Extend your coverage with the fastest growing optical network provider in the world.

For three consecutive years, ZTE has been the fastest growing optical network vendor in the world.

Our WDM equipment gives extra high transmission capacity over long distances at the same time as optimizing your optical fibre resources.

Today, ZTE’s Unitrans series of optical network products are used for WDM, MSTP and ASON full-network solutions, and are widely deployed in more than 250 carriers in over 50 countries and regions.

And according to the latest statistics from world-famous consulting company Ovum-RHK, ZTE ranks top 2 in the world in its ADM and LH DWDM business.

Now, we are ready to serve you. ZTE is a leading global provider of telecommunications equipment and network solutions.

We deliver innovative, custom-made products and services to customers in more than 135 countries, helping them achieve continued revenue growth, while shaping the future of the world’s communications.

Please visit www.zte.com.cn or contact your local ZTE office to know more. Welcome!
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Being Green, Being Successful

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HSUPA Solution Enabling a New 3G Experience

Attracted by the high performance of HSPA, more and more mobile operators are deploying or planning to deploy HSUPA/HSDPA networks to deliver quality services to subscribers anytime and anywhere.

Building Broadband Optical Access Network with CWDM

When fixed operators are carrying out the fiber replacement strategy, CWDM becomes an important means to solve the bandwidth bottleneck in the transmission network access layer.

Protection Technologies for Packet Transport Network

As an emerging carrier-class transport network, PTN is being perfected in technologies and standards, which will drive the growth of the relative network protection technologies.
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ZTE, a leading global provider of telecommunications equipment and network solutions, will be supplying a comprehensive range of its telecom products and solutions in the forthcoming Beijing 2008 Olympic Games to ensure the reliable and smooth operations of the global event’s 3G network infrastructure. In conjunction with this, ZTE has developed a contingency plan together with major telecom operators in China to ensure the smooth provision of various communication support services including 3G TD-SCDMA network, TD-SCDMA mobile phones, Global open Trunking architecture (GoTa) emergency communications, broadband access, IPTV, and optical transmission, among others.

To show its commitment to this prestigious international sporting event, ZTE is sending a strong 200-manpower technical expert as part of its Olympic Communications Support Group to Beijing to provide technical support in managing the event’s communications network.

“Following our successful participation during the Athens 2004 Olympic Games where we expertly provided broadband and communications services, we are very proud that ZTE will again play a key role in helping the smooth operations of the Beijing 2008 Olympic Games’ communications network when it is held in our motherland,” said Yin Yimin, CEO of ZTE.

During the Athens 2004 Olympic Games, ZTE partnered with European telecom operator OTE by providing its ADSL broadband communications products to support the Games’ network operations. Today, major telecom players in China has again selected ZTE to supply equipment and solutions for the deployment of advanced 3G networks, further attesting the company’s leading position in the industry.

China Mobile, China’s largest telecom operator in terms of revenue has selected ZTE to construct TD-SCDMA network in several major Chinese cities, including host cities Beijing and Qingdao. Recently, China Mobile purchased significant number of TD-SCDMA handsets with ZTE supplying 30% of the purchase order, the largest share among the industry, making it the biggest 3G provider of both network infrastructure and handsets for the Beijing Olympic.

ZTE is also partnering with China Telecom and China Satellite Communication in line with the deployment of emergency communications security system for the Qingdao Olympic Regatta by providing GoTa, a next-generation CDMA-based digital trunking technology, marking it the first time that a China-grown trunking technology is applied in Olympic Games. As the largest CDMA equipment provider to China Unicom and the biggest DSL supplier to China Netcom, ZTE has also been actively involved in the two operators’ communications exercise to ensure that all the components of the 3G network are deployed before the Games begins next month.

In addition, ZTE is also helping China Telecom’s Shanghai IPTV in upgrading its network, the world’s largest H.264 version, to 12M-bandwidth in order to satisfy the high demand for TV broadcast during the Games.
ZTE Records Highest Industry Growth for Optical Networking Solutions

4Q07 sales growth for ON increased by 120%, according to Ovum report

ZTE scored the highest industry sales growth in the area of Optical Networking (ON) in 2007, according to a report published by international research firm Ovum entitled “Market Share 4Q07 and 2007 Global ON”. The company’s ON products’ sales grew by 120% in 4Q 2007 compared with that of 2006, the report revealed. The Ovum report analyzes quarterly results of different ON solution vendors, including ZTE’s, and compares that with the sales figures recorded in the previous year.

The Ovum’s Optical Networking Market Analysis by segment ranks ZTE second in terms of global market share for LH Dense Wavelength Division Multiplexing (DWDM) and ADM area, proving that ZTE’s continuous efforts in investing and developing new optical technology is paying off.

Market-wise, Ovum predicts global ON spending to reach $16.4 billion by end of 2008, laying ahead enormous market opportunities and increasing bandwidth demands in all regions.

“It is a significant accomplishment for us that our ON products have successfully penetrated more than 90 countries worldwide, including APAC, Europe, North America, Africa and Middle East. We partner with multinational telecom companies and carriers to deliver high-quality ON solutions that meet the rapidly accelerating demand for high-end optical networking products,” said Mr. Han Ling, ZTE’s Vice President and General Manager, Optical Network Products. “ZTE is fully committed to expanding our ON product portfolio in the years to come to address the market needs for higher bandwidth, as well as to sustain sales growth of our optical networking product range.”

(ZTE Corporation)

ZTE 'Talks to the Future' with Comprehensive Telecom Solutions Display at CommunicAsia 2008

Senior executives shared views on next generation mobile network as guest speakers

ZTE, in line with its corporate theme ‘Talking to the Future’ showcased a comprehensive range of its latest product portfolio at CommunicAsia 2008 held from 17th to 20th June in Singapore.

To further reaffirm its leadership in global communications area, ZTE aims to provide its worldwide customers with satisfying and customized products and services. With the theme of ‘Talking to the Future’ at the event, ZTE showed its latest solutions on wireless technology, including the most recently released Software Defined Radio (SDR)-based Long Term Evolution/ Universal Mobile Telecommunications System (LTE/UMTS) multi-mode base stations, all-IP SDR-based unified platform, WiMAX and CDMA.

“This is the fourth consecutive year that we are participating in CommunicAsia. At this year’s event, ZTE is once again highlighting our distinguishing capabilities and strengths over the competition with our one-stop telecom equipment solution, our leading edge in mobile convergence and evolution, and with our customized products and services that help our global clients meet their business needs,” said Mr. Pang Shengqing, Senior Vice President of ZTE.

(ZTE Corporation)
ZTE to Help Ethiopia Telecommunications Corporation Build National Network

ZTE is exclusively developing Ethiopia’s nationwide network to cover 14 major cities in Ethiopia, including Addis Ababa, the capital of Ethiopia. This cooperation marks ZTE’s continuous success in penetrating Ethiopia, after reaching an agreement with ETC to help construct IP-backbone network late last year.

As part of the agreement, ZTE will help ETC establish two separate networks that will allow ETC to provide NGN and BTS related network services by deploying ZTE’s GSM bearer network optical solutions. ZTE will play a role in helping ETC to establish Metropolitan Area Network (MAN) by deploying ZXMP M800 high-end optical transmission equipment, and Access Network by using ZXMP M600, Coarse Wavelength Division Multiplexer (CWDM) system with Fixed Service Access Gateway (SAG).

ZTE’s ZXMP M600 is a highly integrated CWDM transmission system, supporting 18 wavelengths and a maximum rate of 2.7 Gb/s. It features an open multi-service access model and high flexibility in consolidating voice and data services.

Moreover, it can be widely deployed at the convergence and access layers of large-scale metro network, the backbone, convergence and access layers of small to medium sized metro network, as well as the private network of utility infrastructure. With its high deployment flexibility and large capacity, ZXMP M600 helps telecom carriers lower operating cost.

“With our state-of-the-art optical transmission solution, we believe we can provide a smooth transmission route for Ethiopia’s telecom network to help them satisfy their customers’ demands for multi-service transmission within GSM, CDMA, IP and fixed line. ZTE is committed to playing a key role in bolstering Ethiopia’s telecom infrastructure, and in return, boost its economic growth,” said Mr. Han Ling, ZTE’s Vice President and General Manager, Optical Network Products.

(ZTE Corporation)

ZTE Achieves Strong Growth for Bearer Network Products

Customized network solution meets growing demand in Malaysia

ZTE continues to register remarkable growth rate for its bearer network products according to the announcement the company made at the recent “ZTE Bearer Network Workshop Malaysia 2008” held in Malaysia.

ZTE bearer network products include IP network products and optical transmission solutions. In 2007, its IP network products recorded over 100% growth, with bulk of the sales coming from overseas market. At the same time, the optical transmission business also registered sterling record as sales grew by 71% compared with 2006, topping the industry by exceeding the overall market’s 24% growth.

According to the International Telecommunication Union-Telecommunication Standardization Sector (ITU-T), Malaysia is one of the fastest-growing telecom markets in the region, closely following China. To effectively penetrate Malaysia, ZTE partnered with leading key operators in the country in introducing its innovative products to the local market. ZTE’s aggressive efforts in developing and penetrating international markets, including Malaysia, contributed to the tremendous sales growth of its bearer network products.

At the recently concluded “ZTE Bearer Network Workshop Malaysia 2008”, around 100 well-known experts representing various local telecom operators including TM, Celcom, TIME, U Mobile, Maxis and DiGi gathered to discuss network evolution trends and changes in service demand. The operators also recognized ZTE bearer network and service solutions as among the most reliable in the industry.

(ZTE Corporation)
Wi-Fi Alliance Gives Wireless Voice
July 3, 2008

The Wi-Fi Alliance has introduced a program to certify voice handling on Wi-Fi networks, according to IDG.

The Wi-Fi CERTIFIED Voice-Personal stamp of approval means a product is capable of making or handling good-quality voice calls in the home or a small office environment, according to the Wi-Fi Alliance. Access points, wireless routers, handsets (which are growing at a steady rate) and laptops can all be tested and certified.

The IDG story says the push is a way for Wi-Fi Alliance to keep femtocells and upcoming technologies such as WiMAX, HSPA and LTE which lately have overshadowed Wi-Fi out of the home, according to Richard Webb, directing analyst at Infonetics. Webb thinks Wi-Fi, helped by a low cost and a large installed base, will be able to stay dominant.

(www.telecomasia.net)

China to Accelerate TD-SCDMA Base Station Building in Beijing
July 3, 2008

China will build more TD-SCDMA base stations in Beijing and provide TD-SCDMA mobile TV services during the Olympic Games, the official Xinhua news agency reported, citing Minister of Industry and Information Technology Li Yizhong.

Li urged China Mobile to upgrade TD-SCDMA networks and further improve the voice and video quality for China’s homegrown 3G platform before the Olympic Games.

He noted that the ministry has set up a special working committee to focus on 3G service promotion and development.

Li also said that his newly launched ministry will complete its personnel adjustments within the month. The ministry officially started operations on June 29. It consists of the former Information Industry Ministry, the science and technology department of the National Development and Reform Commission, some operations of the state council, and the Commission of Science, Technology and Industry for National Defense.

(www.cn-c114.net)

Mobile CAPEX to Zoom Past $160b in 5 Years
July 8, 2008

Global capital expenditure on mobile communications continues to rise due to greater emphasis on new data services, increased traffic load, and preparation for 4G deployments, a report from ABI Research said.

With the US economy’s uncertain outlook in 2008, ABI Research expects North America’s CAPEX to remain flat this year, while other regions will increase their CAPEX commitments for new 2G/3G deployments or expansions, all-IP service discovery platform upgrades, softswitch unified core systems, and preparations for 4G.

ABI Research calculates that CAPEX investment in 2007 exceeded $131 billion, and will reach $163.5 billion in 2013.

(www.telecomasia.net)
On 10 April 2008, the prestigious “Best Contributor to IPTV Ecosystem” award was granted by the Ministry of Information Industry of China to ZTE Corporation for its outstanding contributions in promoting the IPTV industry. As shown in the photo, Mr. Yu Yifang, General Manager of ZTE’s Multimedia and Terminals Product Line, receives the award from Mr. Chen Ruming, Deputy Minister of Ministry of Information Industry, China.

ZTE works diligently with carriers, content providers (such as SMG and CCTV), and application service providers to build a strong IPTV ecosystem.

As a primary member of Chinese Communication Standard Association (CCSA), ZTE has taken a leading role in drafting a number of IPTV standards, solely or jointly with industrial partners. Moreover, ZTE is a sponsor of AVS Industry Alliance of China, which has defined an industrial leading IPTV standard along with AVS-IPTV test schemes.

Meanwhile, ZTE continues to make important contributions to the global IPTV standard activities, with its contributions accounting for 8% of the total resolutions during ITU-T FG IPTV research period, and as the editor on IPTV architecture in ITU-T IPTV GSI 2008.

ZTE has won the largest market share in China (more than 50%) with its IPTV “Eye-Will” platform and services deployed by the two largest fixed-line network providers, China Telecom and China Netcom, in more than fifteen provinces. It serves more than 800,000 end users with residential IPTV services. ZTE also empowers carriers to penetrate vertical markets with hotel solution, global surveillance solution, and remote education solution.

ZTE has become a significant global player in all telecommunication areas. In particular, ZTE has provided feature-rich and cost-effective IPTV solutions to international carriers in ten countries, including Columbia, Thailand, Belarus, etc.
Being Green, Being Successful

June 2008, by Loren Zhao and Irene Liu, from market research firm iSuppli
Being “green” is not simply a cost center for being compliant with regulatory standards or industry directives. On the contrary, it provides new and substantial business opportunities in the global telecom market. To compete effectively, in the Tier-1 carrier market, vendors should align themselves with their environmentally-aware customers.

Environmental Issues

Environmental issues including climate change, pollution, renewable energy, conservation, recycling, the exhaustion of natural resources and public health concerns are rapidly gaining public awareness. This is pushing governments to follow policies encouraging renewable energy production, environmental technologies and services.

Companies from all industries, including telecommunications, are preparing for major shifts in public opinion and increased environmental regulation by announcing green technology programs and innovative products.

This special iSuppli report provides an overview of global telecom trends related to environmental issues. In the process, the impact on China and the international telecom market will be reviewed, including new green business practices and products.

International Public Policy on Green Initiatives

Climate Change

The Kyoto Protocol is an agreement made under the United Nations Framework Convention on Climate Change (UNFCCC). It started in February 2005 and will expire in 2012. Countries that ratified this protocol have committed to reducing their carbon dioxide (CO2) emissions as well as five other greenhouse gases. The 2007 United Nations Climate Change Conference in Bali decided that the follow-up process to the Kyoto Protocol.

The International Telecommunication Union’s Telecommunication Standardization Sector (ITU-T) strategy on climate change may soon provide a standardized way to calculate the carbon footprint of data and telecom equipment.

The United Nation’s “Solving the E-Waste Problem” (StEP) initiative was launched in March 2007. It organizes UN organizations, together with prominent members from private industry, government, non-governmental and scientific organizations. It aims to harmonize world policy, legislative approaches, standards and processes for electronic waste and recycling. StEP sets global guidelines for the treatment of e-waste and the promotion of sustainable material recycling based on the European Union’s Waste from Electric and Electronic Equipment (WEEE) directive.

The Green Telecom Market

In 2007, some major European operators had already announced their strategies for cutting greenhouse gas emissions, including Vodafone Germany, Deutsche Telekom (DT), TeliaSonera, and Telenor. DT views climate change as one of the greatest challenges facing humanity in the 21st century. Although DT does not face any regulatory/financial risks, DT anticipates that Information and Communications Technologies (ICT) will be included in emissions trading during the post-Kyoto phase after 2012, and is making strategic preparations for this move.

Business Opportunities

iSuppli recognizes that although “being green” represents an additional cost source for compliance with regulatory or government policies, it also provides valuable business opportunities for innovative products, services and solutions.

Cost savings are the primary driver at present. Improved energy efficiency reduces Operating Expenses (OPEX) and increases profits.

The second motivation is customer-driven. Environmentally-aware consumers are demanding operators in different countries to go “green”, especially in Europe. Consumers want green choices from their telecom providers.

Meanwhile, carriers are preparing for greater consumer awareness of climate change issues and looking for new commercial opportunities in green telecom services.

The third driver is public relations within the domestic and global market. Projecting a strong green brand image
and fulfilling it through clear action will soon become a standard part of the telecom industry.

**Green Supply Chain for Telecom Technologies**

The global telecom industry has a serious role to play in reducing CO2 emissions by providing “low-carbon” solutions, by providing alternatives to travel and higher resource efficiencies. A green supply chain is forming rapidly throughout the telecom industry.

- **Design and production**
  Environmental issues are evaluated and addressed during the core R&D phase of equipment manufacturing. For example, components supporting greater energy efficiency that also help cut CO2 emissions can be selected. Moreover, manufacturers can support higher operating temperature ranges to reduce air-conditioning requirements for equipment. They can also introduce automatic stand-by modes in low-use periods to lower power consumption.

- **Network infrastructure**
  In the case of wireless network equipment, this can mean requiring fewer Base Transceiver Stations (BTS) per unit area to achieve coverage and providing interoperability with other BTS network equipment providers.

- **Waste management**
  Provide recycling, e-waste and second-hand unit purchasing services, using biodegradable materials where possible.

- **Installation and maintenance**
  Offer support functions, such as remote testing and management that can reduce carrier operating costs and their carbon footprint.

**Major Case Study: ZTE Broadband Products — A Green Success**

**Question:** How do equipment manufacturers survive the future global telecom market?

**Answer:** iSuppli analyzes this critical question by analyzing example ZTE broadband products.

In April 2008, Chinese equipment vendor, ZTE received a “Best Green Innovation” Award at SOFNET, an international forum organized by the International Engineering Consortium (IEC) in London. The SOFNET forum, primarily sponsored by British Telecom (BT), is a conference and exhibition of the latest innovations in software and network technology. Participants include leading European operators, telecom equipment manufacturers and software developers.

ZTE “green” broadband products include its Digital Subscriber Line (DSL) and Passive Optical Network (PON) product lines. The DSL line includes digital subscriber line access multiplexer models 831 and 831II. ZTE’s PON product line includes the Optical Line Terminal (OLT) model C220 and the Optical Network Terminal (ONT) model F660.

**Analysis of ZTE’s ZXDSL 9806H Mini-DSLAM**

For example, ZTE’s ZXDSL 9806H mini-DSLAM is part of its next generation IP-DSLAM product portfolio.

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Third Eye
for broadband networks. Equipment size and user capacity is designed for fiber-to-the-basement (FTTB) networks. Of course, all carriers must choose the right strategy for FTTx deployment. They must maximize their return on capital and operating expenditures with new revenue-generating services. ZXDSL 9806H supports ADSL/ADSL2/ADSL2+, SHDSL and VDSL2 access via Ethernet, as well as Ethernet Passive Optical Networks (EPON) or Gigabit Passive Optical Network (GPON) uplink interfaces.

### Design and production
According to test results from Texas Instruments (TI), ZTE’s ZXDSL 9806H meets the “European code of conduct on energy consumption for broadband equipment” in terms of power consumption savings per port.

As per the “European Code of Conduct on Energy Consumption for Broadband Equipment, Version 2”, under full power, VDSL2 DSLAM port power consumption should be below 2.75W in 2007 and 2.0W in 2008.

For example, take the case of a carrier with 5 million subscribers and an assumed power price of $0.1 per kilowatt-hour (KwH). In full power mode, the total power consumption cost in 2007 would have exceeded $12 million. However, when maximum per line power consumption is decreased to 2.0W in 2008 in Europe, the electricity costs will fall to $8.76 million, saving at least 27%. ZTE’s xDSL 9806H VDSL2 unit can achieve 1.69W per port. Annual electricity costs could decline even further to $7.44 million. For this carrier and customer base size, the total energy reduction achieved in 2008 using ZTE’s broadband equipment could theoretically be equivalent to 6.8 million pounds of (lbs) of CO2 and over 350,000 gallons of gasoline.

### Network Infrastructure
ZXDSL 9806H can be used for fiber-to-the-building (FTTB) architecture. It can be installed in hardened outdoor cabinets and multiple shelves can aggregate a larger number of end-users using longer copper cables.

By equipping its DSLAM solution with a PON uplink card, ZTE has reduced the amount of fiber required compared to conventional point-to-point Ethernet architectures, allowing operators to serve multiple premises using a single optical fiber cable. ZTE’s solution enables broadband operators to significantly limit their power consumption, achieving substantial cost savings and a reduced carbon footprint.

### Installation and maintenance
In order to meet carrier needs for broadband network development, operations, and maintenance, ZTE’s ZXDSL 9806H unit offers functions, such as remote maintenance tools that substantially improve organizational efficiency by reducing capital and human resource expenses.

### Applications
ZTE’s ZXDSL 9806H unit supports:

1) Residential broadband Internet access supporting a wide range of applications including online gaming and video-on-demand

2) Enterprise/commercial broadband Internet access services involving high quality of service (QoS) to support video conferencing, virtual private networks (VPNs) and time-sensitive voice over Internet protocol (VoIP) applications

### Conclusion
How to become a successful green company is a major global business concern. The market opportunities for green technology innovation are closely linked to changing government policies and incentive programs. Europe will continue to be a strong leader.

Although being green and complying to standards or regulations does bring additional cost, it provides new and valuable business opportunities within the global telecom market. To enter the Tier-1 carrier market, telecom equipment vendors must anticipate this trend and align themselves with their environmentally-aware customers to remain competitive.

For new players like ZTE, addressing environmental and energy efficiency issues are crucial to their expansion in the global market. Being green improves the public and industry image of telecom companies. Demonstrating a continuous commitment to environmental responsibility will be regarded as a key benchmark in the future telecom market.

In iSuppli’s case study of ZTE’s ZXDSL 9806H broadband product, it appears to provide an environmentally-friendly broadband equipment solution in terms of design, production, network optimization, installation and maintenance criteria. iSuppli believes that such green technology innovation will help ensure the international competitiveness of telecom equipment vendors.
HSUPA Solution Enabling a New 3G Experience

Zhu Junman

Ruth, a manager in a transnational corporation, is a busy professional woman. In the morning, on her way to the airport, Ruth joins a video conference to discuss the marketing strategy using her 3G handset.

Alice, a college freshman, plays the interactive game with her 3G mobile phone in the MTR.

Jenny, a happy bride, uploads beach wedding photos from her 3G mobile phone to her Blog, to share the romantic scenes with her friends.

What makes their 3G life so exciting? The answer is HSUPA, the next hot topic after HSDPA, which enables high uplink data speed, short service response time, and perfect user experience.

Features of HSUPA

As we know, 3GPP Release 99 (R99) offers a maximum speed of 384kbps, and then HSDPA defined in 3GPP R5 supports higher speed 3G services. But HSDPA only delivers improved downlink performance. HSUPA is introduced to improve uplink data speed and system efficiency. It can achieve a uplink peak data rate of 5.76Mbps, bringing a more satisfying user experience.
HSUPA is the enhanced uplink technology specified in 3GPP R6. With HSUPA, operators can provide more interactive and high-speed multimedia services, such as video conferencing, online games, email, DVD quality video, MMS. These flexible and powerful services can help telecom operators improve branding, develop more individual and enterprise users, and increase profits.

**Technical Principles of HSUPA**

**Similar to HSDPA**, HSUPA introduces new physical channels including E-DPDCCH, E-DPCC, E-AGCH, E-RGCH, E-HICH and two MAC entities, known as MAC-e and MAC-e. In order to support fast scheduling function at NodeB, the decentralized scheduling is moved from RNC to NodeB. With key technologies including Hybrid Automatic Repeat Request (HARQ), NodeB fast scheduling, 2ms short frame, and multi-code transmission, HSUPA improves the uplink service bearing capability and frequency utilization, greatly enhancing the network performance.

**HARQ**: HARQ is an error correcting technology, which can lower requirements on wireless channel quality, control uplink interference, reduce transmission delay, and increase uplink data transfer rate.

**NodeB fast scheduling**: With the introduction of decentralized fast scheduling at NodeB, user’s data transmission rate can be scheduled up to 2ms, based on channel conditions and cell loads.

**2ms short frame**: In HSUPA both 2ms short frame and 10ms frame are supported. The 2ms short frame length allows to minimize Round Trip Time (RTT) in the NodeB controlled HARQ, reducing the fast scheduling response time as well.

**Multi-code transmission**: E-DPDCCH supports multiple frequency spreading codes from SF2 to SF256, and multi-code transmission like 2xSF4, 2xSF2, 2xSF2+2xSF4, etc. By the use of multi-code transmission, HSUPA can increase the uplink data rate up to 5.76Mbps.

**Constructing a Perfect HSUPA Network**

HSUPA with multiple advantages is attracting an increasing level of interest. Combining HSDPA with HSUPA is quickly becoming the most popular UMTS evolutionary choice. HSPA-enhanced UMTS network will enable subscribers to enjoy more diversified and exciting services. Therefore, it is critical to study how to build a HSUPA network or how to upgrade the exiting UMTS network to HSUPA rapidly and at a low cost.

HSUPA is usually deployed on top of R99/HSDPA network on the same carrier, sharing cell resources such as power and codes with R99/HSDPA. It is necessary to evaluate the impact of HSUPA on the existing UMTS system. With patented HSUPA simulation tool, ZTE conducted research on the impact of HSUPA on the R99/HSDPA network when HSUPA and R99/HSDPA operate on the same frequency, and concluded that the introduction of HSUPA puts higher requirements on the upgradeability of power resource, baseband processor and other aspects of NodeB.

Since HSUPA adds a set of new physical channels and some MAC entities, it is required that the existing base stations can be upgraded to support HSUPA, to protect initial network investment while quickly responding to market requirements.

**ZTE’s HSUPA Solution**

As a leading provider of telecommunication solutions in industry, ZTE launched cost-effective, high performance end-to-end HSUPA solutions in 2006. It is worth mentioning that ZTE’s self-developed Radio Resource Management (RRM) algorithm solves the mutual influence problem that occurred during HSDPA/UPA simultaneous transmission at the highest possible rates.

Taking HSUPA into consideration, ZTE’s UMTS system was designed...
to support HSUPA and HSDPA. The baseband processing board in NodeB has special HSUPA processing module, which can handle HSPA and R99 services simultaneously, guaranteeing large HSPA throughput. Only a software upgrade is needed to support the migration path from HSDPA, to HSUPA and even HSPA+.

ZTE, based on its independently developed Doherty and DPD technologies, has developed 20W, 40W, 60W serial Power Amplifier (PA), meeting the requirements of R99/HSDPA/HSUPA multi-carrier networking. Meanwhile, the high efficiency PA can reduce power costs by 50% compared with traditional base stations.

To meet the development needs of UMTS networking, ZTE’s UMTS base stations support smooth expansion from 1 carrier to 4 carriers, which can help realize flexible R99 and HSPA networking on a single carrier, dual carriers or multiple carriers.

The 3GSS system, ZTE’s HSPA simulating platform released in 2006, can provide diverse HSUPA scheduling algorithms and support different HSUPA throughput configurations. It can implement performance simulation of various application scenarios like single-carrier networking or multi-carrier networking, providing the theoretical basis for HSUPA network deployment.

**Conclusion**

Attracted by the high performance of HSPA, more and more mobile operators are deploying or planning to deploy HSUPA/HSDPA network to deliver quality services to subscribers anytime and anywhere. ZTE, specializing in providing end-to-end solutions for operators, has launched the commercial version of HSUPA system and HSUPA terminals, helping operators build future-oriented 3G network.

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**Replacing Copper with Fiber**

When fixed operator’s voice business is declining, both China Telecom and China Netcom, China’s fixed-line operators, adopt the strategy of developing broadband services. With the approach of 3G, China is set to restructure its telecom industry. The existing fixed-line operators are pressed to build broadband access networks for future initiative.

Transmission bandwidth on copper lines is in inverse proportion to transmission distance. Thus, when optical broadband access network is being built, the copper cables will be reduced in length or avoided, that is, optical nodes should be placed as close to end users as possible. This is also called “replacing copper cables with optical cables”.

China Telecom takes “replacing copper cables with optical fibers” as an important measure to transform its network and improve its network operation and maintenance quality. This marks the change from the focus on narrowband voice based on copper cables to focusing on broadband data based on optical cables.

The actual application of replacing copper cables with optical fibers is fiber to the x (FTTx). According to where fiber ends, FTTx can be further categorized into: fiber to the home (FTTH), fiber to the building (FTTB), fiber to the node (FTTN). FTTH, which deploys an optical network unit (ONU) in the end user’s living or office space, is the closest to the end user among all FTTx solutions, and is the ultimate solution to broadband access.
Using CWDM for Optical Access Network

There are two solutions for replacing copper with fiber: using EPON or moving down Point of Presence (POP) like MSAG, MSAN and DSLAM. In these two solutions, the uplink traffic of EPON or POP increases greatly, and the bandwidth of the corresponding uplink interface is usually FE or GE.

The existing MSTP network is insufficient to process large-granule GE service, and with the increase of access bandwidth, the traditional STM-1/4/16 MSTP ring bandwidth is obviously inadequate for use. A good metaphor is that roads are available between towns and villages, so the bottleneck roads between towns and counties also need to be reconstructed.

The low-cost CWDM equipment is the best way to reconstruct and upgrade the existing transmission network access layer.

Figure 1 illustrates using CWDM to build the bear network of the transmission network access layer. After reconstructing the network with CWDM equipment, the existing GE and FE services are converged and carried via some CWDM wavelengths, while the original MSTP ring services are carried via a CWDM wavelength. The solution has the following advantages:

- IP over WDM, complying with the network evolution trend, simplifies the network hierarchy, avoids wasting resources at the SDH layer, and meets urban user demands for various services by utilizing the transparent CWDM and DWDM transmission.
- The transmission network access layer, built with high performance-cost ratio CWDM, features low initial investment and smooth upgrade. It can carry the original MSTP ring services via a CWDM wavelength, making full use of the original equipment.
- With the complete protection mechanisms and mature carrier-class applications of WDM network, the solution can meet urban user’s demands for high reliability and QoS, and has natural advantages in carrying Storage Area Networking (SAN) services in urban areas. It is an integrated platform for carrying NGN/IPTV/3G/VIP services.

Introduction to ZXMP M600

ZTE’s independently developed CWDM product, ZXMP M600, in strict compliance with CWDM international standards. It has the following characteristics:

High system integration

- An Optical Terminal Multiplexer (OTM) node formed by a CWU box (1U high) can implement the
bidirectional transmission on 4+1 wavelengths. +1 refers to 1310nm Optical Supervision Channel (OSC).

- An Optical Add/Drop Multiplexer (OADM) node formed by a CWU box (1U high) can implement the bidirectional transmission on 2+1 wavelengths.
- A CWU box (6U high) can implement the bidirectional transmission on 18 wavelengths at most.

**Powerful transmission and multiservice access**

ZXMP M600 supports a transmission capacity of 45Gb/s (2.5Gb/s×18), the highest in the industry. By performing O/E/O wavelength conversion, it converts the accessed optical signals into G.694.2-compliant wavelength signals for output. It can access services of different rates, including STM-1, STM-4 and STM-16, or services of continuous rates (12.5Mbit/s-2.7Gbit/s). It can also converge multiple services, for example, converge 2×10G into STM-16.

**Flexible networking**

It supports multiple networking applications including chain, ring and tangent ring. With a modular structure, it provides modular upgrade path and supports flexible add/drop of 1 to 18 wavelengths.

**Powerful protection**

It provides optical multiplex section 1+1 protection and optical path 1+1 ring protection.

**Complete supervision information transmission function**

It provides two pairs of OSC interfaces for 100Base-FX applications and two 10/100M Ethernet interfaces. The ETM board can also offer the electronic supervision channel. The OSC can transmit signals over a distance of 80 km.

**Flexible box design**

A CWU is 1U high (44 mm) and has 6 board slots. It can be mounted on desk or installed in the 19-inch IEC/ETSI cabinet at front or back. A CWE is 6U high (265.9 mm) and has 18 board slots. It can be installed in the 19-inch IEC/ETSI cabinet at front or back.

**Multiple power supply modes**

A CWU box supports -48V/-60V DC power supply or 220V (50Hz)/110V (60 Hz) AC power supply. A CWE box supports -48V/-60V DC power supply. Each box provides two power boards for 1+1 hot backup, ensuring reliable power supply of the system.

**Convenient maintenance**

Except the power and NCP boards, the boards for CWU and CWE support mixed insertion, hot swap, replaceable SFP optical module and front installation. The box fans support hot swap and front installation.

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**ZXMP M600 Application**

As Figure 2 shows, ZXMP M600 is applied to the transmission network reconstruction project for the fiber replacement project in a Chinese county. In this fiber replacement project, some access nodes in county network 1 and 2 need to deploy IPTV services, and use GE as DSLAM uplink interface, but the original MSTP network cannot meet such demands. After careful evaluations and tests, the ZXMP M600 was chosen for the transmission network reconstruction. In Figure 2, CWDM rings are built for county network 1 and 2, the original MSTP network transmits services via the CWDM network, and new services from DSLAM are directly converged to the local DWDM network via CWDM wavelengths. The network has been running smoothly since the operation.

When fixed operators are carrying out the fiber replacement strategy, CWDM becomes an important means to solve the bandwidth bottleneck in the transmission network access layer. ZTE’s CWDM equipment ZXMP M600, featuring large capacity, high...
Protection Technologies for Packet Transport Network

He Tingzong

Development Trend of Transport Network

IP has been the first choice for operators to constantly roll out new services and enhance their competitiveness. New services such as 3G, WiMAX, triple play, High Definition Television (HDTV), Video on Demand (VoD) and storage services are all delivered over IP-based network architecture. As the fast-growing carrier-class IP services pose higher requirements for existing transport networks, Packet Transport Network (PTN) will become the development trend.

Mainstream PTN Technologies

Two mainstream technologies are available for PTN: Transport Multi-Protocol Label Switching (T-MPLS) and Provider Backbone Transport (PBT).

T-MPLS

T-MPLS is a connection-oriented packet transport technology developed on the basis of IP/MPLS. It discards the complex control protocol stack defined by IETF, simplifies the data plane, removes unnecessary forwarding processes and connectionless features that are independent of transport, and adds layered transport network model, protection switching and OAM functions. Moreover, it defines a multitude of adaptation interfaces for client signals, enabling transport resource management and automatic service configuration through the Automatic Switched Optical Networks/Generalized Multi-Protocol Label Switching (ASON/GMPLS) control plane.

PBT

PBT is a technology developed on the basis of Ethernet switch that supports L2/L3/L4 processing. It enhances manageability and protection features, adds narrowband service emulation and clock functions, and offers powerful multi-service support capability. Furthermore, it disables traditional Ethernet functions such as MAC address learning, broadcasting and Spanning Tree Protocol (STP), and uses the management plane (or control plane in the future) to have full control over the Ethernet forwarding table.
Protection Standards

The PTN network is protected by the OAM mechanism of the transport plane, which offers sub-50ms protection switching capability. The network protection standards involve linear protection and ring protection, as shown in Table 1.

In terms of linear protection, T-MPLS supports trail protection and Sub-Network Connection (SNC) protection, while PBT does not support SNC protection; in respect of ring protection, T-MPLS supports wrapping and steering protection modes, while PBT does not support ring protection.

<table>
<thead>
<tr>
<th>Protection Technologies</th>
<th>T-MPLS</th>
<th>PBT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linear protection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>● Trail protection defined by the ITU-T standard</td>
<td>Constitution of ITU-T G.8131, G.8132</td>
<td>ITU-T G.8031, IEEE 802.1Qay</td>
</tr>
<tr>
<td>● SNC protection defined by the ITU-T standard</td>
<td>Constitution of ITU-T G.8132: 1:1 SNC Protection</td>
<td>No standard available yet</td>
</tr>
<tr>
<td>Ring protection</td>
<td>ITU-T G.8132: TM-SPRing (Wrapping and Steering)</td>
<td></td>
</tr>
</tbody>
</table>

Table 1 Protection standards for PTN

failure and signal degradation. For 1+1 bidirectional trail protection switching, Automatic Protection Switching (APS) protocol is required to ensure the selectors in both directions can select the same connection. In the 1+1 unidirectional trail protection switching, the APS protocol is not supported.

The 1:1 architecture only operates with bidirectional protection switching. The protection connection is also dedicated to each working connection. However, the traffic is selected by the bridge selector at the source side and transmitted either over the working or protection connection. The selector at the sink side selects the connection that carries the traffic. Since both the source and sink sides need to be coordinated to ensure that the selector bridge at the source side and the selector at the sink side select the same connection, the APS protocol is necessary.

● SNC protection defined by the ITU-T standard

The SNC protection (see Figure 2) defined by the ITU-T standard contains 1+1 and 1:1 SNC protection, supporting unidirectional, bidirectional, revertive and non-revertive modes.

The operating principle of the SNC protection is basically the same as that of the trail protection, and the only difference is that it can protect connections within the subnetwork and support flexible networking.

● Trail protection defined by the IEEE standard

The trail protection defined by the IEEE standard includes 1:1 bidirectional trail protection and 1:1 bidirectional trail protection (load sharing).
sharing), supporting unidirectional, bidirectional, revertive and non-revertive modes.

The 1:1 bidirectional trail protection uses the Connectivity Fault Management (CFM) OAM mechanism instead of the APS protocol. The protection switching can be triggered as soon as trail failure, such as alarm indication signal (AIS) and remote defect indication (RDI), is detected at either side.

For the 1:1 bidirectional trail protection in load sharing mode, when working and protection connections are in normal operation, the traffic is transmitted simultaneously over working and protection connections; in the event of a certain connection failure, the traffic can only be transmitted over the normal connection.

**Ring protection**

At present, T-MPLS can support T-MPLS Shared Protection Ring (TM-SPRing) protection, but PBT does not support ring protection.

The T-MPLS ring protection (see Figure 3) requires the completion time for protection against a single failure should be less than 50ms assuming a reference network with a 16-node ring and less than 1200km of transmission distance.

Similar to SDH Multiplex Section Shared Protection Ring (MS-SPRing), T-MPLS ring protection provides two protection modes: wrapping and steering. The wrapping mode is similar to normal SDH MS-SPRing, and the steering mode is similar to SDH cross-ocean protection switching.

**Wrapping mode**

When a network node detects a failure, the adjacent nodes at the two sides of the failure will send a switching request through the APS protocol to the opposite nodes in the far-end and near-end directions respectively. When the nodes receive the switching request, the traffic transmitted towards the failed span is switched to the opposite protection connection. After the failure is cleared, the traffic returns to the original working connection.

**Steering mode**

When a network node detects a failure, a switching request will be sent through the APS protocol to all nodes in the ring. For the affected traffic, each source service node performs switching from working to the opposite protection connection. After the failure is cleared, the traffic returns to the original working connection.

**Conclusion**

All protection technologies for PTN mentioned above can meet the requirements for carrier-class protection switching of less than 50ms. T-MPLS offers relatively more complete protection technologies than PBT. As an emerging carrier-class transport network, PTN is being perfected in technologies and standards, which will drive the growth of the relative network protection technologies.
ICT is the combination of information and communication technologies, emerging after the Internet convergence with telecom networks. It improves the work efficiency of enterprise, individual and government users.

The concept of ICT originated from British Telecom (BT), which defined the core value of ICT service as “with the convergence of CT and IT, ICT promotes fast information exchange transcending space and time”. IT focuses on the workflow or business process while CT focuses on information exchange and communication.

When enterprise customers increasingly require seamless connection between the Internet and telecom networks, they have an increasing need for service providers who can offer a reliable package solution covering network communication, IT, and business process management system.

ICT service does not provide enterprises with a simple communication pipeline or information channel, but an integrated service that combines network communication, manageable service, wireless data and voice, videoconference, application hosting, software and system maintenance, security, and outsourcing. It can be divided into three levels: network service, IT application, and consultation service.

With the rapid development of IP technology, new competitors enter the telecom service market successively; revenue from the traditional voice business declines or even drops; the traditional operators, especially the fixed network operators, have to seek a new service development path. When telecom operators extend their services into IT, their powerful telecom service capabilities, steady income, and global customer service branches will make them the best providers of ICT service. As ICT is coming of age, operators can build an ICT service operation platform from the following four aspects:

**Building a Carrier-Class Operation Platform**

For telecom operators, service is critical while a manageable operation platform is basic in providing enterprise with ICT services. In the traditional communication field, there are some operating indices such as service response time, service interruption time,
fault alarm, and automatic recovery. Therefore, telecom operators need to consider how to design the IT system based on telecom technologies, how to support large numbers of users, how to realize mass data storage and access, backup and disaster recovery, how to guarantee the safety of user data, and how to unify service standards.

ZTE proposes building ICT service management platform based on the Service Delivery Platform (SDP). It turns the vertical development model to the horizontal mode, allowing large-scale customization of ICT products through the standard product architecture and universal middleware platform as well as integration between services through the Application Program Interface (API). In this way, the operational performance, service security, and service reliability of the platform can be ensured.

**Selecting Simple and Practical Services**

Different customers, especially enterprise customers, have different requirements in development phases. The operator, when planning service, should subdivide the industry and the customer market, and select simple and practical services after fully considering its current manpower status.

According to enterprise development features, ZTE sums up three requirements of the enterprise: basic, development and management requirements. The basic requirement of the enterprise is establishing a stable and secure fundamental communications environment, which can help to extend sales channels and cut down office costs. Its development requirement is establishing an office environment to facilitate smooth internal and external communication so that satisfactory services can be provided to customers. When an enterprise develops to a certain degree, it requires solutions to its business operation problems with a reference to industrial standards or customized service, to realize smooth management.

Based on these requirements, ZTE has launched systems like enterprise service gateway, security gateway, online PC maintenance, intelligent office, sales expressway, CRM, and ERP interface platform. These products have a simple interface and is easy to operate and convenient to maintain.

**Choosing Stable Partners**

Equipment manufacturers, IT manufacturers, and service supporters are indispensable links along the ICT service value chain. Every value chain member must consider how to maintain long-term stable cooperation. For the operator, selecting a partner with big comprehensive strength is important.

As a leading telecommunications equipment provider in the world, ZTE has a deep understanding of telecom service. ZTE owns a carrier-class platform and a powerful IT team, and is transforming from a traditional telecom equipment manufacturer to a professional ICT manufacturer that can provide one-stop package spanning from platform and telecommunications equipment to software and service. ZTE would like to undertake risks together with operators, to lead the development of the ICT service industry.

Around the world, the connected economy has greatly changed business mode of the traditional telecom industry, and telecom operators are adopting strategies to transform into integrated information service providers. A batch of worldwide famous operators such as AT&T, BT and FT, have applied ICT service in numerous fields including government, energy and manufacturing, taking ICT service as a new revenue source.

ZTE entered the ICT service field in 2006. The company has found out a path for development and formed its unique advantages in the highly competitive environment by virtue of its rich experience in telecom technologies and IT system, a complete and balanced product line, and a powerful and effective market platform. ZTE now keeps good growth momentum. In the future, it will help operators fully utilize telecom pipelines including transmission network, IP backbone, core network, access network (wired and wireless) and terminals to develop information service covering various aspects such as individual/home, enterprise, government, education, and medical treatment. It will enable operators to integrate the value-added service industry chain and exploit the ICT service market.

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*ZTE TECHNOLOGIES*  
*July 2008*  
*21*
A CDMA Network Tailored to Local Conditions in Nepal

Kong Jia, Xiang Dongsheng

Nepal Telecom is the largest telecommunications operator in Nepal with over 2 million mobile subscribers.

In October 2004, ZTE was chosen by Nepal Telecom as the exclusive provider of a CDMA network that covers the entire country. Up till now, it has developed about 370,000 CDMA subscribers. The network provides services like voice, short messages and 1X data.

Tailored Transmission Solutions

Situated at the southern foot of the Himalayas, the Kingdom of Nepal is also known as a mountainous country that offers a varied topography. The adverse geographical conditions make it very difficult to build and run stably communications network in Nepal. Various transmission solutions should be worked out according to local conditions.

Nepal Telecom adopted A and Abis interface transmission solutions provided by ZTE’s CDMA system, to reduce its transport cost:

- In the densely populated valley cities such as the capital Katmandu, E1/T1 cables and fiber transport featuring stable performance and low prices were used.
- In the extensive rural areas and remote factories and mining areas, the flexible and convenient microwave transport was adopted.
- In the precipitous mountain regions of plateau, satellite transport was used for quick and wide coverage. Transport solutions customized for local conditions help to achieve full coverage at the lowest cost.

Micro Base Station and Solar Energy

The main requirements of Nepal Telecom are quick low-cost network deployment and high stable network performance.

Considering the mountain areas where the terrain is diverse and power supply is unavailable in some parts, Nepal Telecom chose to use a large quantity of ZTE’s micro base stations with small capacity and wide coverage, and solar energy in some areas. ZTE’s micro base stations feature small size, light weight, low power consumption, convenient installation and wide coverage. They support various transport modes and are resilient to adverse outdoor environmental conditions.

The solar power supply solution satisfies the power requirement of micro base stations without deploying power cables. Moreover, the solar power system, featuring short construction period, long life span and no pollution, effectively lowers operational costs for Nepal Telecom. The use of micro base stations effectively saves the costs of transport, engineering and maintenance; fulfils the operator’s goals of fast network construction at optimum cost and wide coverage; and solves the difficulty of voice communications in high mountain areas.

Rich Services for Tourists

Nepal is well known as one of the centers in the world for mountaineering expeditions. Mount Qomolangma, famous for its height, is located at the Sino-Nepal border. The sublime scenery of snow peaks attracts tourists from all corners of the world.

To cater to the requirements of network coverage and mobile services, Nepal Telecom implemented ZTE’s CDMA2000 1X integrated solution tailored to the terrain features of the snow mountain scenic area. The network, launched in July 2005, enables the operator to provide voice, intelligent networks, high-speed data and abundant CDMA wireless value-added services, completely satisfying the requirements of tourists from different countries and enriching their service experience.
Ethiopian Telecommunications Corporation (ETC), founded in 1894, has a time-honored history. As one of the earliest state-owned enterprises in Ethiopia, it is an integrated GSM/CDMA/PSTN operator. At present, ETC has 1.1 million mobile subscribers, 800,000 fixed line subscribers and 30,000 Internet subscribers, with a huge space for development in light of a population of over 70 million in Ethiopia.

In an attempt to cope with an expected increase of over 500,000 returned overseas subscribers, who would attend the Ethiopia Millennium Celebration on September 11, 2007, and to solve the problem of traffic congestion in current network, with strict auditing from a consulting firm, ETC decided to adopt the Millennium Solution, exclusively provided by ZTE, and the Turnkey construction model. The whole network was officially put into commercial use within less than 5 months from the end of April 2007, when the contract was signed, to September. The network operates stably, and has successfully passed the heavy traffic test in the Millennium Celebration, and won acclaim from ETC.

Based on the successful cooperation on the Millennium Project and by its profound understanding of ETC’s future plan, ZTE was awarded the Phase 2 expansion project to provide a future-oriented,
integrated GSM/CDMA/NGN solution for ETC, among which the total capacity of the GSM network exceeds 5 million lines. In this project, ZTE aims to achieve all-service operation and all-IP interconnection, helping ETC construct a future-oriented convergence network and service innovation environment and provide quality network service and rich multimedia services for end users.

**V3-Based Unified Hardware Platform Helps ETC Achieve All-Service Operation**

All-IP interconnection is a general trend of the development of core networks. The IP technology adopts the connectionless operation to simplify signaling and overcome the issue of complex node equipment, which can bear all existing services including voice service while greatly reducing the network construction cost. The IP transformation is also a service convergence requirement. At present, except the traditional circuit switched voice services, other telecommunications value-added services are all based on IP protocol. The IP transformation of IMS-based mobile networks has become a general trend. The ETC project in Ethiopia adopts the SIP-I protocol to enable the interconnection among different GSM/CDMA/NGN networks. This is the first large-scale commercial use of all-IP networking in the communication industry.

As an all-service operator, what ETC considers most important is how to operate all services, which inevitably requires complete fixed-mobile convergence in terms of networks and services. With the development and application of an architecture, where switching is separated from control in mobile and fixed networks, mobile Softswitch and fixed NGN will finally be able to deliver VoIP and multimedia services through the IMS architecture. The IMS-based fixed-mobile convergence core network can provide not only a unified and powerful service engine for various access networks, but also an open service environment to meet the requirements for seamless roaming of terminals in different networks and to truly achieve one-point access to all services.

With the above considerations, ZTE supplied ETC with GSM/WCDMA/CDMA2000/NGN core network equipment based on a V3-based all-IP unified hardware platform and the relative all-IP solutions in the Phase 2 contract.

The innovative V3-series all-IP unified platform developed by ZTE can be shared by WCDMA/CDMA2000/TD-SCDMA/NGN core network equipment and radio access products, which effectively reduces R&D investment and maintenance costs. At present, ZTE’s mobile Softswitch products based on the V3-series all-IP unified platform have been serving 200 millions subscribers across the world. Their stability and reliability are fully verified. The V3 series all-IP unified platform offers the following advantages:

- General-purpose boards with higher reliability, facilitating the evolution to all-IP network;
- Smooth evolution to IMS by software upgrade, maximally protecting the operator’s investment.

**All-IP Transformation of Mobile Networks**

The transformation from a traditional GSM/CDMA network to an all-IP mobile network is an arduous and complicated project. The large-scale commercialization of an all-IP mobile network and the fast deployment of a competitive and high-quality all-IP network require comprehensive considerations in terms of service network, core network, data communication network, transmission network, access network, etc. It is also an all-round test for the multiple technology control capabilities of operators and suppliers. With its profound accumulation in the mobile and IP fields, ZTE provides a complete all-IP mobile network transformation solution for mobile operators, helping them build all-IP integrated services network and maximize the profits of their mobile network architecture.

Through meticulous deployment and planning, ZTE divides the all-IP transformation of a mobile network into the following three steps:

Step 1: Achieve IP transformation of the core network by fully using the core network product series based on mobile Softswitch architecture. This IP transformation is not accomplished in one move. In the transformation from TDM to IP, ZTE provides a meticulous transition scheme to guarantee smooth evolution, effectively protecting the operator’s investment.

Step 2: Achieve IP transformation of the access network and implement unified access to 2G/3G networks.

Step 3: Achieve smooth evolution of the core network to IMS/FMC and provide rich access modes including WiMAX.

**Conclusion**

The success of the Phase 2 GSM project for ETC further consolidates long-term strategic partnership between ZTE and ETC. In April 2008, ZTE and ETC signed a supplementary contract for 1.2 million-line GSM core network. So far, the total capacity of ZTE’s GSM networks deployed worldwide has exceeded 6 million lines. ZTE will continue to cooperate with ETC, aiming to supply a total of over 10 million lines of mobile core network equipment.
Hyderabad, the fifth largest city in India and capital of the state of Andhra Pradesh, is located in the middle of India. With an area of 298.5 square kilometers and a population of 4.27 million, it is the main north-south traffic artery of India.

Research In Motion (RIM), TATA Teleservices Limited (TTL), Airtel and Vodafone are major carriers in the telecom market of Hyderabad, taking up 90% of market shares. The original CDMA network in Hyderabad is TATA’s first CDMA network in India that boasts a strong subscriber base. Before the swap, the network had over 200 Base Transceiver Stations (BTSs), up to 800,000 subscribers, and the traffic as high as 24,000 Erl in busy hours. The major problems with the network are frequent call drops, and occasional call failures caused by too many congested BTSs. In order to solve the problems in the network, TATA decided to cooperate with ZTE in rebuilding the CDMA network in Hyderabad due to the excellent performance of ZTE products and their all-round service.
Preparations for Network Swap
Smooth cutover

After the detailed discussion with TATA on how to swap and replace the original network, ZTE’s network planning and optimization project team proposed a secure network cutover plan. Before the official cutover, the project team conducted tests and analysis work on no load, 70% load and busy hours one after another, carried out a pre-cutover of the whole network, and achieved a good result, which gave TATA full confidence in ZTE’s final cutover plan. It took only one night for the project team to successfully swap out all 204 BTSs in the original network and accomplish a smooth cutover without any impact on existing subscribers.

Thorough optimization

After the cutover, the project team carefully analyzed the problems occurring in the original network and worked out solutions to them. Within two weeks after the swap-out, the special optimization team made a thorough optimization of the network. They used special tools, and it took them only two days to finish the optimization of over 40,000 adjacent cells in the network. The network performance indexes are significantly improved. In particular, the call drop rate decreases by 40%. Hence, the subscribers’ complaints about frequent call drops are better handled than previously.

Capacity expansion planning

In an effort to solve the problem of call failure in busy hours, engineers from ZTE and relevant staff in TATA carefully studied the causes, divided the planned BTS sites into different levels according to the information provided by TATA and the complaints from subscribers, and gave priority to planning and cutting over of the BTS sites in key areas.

As for the problem of heavy traffic and serious congestion in Hyderabad, if new BTS sites are chosen at the nearby places to share the traffic, the spacing between the sites is too small to result in a big waste of resources; if carrier frequencies are added to the original BTSs, too many inter-frequency handovers will be performed. To suit local circumstances, ZTE deployed the BTS type with 4 carriers and 6 sectors per rack, which can reduce the number of congested BTSs and bad cells by over 80% while increasing total traffic by 20%.

On the New Year’s Day of 2008, when the peak traffic for a single Base Station Controller (BSC) reached 19,000 Erl, TATA’s CDMA network still ran smoothly, whereas the networks of other operators were almost paralyzed by the shock of the large traffic. So far, ZTE has helped TATA basically solve the problem of call failure in busy hours.

Improved Network Quality

In the first half of 2008, the project team keeps improving network performance indexes through daily optimization work. With the increase of new BTSs that are put into service, TATA received less network complaints from subscribers. In terms of key performance indicators (KPI), the new network has distinct advantages over the original one (see Table 1). In addition, ZTE has also built profound friendship and trust with TATA.

In the 2008 annual network quality appraisal conducted by third-party assessment institutions, TATA’s CDMA network built in Hyderabad scored higher than its rivals, ranking first in quality. TATA expressed its appreciation to ZTE’s network planning and optimization project team, and highly recognized their technical expertise and professional accomplishment.

<table>
<thead>
<tr>
<th>KPI</th>
<th>Original BSC1</th>
<th>New BSC1</th>
<th>Original BSC2</th>
<th>New BSC2</th>
<th>Original BSC3</th>
<th>New BSC3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Erlang Usage</td>
<td>10562.4</td>
<td>10920.6</td>
<td>5582.03</td>
<td>5588.8</td>
<td>11185.5</td>
<td>11733.6</td>
</tr>
<tr>
<td>Call Success Rate</td>
<td>97.94%</td>
<td>98.44%</td>
<td>94.79%</td>
<td>98.94%</td>
<td>98.03%</td>
<td>98.75%</td>
</tr>
<tr>
<td>Call Originating Success Rate</td>
<td>98.15%</td>
<td>98.39%</td>
<td>94.50%</td>
<td>98.45%</td>
<td>98.18%</td>
<td>98.30%</td>
</tr>
<tr>
<td>Call Terminating Success Rate</td>
<td>96.92%</td>
<td>99.80%</td>
<td>94.73%</td>
<td>99.77%</td>
<td>96.55%</td>
<td>99.73%</td>
</tr>
<tr>
<td>Call drop rate</td>
<td>0.54%</td>
<td>0.29%</td>
<td>0.40%</td>
<td>0.26%</td>
<td>0.48%</td>
<td>0.30%</td>
</tr>
</tbody>
</table>

Table 1: A comparison of KPI before and after the network swap-out.
Introduction to GoTa Terminals

Zhou Zhuming, Ling Yong

GoTa terminals are trunked radio terminals, independently developed by ZTE, that enable abundant and professional trunked radio services. Since 2003, ZTE has developed several generations of GoTa terminals, which are applied to various fields in radio trunked communications and satisfy the requirements of different users.

Based on different market segments, ZTE clearly defined two development trends for GoTa terminals: professional GoTa terminals and consumer GoTa terminals.

Professional GoTa Terminals
With its experience accumulated in developing ordinary consumer handsets, ZTE has launched several professional hand-held terminals, offering multiple choices to GoTa users.

G600 series
The G600 series is waterproof, dustproof and shockproof to the IP54 standard, meeting the trend of

<table>
<thead>
<tr>
<th>Item</th>
<th>Professional GoTa Terminal</th>
<th>Consumer GoTa Terminal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Large size, similar to an interphone</td>
<td>Small and portable, similar to a CDMA handset</td>
</tr>
<tr>
<td>IP Grade</td>
<td>Waterproof and dustproof (IP54) Vibration resistance conforms to the U.S. military standard</td>
<td>No requirements for any resistance against water, dust and vibration</td>
</tr>
<tr>
<td>Functionalities</td>
<td>Full GoTa functionalities</td>
<td>Simplified GoTa functionalities</td>
</tr>
<tr>
<td></td>
<td>Support user-defined groups</td>
<td>Support user-defined groups</td>
</tr>
<tr>
<td>Target Users</td>
<td>Enterprise users such as frontline workers in a complicated and changeable working environment Government departments such as military, police and security forces Users that have the “analog to digital conversion” requirements</td>
<td>Enterprise users having no special requirements for handset application environment Fleet users working at the management level Trend-oriented consumers</td>
</tr>
<tr>
<td>References</td>
<td>TETRA-based private mobile radio handsets Professional iDEN-based public access mobile radio handsets</td>
<td>Common iDEN-based public access mobile radio handsets</td>
</tr>
</tbody>
</table>
professional trunking communication. Its target users are government agencies, public institutions, and enterprises that need trunking as well as voice communications.

With candybar style, reliable quality and complete functions, the G600 terminals are well received by users, becoming the dominant products in the trunking communications market. Their functions and performance are constantly improved as the GoTa technology is getting more and more mature.

G5100 series
The G5100 series is the first professional trunking terminal applied in the European market. With the shape and style customized for European operators, it incorporates the GoTa technology and delivers professional trunking functions.

G612 series
As the GoTa market expands, users are segmented into different groups. To satisfy the requirements of frontline personnel, ZTE developed a new generation of G612 professional interphone series. Its target users are frontline workers and management staff who use interphones as their working tool, especially enterprises and public institutions that have the “analog to digital conversion” requirements.

The G612 series is simpler in appearance and functions than the G600. It weakens the voice call function and enhances the trunking function. The G612 has graphic interface and is easy to use.

G652 series
The G652 series, an enhancement of the G600 series, provides two models operating at 800MHz and sub-800MHz bands. Meeting the IP54 standard for water and dust resistance, the G652 adopts advanced 13-pin audio/data interface and is receptive to the standard fittings of other professional vendors. It has a replaceable antenna, a 0.5W speaker with 36mm in diameter, and portable back splint.

G780 series
The G780 series includes several models operating at 800MHz, sub-800MHz and 450MHz A/B/L bands. Being a major breakthrough in the professional trunking terminal market, the G780 has gained popularity from government departments such as military, police and security forces. It provides 3800mAh lithium battery supporting 10 to 12 hours of continuous use; a convenient knob design for group selection and volume control; waterproof and dustproof to the IP54 standard; vibration resistance compliant with the U.S. military standard MIL-
STD 810 C/D/E/F; new UI design with user friendly and easy to use features; and optional Global Positioning System (GPS) function.

**VJ800 vehicle-mounted station**

Vehicle-mounted products are not only an important part of a GoTa trunking system but also a strong link in the GoTa terminal industry chain. They are mounted on automobiles, ships and other transportation vehicles, providing the same or higher-level trunking services than handheld terminals.

The VJ800 vehicle-mounted station provides the basic trunking call functions and weakened voice call functions. It has been extensively applied in ports and transportation sections, winning a favorable reception from users.

**Consumer GoTa Terminals**

Consumer GoTa terminals are designed for professional trunking users working at the management level, enterprises and public institutions that have no special requirements for handset application environment, service industry including restaurants and hotels, and fashion-seeking youngsters. These users occasionally or often use their handset terminals for professional trunking services in addition to general voice communications, but they have no strict requirements for the application environment.

Featuring fashionable CDMA handset appearance, these GoTa consumer terminals support easy Push-To-Talk (PTT) function in addition to telephony, short message and data functions. Moreover, they come with a built-in FM stereo radio, camera, MP3 and external memory card, supporting GPS, BREW and WAP applications.

**Conclusion**

As the GoTa system is being gradually popularized, the number of GoTa users continues to grow. With its rich experience in the field of trunked radio communication, ZTE has been committed to meeting the needs of customers and it will develop varieties of GoTa terminals with firm structure, stable performance, friendly interface, complete functions, and advanced features.
If real-time route and high-speed data is important, GoTa is vital.

GoTa™ from ZTE is the world’s first CDMA-based system.

Now, ZTE proudly introduces its third-generation digital trunking system featuring a centralized dispatch, data transmission and positioning management function that massively improves work efficiency in operations like ports, container terminals and airports.

GoTa™ now also offers higher data bandwidth, bigger capacity, broader coverage, and better voice quality. In addition, you benefit from significantly lower equipment, terminal and operations costs.

To date, ZTE has deployed GoTa products in more than 20 countries.

Now, we are ready to serve you. ZTE is a leading global provider of telecommunications equipment and network solutions.

We deliver innovative, custom-made products and services to customers in more than 136 countries, helping them achieve continued revenue growth, while shaping the future of the world’s communications.

Please visit www.zte.com.cn or contact your local ZTE office to know more. Welcome!