ZTE TECHNOLOGIES

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Broadband World Forum Europe Special Issue

ZTE’s Strategy

Shanghai Telecom’s Strategies for Successful IPTV Deployment

Fiber to the World: Next Generation Broadband Access Solutions

The Road Towards Convergence

P4

P9

P11

P15
FULL SATISFACTION WITH FULL SERVICE ACCESS.

With ZTE new GPON solution you’ll get new opportunities for increased bandwidth services to your customers.

It complies with G.984.1/2.3/4 standards and supports high capacity access, up to 1.25Gbps and 2.5Gbps. Mixed-plug in one shell supports both EPON and GPON cards.

At the same time you get all the good things with a passive network — stability, low OPEX, high QoS, solid security and flexible networking. The system adopts dynamic bandwidth allocation, priority controls, and multi-array scheduling technologies.

ZTE is the fastest-growing global provider of telecommunications equipment and network solutions.

We deliver innovative, custom-made products and services to customers in more than 100 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!

www.zte.com.cn

FROM THE SILICON VALLEY OF THE EAST.
Shanghai Telecom’s Strategies for Successful IPTV Deployment

There are several key factors for Shanghai Telecom to succeed with its IPTV offerings.

Fiber to the World: Next Generation Broadband Access Solutions

ZTE can address all types of FTTx network requirements with the most appropriate technology, and offer end-to-end solutions for FTTx networks.

ZTE’s Strategy

ZTE offers a total solution that will cater to consumers who prefer a one-stop solution to their entertainment needs.
Factors to Drive FTTH Growth

FTTH not only increases profit opportunities for equipment providers, but also drives the development of relative industry fields.

ZSmart: A New Generation Business Support Solution

ZSmart solution is a new generation business support system that can strengthen operators’ core competitiveness.

Achieving Global Success with Superb Customer Services

In today’s increasingly competitive telecom market, vendors have to seek innovations in terms of after-sales services contents to improve customer satisfaction.
ZTE Introduces First Full-Scale BBU+RRU Solution

ZTE announced the official launch of its GSM BBU+RRU Solution, which leverages on Fiber-optic Remote technology to enable distributed base station deployment, with Base Band Unit (BBU) that supports up to a record high capacity of 48TRX.

To date, ZTE has launched distributed base station solutions that support five different wireless standards, including WCDMA, TD-SCDMA, GSM, CDMA and WiMAX, and is the first to offer a full-scale BBU+RRU solution in the industry.

The BBU+RRU distributed base station is easy to deploy and available at a very competitive price. The solution was first introduced in 2005 to address the increasing environmental awareness, rapid deterioration of resources in densely populated areas, and the soaring cost of traditional macro base station operations.

ZTE to Deploy Transmission Network in Tunisia

ZTE has signed a contract with Tunisie Telecom, a telecom operator in Tunisia, to deploy the national transmission network in the country. ZTE will deploy a network to cover nearly two-thirds of the territory, including all developed coastal regions.

Upon completion, the national transmission network will offer transmission channels for mobile services, ADSL and other services, while establishing a foundation for Tunisie Telecom’s future development.

“We are glad to establish this technological partnership with ZTE, enabling our transmission network upgrade with state-of-the-art optical products from ZTE in order to deliver high-speed connectivity and next-generation services to our customers,” said Nizar Bouguila, executive vice president, planning, engineering and deployment, Tunisie Telecom. (ZTE Corporation)
ZTE announced on August 21 that it has shipped close to 12,000 CDMA base stations in the first 6 months of 2007. The figure represents a remarkable 240% increase compared with same period last year, resulting in ZTE meeting its 2006 annual target, with still five more months before the year ends.

In addition to registering a sterling record in volume shipment, the company also has another milestone to announce—its CDMA system subscriber capacity has exceeded 100 million lines, representing a 100% increase compared to the figure as of end-2006. As the leading global CDMA supplier in the market, ZTE not only secures large volume market share in Asia and Africa, but also enjoys significant development in its business scope in high-end strategic markets in Europe and America.

In large volume market segments, ZTE has significant business success in India and Indonesia this year.

ZTE has posted its interim results, reporting its operating revenue for the first half of the year expanded 43.85 percent to RMB 15.232 billion.

The half-year results further mirrored that the company brought in RMB 460 million net profit, hiking 32.50 percent, and RMB 0.48 earnings per share.

During the first six months of 2007, with the domestic and overseas telecommunication markets growing strong and steady, the Group maintained steady growth for its domestic business. In the domestic market, its TD-SCDMA and GSM products in particular delivered outstanding performance and China Mobile became the Group’s largest domestic customer. In the international market, the Group focused on developing premium customers among multinational carriers and mainstream carriers in various countries, in addition to reinforcing its stronghold in traditional markets in the Asia Pacific region, South Asia and Africa.

(ZTE Corporation)
Report: Voice Drives IMS

Service Delivery Platforms (SDPs) are the means by which service providers can introduce fully-converged fixed/mobile consumer services, without waiting for network convergence to happen. SDPs can enable a whole new generation of value-added consumer services that will halt the decline of fixed-line revenues and establish a foundation for the adoption of IMS-based multimedia applications, reports In-Stat. Converged Voice Services (CVS) is the killer IMS application everyone has been looking for, the high-tech market research firm says. (Aug 21, lightreading.com)

Optical Transport Shines

A newly published report by Dell’Oro Group, the trusted source for market information about the networking and telecommunications industries, reveals that revenues from total worldwide sales of WDM, SONET/SDH and optical switch equipment grew 8 percent over the first quarter of 2007, and reached its highest quarterly revenue level in over five years. The report indicates that all major regions of the world contributed to the second quarter’s growth. (Aug 22, lightreading.com)

Ofcom Reports on UK Market


UK consumers now spend 50 hours per week on the phone, surfing the internet, watching television or listening to the radio. Average daily internet use in 2006 (36 minutes) was up 158% on 2002 and time spent on the mobile phone (almost 4 minutes per day) was up 58%. Time spent watching TV was down 4% at 3 hours and 36 minutes, listening to radio was down 2% at 2 hours and 50 minutes and time spent on a fixed line phone was down 8% at 7 minutes. (Aug 28, unstrung.com)

CDMA2000 Hits 50M

The CDMA Development Group (CDG) today announced that India’s CDMA2000(r) subscriber base has surpassed 50 million fixed and mobile device users. Subscriber growth reached this milestone only five years after the technology’s introduction to the market, half the time it took GSM to reach the same number. (August 22, unstrung.com)

Carriers Chosen for European iPhone

Apple has chosen its carriers for the iPhone launch in Europe, according to a report published Tuesday in the Financial Times. The report, citing unnamed sources, said the chosen partners are T-Mobile Deutschland for Germany, O2 in the UK, and Orange SA for France. (Aug 22, newsfactor.com)

Swisscom Adds Music Video

Swisscom Mobile today launched an ad-enabled mobile music video service through their Vodafone live! portal, offering customers an extended choice of music content ranging from the biggest names in music, to local artists, to rising stars. (Aug 27, lightreading.com)
ZTE has a strong position in its domestic market but is seeking to boost international sales in the handset segment and through recent product launches in the picocell, FTTx, IMS, and other segments.

**Executive Summary**

**Corporate overview**
ZTE is a leading global provider of fixed and mobile telecommunications equipment and network solutions. It was established in 1985 and by the end of 2006 had 39,266 employees.

ZTE began targeting overseas customers in 1995; since then it has won contracts with more than 500 operators in more than 100 countries globally.

**International presence**
ZTE has established R&D facilities in China as well as Asia (India and Pakistan), the United States, and Europe (France and Sweden). Each institute specialises in a different technology/product area. The vendor also has about 4,500 employees at 96 representative offices throughout the world.

**Financial and Operational Performance**

**Revenue trends**
Table 1-2 shows the breakdown (%) of ZTE revenues split by geography and business lines.

### Table 1 ZTE revenues split (%) by geography

<table>
<thead>
<tr>
<th>Unit</th>
<th>2005</th>
<th>2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>64.3</td>
<td>55.6</td>
</tr>
<tr>
<td>Asia (outside China)</td>
<td>21.2</td>
<td>25.0</td>
</tr>
<tr>
<td>Africa</td>
<td>13.1</td>
<td>11.1</td>
</tr>
<tr>
<td>Other Regions</td>
<td>1.4</td>
<td>8.3</td>
</tr>
</tbody>
</table>

### Table 2 ZTE revenues split (%) by business lines

<table>
<thead>
<tr>
<th>Unit</th>
<th>2005</th>
<th>2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wireless Communications</td>
<td>41.4</td>
<td>39.9</td>
</tr>
<tr>
<td>Wireline Switch and Access</td>
<td>12.8</td>
<td>9.9</td>
</tr>
<tr>
<td>Optical and Data Communications</td>
<td>15.5</td>
<td>16.8</td>
</tr>
<tr>
<td>Handset</td>
<td>20.1</td>
<td>19.6</td>
</tr>
<tr>
<td>Telecommunications Software Systems, Services, and Other Products</td>
<td>10.2</td>
<td>13.8</td>
</tr>
</tbody>
</table>

**Key findings**

- ZTE has a strong position in its domestic market, and has particularly seen success in selling CDMA systems to emerging markets.
- The vendor is enjoying leadership in the TD-SCDMA space with a US$313.9-million deal with China Mobile’s parent.
- ZTE is seeking to boost international sales in both emerging and developed markets through an international R&D presence, new products in the CDMA-evolution and GSM-evolution handset space, and collaborating with international bodies on interoperability.
- Recent major wins include the provision of WiMAX PC cards and USB form factors to U.S. operator Sprint Nextel and the supply of ultra low-cost handsets Vodafone 125 and Vodafone 225 to support Vodafone’s emerging market strategy.
- Recent product launches include the gigabit passive optical network (GPON) solution, the ZXA10 product series, dual-mode pico BTS-ZXG10 S8001, and new network transmission architecture–IP over WDM.
in revenues by geography and business unit in 2005 and 2006.

**Recent contracts (in 2007)**
See Table 3-6.

### Company Strategy
This analysis is based on Global Insight’s tracking and interpretation of ZTE’s recent activities.

### Increase international sales
In 2006 more than half of ZTE’s revenues came from China. However, the share of sales beyond China is increasing as ZTE pursues an internationalisation strategy. Sales of CDMA infrastructure for mobile, fixed wireless, and trunking access have been one of the driving forces of ZTE’s increased international sales.

### Boost handset sales
ZTE manufactures and markets CDMA, GSM, PHS, and 3G (WCDMA/UMTS, CDMA 2000, and TD-SCDMA) handsets to more than 50 countries worldwide. By the end of 2006 it had achieved global handset and other terminal sales of 15 million units. By the end of 2005 its global CDMA shipments had reached 10 million. As well as seeking volume deals, ZTE has also developed a range of higher end products.

### Drive long-term growth through R&D into new technologies and products
At the end of 2006, ZTE had 13,600 R&D staffers, or 34.6% of its total workforce. In 2006 ZTE spent 2,832.7 million renminbi on research and development (12.3% of its total

<table>
<thead>
<tr>
<th>Date</th>
<th>Country</th>
<th>Operator</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>April 2007</td>
<td>Rwanda</td>
<td>MTN Rwanda</td>
<td>Contract to deploy backbone network and metro network in the capital, Kigali. Will utilise ZTE’s ZXMP S330 SDH transmission equipment.</td>
</tr>
<tr>
<td>January 2007</td>
<td>Bulgaria</td>
<td>Vestitel</td>
<td>Contract to provide high-end router and switching solutions to enable such services as corporate internet and VPN services to a larger number of subscribers. The deployment will employ the ZXR10 T64E and GER routers and T64G and T40G switches.</td>
</tr>
</tbody>
</table>

**Table 3** Optical and data communications

### Supply of ultra low-cost handsets Vodafone 125 and Vodafone 225 to support Vodafone’s emerging market strategy.

### Joint development of 3G handsets for the Spanish market.

### ZTE to provide 900,000 handsets (of 40% of China Unicom’s handset needs) for the first quarter of 2007.

<table>
<thead>
<tr>
<th>Date</th>
<th>Country</th>
<th>Operator</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>May 2007</td>
<td>United Kingdom</td>
<td>Vodafone</td>
<td>Supply of ultra low-cost handsets Vodafone 125 and Vodafone 225 to support Vodafone’s emerging market strategy.</td>
</tr>
<tr>
<td>February 2007</td>
<td>Spain</td>
<td>Telefonica de Espana</td>
<td>Joint development of 3G handsets for the Spanish market.</td>
</tr>
<tr>
<td>February 2007</td>
<td>China</td>
<td>China Unicom</td>
<td>ZTE to provide 900,000 handsets (of 40% of China Unicom’s handset needs) for the first quarter of 2007.</td>
</tr>
</tbody>
</table>

**Table 4** Handsets

### Contract for nationwide MSAN.

### Provision of ZTE Class 5 Softswitch for installation in London’s Docklands telecoms hub.

<table>
<thead>
<tr>
<th>Date</th>
<th>Country</th>
<th>Operator</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>June 2007</td>
<td>Malaysia</td>
<td>Telekom Malaysia</td>
<td>Contract for nationwide MSAN.</td>
</tr>
<tr>
<td>February 2007</td>
<td>United Kingdom</td>
<td>Global e Networks</td>
<td>Provision of ZTE Class 5 Softswitch for installation in London’s Docklands telecoms hub.</td>
</tr>
</tbody>
</table>
revenues, up from 9.1% in 2005). This is a relatively high proportion of spend on R&D. In 2006 Alcatel-Lucent spent 11.9% of its revenues on R&D, while Nokia, another competitor, spent 9.5% of its net sales on R&D.

Launch new products

ZTE is actively engaged in developing (through R&D and related patent activity) new products and services that meet operators’ requirements in a number of areas, including:

- Capital expenditure- and operating expenditure-efficient infrastructure (such as softswitches), reflecting the need to manage costs in an intensely competitive service provider market;
- Equipment that creates greater capacity in all areas of fixed and mobile networks, including the access network (e.g. ZXA10 GPON) and backbone network, to cope with greater voice, data, and video traffic;
- Gear that enables the launch of new services (such as IPTV) or seamless access/interoperability between different types of networks (ZIMS);
- Infrastructure that enhances coverage within (such as in-building cellular coverage Home Node B) and beyond existing networks (such as WiMAX); and
- Functionality-rich handsets that are affordable in lower income countries/segments.

Recent new products include:

- July 2007: Announcement of the availability of gigabit passive optical network (GPON) solution, the ZXA10 product series, which supports the delivery of triple-play services.
- June 2007: Launch of ZTE’s smallest GSM base station, the dual-mode pico BTS–ZXG10 S8001.
- June 2007: Launch of new network transmission architecture–IP over WDM.
- April 2007: Launch of new IMS-based solution (ZIMS), which supports multiple access types, as well as fixed-mobile convergence services.
- March 2007: Launch of CDMA2000 1xEV-DO Rev. A solution specifically targeted at AWS licence winners. Can be configured for cellular (800 MHz), PCS (1900 MHz), and AWS (1700/2100 MHz) frequencies.
- March 2007: Unveiling of ZTE’s F3G (Fast Triple Gain) multimedia

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### Table 6 Wireless communications

<table>
<thead>
<tr>
<th>Date</th>
<th>Country</th>
<th>Operator</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>July 2007</td>
<td>United States</td>
<td>Sprint Nextel</td>
<td>Master purchase agreements for WiMAX PC cards in express and USB form factors, and home modem.</td>
</tr>
<tr>
<td>June 2007</td>
<td>Malaysia</td>
<td>Telekom Malaysia</td>
<td>Contract for nationwide MSAN (multiple access service network)</td>
</tr>
<tr>
<td>June 2007</td>
<td>Poland</td>
<td>Polkomtel</td>
<td>Alliance to promote mobile multimedia and internet applications in Poland.</td>
</tr>
<tr>
<td>May 2007</td>
<td>Georgia</td>
<td>UTG</td>
<td>Contract to deploy all-IP CDMA WLL network.</td>
</tr>
<tr>
<td>January 2007</td>
<td>Czech Republic</td>
<td>Mobilkom</td>
<td>Deployment of CDMA2000 1xEV-DO Rev. A network nationwide to support PTT and data services.</td>
</tr>
<tr>
<td>January 2007</td>
<td>Libya</td>
<td>GPTC</td>
<td>Provision of 300,000 lines. ZTE will supply its all-IP CDMA 2000 solution.</td>
</tr>
<tr>
<td>January 2007</td>
<td>Malaysia</td>
<td>Electcoms</td>
<td>Launch of GoTa network based on ZTE’s CDMA digital trunking system.</td>
</tr>
</tbody>
</table>
network solution in the CeBIT, which enables the convergence of IPTV, fixed-line, and mobile telecoms services onto a single service platform.

- February 2007: Launch of new ZXWR R8840 micro base station (remote radio unit) to extend UMTS coverage.
- February 2007: Launch of new MF362 data card, an HSDPA/HSUPA-compatible data card supporting a wireless uplink transmission rate of 2.0 Mbps and a wireless downlink rate of 7.2 Mbps.

**Increase addressable market through gaining product licences and participating in interoperability tests**

ZTE is actively engaged in seeking approval for new products, both domestically and internationally, to increase its addressable market.

- July 2007: ZTE said that its IMS product portfolios support the MultiService Forum (MSF) R3 “NGN Guidelines” and comply with the MSF Release 3 Architecture.
- March 2007: Approval of ZTE’s high-end router ZTE’s ZXR10 by the MFA Forum in conjunction with the European Advanced Network Testing Centre (EANTC) in Berlin.
- March 2007: Awarded TD-SCDMA entry certificate by the MII.

**Partner with other vendors to target new segments**

Like other Tier 1 equipment vendors, ZTE has teamed up with vendors with an existing capability in a niche area to enrich its products:

- March 2007: Deal with Fastap, a patented keypad design technology, to support the launch of ZTE’s high-end D-series handsets, to be offered in North America and global markets in 2007.
- February 2007: Co-operation with South Korean vendor Samsung to develop WCDMA-based Home Node B products (or femtocell) to further the convergence of services within the home.

**Comment**

As per above, based on Global Insight’s tracking and interpretation of ZTE’s recent activities, ZTE is pursuing the following inter-related strategic goals:

- Increasing international sales;
- Driving long-term growth through R&D into new technologies and products;
- Launching new products;
- Increasing addressable market through gaining product licences; and
- Partnering with other vendors to target new segments.

To date ZTE has seen most success in developing business in relatively low-income emerging markets. Its deals with Telefónica and Vodafone are aimed at providing low-cost...
On the domestic front, ZTE is well-placed to benefit from the development of a market in TD-SCDMA equipment and handsets. Although the government has yet to make a final announcement on 3G licensing, its preference for TD-SCDMA bodes well for ZTE. In March 2007 ZTE, along with Datang, received the go-ahead to sell TD-SCDMA core networks, radio network controller, base station, and application platform. ZTE’s leadership in the area of TD-SCDMA has established powerhouses with the ability to offer end-to-end solutions to their large European, North American, and Asian customers. All of the major European and North American infrastructure vendors also have strong relationships with their major telco customers. These relationships are being strengthened, in some cases, through the increasing trend of outsourcing the management of fixed and mobile networks to vendors such as Alcatel-Lucent, Ericsson, and Nokia.

The current suppliers of major global operators such as Telefónica and Vodafone are set to benefit from the overseas expansion of these operators. Major vendors are also best-placed to defend their position during large-scale consolidation between operators (such as AT&T/SBC/BellSouth). We expect to see further consolidation in the mobile and alternative operator segments in Europe, Latin America, North America, Middle East and Africa, and Asia, which could have a negative effect on capital expenditure. Other risks include the limited take-up of WiMAX, resulting in delayed or reduced deployment.

R&D, new product launches, gaining product licences, and partnering with other vendors to target new segments will help ZTE’s efforts in driving international sales and winning contracts with major international telcos. However, ZTE faces a number of risks and challenges.

The main challenge ZTE faces is intense competition. The consolidation of the major vendors—such as Alcatel and Lucent, Ericsson and Marconi, and Nokia and Siemens’ carrier infrastructure business—has established powerhouses with the ability to offer end-to-end solutions to their large European, North American, and Asian customers. All of the major European and North American infrastructure vendors also have strong relationships with their major telco customers. These relationships are being strengthened, in some cases, through the increasing trend of outsourcing the management of fixed and mobile networks to vendors such as Alcatel-Lucent, Ericsson, and Nokia.

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ZTE is a relative newcomer to the handset market, but is recording strong growth.

ZTE is not as concerned as the world’s largest handset vendors with average selling price (ASP) levels. ZTE is more concerned with volume and developing long-term relationships with major international operators.

ZTE is at a relatively early stage in developing its infrastructure business within the developed markets.

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Shanghai Telecom’s Strategies for Successful IPTV Deployment

Hu Cuiwen

Background
Shanghai, the most illustrious of Chinese cities, once known as the Paris of the East, now calls itself the Pearl of the Orient. It has a huge population and modern lifestyle. Shanghai Telecom, a branch of China Telecom, the largest operator in China, has become a pacemaker for the broadband market, with more than 2.1 million broadband users—each generating a monthly APRU of RMB 130 (US$17). China Telecom is aggressively promoting Internet Protocol Television (IPTV) services at the time when China’s fixed-line phone market is shrinking. Shanghai Telecom joined hands with Shanghai Media Group (SMG), the leading Chinese broadcasting and television operator, to test IPTV in 2005. The successful trial gave Shanghai Telecom the confidence for a large-scale promotion in the city.

Project Overview
Shanghai Telecom planned to build a system with 100,000 subscribers who will be offered around 58 live H.264 standard definition (SD) TV channels and 3000 hours of VoD programs in the first phase. As a leading provider of telecommunications equipment and solutions, ZTE has been selected in 2006 to supply IPTV equipment for 50,000 lines, including 25,000 concurrent users.

After three months’ hard work, ZTE built a system that can offer all services that customers require. On September 1, 2006, China Telecom and SMG have officially started the allocation of IPTV-enabled phone numbers in Shanghai, indicating the availability of the operator’s IPTV network for commercial use.

By the end of March 2007, Shanghai Telecom had accepted applications from 120,000 subscribers, which exceeded the load threshold of the current capacity. Shanghai Telecom had an urgent need to expand the system in the second phase. Because of the perfect network performance in the first phase, ZTE was awarded the IPTV network expansion contract from Shanghai Telecom. ZTE’s involvement in the second phase includes the provision of around 101,000 ports. The second phase has started this July. To date, Shanghai IPTV network has become both the largest commercial network in China, and the largest H.264...
standard-based IPTV network in the world.

**Successful Factors**

All carriers are taking a keen interest in finding the successful ways to approach IPTV services. What did it take for Shanghai Telecom to enter the market successfully with its IPTV offerings? There are three reasons for this:

- **A powerful service generator**
  In the first phase of the project, end users are offered basic video services like live channel, VoD, Time shift TV (TSTV) and Network Personal Video Record (NPVR). The TSTV function is promoted to subscribers as a key benefit since it is an interactive application wherein end user can view their favorite TV programs at their chosen time, as well as pause or rewind the TV programs at any time. Furthermore, media sharing and remote medical services will be implemented as value-added services for customers.

  Services have always been the carrier’s cash cow. Shanghai Telecom is focused on providing value-added service packages to attract new users and increase user loyalty, as well as to make their life more convenient and fun. Now, ZTE is developing specialized services defined by Shanghai Telecom to promote IPTV services. Some of the specialized services include Karaoke services, online stock information and video conferencing.

  The video conferencing function is worth mentioning here. Video communication services provide an effective means to overtake cable operators’ triple play package, and enable operators to significantly improve customer retention. Carriers can easily develop more applications such as remote education, remote health care, on top of the IPTV platform.

- **Effective promotion**
  At the beginning, the end users had no idea what IPTV was, and weren’t interested in it either. Shanghai Telecom and SMG made great efforts to promote IPTV services. Firstly, they did a lot of market investigations and defined that the target customers are high-end white-collar consumers who have strong purchasing power, and are ready to accept the new things. Then, they made frequent advertisements on newspapers, magazines and even on TV. In the first phase, they advertised TSTV and TVOD services as “a new way to watch TV–you can get anything whenever you want”. In the second phase, they advertised and promoted more value-added services like weather station, media sharing, and TV yellow page, with the message “you can get whatever information you want”.

  Furthermore, Shanghai Telecom promoted the IPTV service with a strong business plan—the end user can get a free STB if they sign a two-year contract and pay in full. The price strategy attracted many users to Shanghai Telecom’s IPTV services.

- **Value chain cooperation**
  The development of IPTV needs a mature industry chain. The carrier must build a good relationship with every link in the IPTV industry chain such as content providers, service providers and equipment vendors. Shanghai Telecom has taken a series of measures to create win-win relationships. Firstly, Shanghai Telecom introduced a revenue-sharing arrangement between itself and SMG, which led the two parties to change their roles from a simple infrastructure/content provider to an integrated service provider. Secondly, the operator built up an integrated management platform so that two equipment vendors can manage the product, service and customers via the same platform. Finally, the operator collaborated with Internet Service Providers (ISPs) such as Sina, Tudou and Shanghai Online to develop more value-added services leading to more revenue gains.

The success of IPTV services depends on operators’ business models and content offerings. Through getting the right contents, advertising and pricing, as well as cooperation in the industry, Shanghai Telecom achieved a successful IPTV launch. Shanghai Telecom is now targeting enterprise users like hotels, governments and schools while also trying to launch more services for users.
Fiber to the World: Next Generation Broadband Access Solution

Jérôme Auberge—Senior Broadband Access Product Marketing Manager (Western Europe)
Christophe de Saint-Martin—Director of Marketing (Western Europe)

Introduction

Choosing the right strategy for fiber-to-the-x (FTTx) deployment is the challenge for operators, whether incumbents, alternative or new entrants like municipalities or power utilities who are willing to preserve their investment, optimize CAPEX and OPEX expenditures while maximizing their revenues with new services.

There is no “one size fits all” solution, and each option depends on the addressed market, the regulatory environment and the deployment cost.

A smooth evolution path reusing copper cables can be the first step for incumbent operators with combined FTTx/xDSL topologies while greenfield operators may find an opportunity to deploy pure fiber-to-the-home (FTTH) networks to offer service differentiation to end-users with higher speed services.

ZTE can address all types of FTTx network requirements with the most appropriate technology, and offer end-to-end solutions for FTTx networks leveraging from over 12 years experience on fixed access networks and data communication products.

The Smooth Evolution Path

Operators may deploy combined media access networks, bringing optical fiber to an intermediate distribution point located in an indoor/outdoor remote office or point of presence, and then reach each end-user with xDSL technologies using existing copper cables; this strategy has been already chosen by some incumbent operators willing to cut the deployment...
costs mainly based on civil works.

A combined FTTx/xDSL topology can be based on a point-to-point architecture using Ethernet switches with IP DSLAM.

Another alternative is to use a passive point-to-multipoint topology to bring either FTTH services directly to end-users through optical network terminals (ONTs), or xDSL services through an intermediate Optical Network Unit (ONU) like an IP DSLAM.

**Fiber Based Access Networks - The Sky is the Limit**

By installing a fiber optic cable directly to the end-user’s premises, carriers will have two alternatives, either based on point-to-point (P2P) or point-to-multipoint (P2MP) architectures.

**Combined FTTx/Ethernet LAN networks**

In this case, a dedicated fiber is used between the central office and each end-user, and the appropriate technology is Ethernet. Optical Ethernet switches find their best fit either in the central office or in the remote office. In some cases, the existing LAN can be reused, building up a combined FTTx/Ethernet LAN network.

**FTTH networks**

As xDSL technologies offer decreasing speeds when distance between central/remote offices and end-users increase and as Ethernet LAN is distance limited when based on copper, FTTx topologies, using fiber media and based on passive optical network (xPON) technologies, allow higher distances, up to 60 km, while preserving higher speeds, with up to 100 Mbps per user.

This solution is based on a point-to-multipoint topology using a shared optical access network by users: passive splitters are used to distribute a single fiber to several users.

While Ethernet PON (EPON) technology, based on Ethernet, offers theoretical 1.25 Gbps symmetrical speeds over 20 km for up to 32 users, Gigabit PON (GPON) technology is based on ATM, Ethernet and TDM protocols, and it offers two asymmetrical speeds (theoretical 2.5 Gbps downstream and 1.25 Gbps upstream) over 60 km for up to 64 users, thus offering additional CAPEX savings with increased density.

PONs reduce OPEX by eliminating active components requiring power, maintenance, air cooling, and space demand; they offer a future-proof solution since fiber keeps offering preserved investments to operators while ONT/OLTs can evolve with new standards.

For all these evolution paths, ZTE provides an unmatched portfolio of Ethernet switches with ZXR10 series, of xPON switches with ZXA10 series, of Next Generation IP DSLAM (Full Service Access Platform series) with FSAP 98xx series, and offers a complete family of Customer Premises Equipment (CPE) to address and satisfy the needs of both operators and end-users.

**Unmatched FTTx Product Portfolio**

ZTE offers an unmatched portfolio for all types of FTTx networks (Fig.1). Depending on the access network deployment strategy, whether based on a combination of fiber and copper like FTTx/xDSL or based on point-to-point or point-to-multipoint configurations, central offices or remote offices can be equipped with either ZTE’s pure Ethernet switches or ZTE’s next generation broadband optical access solutions, like pure xPON switches or Full Service Access platforms.

These solutions are established to

![Figure 1 ZTE’s unmatched next generation broadband access portfolio](image-url)
build a new generation optical access network, and to meet the needs of increasing bandwidth at the access layer.

Like the network infrastructure platforms seen previously, ZTE offers an unmatched portfolio for CPE, as shown in Fig. 2, that fits to FTTx networks. ZTE’s CPE portfolio can be divided into 4 families: access switches, xDSL modems, home gateways and ONTs.

**New generation Ethernet switches**

ZTE’s Ethernet switches are the answer to the FTTx/Ethernet LAN deployments requirements. They could be installed either in central offices, when they feature large capacities and performances like ZXR10 T40G/T64G/T160G series, or find a best fit in remote offices or in end-user buildings with lower capacity platforms offered by ZXR10 28xx/3xxx/5xxx series.

**ZXR10 T40G/T64G/T160G**

ZTE’s T40G/T64G/T160G routing switches are new generation intelligent multi-service routing switches featuring large capacities and high performances. They have Layer 2/3/4 wire-speed switching capability, with QoS, MPLS, NAT services processing, bandwidth control and multicast functions.

They provide wire-speed Internet-level routing and switching functions, adopt modular design and a parallel processing mechanism based on multiple processors, and support a wide variety of interfaces, such as 10GE, GE, and FE.

**ZXR10 28xx/3xxx/5xxx series**

While higher capacity ZXR10 T40G/T64G/160G series are mostly adapted for central offices, ZXR10 28xx/3xxx/5xxx series are the best fit for remote offices or in end-user buildings.

ZXR10 28xx series are L2 Ethernet switches oriented to the access layer of enterprise networks and broadband IP MANs. These switches provide users with high-speed, high-efficiency and inexpensive access and convergence solutions.

ZXR10 32xx/39xx series Intelligent Ethernet Switches are L3 switches that provide high availability, security and quality of service (QoS) to enhance the operation of the network.

ZXR10 52xx/59xx series are L3 Gigabit Intelligent Ethernet Switch using high-speed ASIC forwarding chips to carry out L2-L7 data wire-speed forwarding.

**Next generation IP DSLAM**

FSAP 9800 and 9806H (Fig. 3) both offer a smooth evolution path within xDSL technologies, from ADSL to ADSL2+, VDSL2, SHDSL, or from xDSL technologies to higher speed internet technologies based on EPON/ GPON.

ZTE’s FSAP series can be installed either in central or remote offices, and offer solution from lower to higher capacities for FTTx passive optical networks in point to multi-point topologies.
Next generation EPON/GPON switches

ZTE’s ZXA10 C200 and ZXA10 C220 (Fig. 4) are tailored for passive optical networks using point-to-multipoint topologies. The ZXA10 C200 and ZXA10 C220 are OLTs that have been designed with EPON, GPON, Ethernet and xDSL technologies to be installed either in central or remote offices. They offer medium and high capacities for FTTx topologies respectively.

Choosing the right FTTx deployment is not a simple question. ZTE, with unmatched FTTx product portfolio, can provide end-to-end FTTx solutions while taking customers’ requirements and needs into consideration. Aiming to be a global independent innovative enterprise, ZTE dedicates over 10% of its revenue to R&D and has participated many standardization organizations, laying a firm foundation for the continuous development of its next generation broadband access products.

ZTE References and Milestones on Next Generation Broadband access solutions

Ranked as one of the top three DSL providers in the world by Gartner Dataquest, ZTE has deployed over 18 million DSLAM lines in commercial applications worldwide in more than 40 countries including China, Greece, Egypt, India and Pakistan. At the 2004 Olympics, ZTE’s DSL has successfully provided athletes, referees, journalists and spectators from all over the world with quality broadband services in 16 venues and news centers.

In 2005, ZTE became a global supplier of ADSL equipment to France Telecom.

Among the 12 million modems already shipped, hundreds of thousands of CPEs have been selected in Europe by France Telecom and Bulgaria Telecom.

Apart from China, where ZXR10 series have been installed, ZTE’s ZXR10 series have been widely deployed in Romania for the national access network of the CATV Operator RDS. A Triple Play IP/MPLS Transport Network for the Bulgarian IPTV Carrier Vestitel and an IPTV Data Network for Telepassport in Greece have also been installed using ZXR10 series.

Regarding Fiber to the home networks, since end of 2004, ZTE has deployed commercial FTTH networks in China and in the USA; in addition, several FTTH trials are ongoing in China, Europe and Africa.

Today, thousands of end-users benefit from services such as voice, data, video and other kinds of applications using ZTE’s PON solutions.
IMS: The Way Towards Convergence

IMS is basically a signalling network based on SIP and Diameter. IMS is all about entirely rethinking the network and simplifying it with only three layers: Transport, Core and Services.

IMS has been designed to provide robust multimedia services across roaming boundaries and over diverse access technologies. This technology provides the real capability to merge the fixed network with the cellular world. IMS is the powerful engine providing Service control, Quality of Service, Charging of multimedia sessions and Integration of different services. IMS will also change the way of communicating by providing personalization. For instance, “Always on” does not mean “always available for everyone.” With IMS, the users have the capability to manage how they should be reached depending on their device, access, and their will to be reached or not by some users.

IMS frees up the application layer from the network and opens the potential for the development of new services and applications. Today, services are typically “vertically” developed. Thanks to IMS, the traditional vertical, silo-like service delivery mechanism is moved to a horizontal, shared service delivery platform. As far as customer access is concerned, IMS allows pragmatic fixed-mobile convergence by enabling...
centralized service control and management.

The IMS architecture has originated in 3GPP Release 5, and in Release 6 it became stable and more implementable. 3GPP2, ETSI TISPAN and ITU-T are using the same IMS core for different access technologies, which makes the IMS core a real convergent architecture over different access networks.

**ZIMS: ZTE IMS-Based Multi-Network Convergence Solution**

Fig. 1 shows the function entities in ZIMS—ZTE’s IMS-based convergence solution. ZIMS is an end-to-end solution that covers IMS network equipment, services platforms and terminals. It supports multiple access types such as WCDMA, CDMA2000, and fixed broadband access. It enables IMS users to enjoy rich multimedia services from both mobile and fixed accesses. ZIMS is based on Release 6 of the 3GPP specification and Release 1 of the TISPAN NGN specification. Its third commercial release widely deployed in China incorporates 3GPP Release 7, including its key features like Voice Call Continuity (VCC).

According to the logical positions and functionalities, the ZIMS equipment can be divided into IMS core, IMS edge, user profile, network interconnecting, service charging, element and network management system, and application servers.

- IMS core: Functional elements of the IMS core, including Interrogating-Call Session Control Function (I-CSCF) and Serving-CSCF (S-CSCF), are access-independent.
- IMS edge: Functional elements of the IMS edge are somehow access-related; although, IMS is agnostic to the access technologies. As far as standards for TISPAN NGN and 3GPP IMS are concerned, Proxy-CSCF (P-CSCF), Access Gateway Control Function (AGCF) and Policy Decision Function/Service Charging Gateway Function (CDF) are responsible for collecting and transferring CDRs from network elements to the billing center.
- Network management: Element Management System and Network Management System support the operation of the IMS network via FCAPS functionalities.
- Application server: ZTE provides a powerful service delivery platform (SDP) that encompasses all the three types of application servers defined by IMS standard organization: SIP AS, OSA/Parlay AS, and traditional mobile intelligent network (SCP).
China: The Market to Watch When Dealing with IMS

It’s vital that the migration of existing services to IMS and NGN should be seamless. Despite clear and substantial business and technology benefits, the migration towards IMS is very challenging for European operators as they have a mix of different generations of platforms.

In China, operators are facing lower constraints compared to European operators because they do not have so many legacy platforms. That’s why China is the region to watch when dealing with IMS. ZTE has already been deploying IMS-based FMC systems for almost all the Chinese leading operators.

Fig. 2 shows one of the typical ZIMS deployments for a leading Chinese mobile operator. It is the largest commercial IMS network in China till now, and the capacity is planned to be up to 220,000 users. ZTE provided all the IMS system equipment, including IMS core network, service platforms, IP bearer network, charging and management system, as well as IMS multimedia terminals and IMS PC client. Based on this deployment, rich converged services are provided, covering not only traditional voice call services such as IP Centrex, one number links you (ONLY), but also multimedia services such as instant messaging, presence, multimedia ring back tone, video conferencing, group list management, dynamic phone book, whiteboard, application sharing, etc.

Conclusion

Even if the maturity of IMS/FMC is questionable, it is of paramount importance to understand clearly the current trends and to avoid a “wait and see” attitude as the world is changing very fast and is opening the door to new service providers. Indeed, we are entering a new era where the ubiquitous broadband and IP is radically changing the traditional models of operators. IMS and SDP are the complementary solutions to cope with the following challenges: reducing costs, creating more revenues and increasing customer loyalty.

IMS/FMC enables a strong rationalization of the network with a unified core control layer and a unified service provisioning. By clearly decoupling the applications from the network, it also opens the door to many promising services as fixed-mobile convergence will develop the usage.

By focusing on FMC, ZIMS provides a graceful solution without any misalignment between fixed and mobile roadmaps. As a world-leading vendor with a full product portfolio, ZTE offers a 3GPP/TISPAN-based solution for all global mobile operators, fixed network operators, and full-service operators. This end-to-end solution that has been commercially deployed in China is the biggest IMS network all over the world. It focuses firstly on business users and secondly on consumers. It is a chance for the industry to understand the business case and the usage of IMS, and to analyse the challenges of interoperability and deployment.
It consists of three basic elements: a home gateway, which is a means for users to access a service; home network connection devices including Set-Top Box (STB), PC, videophone, Bluetooth phone, and etc.; and an Auto Configuration Server (ACS).

Home gateway
Home gateway (HG) is a very important part of ZTE Digital Home Total Solution. It is the integrated access gateway for home devices. As the core of the home network, HG controls and coordinates all devices at home; it also provides users with a uniform and convenient user interface.

Home network connection devices
Home network connection devices mainly consist of commonly used home devices such as analog phone, fax machine, USB printer, STB, video phone, IP phone, PC, Bluetooth phone, Wi-Fi phone, Wi-Fi camera, and etc.

ACS, based on TR069 protocol, is intended to support a variety of functions to manage a collection of customer premises equipment (CPE) and CPE LAN-side client devices. Its main capabilities include auto-configuration and dynamic service provisioning, software/firmware image management, status and performance monitoring, and diagnostics.

ZTE Digital Home Applications
The ZTE Digital Home Total Solution mainly provides the following four application services:

Triple play service
Triple play service bundles data, voice and video services. Laptops, PCs, PDAs, and handsets, as part of a fixed home network, can establish wireless connection with the home gateway through Wi-Fi and/or Bluetooth, thus maximizing accesses to wireless broadband data, voice and video resources. Analogue phone can access home gateway via FXS, realizing VoIP services. IP STBs, PCs, IP phones and video phones can access the home gateway via LAN, providing users with services like Internet browsing, Video on Demand (VoD), IPTV video multicasting, online interactive gaming, online learning via TV, and etc.

Fixed-mobile convergence
Users can realize communication with a GSM/3G network via a HG. A home dual-mode handset can achieve communication between a HG and a GSM/3G base station.
Media sharing
Media sharing includes sharing among home devices as well as sharing between home and external devices. For example, a PC, which can display image contents in a digital camera, can transfer picture files to an Internet server for storage via HG so that these files can be browsed with a STB or a PC when needed.

Home control
With ZTE Digital Home Total Solution, users can remotely control their home environment (e.g., powering home devices on or off) from their office or any remote location.

Highlights of ZTE Digital Home Total Solution
- Full product series
ZTE can provide a complete digital home product portfolio, including xDSL home gateway, Ethernet home gateway, xPON home gateway, EVDO/HSDPA/WiMAX Fixed Wireless Telephone (FWT) and diverse in-home connection devices, such as IP phone, video phone, Bluetooth phone, ATA, wireless AP, wireless network card, IP STB and so on. ZTE can provide a total of over 40 digital home product models.
- Feature-rich solutions
ZTE solutions boast of the latest and hottest features for triple play, Quality of Service (QoS), network security and network management. Both SOHO and home users can take advantage of ZTE digital home products to enjoy high quality communication services, information services, entertainment services and automation control services in a secure and manageable networking environment.
- Manageable and easy to install
With the large scale deployment of next generation CPE devices, their management becomes increasingly complex. TR069, as DSL Forum’s CPE WAN Management protocol, can control or even reduce the OPEX, as well as improve customer experience. ZTE is one of the pioneers in TR069-enabled CPE and ACS, and has developed auto-configuration management solutions to improve the manageability of CPE devices. Meanwhile, ZTE successfully participated in the second TR069 Interoperability Plugfest held at the University of New Hampshire. Test results indicated that ZTE’s CPE can interoperate with other ACS manufacturers (e.g., Motive/Alcatel, 2Wire, Cisco, SupportSoft, Siemens and Netopia).
- Multi-tier security mechanisms
End users can be protected from virus and attack with security mechanisms like multi-tier firewall, port forwarding, port trigger, service control, De-Militarized Zone (DMZ), bridge/IP/URL filter, and L2TP/PPTP/IPSec VPN.
- Perfect QoS to support current and future services
ZTE digital home products adopt a differentiated services (DiffServ) mechanism to implement QoS. The mechanism includes multi-tier priority queue, cache management, SP/DWRR queue scheduling algorithm, RED congestion avoidance, priority marking, traffic shaping, and policy management.
- Mass applications worldwide
As one of the leading DSL modem makers, ZTE ranks No.3 in its DSL modem output with about 10 million units delivered to more than 20 countries.

In March 2007, ZTE was awarded a 2-year contract for supplying 4-port ADSL Wi-Fi router to PCCW, one of the earliest and the largest IPTV carrier in the world. Meanwhile, ZTE H250 WiMAX modem and I201 series ADSL home gateways are shortlisted by Sprint Nextel and France Telecom.

Conclusion
Digital home market is booming with the proliferation of consumer devices. ZTE’s Digital Home Total Solution is an end-to-end solution that has various applications, and is very reliable, easy to use, and easy to manage, meeting users’ various needs and adding value for operators.
Recent years have seen the widespread deployment of optical fiber, with the rapid adoption of fiber-to-the-x (FTTx) and the fiber cable extended closer to end-users. Fiber-to-the-home (FTTH), as the technology for broadband access, has seen significant deployments in Asia-Pacific region, North America, and Northern and Western Europe. Top class operators, including NTT Group, Korea Telecom (KT), France Telecom and Verizon, see FTTH as the ultimate access network goal, as well as a way to attract more subscribers and further increase profit margins. It can be observed that supportive government policies also drive FTTH deployment; countries such as Japan, South Korea and Singapore regard broadband application as the measurement of national informatization.

In China, FTTH networks began to emerge in the year 2005. Major landline providers such as China Telecom and China Netcom have carried out testing, trials and commercial deployments of Ethernet-based passive optical networks (EPON); mobile provider, China Mobile, started its EPON project in 2006. Although FTTH applications started relatively late in China, it has huge potential market there. FTTH not only increases profit opportunities for equipment providers, but also drives the development of relative industry fields such as fiber, channel, connector, testing instrument, chipset, engineering and etc.

Fiber is known as the most important factor to spur widespread deployment of FTTH. From 2006 to the first half of 2007, the copper price has increased a lot, which inflated the costs of the products based on copper technologies such as copper cables. However, with the improvement of fiber producing techniques and procedures, the cost of fiber per mile has become very close to or even lower than that of copper. This, when coupled with the advantages of fiber itself, like longer transmission distance, portability, requiring no electrical power and shorter construction cycle, makes fiber the best choice for project engineering.

Optical module is another important factor to consider in FTTH implementation. The longer the distance is, the higher price for optical module will be. With the increasing spread of FTTH, optical module will rapidly decrease in cost.

Chipset is also a key contributor spurring this widespread deployment of FTTH. In the early stage of FTTH market, chipsets for FTTH applications are mainly based on Field Programmable Gate Array (FPGA), which has high price and power consumption and needs more space. When ASIC chipsets become generally available and widely used, the equipment price will go down quickly.

Furthermore, optical test instrument plays an important role in FTTH operation. FTTH system is composed of optical line terminal (OLT), optical network terminal/unit (ONT/ONU) and optical distribution network (ODN) system which connects OLT and ONT/ONU. The ODN components include fiber, connector, optical distribution...
frame (ODF), optical connecting cabinet, and etc. The whole passive ODN system is difficult to manage and maintain, especially when a splitter is inserted into it to support point-to-multipoint access. The passive nature of the whole network makes failure-finding complicated; however, the optical test instrument can quickly identify the point of failure in the fiber channel. There are now two kinds of fiber test instruments. One is Optical Time Domain Reflectometer (OTDR) and the other is optical power tester. An OTDR can measure fiber length and connection losses, and it can also locate the fiber break point.

Other components such as splitter, connector, ODF and engineering are also key factors encountered in the development of FTTH.

As one of the top leaders in xPON deployment, ZTE has launched end-to-end xPON solutions covering OLT, ONU/ONT, network management system and ODN. While meeting the applications requirements of FTTH, FTTB, FTTC, FTTO and FTTB+LAN, USA this June. ZTE’s GPON system has shown excellent interoperability with other vendors’ OLTs and ONTs. To date, ZTE has achieved almost 50 percent share of China’s FTTx market, and also has good results from international markets.
ZSmart: A New Generation Business Support Solution

Xu Duo

Core Competitive Capability of Operators

The fast development of network technology and the increasingly competitive markets drive telecom operators all over the world to speed up the process of new network construction and new services introduction. However, by adopting new technologies, can operators stand out from the competition?

Nowadays, new technology seldom brings the explosive growth of subscribers. Subscribers are losing passions for technology revolutions. When networks are converging and service offerings are becoming homogeneous, what constitute the core competitive capability of operators?

One can get the answer from the words of a high executive from China Mobile Pakistan (CMPak): “As China Mobile is unfamiliar with the people and the place in Pakistan, what can we rely on to beat the competitors? The answer is that we have a set of mature operating procedures, as well as a set of IT systems that support these procedures.”

How can a complete business model be brought about and implemented in the market? The top secret is that the precise business operating procedure, together with the underlying support system that enables the procedure, can make the whole business model come true.

Business operation support system is one of the important parts that compose the core competitive capability of telecom operators. A good business operation support system can match the business procedure and facilitate business expansion.

In a working meeting held in Hangzhou this March, Mr. Sha Yuejia, Vice President of China Mobile, set up the strategic goal to change the role of business operation support system from a business supporter to a business enabler. There is a huge difference between the roles played by a “supporter” and an “enabler”. A “supporter” can only realize IT automation of the present business procedure. However, an “enabler” should deeply understand operations of enterprises, be familiar with the telecom market environment, and master services development trends so as to provide operators with unique advantages in market battles. The above role change does not impose higher requirements only on to the operators’ support departments, but also to the support system providers.

What ZSmart Brings?

With many years of experience in supporting telecom operators all over the world, ZTEsoft, a leading telecom software company jointly held by ZTE, developed its new generation telecom business operation support system called ZSmart. Built on unified platform architecture, ZSmart suite provides rich business service components/product packages, including the extended service function packages for different networks and services. The various product packages and extended service function packages can be assembled flexibly to provide diversified solutions for different subscribers, various networks and telecom operators of different sizes. At the moment, ZSmart has been deployed successfully by 33 telecom operators in more than 30 countries and areas all over the world, serving more than 150 million end users.

In 2005, ZTEsoft enhanced the online charging feature of ZSmart, with a reference to 3GPP Online Charging System (OCS), so as to provide operators with the converged
online/near real-time, pre-paid/post-paid, all-services and all networks billing capabilities. The mostly used deployment modes of ZSmart include the following:

- **Pre-paid/post-paid converged customer care and billing mode:** This mode features both “hot billing” and “online charging” options. The pre-paid and post-paid services are no longer considered as oriented to different markets and customers, but as different payment methods. It is an innovative new generation comprehensive billing solution, with an industry-leading charging engine that supports real-time/near real-time billing models. It provides flexible bundle tariff plans, and can be deployed for different billing scenarios.

- **Enhanced pre-paid billing mode:** This mode can be applied to old/legacy support systems to address the operators’ requirements on reconstructing the pre-paid platforms (e.g., to combine several prepaid platforms, or to provide stronger billing capabilities to prepaid subscribers of a single network).

- **Post-paid customer care and billing mode:** ZSmart can be deployed as a post-paid billing mode although it has the online charging capability.

To support new market strategies and creative tariff bundles, the billing system must be equipped with a powerful charging engine that support flexible tariff plans and cover the entire market lifecycle of customers. Furthermore, the integration of other corresponding systems is required since the charging engine and billing system can not support the innovative tariffs and bundles on their own. A complete end-to-end solution is indispensable for operators. ZSmart can address these requirements with the following features:

### Customized tariff plans and a powerful charging engine

A powerful charging engine provides the following features:

- **Support for all services and different charging schemes**
  - It can support telecom services for all types of networks including fixed, mobile and IP. It can also support charging based on arbitrary attributes such as position, distance, time duration, QoS, as well as charging based on arbitrary measurements, such as session duration, traffic, event, transaction content, or combinations of measurements.

### A convenient and quick tariff designer

The numerous billing factors and complicated billing rules make it difficult to manage and maintain tariffs/bundles. An integrated and friendly management interface is required to manage all the policies and rules and facilitate operators in introducing new tariff plans. Based on multi-level pricing elements, ZSmart tariff plan designer provides a friendly interface for easy, quick and powerful tariff management.

### Multi-level structure of products and tariff plans

The charging engine provides a comprehensive product catalogue supporting the targeted marketing strategies of operators. Its simple and easy environment for creating new products and tariffs, together with the automatic product management procedure, enables quick introduction of new services, leading to customer satisfaction. It is also capable of supporting complicated products and tariff bundles, enabling cross-sale marketing strategy, as well as encouraging customer loyalty.

### Support for an open and customizable architecture

Despite the system flexibility, its rating rules may not be able to address all marketing scenarios. There is a need for an open architecture, based on which, the maintenance staff can develop and define new tariffs based on some open script languages. By extending the python script language, ZSmart’s charging engine has become
very flexible and effective.

An end-to-end comprehensive solution

As the tariff strategy becomes increasingly complicated, multiple processing procedures and different systems may be involved when a new tariff plan is adopted, which makes it very difficult for different systems to coordinate with each other. ZSmart’s customer care and billing comprehensive service solution provides the possibility of end-to-end flows (Fig. 1) during the horizontal and vertical fulfillment, assurance and billing (FAB) processes.

Tariff strategies for a complete customer life cycle

For operators, they need to analyze the focal points of the market competition, and consider questions such as who are the important target customers, and is it better to attract new customers or to get more value out of old customers. Different marketing strategies rely on different innovative tariff strategies.

Furthermore, since the focus of the tariff strategies will change along with the market environment, strategies targeting each phase of the customer lifecycle should be strongly supported, and various means, such as free equipment, product-service bundles, accumulation plans, and top-up discounts, can be adopted.

ZSmart OCS supports different marketing strategies throughout the customer lifecycle (Fig. 2).

Conclusion

As an important part of the operator’s core competitive capability, the business operation system tends to be more of an “enabler” that can quickly respond to the changing and complex market demands. As a new generation business support system that can strengthen operators’ core competitiveness, ZSmart solution is complying with this trend. It can help operators reduce time-to-market with attributes of convergent billing, easy operation, and rapid service deployment. Its capability to support comprehensive revenue assurance and new generation networks will continue to grow together with operators.

Figure 1 End-to-end process flow

Figure 2 Marketing strategies supported by ZSmart
Modern enterprises have stepped from the product competition age into the service competition age. An enterprise that wants to capture the market or enlarge their market share should not solely depend on technology and standards. Lowering prices cannot become the major means of attracting customers either. Customers are more concerned about provision of more and better services, as well as the services and profitability model that meet their requirements.

ZTE’s Concept of Customer Services

ZTE has established partnerships with over 500 operators in more than 100 countries around the world, and has supplied products and solutions to 30 of the world’s top 100 operators, and six of the world’s top 20 operators. While providing network solutions, the company has accumulated rich experience in customer services.

For ZTE, customer services do not only mean caring about the customers’ surface requirements but also their potential needs, and even the likely changes in their future demands. Dedicated to providing excellent customer services, ZTE continuously improves its service models and customer service contents, seeks professional, diversified and all-around services, and makes customer service teams closer to customer’s sites and markets.

With its optimized working processes and rich expertise, ZTE provides customers with continuous, efficient, and fast services. By providing excellent customer services, ZTE hopes to earn customers’ satisfaction and create win-win situations with its customers.

Customer Services Contents

ZTE is committed to ensuring high network availability and creating long-term value as well as growth potential for its customers. The company can offer them customized end-to-end service portfolios (Fig. 1), and the support of a well-structured organization, high-caliber staff, effective work flow and advanced tools, which will surely bring in huge benefits and dramatic profits for customers.

![Total Customer Service Solution](image-url)

**Figure 1 Total customer service solution**
Managed services
With high caliber staff and rich experience in telecommunications field, ZTE can provide tailor-made services for operators all over the world. By sticking to service level agreement (SLA) and key performance indicator (KPI), the company can help them achieve a high quality network and minimum downtime, optimizing their operating expenses (OPEX). Through managed services cooperation with operators, ZTE builds strong ties with operators and meet the challenges of competition together with them.

ZTE’s Customer Services System
ZTE’s customer services are backed up by its professional service teams, three customer service support platforms and a wealth of outsourcing service providers.

ZTE’s professional service team
ZTE has established 12 regional service platforms and more than 70 regional offices, employing more than 8,000 professional service staff globally to meet diversified demands of global customers. The localization rate of overseas professionals has reached 79%, which ensures that customers’ diversified business demands can be met.

Three customer service support platforms

● Customer support center
ZTE Global Customer Support Center (GCSC), established in October 2002, is a global service system which includes an integrated data-monitoring center and local customer service centers located in regional platforms. It provides 24 hours local and international hotline, customer issues management, remote diagnosis, telephone support, emergency resource allocation, software version management, and technical correction. Its work flow is illustrated in Fig. 2.

● Repair and return center
ZTE Repair and Return Center (RRC) was established in September 2002. Using first-grade technologies, advanced inspection/test facilities, ZTE RRC promises to offer satisfactory services to its customers. In order to better meet the requirement of customers, ZTE has set up two large-scale regional RRCs in India and Pakistan, in addition to the global RRC in China, and spare parts warehouses in every country office.

Outsourcing service providers
ZTE has built up cooperation relations with more than 800 international and local project outsourcing providers. In order to select its excellent partner, ZTE established strict standardized procedures such as needs analysis, qualification certification, agreement, training and certification, project cooperation appraisal, and incorporated key indicators such as technique, quality, response, environment, society responsibility, cost, and etc. Now, ZTE is closely working with famous service companies.

In today’s increasingly competitive telecom market, vendors have to seek innovations in terms of after-sales services contents to improve customer satisfaction. Customer services, as a means of marketing, will ultimately be beneficial to both vendors and customers. ZTE has already established a comprehensive customer services system, and, as always, will focus on customers’ needs and provide them with superior services.
Telus and ZTE announced on August 9 the exclusive availability of the ZTE D90, featuring Digit Wireless’ Fastap keypad. The ZTE D90 is the first mobile handset in the world to feature both Zi Corporation’s eZiType software for increased data input speed and accuracy, and the Digit Wireless Fastap keyboard, which dramatically simplifies the text input experience. With this announcement, ZTE became the first wireless phone manufacturer from mainland China to directly offer a device for sale in Canada.

The ZTE D90 incorporates a Fastap keypad that combines the use of backlighting with semi-transparent key graphics. Additionally the model features ‘hot keys’, enabling one-click access to services, applications or contacts. It gives clients full access to the Spark services that include Telus Mobile Music full track download service, Telus Mobile Radio (powered by XM Radio), Windows Live Messenger, Telus My Email and location-based services such as Telus Navigator and Telus Kid Find.

The D90 operates on Telus’ wireless high speed (EVDO) network and features a built-in 1.3 megapixel digital camera with zoom and nightmode, Bluetooth support for compatible accessories such as a stereo headset and expandable MicroSD port.

**About Telus**
Telus (TSX: T, T.A; NYSE: TU) is a leading national telecommunications company in Canada, with US$8.9 billion of annual revenue and 10.9 million customer connections including 5.3 million wireless subscribers, 4.5 million wireline network access lines and 1.1 million Internet subscribers.
ZTE F3G SOLUTIONS GIVE YOU A FULL-SERVICE NETWORK AT A QUICK BREAK-EVEN.

When upgrading your network, you should consider ZTE F3G solutions. You get a total solution for Triple-play that increases your revenue dramatically, and you could cut your break-even time by 50%.

The ZTE F3G concept is based on our experiences as a leading player in IPTV. It gives you a fully converged service platform, a centralized control network, and an end-to-end solution with the bandwidth needed.

It also gives you a smooth transition to a full-service network, and you can offer your customers voice, data, and video in one comprehensive package.

ZTE is the fastest-growing global provider of telecommunications equipment and network solutions. We deliver innovative, custom-made products and services to customers in more than 100 countries, helping them achieve continued revenue growth, and shaping the future of the world's communications.

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