smoothly evolve to VoLTE.
- operating and billing. Operators need to consider how to make billing and business-acceptance systems compatible with both CS and VoLTE business systems and how to ensure consistency of CS and VoLTE businesses.

RTCWeb: The Future of VoLTE

Real-time communication in Web browsers (RTCWeb) is designed for real-time video and audio communication. RTCWeb integrates audio/video processing, network transmission, and session control into a browser so that third-party application developers can easily provide real-time audio and video with a simple JavaScript API. If the browser network is based on LTE, RTCWeb will probably be a future VoLTE trend.

RTCWeb creates new opportunities for operators. If an operator creates

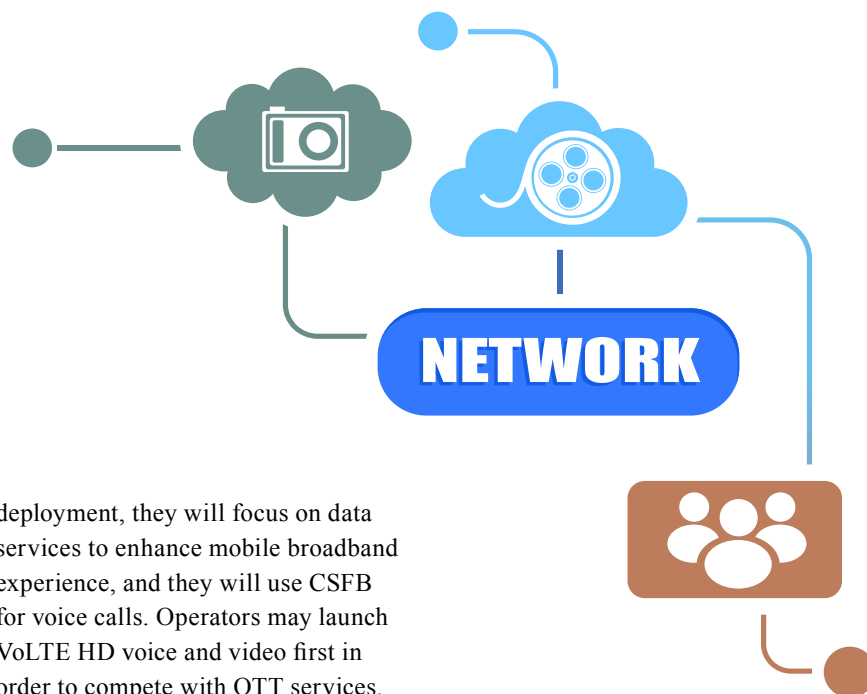
IMS network capacities in API mode, browser-oriented applications can provide unified user authentication, unified accounting, QoS guarantee, and compatibility with conventional networks. Browser-oriented applications can be rapidly deployed; they have a large user base; and they are not costly to maintain. They will boost operator IMS businesses.

Global VoLTE Deployment and Prospects

According to GSA's latest report, 21 operators worldwide, including SK Telecom, DoCoMo, T-Mobile, AT&T, Verizon and CSL, have deployed or are deploying VoLTE.

SK Telecom and U Plus, both in South Korea, have launched commercial VoLTE HD voice, video, and RCS services. In North America, MetroPCS has also rolled out VoLTE services.

In December 2013, CSL and ZTE demonstrated VoLTE HD voice and video calls on a 4G network in Hong Kong. This service also supports eSRVCC. CSL has evolved from 3G to 4G, and is ready to deploy VoLTE/SRVCC over its commercial 4G networks. Once VoLTE/SRVCC terminals have been put into commercial use, CSL will be the first to offer VoLTE/SRVCC in Hong Kong. China's 4G licenses were formally issued in early December 2013. How will China Mobile, China Telecom and China Unicom launch their voice services over LTE after they have deployed 4G networks? All three operators have wide 2G/3G CS coverage, high-capacity equipment, and large subscriber bases and need to do much work within a short period of time to upgrade their existing networks to VoLTE. In their early stage of LTE



deployment, they will focus on data services to enhance mobile broadband experience, and they will use CSFB for voice calls. Operators may launch VoLTE HD voice and video first in order to compete with OTT services. Both CSFB and VoLTE solutions can co-exist on a network. As LTE networks expand and commercial LTE terminals mature, operators will gradually introduce SRVCC for better user experience.

Milestones in ZTE's VoLTE Development

- December 2008. ZTE introduced new-generation ETCA hardware platform. It is a unified, converged platform on which the IMS+CS solutions are based.
- 2010 GSMA Mobile World Congress. ZTE demonstrated the world's first VoLTE call over a commercial LTE network.
- September 2011. ZTE attended the MultiService Forum organized by GSMA and participated in the LTE/EPC interoperability test (IOT). The test scenarios included basic service interoperability, global roaming, and VoLTE interconnection.
- November 2011. CSL put ZTE's CSFB solution into operation.
- Third quarter 2012. ZTE provided a full set of mature VoLTE and voice continuity solutions. MMTel AS has a built-in SCC AS and can

smoothly evolve to SRVCC after CSFB has been deployed and LTE coverage is complete.

- February 2013. ZTE's IMS-based eSRVCC+HD voice solution passed a field test conducted by CSL Hong Kong. This solution considerably shortens call setup and handover time for better user experience.
- December 2013. ZTE and CSL jointly launched a 4G VoLTE network, the first of its kind in Hong Kong and the second in Asia-Pacific. ZTE and China Mobile also jointly implemented eSRVCC 2G/4G interoperability in a hybrid TDD network architecture, which was the first time this had been achieved.

ZTE works with operators and related parties worldwide to explore VoLTE deployment and operation in the 4G era. ZTE provides efficient and flexible solutions to reduce capex and opex, enhance an operator's core competitiveness, and deliver crystal clear voice calls to users through 4G networks. **ZTE TECHNOLOGIES**

Intelligent Data Network: Building a Mobile-Oriented, Service-Driven Network

By Liu Qin and Wu Se

The rapid evolution of mobile internet has created great challenges for telecom operators. The industrial chain has been broken open, and people are now flocking to use a wide variety of OTT internet services that are flexible, free (or low-cost), and better than traditional telecom services. This has affected operators to an unprecedented extent. It is now more difficult for them to continuously profit from voice and SMS. In response to mobile internet, operators are investing tremendous amounts to expand their networks, but profitability is declining. It is imperative for operators to transform themselves in terms of network, development mode, and operational focus. They need to change their thinking—from growth in terms of scale to growth in terms of fine-tuning efficiency. They need to change their operational focus from traditional voice to mobile internet and data. And they need to transform their telecom networks, which use multiple access technologies, into truly converged ICT networks.

To bring about these transformations, operators need to build intelligent data networks that are oriented towards mobile internet service provision. In the mobile internet era, intelligent data networks will be groundbreaking and will create

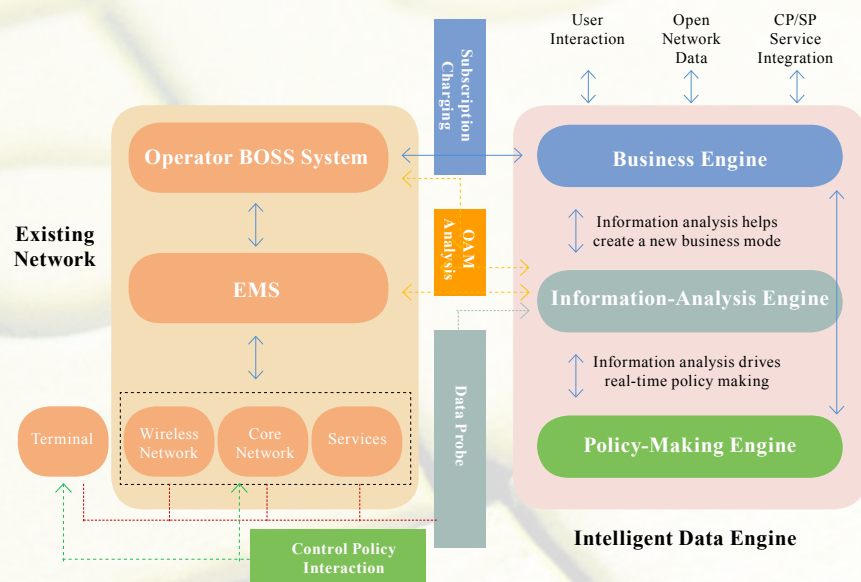


Figure 1. Architecture of an intelligent data network.

significant value for operators, just as intelligent voice networks did in the voice era. The disordered, chaotic packet-switched telecom network will be transformed into an intelligent, service-driven network that is built and shared by users and operators. This will give rise to value-added services that will increase operator revenue.

To help operators create intelligent data networks, ZTE has introduced a solution with an intelligent data engine at its core (Fig. 1).

The intelligent data engine comprises information-analysis engine, business engine, and policy-making engine, all of which collaborate with each other.

Information-Analysis Engine

The information-analysis engine is based on big-data technology and makes the network visible. Using a variety of probes, the engine collects end-to-end signaling and service data from terminals, wireless network,

core network, and services. The signaling and data are pre-processed and converted into key indicators and information data, both of which reflect the quality of network, service, and user experience.

The information-analysis engine analyzes indicators and data in terms of scenarios associated with a telecom operator's routine operations. The information-analysis engine handles user complaints, assesses and optimizes service quality, monitors the experience of VIP users, determines those users with low satisfaction, analyzes user behaviors, and analyzes service-development trends (Fig. 2).

The information-analysis engine provides detailed analysis and suggestions for each scenario. It uses self-learning to induce analysis procedures and processes within the expert system and record them in a knowledge base. In this way, the system becomes increasingly intelligent over

time. These analyses provide strong support for intelligent OAM and traffic-based operation.

Business Engine

The business engine increases the value of the network. Using information from the analysis engine, the business engine helps an operator innovate their business models and increase revenue. For example, the analysis engine can determine the relative success of a service. This information can inform an operator's decisions about how to cooperate with service providers (SPs) and content providers (CPs) in order to provide higher QoS and better-targeted advertising. To increase ARPU, an operator can customize services and bundles according to user behavior.

Moreover, the business engine has open interfaces so that operators can collaborate with users, SPs, and CPs to increase the network's ability to bear value-added services.

By enabling users to access the network in many different ways, e.g., web portal and mobile phone apps, the business engine enables users to easily query their service usage, customize services, and adjust service quality. Operators can push relevant services and bundle packages according to user preferences.

The business engine also provides open network-management interfaces to CPs and SPs. These interfaces enable unified authentication, management, and accounting between cooperating CPs and SPs. The service demands of users, CPs, and SPs determine the quality of network resources allocated so that the policy-making engine can provide services with guaranteed quality.

The business engine provides operators with more opportunity and resources to increase revenue. At the same time, it minimizes the impact of open network services on the existing BOSS system. In this way, an operator can obtain greater value for minimal investment.

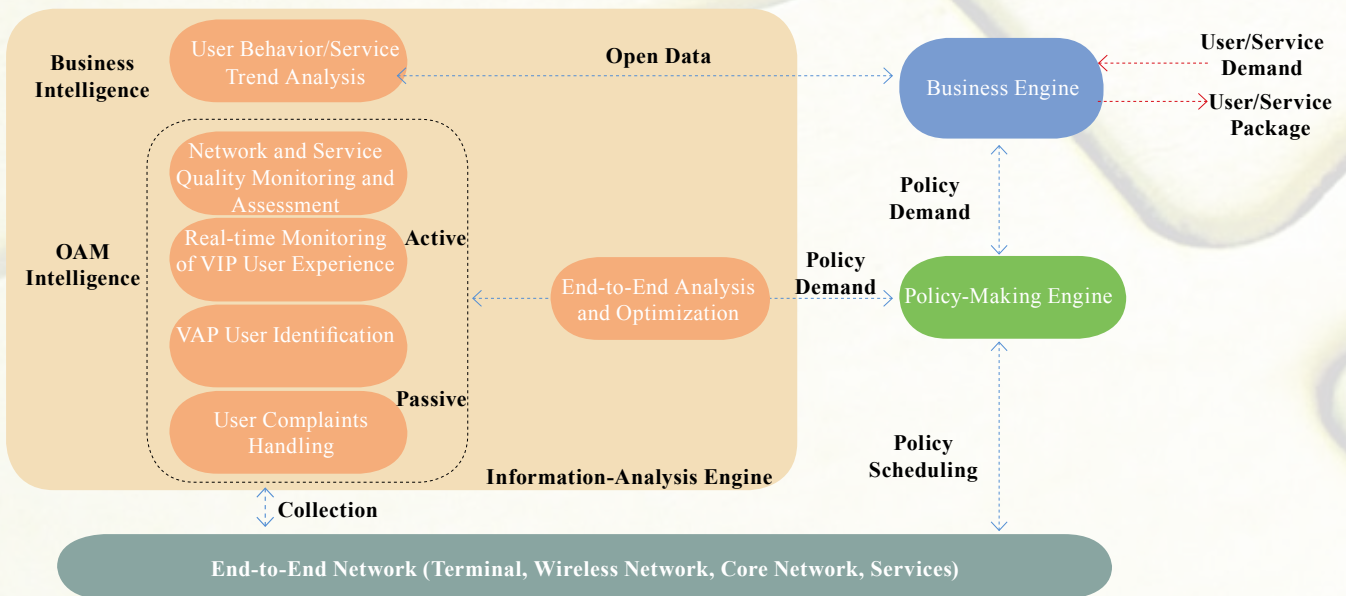


Figure 2. Information-analysis engine.

Policy-Making Engine

The policy-making engine obtains network-optimization and service-optimization requirements from the information-analysis engine. It also obtains user and QoS requirements from the business engine. After analyzing all these requirements, the policy-making engine converts them into operational instructions that are delivered to implementation entities such as RAN NEs, CN NEs, service NEs, and even user terminals. This enables resources to be automatically established, adjusted, and optimized.

ZTE's intelligent data engine facilitates collaboration between the information-analysis engine, business engine, and policy-making engine so that an operator can transform their passive, traffic-driven profit model into a proactive, service-driven compound profit model. OAM also becomes highly automated, and opex is greatly reduced.

As telecom networks evolve towards NFV/SDN virtualization, ZTE's intelligent data engine will become even more important. ZTE intelligent data engine enables finer network analysis, which helps with business innovation and creates multidimensional, policy-driven capabilities for an operator. NFV/SDN enables elastic network performance and customization of network functions so that an operator can maximize profits, minimize TCO, and provide the best possible experience for all users (Fig. 3).

As well as increasing revenue, ZTE's intelligent data engine also enables an operator to cheaply transform their existing networks. The information-analysis engine obtains data from relevant interfaces through hardware probes. The business engine can

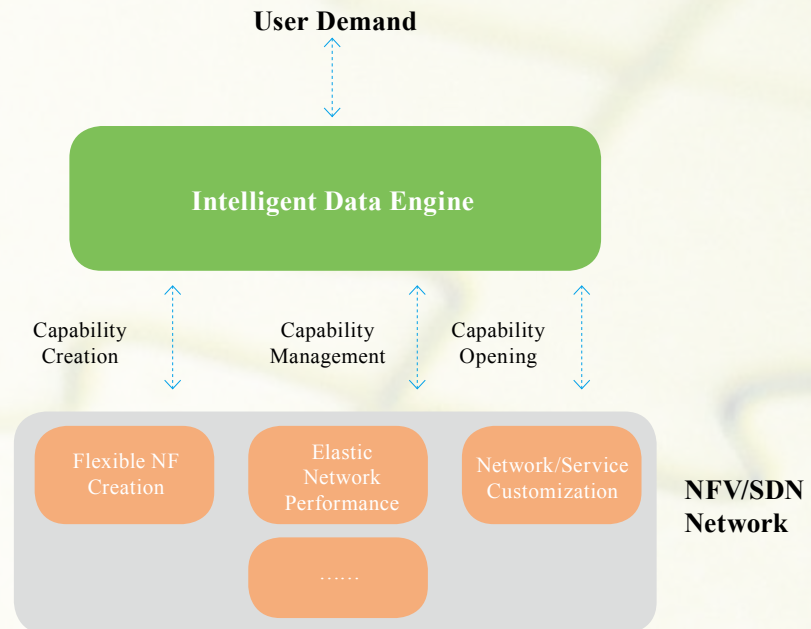


Figure 3. Capabilities and management of an open network based on NFV/SDN.

connect with the BOSS through existing subscription and charging interfaces. The policy-making engine can connect with NEs through standardized interfaces, for example, the Gx interface. ZTE's intelligent data engine is a universal solution that can transform the mobile data networks of most operators.

In one particular instance, ZTE's intelligent data engine helped a telecom company analyze and optimize its busy and idle cells. The information-analysis engine works with the policy-making engine to restrict the traffic of low-value services (e.g., P2P) that consume wireless resources in busy cells. In fact, such low-value traffic can be reduced by as much as 50%. This relieves the workload of busy cells and improves the service experience for most users. This solution has helped mobile companies guarantee VIP user experience. The information-analysis engine works with the policy-making engine to evaluate the user experience

of VIP users and establish dedicated service bearers for these users. Another mobile company has used this solution to diversify their services. The business engine works with the policy-making engine to provide services such as Speed Up with One Click, for individual users, and Rapid Upload, for the media industry. This has opened up new opportunities for the operator to increase their revenue. A European operator has used the intelligent data engine to analyze and optimize network quality. The information-analysis engine works together with the policy-making engine to monitor network quality and provide corresponding optimization policies.

In the future, ZTE's intelligent data network will have more finely-tuned analysis and collaboration capabilities, and will be even easier to operate and control. This will help operators build mobile internet-oriented, service-driven intelligent networks. **ZTE TECHNOLOGIES**

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