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Rising Against All Odds

—An interview with Zhao Xianming, Senior Vice President of ZTE Corporation

10G EPON Industry Ready for Take-Off

The 10G EPON industry chain has entered a rapid development stage with operators, equipment vendors, chip vendors and optical module manufacturers all actively helping to push the R&D of this technology.
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ZTE Announces 2009 Interim Results

Frost & Sullivan: ZTE Holds 1/4 Global CDMA Network Market Share

Frost & Sullivan: ZTE to Become Top 3 Global GSM Vendor in Newly Added Markets in 2009

Gartner: ZTE is “Top 3” Global LTE Network Infrastructure Vendor

ZTE Leads Data Card Industry with Impressive 366% Growth

ZTE Wins Contract to Build Commercial UMTS Network in Belarus

ZTE HSPA+ MIMO Solution Ready for Large Scale Commercialization

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Smooth Evolution of EPON to 10G EPON
With the rapid growth of the EPON standards and industrial chain, 10G EPON shows a promising potential for future applications

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The 10G EPON industry chain has entered a rapid development stage, with operators, equipment vendors, chip vendors and optical module manufacturers all actively helping to push the R&D of this technology

Backhaul over EPON Solution for Full Service Operation
ZTE’s backhaul over EPON solution helps operators carry out full-service operation by offering a fast-to-deploy, secure, effective, and low-TCO path towards fixed-mobile convergence

ODN—The Key to FTTx Network
Effective ODN design brings billion dollars delivery game and optimizes the TCO
CONTENTS

Third Eye

FTTx Experiences New Growth
In the 2009 Chinese telecommunication market, FTTx, as one of the two hot investment spots, has become a powerful means to advance the network convergence

Mobile Market Moves ZTE
Mobile equipment sales help ZTE continue to defy gravity as the networking equipment vendor reported revenues of RMB27.7 billion ($4.05 billion) for the first half of 2009

ZTE Q2 Net Jumps on 3G Network Buildout
ZTE posted a 41.9% rise in second quarter net profit, boosted by huge spending on 3G networks by the country’s three telecom carriers

Case Study

ZTE Provides Reliable Power Supply for Telekom Malaysia
ZTE performs a miracle for TM to save more than 35% TCO while ensuring stable and reliable power supply

Research Note

Dynamics of Messaging World
With the escalation of competition among operators, messaging services have become one of the tools to attract masses

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ZTE Profile
ZTE is a leading global provider of telecommunications equipment and network solutions. It has the widest and most complete product range in the world—covering virtually every sector of the wireline, wireless, service and terminals markets. The company delivers innovative, custom-made products and services to over 500 operators in more than 140 countries, helping them achieve continued revenue growth and shape the future of the world’s communications.
ZTE Announces 2009 Interim Results

Strong increase in revenue drives ZTE’s growing global market position

ZTE announced on August 20, 2009 its interim results for the day ended 30 June 2009. Based on ASBEs and HKAS, ZTE recorded a revenue of RMB27.71 billion in the first half of 2009, representing an increase of 40.4% against the same period of 2008. Net profit was RMB780 million. Basic earnings per share were RMB0.45.

During the reporting period, benefited by the full-scale construction of 3G networks in China, ZTE reported operating revenue of RMB14.95 billion in the domestic market, representing a year-on-year growth of 111.7%. The company’s wireless products delivered expected performance in the network tenders of China Unicom and China Telecom and significant breakthroughs were achieved in major coastal provinces that are more prosperous riding on the cost advantages and customization capabilities.

From the international market, ZTE made revenue of RMB12.76 billion, up by 0.7% year-on-year and accounted for 46.0% of its total operating revenue. 2G network construction and capacity expansion in key markets in developing countries and growing demand for bandwidth upgrades and innovative services in developed countries have been the force behind steady growth of the company’s international market. The ever stronger cooperation between ZTE and mainstream global carriers has presented the company with opportunities for expanding its market in both depth and width in the future.

On the product front, ZTE recorded year-on-year revenue growth of 46.2% for carriers’ networks, 29.8% for handset products and 29.2% for telecommunication software systems, services and other products during the reporting period.

ZTE puts about 10% of its revenue to R&D every year. During the reporting period, the company’s R&D cost grew by 58.2% year-on-year, which was higher than the rate of revenue growth. Selling and distribution cost and administrative expenses also grew, by 21.4% and 21.0% respectively, whereas financing expenses was down by 8.6%, which is slower than the rate of revenue growth. These figures indicated the emphasis of the company on R&D and that it managed to improve management of its operations.

Mr. Hou Weigui, Chairman of ZTE, said, “We will seek to consolidate our businesses with the three leading China’s carriers on the back of our initial market shares in the domestic 3G sector. Meanwhile, we will seek to maintain our competitive edge in the international market and focus on large, populous countries as potential emerging markets. We will also strengthen cooperation with key strategic carriers in high-end markets such as Western Europe and North America to unfold further opportunities for cooperation with top-tier global carriers, in response to upgrades of communications technologies taking place in developed countries/regions and changes in the competitive scenario for global suppliers. We will continue to implement the strategies of differentiation and cost leadership in the second half of the year, seeking to pursue stable development and deliver sound results by enhancing project-based operations and extending our advantages in cost and technology as well as our ability in one-stop project delivery.”

(ZTE Corporation)
Frost & Sullivan: ZTE Holds 1/4 Global CDMA Network Market Share

Company is expected to be the leading CDMA network supplier by next year

ZTE recently announced that it has been ranked as the second largest global CDMA network supplier with 25% market share by Frost & Sullivan, the world’s leading consulting firm. In its recently published research report entitled “Global CDMA Network Market and Provider Competition Analysis”, Frost & Sullivan also anticipates that ZTE will become the No.1 provider in the worldwide CDMA network market by obtaining 29.3% global market share by 2010.

According to the report, which tracked up to 2Q09, Alcatel-Lucent and ZTE were the top two vendors leading the world’s CDMA network market with 30.1% and 25% accumulated market share by capacity respectively. The two companies are considered top tier suppliers. Tier 2 and 3 CDMA vendors worldwide include those with less than 20% market share.

In the recent years, CDMA market has been growing fast in Asia and China’s CDMA equipment vendors are performing outstandingly in the industry. ZTE has demonstrated strong performance throughout the Asia Pacific region, especially in China and India. China and India’s CDMA subscribers account for more than 30% of the world’s total CDMA user population. ZTE’s CDMA market share in India and China is 35% and 41.5% respectively as of 1Q09.

For its excellent achievement in the CDMA market, ZTE’s next stage target is to realize market breakthrough in the U.S. and other large-scale, high-end CDMA markets. The Frost & Sullivan’s analyst cites ZTE’s technology advantage in EV-DO Rev.B as an opportunity to further expand CDMA and LTE dual-mode network construction opportunities, and to strengthen its supply of CDMA terminal equipment to the worldwide market.

(ZTE Corporation)

Frost & Sullivan: ZTE to Become Top 3 Global GSM Vendor in Newly Added Markets in 2009

The company’s GSM equipment shipments achieve the fastest growth in the industry

ZTE continues to garner significant recognition from international and independent research firms. Frost & Sullivan, the well-known industry research firm, in its Global GSM Market Analysis report, predicts that ZTE will be one of the top three global GSM vendors in newly added markets in 2009.

According to the report, GSM and UMTS are still dominating the global mobile communications market, accounting for 83.5% of global mobile communications subscribers. GSM shipments attained a high level of 3.5 million carrier frequencies in 2008, with the slight slow-down from 2007 being largely attributed to the global financial crisis and 3G market growth.

In terms of all new carrier frequency shipments, Ericsson, Huawei, Nokia-Siemens, ZTE and Alcatel-Lucent accounted for 31%, 27%, 16%, 15% and 9% of the global market respectively in 2008, while the remaining vendors took up 2% of the market share. Statistics indicate that despite a slowdown in GSM network establishments in the worldwide market, ZTE has nevertheless registered fast GSM shipment growth for three consecutive years. With a compound annual growth rate of 120% in the past three years, ZTE’s GSM equipment shipments have been the fastest amongst industry players. The report predicts that ZTE will overtake Nokia-Siemens to become one of the top-three global GSM equipment vendors in 2009.

(ZTE Corporation)
Gartner: ZTE is “Top 3” Global LTE Network Infrastructure Vendor

ZTE has been named a “Top 3” LTE network infrastructure vendor by Gartner, the world’s leading information technology research and advisory company. In its latest industry report, “Dataquest Insight: Scorecard for Vendors of Long Term Evolution Network Infrastructure,” Gartner uses an item-by-item rating method to comprehensively evaluate the performance of global LTE vendors.

Gartner divides market performance into seven criteria including: Product or Service, Market Understanding, Offering/Product Strategy, Geographic Strategy, Sales and Marketing Strategy, Market Responsiveness and Track Record. In addition, the report also employs a 5-level rating for each criterion to review the major telecom equipment vendors, including Alcatel-Lucent, Ericsson, Huawei, Nokia Siemens Networks and ZTE and among others. ZTE rated as a strong performer, was at the top of list in “Geographic Strategy” and has zero “Risk” rating.

According to Gartner, ZTE is a strong player in the LTE industry with a quality product portfolio and a growth strategy that is both prudent and sustainable. ZTE is continually improving its marketing and business reach outside of China, while also strengthening its regional market presence, as Asia/Pacific offers good growth opportunities for mobile infrastructure vendors. In addition, its strong financial position has allowed it to maintain its R&D spending at 10% of revenue.

The report also forecasts that 70% of UMTS vendors will gradually upgrade to HSPA+ and LTE, and that most CDMA operators will choose LTE.

(ZTE Corporation)

ZTE Leads Data Card Industry with Impressive 366% Growth

7 million units shipped in H1

ZTE announced on August 25, 2009 the sales of its Data Card have topped 7 million in first half year of 2009, representing an increase of 366% compared to the same period last year, the fastest growth amongst all manufacturers.

ZTE rapidly expanded its leadership in the Data Card market last year, with cumulative sales of more than 10 million in 2008 and 426% year-on-year growth—a second place position in the global market. This momentum laid a solid foundation for the company to achieve its goal of capturing 30% of the global Data Card market in 2009. With its ongoing expansion in overseas high-end and emerging markets, ZTE continues to showcase its considerable strength and competitiveness in data card products.

In addition to strong partnerships and a wide range of cooperation with the three major operators in China, ZTE received 40% of its data card sales revenue in 1H09 from developed countries in North America, Europe and Japan, attributable to delivery of high quality products to meet growing and advanced market needs.

ZTE recently received Data Card orders from T-Mobile, a division of world-class operator Deutsche Telekom, and WILLCOM, the 4th largest operator in Japan. In July, Telenor Group in Norway signed an agreement with ZTE to purchase USB Data Cards in the next 12 months. In addition, ZTE and COSMOTE, the largest mobile operator in Greece, have jointly introduced the world’s fastest-download 3G Data Card, MF662, to the Greece market.

(ZTE Corporation)
ZTE Wins Contract to Build Commercial UMTS Network in Belarus

Turkcell subsidiary “life:)” to deliver HSPA+ data services over new SDR network

ZTE has signed a contract to build a commercial UMTS network in Belarus for the Byelorussian Telecommunication Network (BeST) subsidiary of Turkcell, the third largest European mobile operator. The UMTS network will serve mobile service operator life:), the trading name for BeST.

The UMTS network will provide fast network access to life:) subscribers and enhance user 3G services experience. In addition to voice communication, life:) provides its subscribers with SMS and MMS services, GPRS and EDGE data transfer services. The life:) network will use ZTE’s industry-leading SDR solution to deliver high speed HSPA data services and enable an easy evolution to LTE.

“The UMTS network that we are working with ZTE to construct will enable life:) to continue its rapid expansion in the Belarus mobile market by helping us deliver high quality, high-speed data services to our subscribers,” said Mr. Ozcan Ermis, life:) CEO.

“This contract with Turkcell, a major European cross-border operator, is an important step forward in ZTE’s UMTS product utilization and exposure in Europe,” said Mr. Zhu Jinyun, Senior Vice President of ZTE Corporation. “It follows many other recent UMTS contract wins that ZTE has already executed on to the high satisfaction of our customers.”

ZTE is committed to the development of UMTS and LTE. The company has been playing an active role in supporting the industry by providing UMTS solutions to worldwide markets including Hong Kong, Romania, Estonia and Turkey.

Since late 2008, ZTE has partnered with some of the world’s leading telecom operators to establish UMTS networks, including Hong Kong mobile operator CSL Limited, China’s Unicom, Turkey’s third largest operator AVEA, and Vietnam’s largest operator Viettel.

(ZTE Corporation)

ZTE HSPA+ MIMO Solution Ready for Large Scale Commercialization

28.8Mbps download speed achieved in testing

ZTE announced that it has completed the Inter-Operability Test (IOT) of its 3GPP R7-based HSPA+ MIMO solution, conducted in conjunction with mainstream terminal chip platform manufacturers, in July 2009.

ZTE’s MIMO solution, realized with its SDR-based next-generation base station, has reached a theoretical speed limit of 28.8Mbps in both cable connection and wireless environment tests. The trials included data download services for User Datagram Protocol (UDP) and File Transfer Protocol (FTP), as well as various IOT item tests. All the test results indicated stable and fast data download performance. The successful IOT testing confirms that ZTE’s MIMO solution is now ready for large-scale commercial deployment worldwide.

“ZTE’s HSPA+ MIMO solution shows our lead performance in the industry with its capacity for large-scale commercialization,” said Zhang Jianguo, General Manager of ZTE’s UMTS/LTE products. “We look forward to collaborating with global operators to introduce this state-of-the-art technology to fulfill market needs for next-generation mobile communication.”

As a key player in the industry, ZTE has made numerous breakthroughs in the UMTS industry in recent years. It aims to drive innovative technology development with significant R&D investments in advanced HSPA+ and LTE technologies. To date, ZTE’s UMTS/HSPA+ commercial solutions have been widely adopted in more than 30 countries and regions around the world.

(ZTE Corporation)
Rising Against All Odds

—An interview with Zhao Xianming, Senior Vice President of ZTE Corporation

Zhao Xianming has been Senior Vice President of ZTE Corporation since 2007, responsible for management of the company’s wireless infrastructure business. He served as Vice President of ZTE Corporation and General Manager of ZTE CDMA Division from 2004 to 2006. He joined ZTE CDMA Division in 1998 and worked successively as CDMA1X BSS Product Manager and ZX3G 1X Product Manager. As a founder and manager of ZTE’s CDMA projects, Zhao Xianming has made great achievements in the R&D and management of CDMA products, and led a successful global market exploration.

Wu Jie

Under the current financial crisis, there are two different phenomena in the telecom industry: On the one hand, oversea telecom operators are difficult in financing; on the other hand, China’s telecom operators are vigorously constructing 3G networks. Recently, the journalist of ZTE TECHNOLOGIES interviewed Zhao Xianming, Senior Vice President of ZTE Corporation, to find out how ZTE achieves a leap in development under the two totally different circumstances.

Journalist: First of all, could you tell us about the global wireless market, ZTE’s market share and its product strategy?

Zhao Xianming: Our wireless business has grown rapidly despite the global financial crisis. As we predicted, the financial crisis brings more opportunities than challenges to ZTE. Under the current financial crisis, telecom operators in the developed countries become more concerned about their OPEX. By selecting vendors with cost advantage, these operators can maintain their competitive edges. Meanwhile, the developed countries are auctioning new frequency bands, including AWS, 700MHz, and DD. They also encourage market competition to promote further development in wireless broadband networks. The
By the first half of this year, ZTE has ranked first globally for its growth in CDMA base station shipment volume; kept the largest share of China Mobile’s third round of tenders for TD-SCDMA equipment; maintained a 90% growth in volume shipments of its GSM products... By 2011, ZTE is expected to be among the top 3 global vendors of wireless infrastructure equipment.”
emerging markets, such as China, India, and Indonesia, are relaxing control over frequencies and speeding up issuance of 3G licenses. Opportunities in these markets can effectively accelerate the growth of ZTE.

By the first half of this year, ZTE has ranked first globally for its growth in CDMA base station shipment volume; kept the largest share of China Mobile’s third round of tenders for TD-SCDMA equipment; maintained a 90% growth in volume shipments of its GSM products; found large scale deployment of its UMTS products due to the benefit from China’s 3G kickoff and China Unicom’s WCDMA tender; tallied impressive growth in its WiMAX commercial deployments. By 2011, ZTE is expected to be among the top 3 global vendors of wireless infrastructure equipment.

Currently, ZTE’s wireless products have been widely applied not only in global emerging markets but also for many leading Multinational Telecom Operators (MTOs), such as Etisalat, SingTel, Telisionera, Telenor, Maxis, and Turkcell. The strategies for breakthroughs with high-end markets we are now implementing will further optimize our position in the global wireless infrastructure market as a leading global provider of wireless equipment.

J: According to CCID’s 3G market report, ZTE leads among all vendors that have supplied 3G equipment in China. Could you comment on ZTE’s performance in the 3G market from the perspective of global 3G network construction?

Zhao: ZTE has gained the largest share in China’s 3G market for its focus on customers’ requirements, sincere cooperation with three major telecom operators in China, and long-term adherence to product and solution innovations. From the global perspective, as the 3G technologies are evolving constantly, the 3G networks deployed in the early period fail to deliver good service experience to 3G data subscribers due to high licensing cost, immature industrial chain, and low data rates. As a result, the service requirements of the subscribers cannot be satisfied.

Over the last two years, we have seen a boom in deploying HSPA/EV-DO networks worldwide. Reasonable tariff, higher bandwidth and data rates, and diversified terminals have greatly facilitated the global construction and upgrade of 3G networks. The UMTS networks constructed in the early period fail to be smoothly upgraded into HSPA+, and the conventional GSM systems have been running for more than 10 years, making network maintenance very costly for operators. Therefore, a major challenge facing the operators is how to make coexistence of multi-band and multi-mode wireless networks possible on a long-term basis and upgrade them smoothly.

To meet the challenge, ZTE has launched its SDR products that can allow the network convergence, backward compatibility, and evolution to HSPA/LTE based on the same base station platform. This innovative SDR solution has been highly recognized by global leading operators and widely applied in networks of China Mobile, China Unicom, China Telecom, Hong Kong’s CSL, India’s Tata, Indonesia’s Telkomsel, Vietnam’s Viettel, and Turkey’s Avea and Turkcell. Meanwhile, this solution has also attracted attentions from Vodafone, Orange, and Telefonica.

J: The bidding result for China’s 3G equipment procurement shows that China’s home-grown equipment vendors have changed their market share in the 2G era. What are your comments on the changes?

Zhao: China’s 3G market share can also reflect future global market share of wireless products. In the 2G era, ZTE lagged behind the leading telecom operators. However, we can change our market share through hard-working and innovations, focus on customers’ requirements, and rapid response to their demands. The recent 10 years of wireless network development shows that the competition for market share among equipment vendors is very fierce and only those who continually reduce equipment costs, make innovations, and create revenues for operators can survive the competition.

J: What do you think of the existing 3G industrial chain? Are there any suggestions for its improvement?

Zhao: We are ushering in a colorful 3G era that everyone has been waiting for. 15 years ago, Internet seemed strange to us, but now it is a necessity in our daily study and work. What the 3G brings to us are not specific services but changes to our way of living. In other words, 3G can bring about mobile Internet. The changes in our way of living need the coordinated efforts of the overall industrial chain, including infrastructure equipment vendors, terminal vendors, service providers, and chip vendors.

Currently, low-cost data cards and the netbooks embedded with data cards are sold very well, which indicates the end users are enthusiastic about mobile Internet services. Additionally, 3G data
services, including mobile searching, mobile payment, VOD, and combined multimedia and location services, should be further enhanced. However, there are fewer chip suppliers to 3G terminals than 2G terminals, and there is much room for enhancements in feature-rich functionalities. Due to the difference in business models adopted for data services and voice services, operators have higher requirements on the cost of 3G terminal chips.

J: ZTE’s achievements in the wireless market are widely recognized. What are the main competitive edges of ZTE?

Zhao: Our competitiveness mainly lies in cost leadership and continuous innovation. ZTE has always been devoted to reducing product cost. We provide solutions to reduce the customers’ TCO, helping them alleviate the pressure arising from the ever-increasing TCO and gain long-term competitive edges.

Reducing OPEX has been a major concern of leading telecom operators competing for markets of developed countries. By applying our SDR base station solution, we have helped CSL, Hong Kong’s leading mobile operator, implement a successful network convergence, which greatly reduces its OPEX. The important measure for cost reduction is to adopt a convergent platform. Due to the uncertainty of current technical development trend and the coexistence of multiple technologies, ZTE put forward an convergent platform solution: At the wireless side, multiple wireless systems are converged using the SDR base station solution that can reduce the risks of several upgrades and uncertainty in evolution and thus reduce TCO on a long view; at the core network side, a unified platform can be used to realize the transition from TDM-based to IP-based service bearing and satisfy the needs for full-service operation and Fixed Mobile Convergence (FMC).

Additionally, we have kept on innovating to maintain our competitiveness in the wireless infrastructure equipment sector; made continual investments into R&D, especially the R&D of SDR base stations, LTE, next generation core network, mobile backhaul, and service platforms; and based our innovations on maximizing customers’ values.

In recent years, ZTE has made successful innovations in the wireless business segment: In the first phase of China Mobile’s TD-SCDMA project, ZTE launched its industry-leading distributed RRU+BBU solution; in the second phase of China Mobile’s TD-SCDMA network expansion project, ZTE rolled out its innovative TD-HSPA MX technology that can double cell throughput by software upgrade and considerably improve user experience; ZTE announced its world’s first commercial SDR base stations, with global shipment topping 100,000 units; ZTE deployed its first 2.5G commercial WiMAX network for SingTel.

J: Finally, would you please tell us ZTE’s strategies for future development of its wireless infrastructure equipment?

Zhao: ZTE has been closely following the 3GPP and NGMN standards, and making the evolution roadmap together with global leading telecom operators. It is generally agreed in the industry that wireless networks will evolve to LTE in the future. As a telecom equipment vendor, ZTE is not only concerned about technologies and standards, but also considers how to select a desirable platform to help operators reduce their TCO.

Different from the traditional 2G/3G networks, LTE is a highly-flattened network that involves new mobility management and SON techniques. The deployment of LTE is a long-term process, and the future LTE will coexist with 2G/3G networks on a long-term basis. The deployment of LTE starts from the hot areas with strong requirements for high-speed data services. ZTE’s SDR base station solution features excellent forward compatibility (CDMA/GSM/UMTS/HSPA/TD-SCDMA) and excellent backward evolution capability. We are lucky to be selected by Telstra as a partner to implement network convergence for Hong Kong’s CSL based on our SDR platform that allows smooth upgrade to HSPA+ or LTE via software without any change to the hardware platform and thereby reduces TCO significantly.

Moreover, we have made outstanding achievements in FDD-LTE and TDD-LTE; and the related products are also developed on the basis of SDR base station platform. We believe that ZTE will offer global operators better LTE upgrade and evolution solutions.
Smooth Evolution of EPON to 10G EPON

Wang Lei

With the development and popularization of high-speed bidirectional broadband services such as high definition TV, video communication, video monitoring, network gaming, Internet surfing and VoIP, the access bandwidth of users is under tremendous challenges.

According to the access bandwidth plan for FTTx users by telecom operators, the downlink bandwidth per user is expected to reach 20–30Mbps in 2010 and 50–100Mbps after 2010. The current EPON-based FTTx networks are basically built in FTTB+LAN or FTTB+xDSL modes. The FTTH/FTTO mode is adopted for high end users.

The FTTB mode can provide the access bandwidth of 20 to 30Mbps for high bandwidth users, with over 100 users connected to each PON port. To provide the access bandwidth of 50–100Mbps for each user, you can adopt either of the following two modes:

- Change the networking mode and the Optical Distribution Network (ODN), upgrade FTTB to FTTH, and reduce to no more than 32 users connected to each EPON port;
- Keep the networking mode, the ODN, and the number of access users unchanged, upgrade the EPON equipment, increase the uplink and downlink bandwidth of PON by 3–5 times.

The FTTH/FTTO mode can satisfy the bandwidth requirement of 50–100Mbps per user. However, currently the number of users connected to each PON port does not exceed 32. To upgrade FTTH/FTTO to accommodate Gigabit access bandwidth and achieve high-density large-scale deployment in the long run, it is necessary to improve the uplink and downlink bandwidth and the splitter ratio of PON. Since improving access bandwidth is a differentiated service that improves ARPU and can be implemented in a gradual manner, it is necessary to consider the investment protection of existing EPON and ODN equipment and...
the coexistence of 50–100Mbps users and the existing 20–30Mbps users.

10G EPON increases the uplink and downlink bandwidth from 1Gbps to 10Gbps, satisfying the access bandwidth requirements in the FTTB/FTTC and FTTH/FTTO modes; it is well compatible with the existing ODN, 1G EPON, and OAM system, maximally protecting the operator’s equipment investment while allowing smooth evolution. With the rapid growth of the EPON standards and industrial chain, 10G EPON shows a promising potential for future applications. The evolution of EPON to 10G EPON is now widely recognized by operators and becomes an unavoidable trend.

**Evolution to 10G EPON in FTTB Mode**

When building a FTTx network, operators have to invest much in the ODN construction including optical conduit, fiber backbone, optical distribution cabinets, indoor optical cables, optical cross-connection cabinets, various components and auxiliaries, and engineering. In order to protect the investments, ODN must be fully utilized for quite a long time once it is built. As ODN involves a wide range of aspects, its frequent adjustments and changes may bring about tremendous difficulties in engineering and maintenance. At the stage of ODN planning and design, it is necessary to consider the flexibility of ODN. The evolution to 10G EPON in FTBB mode is an optimal solution regarding cost-effective and simple engineering implementation that allows the equipment upgrade without any change to ODN. It not only satisfies the users’ long-term bandwidth demands but also extends the lifecycle of the FTTB network. With a high-bandwidth and reliably running network, operators can focus from network construction and O&M to user requirements exploration, new services development, and QoS enhancement, thus improving their competitive edge and realizing the transformation to full-service operators.

When implementing the evolution to 10G EPON in the FTTB mode, at the Optical Line Terminal (OLT) side, operators only need to upgrade the original 1G EPON line cards to 10G EPON line cards, and replace the original GE uplink ports with the 10GE uplink ports or add the 10GE uplink ports; at the terminal side, they only need to replace the uplink 1G EPON sub-cards on the plug-in Multi-Dwelling Unit/Multi-Tenant Unit (MDU/MTU) with the uplink 10G EPON sub-cards; for the DSL MDU, it is recommended to replace ADSL2+ cards with VDSL2 cards and the related modem, as shown in Figure 1.

**Evolution to 10G EPON in FTTH/FTTO Mode**

In the FTTH/FTTO mode, the evolution to 10G EPON can make two major improvements:

- Improve the access bandwidth of each user to gigabit level under the existing optical splitter ratio and concurrency ratio;
- Increase the number of users connected to each EPON port by 4 times while satisfying the requirements for 50–100Mbps access bandwidth and 1:128 optical splitter ratio. In the initial FTTH deployment, the network scale and user access density are not very high, the optical splitter ratio of 1:32 can satisfy the requirement; to implement widespread and high-density FTTH deployment, it is necessary
to adopt the 10G EPON and the optical splitter ratio of 1:128.

When implementing the evolution to 10G EPON in the FTTH/FTTO mode, if the operators hope to improve the user access bandwidth while keeping their existing ODN unchanged, at the OLT side they only need to upgrade the original 1G EPON line cards to 10G EPON line cards, and replace the original GE uplink ports with the 10GE uplink ports or add the 10GE uplink ports; at the FTTH terminal side, they only need to replace the original uplink 1G EPON ONU with the uplink 10G EPON ONU. If the operators hope to improve the optical splitter ratio and connect more users to each 10G EPON port, they need to replace the original 1:32 optical splitter with the 1:128 optical splitter and replace the original uplink 1G EPON ONU with the uplink 10G EPON ONU, as shown in Figure 2.

**Coexistence of 1G EPON and 10G EPON in the Same ODN**

The 10G EPON technology is compatible with the 1G EPON technology. 10G EPON and 1G EPON can coexist by sharing the same ODN, the same OLT and the same PON port, as shown in Figure 3.

The 1G EPON OLT/ONU and ODN devices initially invested by operators can still operate in the network, with the bandwidth of 1G EPON remaining unchanged and continuing to serve low-end users; the 10G EPON can be used to expand the capacity of OLT or build a new OLT. According to the bandwidth of different users, the operators can flexibly adopt 10G EPON MDU, 1G EPON MDU, and FTTH/FTTO ONU to help users realize the transformation from low bandwidth to high bandwidth.
The global fiber access market is booming today. 10G EPON has become a hot technology for the next generation optical access; and the IEEE802.3av 10G EPON standard will be officially introduced in September this year. Currently, the 10G EPON industry chain has entered a rapid development stage, with operators, equipment vendors, chip vendors and optical module manufacturers all actively helping to push the R&D of this technology. It is expected that 10G EPON will enter the large-scale commercial deployment stage within one to two years.

MAC Chip Vendors

Currently, EPON MAC chip vendors are all actively participating in the R&D of 10G EPON MAC chips. PMC-Sierra, Teknovus, Cortina and Opulan have developed their specific route maps for the R&D of 10G EPON chips. PMC-Sierra announced the availability of
industry’s first asymmetrical 10G EPON equipment prototype in May 2007 and industry’s first symmetrical 10G EPON equipment prototype in March 2008; Teknovus launched its asymmetrical 10G EPON equipment prototype in the second half of 2007; Cortina and Opulan have also developed their 10G EPON equipment prototypes. Moreover, several 10G EPON ONU ASICs and OLT ASICs will be rolled out respectively in the second half of 2009 and the first quarter of 2010.

Optical Module Vendors

Many vendors are actively involved in the R&D of 10G EPON optical modules. As one of the first vendors in China to participate in drafting the specifications for 10G EPON optical modules, Hisense Optoelectronics has been capable of offering a full range of asymmetrical and symmetrical 10G EPON optical modules.

- Its LTX4301/LTX3401 is asymmetrical 10G EPON OLT/ONU optical module that can be supplied in mass quantity. At the OLT side, it integrates three-wavelength 10G EPON and 1G EPON optical transceiver modules, and provides single-fiber optical interfaces to allow the coexistence of 10G EPON ONU and 1G EPON ONU on the same ODN network, thereby maximally protecting the operators’ investment.

- Its LTX5302/LTX3502 is an integrated symmetrical 10G EPON OLT/ONU optical module. LTX5302 integrates four-wavelength optical transceiver modules for 10G downstream and upstream as well as 10G downstream and 1G upstream.

The 10G EPON optical modules of Hisense Optoelectronics comply with the IEEE802.3av standard, with their optical power budget up to PRX/PR30.

In Japan, many vendors are also actively involved in the R&D of 10G EPON optical modules. Mitsubishi launched its symmetrical 10G EPON equipment prototype at the FSAN meeting in September 2008.

In Taiwan, many companies are also researching and developing 10G EPON optical modules. APACOPTO has planned to launch its symmetrical 10G EPON optical modules in 2009.

In Mainland China, SourcePhotonics has planned to launch its 10G EPON optical modules in the second half of 2009.

Burst-Mode Transceiver Vendors

As PON uses TDM for transmitting upstream data, the burst-mode transceiver is the key technology to be solved. Currently Kawasaki Microelectronics (K-Micro) and Vitesse can supply burst-mode transceivers for 10G EPON.

K-Micro has developed burst-mode SERDES test chip CTXL1 that can be used in 10G EPON OLT. The CTXL1 supports simultaneously symmetrical 10G downstream and 10G upstream and asymmetrical 10G downstream and 1G upstream. Its locking time is less than 100ns, which can greatly improve system efficiency.

Vitesse announced the industry’s first complete Physical Media Dependent (PMD) chipset for 10G EPON in April 2009. The PMD chipset uses four Integrated Circuits (ICs) to address both the transmission and the reception paths within the network. For the transmission path, Vitesse offers the industry’s first 10G burst-mode driver combination: Best-in-class 10G Direct-Modulated-Laser (DML) diode driver, the VSC7981, with a highly integrated laser burst-mode controller, the VSC7960.

On the reception side, Vitesse provides a high-performance continuous mode solution using its VSC7978 10G Transimpedance Amplifier (TIA) and the VSC7987 limiting post amplifier. This 10G EPON chipset is compliant with the IEEE802.3av/D3.0 standard.

ZTE has been actively involved in drafting the 10G EPON standards and developing the related equipment. It announced the industry’s first asymmetric 10G EPON equipment prototype on P&T/EXPO COMM CHINA 2008 (October 2008) and the industry’s first symmetric 10G EPON equipment prototype at the FTTH Forum 2009 (May 2009). In June 2009, ZTE and China Telecom jointly hosted the successful IEEE P802.3av 10G EPON Task Force interim meeting in Shanghai.

Operators

10G EPON has also attracted much attention from many high-end operators around the world. For example, China Telecom has conducted the 10G EPON chip-level interoperability test in July 2009; France Telecom (FT) has always followed the 10G EPON technology, and initiated the related test in June 2009; TWC of America has adopted the EPON technology to build its broadband network that allows smooth evolution to 10G EPON.

The 10G EPON industry chain including chip vendors, optical module vendors, burst-mode transceiver vendors and operators is well established and can provide a complete 10G EPON solution. With the subscribers’ increasing demands for access bandwidth, 10G EPON, the new technology most suitable for the next generation optical access, will be widely deployed in the coming years and thus drive the growth of the 10G EPON industry.
The restructuring in China’s telecom industry resulted in the formation of three full service operators, with each granted a 3G license after the overhaul. At the initial stage of 3G construction, all the operators have to find a way to converge their existing networks and services.

Mobile backhaul remains a critical issue for full service operation. To address the problem, ZTE proposes its backhaul over EPON solution that can not only satisfy the mobile backhaul requirements but also provide a unified access to BTS backhaul and broadband services. It enables fast network deployment, allows network resources to be shared, and effectively lowers the Total Cost of Ownership (TCO), thus rendering a higher profit margin for operators.

What is Backhaul?
In a mobile communication system, the communication link between BTS (NodeB) and BSC (RNC) is called backhaul. In the planning of a 3G network, the design of the backhaul network is crucial to effective reduction of the overall network construction costs.

So far, three primary physical media are widely available for mobile backhaul:
- Copper: The E1 line can be leased or deployed by operators themselves;
- Fiber: SDH or MSTP is widely deployed for mobile backhauling;
- Microwave: Microwave links are costly to deploy and maintain.

Led by the fast-growing EPON and GPON technology, the xPON technology using the Circuit Emulation Service (CES) starts to be used for mobile backhaul. This not only enriches backhaul solutions but also enhances the robustness of the xPON as an optical access technology.

Requirements for Backhaul over EPON
A comparison of backhaul over EPON CES and over GPON Native
similar to that of SDH, where timing information is transmitted from OLT to ONU through the optical physical layer of EPON. As the public clock source of EPON, the network reference clock is input from the OLT. The ONU maintains frequency synchronization with the clock source.

High-precision time synchronization
The IEEE 1588 Precision Time Protocol (PTP) designed on the basis of Ethernet uses a combination of software and hardware to perform time synchronization between nodes. Synchronization with the 1588 master clock is carried out by inputting 1PPS+TOD signals or through the FE/GE interfaces at the OLT side. The test results show that time synchronization between EPON OLT and ONU can be as precise as 0.1us (100ns), which is enough to bear CDMA/TD-SCDMA BTSs that require time synchronization. This mechanism spares BTS the need of GPS, lowers construction cost, and improves system security.

To sum up, the EPON system is able to provide precise time and frequency synchronization for BTSs. Existing BTSs with E1 interfaces perform time synchronization through 1PPS and TOD signals output from the E1 interfaces of the ONU user side. Future BTSs with 1588-compliant IP interfaces perform time synchronization through the FE/GE interfaces of the ONU user side.

QoS of E1 over EPON
EPON provides Service Level Agreement (SLA), admission control, and bandwidth resource allocation to guarantee QoS. It can properly handle traffic based on traffic classification, VLAN allocation, and the Class of Service (CoS) features. In addition, EPON has a reasonable, efficient Dynamic Bandwidth Allocation (DBA) mechanism that supports three modes of bandwidth allocation: Fixed bandwidth,

is listed in Table 1. It can be seen that when the EPON is used to bear E1 services, it complies with the jitter specifications defined in the G.823 standard, and is similar to SDH that can meet the BTS service transmission requirements. The backhaul over EPON CES can fully meet the standard indices, with less E1 downlink delay than that in backhaul over GPON Native.

### Key Techniques of Backhaul over EPON

#### High-precision frequency synchronization
The backhaul over EPON solution adopts a synchronization principle of GPS, lowers construction cost, and improves system security.

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<table>
<thead>
<tr>
<th></th>
<th>EPON CES</th>
<th>GPON Native</th>
<th>Standard Indices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compliance with E1 jitter specifications in G.823</td>
<td>20 to 100k: 0.010UIpp 18 to 100k: 0.008UIpp</td>
<td>20 to 100k: 0.011UIpp 18 to 100k: 0.008UIpp</td>
<td>ITU-T G.823 § 5.1 20 to 100k: &lt;1.5UIpp 18 to 100k: &lt;0.2UIpp</td>
</tr>
<tr>
<td>E1 jitter tolerance</td>
<td>Compliant</td>
<td>Compliant</td>
<td>ITU-T G.823 § 7.1.2</td>
</tr>
<tr>
<td>E1 clock transfer (MTIE)</td>
<td>Compliant</td>
<td>Compliant</td>
<td>ITU-T G.823 § 6.2.4</td>
</tr>
<tr>
<td>E1 clock transfer (TDEV)</td>
<td>Compliant</td>
<td>Compliant</td>
<td>ITU-T G.823 § 6.2.4</td>
</tr>
<tr>
<td>E1 jitter transfer</td>
<td>Compliant</td>
<td>Compliant</td>
<td>F5: 40HZ F6: 400HZ X: 0.5db –X: –19.5db</td>
</tr>
<tr>
<td>E1 24-hour BER (with background traffic)</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>E1 delay (downlink)</td>
<td>0.4ms</td>
<td>0.7ms</td>
<td>From SNI to UNI (OLT to ONU) &lt;1.5ms</td>
</tr>
<tr>
<td>E1 delay (uplink)</td>
<td>1.3ms</td>
<td>1.2ms</td>
<td>From UNI to SNI (ONU to OLT) &lt;1.5ms</td>
</tr>
</tbody>
</table>
assured bandwidth, and best effort bandwidth.

The QoS for BTS services over EPON is guaranteed in four ways:

- Set up dedicated VLANs: The traffic is classified by VLAN and separated from one another;
- Set the BTS services to the highest priority: It is recommended to set the CoS of 802.1p to 7;
- Adopt the strict priority scheduling policy;
- Reserve high-bandwidth channels: It is recommended to reserve 5M or higher bandwidth for each E1 line.

**Ring network protection**

EPON has a point-to-multipoint network topology. The IEEE 802.3 EPON specification defines several protection modes including backbone optical fiber protection and full protection. In order to meet the backhaul protection requirements, the EPON topology is modified on the basis of the standard SDH/MSTP ring protection.

**ZTE’s Backhaul over EPON Solution**

Based on a deep understanding of EPON technology and backhaul, ZTE put forward the backhaul over EPON solution (see Figure 1). Its EPON OLT (ZXA10 C200/C220/C300) is uplinked to the MSTP transmission network through an E1/STM-1/GE interface; its EPON ONU has an E1/FE/GE interface and is compatible with TDM/IP downlink. The ONU bears the E1 interface through PWE3. The backbone protection, full protection, and backup physical links can be deployed between OLT and ONU. The BTS performs frequency and time synchronization through GPS or EPON ONU. To form an integrated BTS, the ONU can be placed into the BTS as a stand-alone device or a card.

The backhaul over EPON solution is applied to the FTTx optical broadband access and integrated information access points. It is fast and easy to deploy, and saves transmission resources and deployment costs.

Since traditional E1 transmission may not be able to accommodate the fast growth of data services, the transmission of E1 and FE can be separated. At the NodeB side, the E1 interface (IMA or PPP) transmits CS services and the FE interface transmits PS services. At the RNC side, the STM-1 interface (IMA or PPP) transmits CS services and the GE interface transmits PS services, as shown in Figure 2.

ZTE’s backhaul over EPON solution was applied in Jiangsu Mobile in 2007, where the EPON technology was used to provide access for BTSs, microcells, and M-Zone business halls (M-Zone is a mobile service brand of China Mobile). So far the system has been running stably for over one year. In addition, ZTE worked with Shanghai Telecom in February 2009 to implement CDMA backhaul over EPON and successfully cut over voice and data services of the BTSs.

ZTE’s backhaul over EPON solution helps operators carry out full-service operation by offering a fast-to-deploy, secure, effective, and low-TCO path towards fixed-mobile convergence.
more service providers are progressing to triple-play and even quad-play packages in order to provide a one-stop shopping service to customers.

IP traffic is growing exponentially and networks evolve to include bandwidth hungry IP-based applications on voice, video and data. A discussion about broadband medium and speed is on everyone’s tongue. But still it is under discussion that “how fast is fast enough”. In fact, broadband is not just a speed; it is defined as a potential medium that offers a wide variety of applications to users at their premises.

Thus, optical access system provides the medium for distributing and supporting triple, quadruple play and narrow band services effectively and efficiently. Passive Optical Network (PON) is reality. The telecommunication industry has had more than 12 years of discussion of the viability and cost effective design of FTTH. Selection of technology such as GPON, EPON or future migration to WDM-PON on the existing infrastructure of Optical Distribution Network (ODN) platform is a big challenge and requires a lot of strategic thinking.

ODN Design is Critical

FTTx network is generally divided into three generic parts such as, Central Office (CO), ODN, and Customer Premises (CP), as shown in Figure 1.

At the CO, we implement the Optical Line Terminal (OLT) that provides the network-side interface of the OAN (e.g. a service node interface or SNI) or simply uplinks to service network and connects to an Optical Network Unit (ONU).

On the user side, the OLT may be connected to one or more ODNs and provides one or more optical paths between an OLT and one or more ONUs. The ODN provides these paths over one or more optical fibers which may have lengths measured in feet or in kilometers.

An ONU is connected to an ODN and provides (either directly or remotely) a user-side interface of the OAN. The ONU, which may serve as a subscriber terminal, may be located outside such as on aerial poles, inside the building or even on a table of house for single family unit. Implementations of such architecture include arrangements...
commonly termed Fiber to the Building (FTTB), Fiber to the Curb (FTTC), and Fiber to the Home (FTTH).

If we deeply look into the concept of ODN and methodically study its design, the ODN can be generally subdivided into the following five components, as shown in Figure 2.

The CO subsystem and feeder cable subsystem are the part of traditional optical network while distribution cable subsystem, indoor cable subsystem and optical fiber terminal subsystem are newly added optical network components in PON to extend optical cable to the end users.

Deployment Strategy of OLT and ONU

Deployment analysis is critical in ODN design to decide the placement or location strategy of deployment of OLT and ONU, because it effects the future enhancements of the network and implementation of complete concept of FTTH. And network planners will tailor the situation accordingly.

To support high-rise buildings with multi-dwelling units, it is feasible to place the OLT equipment dedicated to provide services to the building. OLTS are deployed in central equipment office rooms or in residential community access equipment rooms. If OLTS are deployed in equipment rooms in offices, equipment maintenance is more convenient, but because a large number of optical fibers are deployed from the office to residential communities where fibers are distributed, the costs of fibers are rather high compared to a lot of construction work.

ONU deployment is divided according to the implementation strategy of FTTH, FTTC, FTTB, FTTO, FTTCab, etc. If terminals on the ONU side are deployed outdoors, installation positions, damage prevention, power supply, and other problems need to be taken into consideration; on the other hand, the construction and maintenance work is huge. If terminals on the ONU side are deployed indoors, installation and maintenance are very simple. We can use MDU/MTU in the corridor or low voltage room that saves fiber, but the disadvantage is that it takes more active nodes, has difficulty in operation and needs power supply for the active nodes. SFU/SBU at home or in the office provides high bandwidth, long distance passive coverage and no need for further ODN construction, but the disadvantage is that its cost is high.

Splitter Deployment Strategy and Optical Power Budget

Splitter deployment strategy is critical in ODN design of FTTx network. Using splitting strategy in planning for an area deployment would greatly affect the efficient deployment of the passive equipment network and the scalability of the system. Different splitting level such as one-level or two-level can be used to cover areas in different strategies. Splitters can be deployed on the basis of positions of user groups: Such as in access equipment room, outdoors, in corridors, or in weak electric-pump wells of the floors near users. The nearer the splitters to users, the more fiber resources are saved. However, during network design, costs of supporting facilities should be considered at the same time, that is, it is not worth
attaching full importance to saving fiber resources while neglecting costs of supporting facilities. The following are some of the splitter deployment techniques:

- Centralized one-level splitter (single distribution frame);
- Cascaded splitter (feeder distribution cable and distribution point);
- Cascaded splitter 1:X (CO) and 1:Y (DP);
- Cascaded splitter 1:X (DP) and 1:Y (DP);
- Direct fiber;
- Split in DP.

Star and ring topology is feasible according to the circumstances and used to connect the network. The number of splitters required will be based on the planned FTTH home pass. Table 1 shows the comparisons of different levels of splitting with different elements.

In the consideration of the optical power budget, we should take into account the underlying factors such as fiber cable attenuation and fiber budgeting to ensure the optimal design in the fiber distribution and high quality customer services. Firstly, we should look at the fundamental models that determine the signal loss. The common model for signal loss is calculated as below:

\[
\text{Total loss} = \text{fiber attenuation} \times (\text{length of cable}) + \text{splitter attenuation loss} + \text{splice attenuation} \times (\text{number of splices}) + \text{connector attenuation} \times (\text{number of connectors}) + \text{safety margin}
\]

In above calculation, fiber attenuation is adopted with attenuation loss of \(-0.5\) dB per Km. Splice attenuation is around \(-0.15\) dB per splice (as precaution). If maximum attenuation loss is \(-24\) dB, the optical loss of the ODN is the primary impairment to reach for the 1:32 split-ratio case. The power budgets required for a 20-km reach and 1:32 split ratio for all three wavelengths are shown in Table 2.

Furthermore, a low-loss ODN across the full spectrum of wavelengths from 1260 to 1610nm supports today’s applications and provides an economic upgrade path to future higher-bandwidth applications as well.

**Table 1** Comparison of single Level and multi level splitting

<table>
<thead>
<tr>
<th>Splitter Location</th>
<th>Multi Level Splitting</th>
<th>One Level Splitting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deployment</td>
<td>Dispersive</td>
<td>Centralized</td>
</tr>
<tr>
<td>Port Utilization</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Splitter Utilization</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>OLT Cost</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Splitte Cost</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Optical Power Overall Loss</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>ODN Architecture</td>
<td>Complex</td>
<td>Simple</td>
</tr>
<tr>
<td>Managementet</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>OPEX</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Fiber Cost</td>
<td>Low</td>
<td>High</td>
</tr>
</tbody>
</table>

**Table 2** Model loss assumptions

<table>
<thead>
<tr>
<th>Splitter 1:32 Ratio</th>
<th>Conventional Cabling System (maximum loss)</th>
<th>Low-Loss System (maximum loss)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>18.5dB</td>
<td>17dB</td>
</tr>
<tr>
<td>Connection</td>
<td>0.75dB</td>
<td>0.15dB</td>
</tr>
<tr>
<td>Splices</td>
<td>0.088dB</td>
<td>0.067dB</td>
</tr>
<tr>
<td>Fiber Cable (1310nm)</td>
<td>0.4dB/km</td>
<td>0.35dB/km</td>
</tr>
<tr>
<td>Fiber Cable (1550nm)</td>
<td>0.3dB/km</td>
<td>0.25dB/km</td>
</tr>
</tbody>
</table>

**Conclusion**

In a nutshell, the things covered above are just the comprehensive guideline for effective ODN design. ODN planners will have to adopt the contingency approach during design phase. Standardization procedures in design process and inventory management could provide efficient and speedy design and management of both the active and passive equipments. Hence, effective ODN design brings billion dollars delivery game and optimizes the Total Cost of Ownership (TCO).
June 2009, from market research firm CCID Consulting

A s the two major hot spots of Chinese mobile network and fixed network, the construction of 3G mobile networks and FTTx has already become a dominating investment orientation in China telecommunication industry in 2009. China Telecom, China Unicom and China Mobile, as full-service operators, have been deploying 3G network and FTTx on a large scale from the beginning of 2009. In the benefit of the convergence with mobile network, under the development of broadband services and the drive from policies, the FTTx market fulfilled a new breakthrough and achieved an all-round development in terms of technology and the market in the first quarter of 2009. In the meantime, as Chinese all-IP data network evolves, many operators adopt EPON as the current major access technology of FTTx.

Rapid Growth in Broadband Market, Across-the-Aboard Breakthrough in FTTx Market

The number of Chinese broadband subscribers has reached over 80 million by the end of 2008 (see Figure 1). This is the strong foundation for the future development of optical access. With the pace that China Telecom and China Unicom develop broadband subscribers, the number of subscribers will probably exceed 100 million in 2009. It’s true that xDSL remains the current mainstream technology in the broadband market, but under the rapid development of broadband services, the

Figure 1 Chinese broadband subscribers and the growth in number (2001 – 2008)
number of subscribers and subscribers’ increasing demand on bandwidth lead to a conclusion that xDSL will gradually be replaced by FTTx.

Propelled by the development of the broadband services market and the technology, the FTTx network construction in China formally entered into the commercial stage in 2008. The market scale was approximately 20 times larger than that of 2007. In three main ways of broadband access, FTTx will dominate the market. Hence, with enormous broadband subscriber base, Chinese broadband market will be a “fairyland” for FTTx. CCID Consulting predicts that by 2011, the market scale of FTTx equipment in China will exceed 20 billion yuan. As EPON is a leading technology adopted by Chinese operators, EPON equipment will remain dominating until 2011 in the Chinese FTTx market (see Figure 2).

**Technology Motivates the Development of the Market, ZTE Gains the Initiative**

With the unceasing expansion of the FTTx market, more and more vendors begin to pay attention to this new hot spot. The vendors which entered into this market of an early stage captured most market share with the strong R&D strength and ability to innovate. Currently, Chinese actual FTTx deployment is predominated by EPON, and as the related industry chain of GPON is not yet mature, its deployment is still in experimental phase. Vendors like ZTE and FiberHome invested a great deal of R&D strength in EPON and continuously fulfills technological breakthroughs.

Based on the serial workshops, “speed of light action I” and “the speed of light action II” in 2007 and 2008, ZTE embarked on a nationwide plan for a larger-scale “light action III” in the first quarter of 2009. The aim is to comprehensively publicize and promote to operators about ZTE broadband speed-raising solutions, including green products and customized solutions. As is shown in the first-quarter-data monitoring report of CCID Consulting, ZTE’s EPON products shipments in quarter 1 of 2009 is a lot more than those of 2008, with a significant increase in the market share of over 40% in China (see Figure 3). With the foundation laid in the global telecommunication market, ZTE’s xPON products reached 16 million lines in commercial use which is top 1 in the world. At the same time of promoting products to dominate the market, ZTE keeps an in-depth commitment to the research and development in the next-generation PON technology. Following its rollout of the world’s first non-symmetrical 10G EPON equipment prototype on “P&T/EXPO COMM CHINA 2008”, ZTE launched the world’s first symmetrical 10G EPON equipment prototype in May 2009.

In regard to operators, China Telecom continued to keep a massive investment in FTTx. In the meantime, as a traditional operator in the fixed-network, China Telecom also adopted ZTE’s EPON technology on CDMA base stations, with a convergence of the fixed-network and CDMA, which achieved the initial transition for China Telecom to the field of mobile communications, as well as set a practical example to the future network convergence in the telecommunication industry. With respect to other operators, China Unicom will increase the investment to about 40 billion on broadband and infrastructure construction in 2009, while it is noteworthy that China Mobile also put forward a strategy of a vigorous expansion on mobile Internet with the help of FTTx. Apparently, in the 2009 Chinese telecommunication market, FTTx, as one of the two hot investment spots, has become a powerful means to advance the network convergence. CCID Consulting forecasts that by the end of 2011, Chinese FTTx subscribers will exceed 22 million.
Mobile Market Moves ZTE

August 19, 2009, By Phil Harvey, Editor-in-Chief, Light Reading
(Source: Light Reading)

Mobile equipment sales help ZTE continue to defy gravity as the networking equipment vendor reported revenues of RMB27.7 billion ($4.05 billion) for the first half of 2009. ZTE’s net profit for the period was RMB780 million ($114 million), an increase of about 40% from the year-ago period.

What’s Growing?

Well, anything mobile. In China, 3G networks are still being built, and ZTE is certainly benefiting from the continued construction. The company’s China-based revenues were RMB14.95 billion ($2.19 billion), and last year nearly 40% of ZTE’s revenues came from Chinese carriers.

Mobile CAPEX Appetite

In March, a Light Reading Insider report noted that, in China, mobile accounts for around 74% of all CAPEX investment. On a global level, mobile is expected to account for nearly 60% of all CAPEX by 2013.

Pyramid Research notes that mobile operators will spend somewhere around $41 billion to develop China’s 3G market in the next two years. China’s mobile industry added 71.2 million mobile subscribers in 2008 and that is expected to grow 12% this year, according to analyst Daniel Yu, writing in Pyramid’s June 2009 “Country Intelligence Report” on China.

Even outside of China, ZTE is seeing mobile growth as a boost to its business. So far this year, ZTE has benefited from 2G network buildouts in some countries, and mobile network expansion in countries such as Indonesia, Vietnam, and Turkey.

ZTE is also reporting record shipments for its CDMA base stations. The company shipped 75,000 units during the first half of 2009, more than it shipped all of last year.

ZTE Q2 Net Jumps on 3G Network Buildout

August 19, 2009, By Kirby Chien
(Source: Reuters)

ZTE, China’s second-largest telecoms equipment maker, posted a 41.9% rise in second quarter net profit, boosted by huge spending on 3G networks by the country’s three telecom carriers.

Beijing has targeted spending of $58.5 billion in 3G mobile network construction through 2011 after handing out long-delayed 3G licences earlier this year.

Competition remained intense in the global telecommunications market during the first half of 2009. While the global market outlook remains bleak, China’s buildout of 3G networks more than cushioned the blow for ZTE.

ZTE second quarter earnings rose to 704.7 million yuan ($103.2 million) based on Reuters calculations, falling short of the 733 million yuan forecast by Reuters Estimates, but easily topping the 496.5 million yuan recorded a year earlier.

ZTE said first half net profit was 783.37 million yuan. The second-quarter results come after ZTE posted a first-quarter profit rise of 29% to 78.7 million yuan.

The company’s share price rose 72.3% in the first half of the year, almost doubling the 38.9% surge on Hong Kong’s China Enterprises index .HSCE over the same period.

Analysts estimate the company’s 2009 earnings will increase 32.9% to 2.21 billion yuan, according to Reuters Estimates.
Telekom Malaysia Berhad (TM), Malaysia’s leading integrated information and communications group, offers a comprehensive range of communication services and solutions in broadband, data and fixed-line. Currently TM has nearly five million fixed-line subscribers, a fiber optic cable network along the national roads and railways, and the largest ISP in the country. It also operates ATUR 450 cellular telephone service and 800 MHz CDMA Wireless Local Loop (WLL) service. It is one of the most influential operators in Southeast Asia.

Challenge for TM

The fierce competition in the local wireless telecommunication market resulted in steep drop of fixed voice business of TM. Hence, exploring new services to gain more market share becomes a priority.

ZTE performs a miracle for TM to save more than 35% TCO while ensuring stable and reliable power supply.”
in TM’s business consideration. As a result, TM started NGN construction in 2006. On the one hand, TM must achieve low Total Cost of Ownership (TCO) to fight in the competition and to secure its leadership in Malaysia’s telecom market. On the other hand, as TM should undertake the government’s five year plan of information industry, and fulfill its promise of using globally advanced technologies, its network products are required to be highly reliable and energy efficient. Power supply, as the network infrastructure equipment, has to meet all these goals. Conflict between lower cost and better performance turns out to be the greatest challenge, as it always is.

**ZTE’s Solution**

TM invited bidding for power products in March 2006. ZTE stood out from more than 20 bidders with its state-of-the-art technology and cost advantage. This alone did not turn on all green lights on the way. At the initial stage, some experts in TM questioned ZTE power products and solution. ZTE immediately organized technical experts to communicate with TM and analyzed and compared various design concepts and solutions for TM to get its recognition.

Furthermore, ZTE customized its products and solutions for TM, including modifying cabling to save more equipment room space and make the maintenance easier; improving Control & Supervision Unit (CSU) to enhance the effectiveness of monitoring which contributes to higher stability of the system; optimizing surge protection system to adapt to the areas where thunder is frequent. The concept of dual-feed AC power for backup also came true through mutual efforts of both parties. The operator was satisfied with these improvements. In 2007, ZTE was awarded the official contract to supply power products to more than 1,500 sites, which was 70% of the NGN project. ZTE proved itself a professional partner in telecom power supply: no lightning failure happened over the past two years of operation. ZTE also saved more than 35% CAPEX for TM.

**Cooperation Again**

Malaysian government planned to build up a national broadband network within five years. TM launched a High Speed Broadband (HSBB) project that includes five sub-projects in August 2008. TM again launched an independent tender for power products to meet power supply demands of the existing and future networks. Higher requirements were put on the power supply. Based on previous cooperation experience and its advantage of fast response and customization, ZTE obtained the Letter of Intent (LOI) from TM after three and half month’s technical and commercial assessments. In February 2009, ZTE passed the test organized by experts from TM in Shenzhen, China and was highly praised by them. Organizer of this test, Mr. Mohd Falaah Bin Abd Manap said: “Frankly speaking, ZTE DC power system is the best we have tested, thank you very much for your support.” ZTE was tapped to power 1,300 new base stations and guarantee their smooth operation.

**Milestones:**

- In March 2006, TM launched an independent tender for power equipment. ZTE stood out from more than 20 bidders and signed a LOI with TM to complete 70% of the power project.
- TM conducted a five-month test on ZTE’s equipment in Malaysia after ZTE won the bid.
- In June 2007, ZTE has successfully passed TM’s test. TM signed the official contract with ZTE, confirming that ZTE won 70% of the tender.
- In August 2008, to meet current and future power supply requirement, TM launched another independent tender for power equipment. The power equipment had higher requirements than the 2006 project.
- On August 12, 2008, ZTE organized a powerful bidding team, which performed a high quality bid.
- In December 2008, TM awarded LOI to ZTE after three and half month’s technical and commercial assessments.
- In February 2009, ZTE passed the 7-day test held on its power equipment in Shenzhen. The test was held by a team of six experts from TM.
- In April 2009, TM awarded ZTE the contract to provide TM more than 1,000 sets of power supply equipment.
Global Market Dynamics

Ten years ago, when mobile communication was merely a dream for a common man, the terms messaging and SMS were frequently used interchangeably. With the advent of new technologies; messaging, like other sectors of telecommunication, has been redefined. Messaging now not only represents SMS, it also includes MMS and IM. This does not stop here. Today, many new services, for example, mobile newspapers, are being offered on top of existing messaging services to bring a unique experience to the subscribers and revenue to the operators.

Due to their rich features and convenience, messaging services have won the hearts of people. Today, messaging services account for nearly 40% of the revenue generated by all the value added services. With the escalation of competition among operators, messaging services have become one of the tools to attract masses. With the cut-throat competition ahead, operators are trying hard to offer unique services. This has led to a messaging boom in the telecom industry.

Know Your Shortcomings

SMS—Insufficient capacity

To overcome the cut-throat competition, operators are cutting down their margins and offering attractive
packages to their subscribers. The convenience of use and cheaper prices has led to an immense increase in service demand. Besides, many new services are being introduced to spicce up the SMS experience to new heights, which in turn causes a pressure over the network. The capacity of the messaging network might not be an issue at the moment, but keeping in view the expected unprecedented growth in SMS traffic, as has been predicted by the international consultation agencies operators will have to join their heads in the very near future.

Capacity is one issue, the rapid and reliable delivery of SMs is also terrorizing operators. To solve the bottleneck in the networks due to congestion, industry pundits will have to come up with new solutions.

MMS—Huge investment at the wrong instant

Although it has been a long time since the introduction of MMS, this service has not gained the same momentum as SMS. The simple explanation is “huge investment at the wrong instant”. In the early days of MMS, the terminals with MMS capability were not as common as today. Those who had MMS equipped terminals were not well educated with its use. At that time, operators invested heavily in this service, which left them with a poor response from the subscribers. Although new services have been launched to boost the MMS usage, with the bad experience in the past, operators are still reluctant to invest in this service.

IM—An unexplored goldmine

According to Gartner’s prediction, “By the end of 2011, IM will be the de facto tool for voice, video and text chat, with 95% of workers in leading global organizations using it as their primary interface for real-time communications by 2013.”

The maturity of individual subscriber market has led operators to looking for new markets; enterprise communication is one of them. To date, not many operators have ventured into enterprise communication. They have so far undermined the importance of this future goldmine. IM is a service that provides operators with an effective tool to venture into this market. Looking at the importance of enterprise communication and the benefits that IM can bring, supported with the predications of international consultation agencies, it can be easily concluded that IM is the future of enterprise communication. It is an obvious fact that so far most of the operators have failed to realize the great potential hidden in this service to attract the enterprise subscribers.

Explore Your Opportunities
SMS—Still more to come

Although being the oldest of the messaging services, research is still being carried out to get more and more out of the SMS. Many new services are being launched to introduce a new messaging culture. These new services aim to bring a unique experience to subscribers, provide an additional revenue source for operators, and boost the network utilization of existing SMS network.

Keeping in view the operators’ current demand for capacity and the unprecedented growth of the SMS expected in the near future, they should look for solutions with higher reliability and higher capacity. The demand for such a solution at one hand is not only forcing vendors to design higher capacity solutions but also leading them to coming up with solutions based on new mechanisms.

First Delivery Attempt (FDA) is a remarkable enhancement in messaging. Unlike the “Store and Forward” mechanism of the traditional SMSCs, it enables them to work on the principle of “Receive and Forward”. This change of working mechanism enables operators to save network resources and precious time by delivering SMs instantly to their full capacity without the need of storage.

MMS—Now is the time

Unlike the past, many mobile phone makers are now producing MMS compliant handsets. Today, market is full of such handsets. MMS compliant handsets are not a luxury, not anymore. In the MMS value-chain mobile phone makers have contributed their share by producing MMS compliant handsets at a reasonable price and in large quantity. Even during the bad times of MMS, they have successfully launched and sold new models featuring MMS. The demand of these handsets in the market depicts the potential of this service. Now it is the turn of operators to overcome their fear of this service and look for such promotional schemes that can educate and promote the MMS usage among the subscribers.

Application to Point (A2P) MMS services are the services sent from application to subscribers. In the longer run, these services help to attract subscribers with their rich contents, boost the network utilization, build subscribers’ craving, and bring additional revenue. These services aim to cultivate MMS culture, improve subscriber understanding about MMS, and increase the MMS demand. Keeping in view the above, operators need to overcome their fear and should see the great potential that lies in this service.

IM—Explore future messaging

IM is a future driven messaging service
suited mainly for enterprise subscribers. Unlike MMS, however, operators have not so far made any substantial efforts to deploy and promote IM. Today, many authentic international consultants are advocating IM, and are concluding that the time is right now.

Just as the deployment of email in corporations in the early 1990s proved an unparalleled success for businesses, a similar phenomenon is occurring with IM. The business benefits that IM can bring are considerable. The ability to connect people in disparate locations by text, voice, and video in one application is incredibly powerful and is equally well suited to an informal as well as more formal group communications. It is increasingly being used as a vehicle for rapidly disseminating critical information to the entire enterprise, groups of users, or individuals in such cases as natural catastrophes, health issues, network outages, or schedule changes etc.

Although enterprise subscribers are a new market for operators, there is a tremendous potential hidden in this market segment. Operators need to realize their potential and invest in IM. If properly invested and marketed, this service will carry a great potential to attract enterprise subscribers.

**Overcome Your Shortcomings**

**Advanced services**

ZTE cares a lot about its valued customers. Many new services such as Mobile Newspaper Service (MNS) and Advanced Service Platform (ASP) are being launched to introduce a new messaging friendly culture. The aim of these services is to boost existing messaging network utilization, which increases the revenue generated by them, spice up the messaging experience to attract more and more subscribers, and to bring additional revenue by providing attractive features and contents to the subscribers. These services are added to the messaging network as an add-on to the existing services; they utilize the power of existing service enablers to deliver attractive features and contents to the subscribers.

MNS is a service that provides information contents over the existing SMS, MMS, and WAP networks. With a very minimal investment, operators not only are able to boost their network utilization but also have a new way of generating additional revenue without having a major change in their existing network. With the Mobile Newspaper alone, China Mobile raised its MMS messages per month to 7 times, from 0.714 billion MMS/month in January 2006 to 4.7 billion MMS/month by the end of the year 2008.

ASP in itself is a bundle of services such as SM forwarding, SM firewall, SM signature, and SM auto-reply for SMS, and for MMS it offers services such as MM forwarding, MM firewall, MM signature, MM auto-reply, and MM personal album. These services boost the network utilization of existing SMS/MMS network and provide an additional revenue source for operators by spicing up the subscribers’ messaging experience without any change in the existing network.

**Large capacity**

With the unprecedented growth of the messaging services, and with the new services dependent on existing messaging services, many operators around the globe are facing network congestion. The messaging services designed by ZTE offer higher capacity. At the moment, the capacity being offered by a single module of SMSC is 40,000 MDA/s, which can be further increased by adding more modules. Similarly, the single module of MMSC offers a capacity of 3,000 TPS, which again can be infinitely increased by adding more modules.

**Carrier-grade architecture**

ZTE, a leading telecom vendor, with its feature rich messaging services, offers a carrier-grade solution to its valued customers. ZTE’s carrier-grade solution is characterized by its high reliability, modular design, and all-IP based open platform.

ZTE offers highly reliable solution, based on modern technologies. The network is designed in dual-plane-dual-network mode that ensures service availability in case of single point of failure. Equipment is deployed in n+1/1+1 hot/standby mode that provides traffic balancing and redundancy. Such a carrier-grade solution features excellent reliability.

ZTE adopts modular design in its solution. The modular design facilitates the smooth expansion of the services by a mere upgrade of hardware/software, with minimal effect on the running services. This in turn reduces the Time To Market (TTM), and brings additional revenue to the operators at the cost of minimal investment.

ZTE’s messaging services are designed on an open platform that is characterized by its compatibility to relevant international standards and provides open interfaces that enable 3rd party CP/SPs to design and develop new services easily. These products, thus easily integrate with any kind of network entities as long as they are providing open interfaces.

Moreover, due to provision of all-IP access, ZTE’s messaging services are equally suited to serve GSM/CDMA/3G/IMS networks simultaneously, making them the ideal choice for multi-network operators and for the operators planning 3G/IMS evolution.
Is it best for the environment, your customers or your business?

You may already know our new broadband access system was awarded “Best Green Innovation” at the SOFNET high-end forum in London.

If this doesn’t impress you, maybe 30-50% lower power consumption, reduced noise level, less need for expensive space, and higher reliability will.

Add to that high integration, re-use of existing copper lines and reduced need of fibre, and you get a system that decreases your carbon footprint as well as your CAPEX and OPEX.

We have deployed over 35 million lines with ZTE DOL products in over 40 countries.

ZTE is a leading global provider of telecommunications equipment and network solutions, delivering innovative, custom-made products and services to customers in more than 140 countries and regions, helping its customers achieve continued revenue growth as well as shaping the future of the world’s communications industry.

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