ZTE's New WDM Product: General Service Switch Platform

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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.

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

Welcome!
WCDMA MBMS Solution
With MBMS, many mobile users can receive the same information on a common radio channel.

ZTE’s New WDM Product: General Service Switch Platform
The GSS is a solution that meets the demands of networking in the new IP age and paves the way to the future automatically switched optical network (ASON).

Application of G.653 Fiber in ZTE’s WDM Systems
The move to WDM poses a challenge for G.653 fibers.

ZTE’s F3G Solution Paves the Way Towards NGN
ZTE’s F3G solution has been proven to be very effective to help fixed line operators to deploy a smooth business migration.
Choosing the Right FTTx Architecture for the Access Network

As there is not a single architecture that can be applied to all projects at present, operators must consider the FTTx architectures’ characteristics and the resulting services when deciding what architectural design to use.

ZTE’s BBU+RRU Solution

ZTE’s BBU+RRU dynamic resources pool structure enables sharing of baseband resources and greater resource allocation flexibility.

Moving Towards 3G with ZTE’s All-IP CDMA2000 Solution

As the commercial process of EV-DO Rev. A speeds up, the pace of next generation networks evolution has quickened to all-IP networks.

ZTE IMS Terminal Software System

ZTE is a leading global provider of telecommunications equipment and network solutions. ZTE’s product range is the most complete in the world—covering virtually every sector of the wireline, wireless and handset markets. The company delivers products and services to customers in more than 120 countries.
Vodafone unveiled on May 21 its first Vodafone-only branded ultra-low cost consumer handsets, the Vodafone 125 and Vodafone 225, aimed at providing millions of people in emerging and developing markets the opportunity to access to the benefits of mobile technology for the very first time.

The Vodafone 125 and Vodafone 225 are part of Vodafone’s ongoing commitment to expand access to mobile in emerging markets, where mobile technology and networks are often the only viable and cost effective telecoms service. The handsets are therefore key to offering a range of services, particularly in rural areas where mobile penetration is often at its lowest.

The handsets are likely to retail at around US$25-$45 (19-35 euros) depending on the specific model and the local market conditions.

The Vodafone 125 and Vodafone 225 are the first handsets manufactured for Vodafone by China’s ZTE Corporation, following a global handset procurement agreement signed between the two companies in December 2006.

“The Vodafone 125 and Vodafone 225 are the first of a range of ultra-low cost handsets which will be manufactured exclusively for Vodafone and its affiliates by ZTE Corporation,” said Jens Schulte-Bockum, Vodafone’s Global Director of Terminals. “We are delighted that they represent everything that customers have come to expect from Vodafone’s high quality and exceptional value for money. We believe that the Vodafone 125 and Vodafone 225 will help enfranchise millions more people across the world, giving them good quality, attractive handsets, with popular features and functionality, at a reasonable price”

“Our work with Vodafone represents a big breakthrough in the market and has given ZTE an opportunity to demonstrate its capabilities in product design, production and management”, said He Shiyou, Senior Vice President of ZTE and General Manager of ZTE’s Handset Division.
ZTE has signed a 2.37 billion yuan (US$309 million) contract with the parent of China Mobile to construct a trial mobile network based on the homegrown TD-SCDMA standard.

Ninety percent of the contract involves providing equipment to China Mobile Communications Corp, to be used as part of its efforts to expand its trial networks for third-generation mobile services, based on the commercially untested TD-SCDMA standard. The mobile giant will also purchase about 237 million yuan worth of services, ZTE said in a statement filed with the Hong Kong stock exchange Monday.

Meanwhile, it has raised the amount of chips it plans to buy from United States-based Qualcomm by 66 percent to US$500 million.

In an April 2006 framework agreement, ZTE had said it intended to purchase US$300 million worth of chips in the two years leading up to this December.

(June 12, The Standard)

ZTE Signs Deal with China Mobile Parent

ZTE has signed its first commercial contract in Georgia for construction of a CDMA WLL network. United Telecom of Georgia (UTG) is the largest fixed line operator in Georgia and agreement with it signifies the success of ZTE in opening a doorway for itself in Georgian market.

The network, based on ZTE’s mature All-IP CDMA solution which enables wireless data transmission, better Quality of Service (QoS) and improved data service applications, will support a wide variety of data rich multimedia applications for UTG subscribers upon completion by August 2007. Whereas the phase 1 network is expected to mainly provision voice and 1X data services for over 100,000 subscribers from Kakheti region of west Georgia.

“We’re preparing to be a comprehensive operator, and this is our first time to adopt CDMA for a WLL network,” noted Mr. Jorg Schmolinski, CEO of UTG, “We have been impressed with the strength and depth of ZTE’s CDMA technology expertise, that is the reason why we eventually chose it.”

To date, ZTE has deployed over 75 million lines of CDMA equipment in over 120 carriers’ networks in more than 70 countries and regions. (ZTE Corporation)
Ericsson Lands $1B Deal

Ericsson signed a GSM expansion framework agreement with China Mobile, valued at about US$1 billion, at a ceremony in Sweden attended by Chinese President Hu Jintao.

The Chinese President is in Sweden on a state visit at the invitation of King Carl XVI Gustaf of Sweden—the first visit by a Chinese president to Sweden since the two countries established diplomatic relations in 1950.

President Hu Jintao was joined at the signing ceremony by Swedish Prime Minister Fredrik Reinfeldt, Wang Jianzhou, Chief Executive of China Mobile Communications Corporation, and Carl-Henric Svanberg, President and CEO of Ericsson, joined the two leaders at the ceremony.

(June 11, Lightreading.com)

China Mobile Launches Free Mobile IM

China Mobile has launched its own IM service, Fetion. It offers PC and mobile phone messaging at zero charge, even from mobiles, with just the GPRS data charges being paid for. Users will be able to IM between mobiles running the service; PC to PC and PC to mobile. Currently there’s no monthly charge, although they haven’t ruled out of possibility of it.

It will be interesting to see how this currently free service impacts SMS revenues.

Fetion will come pre-installed on new China Mobile handsets and the software will be downloadable online (PC, Mobile), so account holders should increase substantially.

(June 8, digital-lifestyles.info)

Vodafone Unveils Mobile Web Service

Vodafone has finally launched its new mobile web service in the UK, which allows greater use of the internet on mobile phones.

The Vodafone Live! service incorporates a new technology, which allows users to view web pages on their mobile more easily than before, by reconfiguring the pages for handheld devices.

Vodafone claims that some ten million of its customers already own or use the new third-generation phones and that there is a huge market for people wishing to access the ‘true’ internet wherever they are.

(June 7, usswitch.com)

Report: Home Gateways Triple

The worldwide broadband CPE market totaled US$1.5 billion in 1Q07, up 2% from the previous quarter, as broadband connectivity continues to grow in most regions, says Infonetics Research in its latest “Broadband CPE and Subscribers” report.

The market continues to get a push from service providers seeking to entice customers to subscribe to a bundle of voice, data, and video services, and their demand for intelligent CPE to prioritize traffic coming into and out of the home.

(June 7, usswitch.com)

Ericsson Snaps up SDP Firm

Only days after announcing the acquisition of billing company LHS Group, Ericsson AB has opened its wallet again to acquire service delivery platform (SDP) specialist Drutt Corp. for an undisclosed sum.

Ericsson’s move is yet another sign that the increasingly important but fragmented SDP market is entering a consolidation phase, as earlier this week two of the sector’s other vendors, AePona Ltd. and Appium AB, announced they are merging.

(June 8, Lightreading.com)
Evolution to Next Generation Contact Centers (NGCCs)

The contact centers that support enterprises today and of which we have grown accustomed to have evolved over a span of four decades. The evolution of contact centers can easily be explained over five distinct periods:

- **First generation of contact centers**
  This represents the first efforts by enterprises in managing incoming calls through the public switched telephone network. Calls were still manually screened then and the customer service representatives were eventually grouped by location to promote productivity.

- **Second generation of contact centers**
  This transient version of contact centers integrated the use of customer database as well as having begun using interactive voice response (IVR). This generation of contact centers marked a prominent reliance on workstations and local area networks (LANs), and hence enabled a faster reply rate and a lower degree of errors.

- **Third generation of contact centers**
  Advancement from the second generation of contact centers had further allowed for computer telephony integration (CTI) in this version of contact centers. This adaptation enabled a greater flexibility in data synchronization and also in expansion of the systems since there was a more seamless link between telephony systems and data networks.

- **Fourth generation of contact centers**
  The fourth generation of contact centers exemplifies the inclusion of other functionality such as pronunciation synthesis, speech recognition, click-to-call, and instant messaging. Also, this generation of contact centers are able to support many forms of media such as the Web, email, wireless application protocol (WAP), SMS and videos.

- **Fifth generation of contact centers**
  This latest form of contact centers utilizes the softswitch and Parlay/OSA, as well as next generation networks which also include 3G networks. Each contact center may have virtual contact centers that function independently in terms of service, management and operation, while still maintaining the ability to seamlessly share data between centers that are located within different regions. Also known as the next generation contact center (NGCC), it differs from IPCC since NGCC itself acts as a platform that can provide an open application programming interface (API) for third party applications. This allows for greater flexibility in functionality and expansion with the separation of call processing and control unique feature.

Essentially, contact centers have evolved from a time division multiplexing (TDM) set-up to one which is also TDM-based whilst simultaneously converging different forms of media to one which is running on an Internet Protocol (IP) platform to lastly, one that is able to run on NGNs. This trajectory has finally provided a feasible collaboration for triple play (voice data and video) within the contact center environment.
Market Demands Triggering Change in Contact Centers

As enterprises grow, the need for the organization to acquire a converged system capable of handling multiple types of customer interactions had become paramount. These demands include integrating vast amounts of data distributed across various operations support systems (OSSs), supporting remote customer service representatives (CSRs) in virtual contact centers and providing intelligent data mining engines to allow customers easier maneuver through the immense amount of information. Bigger corporations ultimately experience more pressing needs to break free from silos and ensure closer interactions amongst the business processes within the company. Senior management executives are increasingly being roped in to provide their opinions as well as to drive the high value proposition of contact centers. Fundamentally, the business models in contact centers have morphed over the years and hence new technologies have been developed and introduced to meet the demands. For instance, Session Initiation Protocol (SIP), Voice over IP (VoIP), and service-oriented architecture (SOA) can allow for easier implementation and at lesser costs by reducing it to a software and data issue.

Next Generation Contact Center (NGCC) Solution

An NGCC solution is built on an open NGN platform and hence is expected to be compatible with all forms of media. The level of system intelligence and interaction amongst the different business modules within the NGCC are of a more superior state than its predecessor. The NGCC offers a centralized management model which is not only able to perform network load management tasks but also provide intelligent call processing capabilities.

NGCC vs IPCC

The cardinal difference between NGCC and IPCC solutions lies in the former’s ability to conduct separation of call processing and control. This unique feature is in line with the next generation network (NGN) architecture, provides open interfaces that allow ease of third party applications integration.

The figure below highlights other distinct differences between IPCC and NGCC:

<table>
<thead>
<tr>
<th>Criteria</th>
<th>IPCC</th>
<th>NGCC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compatibility</td>
<td>Supporting NGN was not in its initial blueprint</td>
<td>Is established on the NGNs and therefore, is able to operate ‘tightly’ in that environment</td>
</tr>
<tr>
<td>Industry Standards</td>
<td>Normally supports vendor standards</td>
<td>Conforms to ITU PARLAY standard</td>
</tr>
<tr>
<td>Access Capability</td>
<td>Voice over Internet Protocol (VoIP) gateway supports internet and 2G networks</td>
<td>Functions on NGN, Internet, 2G and 3G networks</td>
</tr>
<tr>
<td>IVR System</td>
<td>Commonly dependent on hardware</td>
<td>Adopts media gateway control protocol (MGCP) and hence is able to implement IVR functions through software</td>
</tr>
</tbody>
</table>

Benefits of NGCC

Overall, NGCC is expected to provide more efficient means in managing productivity as well as to increase user experience for contact centers. This we expect to be translated into increased customer loyalty and reduced churn for enterprises and businesses. Its ability to support many more forms of media provides an avenue for higher margins in value added services (VAS), which is typically being sought after by mobile operators now.

Market Trends

In Asia Pacific, offshore outsourcing has been driving the growth for the contact center market. The rise in outsourcing revenues correlates with the increase in the number of domestic enterprises particularly in more mature markets such as Australia, Japan, South Korea, New Zealand.
and Singapore. Emerging domestic outsourcing markets such as China and India exhibit much potential for these services and has remained largely untapped as yet.

Enterprises from verticals such as Banking, Finance, and Insurance, along with Telecommunications displayed a more prominent appetite for outsourcing services. Frost & Sullivan expects handsets to remain as the preferred medium in contact center outsourcing environment, however we also anticipate the use of other forms of media such as emails and Web channels to increase more significantly in the near future.

In Asia Pacific, where NGCC implementation is not yet pervasive with most deployments stemming from China, Sichuan Telecom rises to the occasion by exemplifying a successful NGCC implementation for the region. ZTE Corporation, a global telecommunication equipment and network solutions provider based in Shenzhen, was engaged to fulfill the following requirements for

- ease of maintenance through real-time and remote monitoring
- a robust design which permits testing and analysis through breakdown-and-isolation means
- an open-standard that encourages third-party development
- a high quality of security in transmission, management systems and databases

Although the NGCC market in Asia Pacific is still nascent, initial efforts by a trail of vendors such as ZTE Corporation (in China, especially) have begun injecting the contact center market with new possibilities and foresight.

**Real Implementation**

Sichuan Telecom Company Limited (Sichuan Telecom) is a state-owned company that belongs fully to one of China’s telecom giants, China Telecom Group. The company operates a communication and network service business for voice, data, as well as broadband, and possesses a strong presence with branches spanning across 21 cities in the country. Sichuan Telecom has consistently made efforts to tap into the next generation networks (NGN) space; in 2006, the company had announced upgrading its existing metro Ethernet network in Luzhou, Sichuan to support the growing demands of its enterprise business.

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- a minimum requirement of 99 percent up-time in terms of service usability
- easy expansion to support new applications and operations without affecting existing system overhead and architecture
- a high level of flexibility to introduce applications based on user demand and costs patterns

**Conclusion**

The NGCC solution extends a proposition to mobile operators and service providers to stay ahead of its competitors in the contact center market. Nevertheless, the roll-out of NGNs in Asia Pacific is not yet widespread and NGCC vendors may need to work harder to a larger extent to convince its clients to dislodge from their current environment and move onto the new platform.
IPTV is a phenomenon that is in its infancy in India. But this is hardly stopping companies of neighboring countries from eying its potential. Why are vendors increasingly investing in setting up offices and manufacturing bases here? One major reason may be attributed to the huge population of the country, hence the enhanced prospects. Making the most of the growing opportunities, ZTE Corporation organized an IPTV workshop on April 19-20 in Shanghai. The company is a fairly new entrant in the IPTV space, with its first trial run undertaken in March 2006 for the Beijing arm of China Netcom. Having recently deployed IPTV in Shanghai, the company is now training its eyes to tap the latent potential here.

ZTE began its India operations in 2001 as a telecommunication equipment provider. The company, which provides products ranging from CDMA/GSM handsets, data cards and value-added solutions in the Indian market claims a 100 percent average growth rate in India over the

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**Workshop highlights**

The panel, which saw representatives from Intel, Shanghai Telecom, Irdeto and PCCW speak about IPTV, gave way to discussions on hurdles in deploying IPTV and finding different means of generating revenue.

**Hurdles:** Making networking simple at home, interoperability (This refers to the ability of a system or a product to work with other systems or products without special effort on the part of the customer: Web definition)

**Revenue generation:** Since revenue in the form of monthly fee is not sufficient as client base is still growing one has to look at other means such as: Horse racing, popular in Hong Kong. SPs can allocate a channel to broadcast the race. Exclusive content (e.g. a football game) would help as it would attract advertisers. Other options are e-commerce and betting.
past six years. ZTE was a participant in Convergence India 2007, during which time they realized the budding prospects for IPTV at hand. “The market here is huge. We also got to know that people here like music and entertainment is a big market, hence there is much potential,” claimed Yu Yifang, GM-Multimedia Products Line, ZTE Corporation.

**India Calling**

As the company slowly gains its foothold in the IPTV market worldwide, its plans for India are gradually taking shape. Fang shared that they had captured more than half of the IPTV market share in China and were at an initial stage in trying to get in touch with the India market. “There are essentially three steps in rolling out a product in a country. In the first step, the vendor must find out the customer needs and understand them. In the second step they must proceed to hold talks with the different carriers in the country. And finally, if the vendor’s systems pass the test, in terms of market requirement and SP requirement, then they can announce plans to rollout the product,” he added.

The trend in IT is also to go upcountry and that is exactly what ZTE plans to do. Even when deploying IPTV in China the company covered not only the metropolitan cities but also many provinces around the cities. This is a strategy they will adopt when deploying IPTV in India. When egged about when they would announce plans to rollout IPTV in India, Fang said it would all depend on the carriers.

**Strategy**

One of the advantages that ZTE has is in the form of existing R&D centers and local offices in the country. The company recently opened an R&D center covering a space of over 4,000 sq. m in Manesar. This facility manufactures telecom equipment and mobile handsets. As part of their expansion plans in India the vendor also indicated that they would consider starting a facility manufacturing broadband equipment in Chennai. Speaking about manufacturing IPTV equipment in India, Fang stated, “We may produce some products like set-top boxes in India. We have local R&D centers so we can use these to cater to the India market.”

Recognizing that India is a price conscious market, Fang claimed that both price and performance would be their forte. “We understand customer requirements so we will provide customized services. That will be our strategy; provide best performance at good price,” he added.

**Brand ZTE**

An important factor for any company is branding. They must go all out to be known in the market. Yu shared that ZTE was attending exhibitions in global markets and taking part in roadshows. The company is also all geared up to cover all systems for the Olympics to be held next year in Beijing.
Overview

Multimedia Broadcast/Multicast Service (MBMS), defined in 3GPP Release 6, specifies the transmission of multimedia service data from a single source to multiple recipients. With MBMS, many mobile users can receive the same information on a common radio channel; network resources consumption is dependent on the number of content channels rather than the number of users. When there are more concurrent users, network resources, especially radio resources, will be used in a more efficient manner.

Fig. 1 and Fig. 2 is a comparison between unicast and broadcast/multicast modes.

The MBMS offers both the streaming and download delivering methods, and enables bit rates of up to 256 kbps. The multimedia content offered via MBMS can be combinations of audio, video, text, still image, and etc.

Technical Solution

Network architecture

The MBMS network architecture is based on WCDMA PS domain. To realize MBMS, Broadcast/Multicast Service Center (BM-SC), an MBMS component, is introduced; the existing functional entities such as GGSN, SGSN, UTRAN and UE in the PS domain incorporate the functions of MBMS; and new logical channels are defined.

The MBMS network architecture is shown in Fig. 3. The new Gmb interface provides control plane functions between the BM-SC and the GGSN, while the Gi interface provides bearer plane functions.

The BM-SC includes the following five sub-functions for MBMS user service provisioning and delivery: membership function, session and transmission function, proxy and transport function, service announcement function, and security function.

The User Equipment (UE) shall support activation/deactivation of the MBMS bearer service; support security functions; receive MBMS user service
announcements and MBMS data or support simultaneous services (for example, a user can receive MBMS video content while speaking on the phone or sending and receiving a message).

The UTRAN is responsible for delivering MBMS data to the designated MBMS service area with appropriate radio bearers. The SGSN performs MBMS bearer service control functions for each UE and provides MBMS transmissions to the UTRAN. The GGSN acts as an entry point for MBMS data. The Cell Broadcast Center (CBC) is optional and may be used to announce MBMS user services to the users.

Service procedures

Two modes are specified for MBMS: broadcast mode and multicast mode. In the broadcast mode, the broadcast service can be received by all the MBMS capable UE. In the multicast mode, only the registered UE can receive the multicast service.

As depicted in Fig. 4, multicast and broadcast services are enabled by different phases; the broadcast mode does not include subscription, joining and leaving phases. These are user specific procedures and initiated by each multicast user.

Radio interface

3GPP requires changes introduced to the existing R99/R5 system should be as small as possible. Therefore, the MBMS solution minimizes the impact on the R99 physical layer and only makes some necessary modifications to Layers 2 and 3.

The MBMS services can be provided through a point to point (P-t-P) or point to multipoint (P-t-M) scheme. The dedicated radio bearer is used for P-t-P transmission, and the shared radio bearer is used for P-t-M transmission.

The MBMS P-t-P transmission uses exactly the same channel structure as the traditional unicast transmission. For MBMS P-t-M data transmission, three logical channels, MBMS control channel (MCCH), MBMS traffic channel (MTCH) and MBMS scheduling channel (MSCH), are added. The MCCH is used for control information transmission, and the MTCH is used for user data transmission. The MSCH is used for downlink transmission of scheduling information so that the UE can be informed of when to receive data from the MTCH in advance. These logical channels are mapped onto the forward access channel (FACH) transport channels with different data rates by the newly-defined MAC-m entity. The UEs in either the connected or idle mode of the Radio Resources Control (RRC) can receive MBMS traffic data when the P-t-M transmission is used, improving network resource efficiency and achieving power saving in a mobile terminal.

Application Prospect

MBMS enables various applications including multimedia broadcast services, file sharing, and etc.; however, mobile TV could be the critical application in the development of MBMS.

Mobile TV is gaining a lot of attention and has emerged as a major mobile application. As mobile TV receives increasing attention, there is a continuous debate over what standard should be adopted for mobile TV. Nowadays there are several dominant
It seems that MBMS is disadvantaged in its competition with those dedicated broadcasting technologies. MBMS, however, can be built on top of an existing 3G network. MBMS is a good choice for mobile operators who have or are going to have WCDMA networks. Firstly, to roll out mobile TV services, there are no needs for large-scale investments; secondly, MBMS allows operators to utilize the existing 3G networks to offer mobile TV, ensuring their control over the mobile TV; thirdly, MBMS offers operators many advantages (e.g., user discovery, localized services, various forms of services, priority mechanism and variable service data rates). In addition, MBMS can reuse WCDMA terminals to a great extent, posing minimum technical and design challenges for MBMS terminals.

**ZTE's Progress on MBMS**

As one of the important members of 3GPP, ZTE has been devoted to MBMS study ever since the standardization process began. A lot of contributions on MBMS have been proposed to and accepted by 3GPP. Meanwhile, ZTE has investigated the market prospects of MBMS and added it to its long-term product roadmap.

ZTE is going to launch the MBMS system based on its WCDMA R99/ R5 system in the second quarter of 2007. Its large capacity IP-based CN and RNC can be software-upgraded to become MBMS-aware. The Node B that supports high speed FACH can also provide MBMS services when its software is upgraded. By incorporating accumulated expertise in developing R99/R5 system products and Radio Resource Management algorithms into MBMS, ZTE maximizes the advantages of MBMS and provides both the mobile operators and end users with superb services.
ZTE’s New WDM Product: General Service Switch Platform

Zhang Lian
In the current communication networks, changes at a service layer network have an enormous impact on a traditional optical transport bearer network. With the increase of the granularity of the services and GE, 2.5G POS and 10GE services at the core layer, the transport bearer network is required to aggregate different types of traffic, as well as to flexibly add and drop them.

The General Service Switch Platform (GSS) is a new Wavelength Division Multiplexing (WDM) technology that can effectively meet market demands. It is a switch platform based on the WDM platform. By adopting the Optical Transport Network (OTN)-oriented technology, it can satisfy the current level of service demands, as well as ensure a smooth evolution to the future OTN.

With the introduction of the GSS, a WDM system can implement Add/Drop Multiplexing (ADM) functionality, which allows the upstream traffic to be switched and aggregated at intermediate nodes, and then be transmitted downstream. For carriers, the GSS can consolidate or regroom the unsaturated upstream traffic or traffic with different purposes before distributing it, saving wavelength channels at downstream nodes and truly realizing X-ADM (ADM for any service) function.

**WDM Networking and Service Dispatching in the New IP Age**

The traditional WDM equipment has limited networking and service dispatching capabilities. The explosive growth of IP traffic poses new challenges to the WDM networking and service dispatching capabilities.

At the initial stage of IP network construction, when the networking is simple, the service dispatching frequency of core and backbone transmission networks is far lower than the VC12/VC4 dispatching frequency of the traditional network, the WDM ring and on-site manual work can meet the traffic dispatching demands. However, with the development of IP network and rapid increase of router nodes and line ports, managing and dispatching service granules at wavelength level is an urgent problem needed to be solved for the traditional WDM equipment. Obviously, the manual dispatching mode cannot satisfy the rising service demands.

The traditional WDM networks are evolving towards dynamically reconfigurable optical networks. By incorporating the wavelength selective switch (WSS), wavelength blocker (WB) and adjustable laser into reconfigurable optical add/drop multiplexer (ROADM), ROADM is gradually becoming a commercial reality. The ROADM implementations are made simpler with the advances in technologies like automatic optical power control, dynamically adjustable dispersion compensation, dynamic channel gain equalization, transmitter with larger dispersion tolerance and intelligent EDFA technologies. Currently, major carriers in some developed areas begin to install the ROADM architecture on a large scale.

The GSS, with perfect capabilities of service aggregation and dispatching, can directly add/drop subwavelength services such as FC, GE and 2.5G POS. It can multiplex subwavelength traffic into one wavelength; flexibly add/drop and pass through subwavelength traffic through the cross dispatching module within the platform, realizing transparent dispatch at subwavelength granularity and facilitating flexible and reliable metro WDM networking solutions. The GSS greatly improves the wavelength utilization, and it enables services at different nodes to share one wavelength. It can select different transmission rates according to the characteristics of metro area networks and services to make full use of system capacity.

As shown in Fig. 1, ZTE’s GSS implements electronic cross-connection
of subwavelength traffic. It performs the functions of Terminal Multiplexer (TM), ADM and Digital Cross Connects (DXC). Its main function is the ADM function (including service termination, add/drop, pass-through, loopback, cross-connect and broadcast), which is also called X-ADM function as any subwavelength service is allowed to be dropped or added. The advantages of X-ADM are enhancing the wavelength utilization efficiency and regrooming subwavelength traffic through cross-connection, aggregation and regrouping. It can be seen that unlike the traditional WDM, WDM in the new IP age, has the following features in terms of networking and service dispatching:

- ROADM and multi-dimension ROADM/OXC dispatch services at the wavelength level (SDH VC-4).
- GSS dispatches services at the subwavelength level (SDH VC-12).

In addition, ZTE’s WDM equipment can address the current trend of network transformation by including the support for OTN.

Characteristics of ZTE’s GSS Solution

GSS solution

The GSS, leveraging ZTE’s mature DWDM system, is composed of customer-side aggregation, line-side aggregation, and clock/cross-connect units (Fig. 2). The customer-side and line-side aggregation units together provide access to data services. The client-side aggregation unit can offer eight simultaneous tributary channels with each channel supporting a variety of client-side traffic including GE, FC, DVB and FICON; the traffic is connected to the clock/cross-connect unit via the backplane, thus realizing the eight-channel traffic access, convergence and cross-connection.

Advantages of GSS solution

The traditional WDM system provides point-to-point services at wavelength level. The GSS provides end-to-end services at the level of optical transmission channels. So the GSS has the following advantages:

- It enables rapid addition and removal of services bursty in nature without interrupting other services.
- The network management system supports the establishment and management of the end-to-end subwavelength (mainly GE and SAN services) connection. The channels can be cross-connected, which changes the traditional
to meet overall network traffic demands, reducing the complexity in network planning. It also enables the system to be more adaptive to bursty traffic and increases the network efficiency.

During the routinary maintenance of networks, the addition of new services and line adjustment are performed manually, which takes considerable time and energy and can easily lead to errors. The ROADM-based network increases operation efficiency and reduces maintenance costs as it is controlled by an effective network management (NM) system (all operations are performed automatically except of the board plugging and unplugging).

**GSS Application**

As shown in Fig. 3, the GSS-enabled WDM system combines four services on a single wavelength (GE services from A to B, from B to C and from A to C, and SAN service). If the network only supports the subrate multiplexing, it needs two wavelengths to carry these services; otherwise, it needs four wavelengths.

The GSS that supports subwavelength dispatching, when coupled with the ROADM that supports wavelength dispatching, can increase the service dispatch flexibility, as well as implement the add/drop functionality on any data traffic. The GSS can cross-connect subwavelengths on a backplane and the subwavelengths are tunable at the aggregate end; it assigns the signal entry and exit ends so that when connection request arrives, the route is generated automatically; it supports smooth system upgrade and independent expansions on the client and line sides, maximizing network bandwidth usage and saving investments. It also optimizes CAPEX and OPEX with the intelligent network management system. The GSS is a solution that meets the demands of networking in the new IP age and paves the way to the future ASON.
Application of G.653 Fiber in ZTE’s WDM Systems

Li Hongjun

G.653 fiber

At the early stage of network development, Synchronous Digital Hierarchy (SDH) dominated transmission networks, and the G.652 single mode fiber is the most common type of fiber. The conventional G.652, characterized by a large amount of chromatic dispersion at C (1530-1565 nm) and L (1565-1625 nm) bands, needs dispersion compensation when a system has a transmission rate exceeding 2.5 Gbps. When G.652 fiber is operating at 10 Gbps, dispersion compensation is costly; however, because it is a cheap fiber, it enables carriers to reduce fiber deployment costs in their metro networks. Therefore, G.652 fiber is widely used in transmission networks.

Long-haul transmission is an increasing development trend. G.652 fiber exhibits large dispersion and is unsuitable for long-haul applications; G.653 fiber, which has small amounts of dispersion, was thus developed.

G.653 fiber is a kind of dispersion shifted fiber (DSF), whose dispersion is greater than -1 ps/nm/km and less than 3.5 ps/nm/km at C and L band regions. It has the smallest amount of chromatic dispersion at C band. The maximum dispersion value for G.653 fiber is about one sixth of that for G.652 fiber. With the zero-dispersion wavelength of G.653 fiber set at 1550 nm band, systems can operate at bit rates of 20 Gbps or 40 Gbps. Therefore, G.653 fiber is the best choice for ultra long-haul transmission over a single wavelength. The G.653 fiber has been largely deployed in Japan, South America and some European countries.

G.653 Fiber Application Challenge and Solution

Regarding G.653 fiber, there are limitations on DWDM applications. As DWDM allows for many communication channels on a single fiber, DWDM networks employing G.653 fiber are subject to non-linear effects leading to signal crosstalk degradation and four-wave mixing (FWM).

Four-wave mixing is the process by which two or more signals at known wavelengths interact with each other and generate signals at new wavelengths. If channels are evenly spaced, channel crosstalk will be induced. It increases as the number of channels increases and the spacing between channels decreases. The FWM effect is pronounced at high signal power levels, and with low or zero dispersion. Therefore, WDM systems working on G.653 fiber will be affected by strong four-wave mixing effects.

FWM can be mitigated by two common channel selection methods: unequally spacing the channels and using the algorithm for unequal time interval. However, both techniques come at the expense of less available channels. A new wavelength selection method must be found to achieve the larger capacity transmission. ZTE introduced the Particle Swarm Optimizer (PSO) algorithm to solve this problem.

PSO is an evolutionary computation technique developed by a social-psychologist (James Kennedy) and an electrical engineer (Russell Eberhart). It originated from the research of food hunting behaviors of birds. PSO,
similar to the genetic algorithms, is an iterative optimization algorithm. As shown in Fig. 1, the system is initialized with a group of random particles (solutions), and then searches for optima by updating generations. Unlike generic algorithms, PSO does not use genetic operators such as crossover and mutation, but allows particles to fly through the problem space by following the current optimum particles. Compared with generic algorithms, PSO is easy to implement and has been applied to solve a wide range of optimization problems.

The PSO algorithm can be used to obtain the optimal working channels for DWDM systems running on G.653 fiber, effectively reducing the effects of FWM.

**WDM Transmission on G.653 Fiber**

ZTE’s WDM products employing G.653 fiber have been applied commercially on a large scale. In 2006, ZTE won the bid for a long-haul backbone DWDM network of Intelig, Brazil’s second-largest long distance carrier. The project consists of a 1523 km (including 15 sites) and a 1197 km (including 12 sites) G.653 fiber links.

ZTE proposed an optimized DWDM solution for full-service bearing capacity. The solution applies the PSO algorithm to optimally select 16 working channels to ensure the best transmission performance.

The system uses ZTE’s ZXWM M900 DWDM equipment with ultra long-haul transmission technologies like Advanced Forward Error Correction (AFEC) and Enhanced Return to Zero code (ERZ) modulation technology. The M900 equipment based on G.653 fiber can maximize fiber bandwidth utilization. Moreover, it can realize 2000 km transmission without electrical regeneration, guaranteeing the efficiency of network design and reducing operational costs.

The successful deployment and operations of a series of projects including Intelig’s DWDM project have proved the application advantages of ZTE’s WDM products working on G.653 fibers. The WDM products, which adopt a series of advanced technologies like AFEC, ERZ and a remotely pumped optical amplifier (RPOA), can effectively boost transmission capacity to more than 400 Gbps when used with G.653 fiber, enabling ultra long-haul transmission and fully satisfying the requirement of next generation services.
Public switched telephone network (PSTN) has matured over the span of more than 100 years. Having served the needs of worldwide users, PSTN has become the primary source of revenue for fixed operators; however, it is declining in terms of both subscribers and revenue as the PSTN market is being saturated and threatened by mobile, VoIP and broadband internet, as well as service and technology convergence.

The current PSTN network features a closed architecture with no separation of control and service and is consisted of many switch models. Fixed operators find themselves in an increasingly difficult position: they are lagging behind Network and by Royal PTT Nederland (KPN)’s “All IP World”, and Verizon’s Private IP network.

According to ITU-T, the definition of NGN is as follows:
- NGN is a packet-based network able to provide telecommunication services and able to make use of multiple broadband, QoS-enabled transport technologies, and in which service-related functions are independent from underlying transport-related technologies.
- It gives users unfettered access to networks and to competing service providers and/or services of their choice.
- It supports generalized mobility,

Softswitch-Based F3G Solution
ZTE’s F3G solution, drawing

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similar to a mobile HLR, is used for storage and management of all user data. It interconnects with the control layer (Softswitch) through the Mobile Application Protocol (MAP), and uses XML/MML to enable interaction with a billing and accounting system. By introducing the SHLR, the F3G solution frees PSTN from the task of burdensome user management and bypasses PSTN deficiencies of new service deployment.

Another feature of the service layer is the application server, ZXUP10, a unified service platform that communicates with Softswitch via the Session Initiation Protocol (SIP). It can quickly implement the intelligent control regardless of the type of PSTN switch that users are connected to; and with diverse types of interfaces, the F3G solution creates an access-independent architecture, which can facilitate the migration of the legacy PSTN towards Softswitch-based NGN.

As to the access layer, operators should first consider how to interconnect the legacy PSTN to the Softswitch-based NGN since it offers a way to protect their investments while offering a smooth migration path. After that, operators can consider introducing the broadband and wireless access methods, which will greatly enrich operating capabilities of the F3G network.

- It allows services to rely less on local switches.
- It facilitates fast service creation and deployment.
- It provides an evolutionary path towards IMS.
- It supports easier Operation & Management and contributes to the OPEX reduction.
- It supports diverse services listed as follows: intelligent services for the called party (e.g. CRBT, One Number); intelligent services associated with access codes (e.g. Prepaid, Discount Bundle); FMC services (e.g. NP, Wide Area Centrex)
- It provides a flexible numbering scheme.
- It enables more convenient billing and accounting.

In the second half of 2005, China Telecom started its local PSTN transformation project—also called network intelligentization project—with the F3G solution. ZTE was chosen as the main supplier to this project with about 63% share. The F3G project has already been accomplished, serving nearly 150M online users. It is reported that revenue derived from F3G services increased to 32% from 2005 to 2006.

Most of the fixed operators are accelerating the transformation process and are developing toward multidimensional operations when they are facing heavier pressure than ever before. The F3G solution, as a customized solution, can help operators conquer various obstacles and realize scalable network development.
Choosing the Right FTTx Architecture for the Access Network

Ye Xiaohua

As telecoms providers are moving towards providing triple play services, they are looking for ways to deliver high bandwidth services. Optical fiber is deemed as the ultimate medium for broadband services as it promises almost unlimited bandwidth. As telcos consider the use of fiber for access, they have a variety of Fiber to the x (FTTx) architectures to choose from: fiber to the premise (FTTP), fiber to the home (FTTH), fiber to the curb (FTTC), or fiber to the node (FTTN). As there is not a single architecture that can be applied to all projects at present, operators must consider the FTTx architectures’ characteristics and the resulting services when deciding what architectural design to use.

Fiber to the Home/Office (FTTH/O)

The FTTH/O network architecture is illustrated in Fig. 1.

In the FTTH/O scenario, the fiber is brought into subscribers’ home or office with an Optical Network Unit (ONT) sited at the customers’ premises. The ONT is the service delivery point that enables operators to provide data, voice, and video services over a single strand of fiber. The ONT provides abundant service interfaces including POTS, GE, FE, and E1/T1.

FTTH/O offers enormous amounts of bandwidth but requires a very high construction cost. This mode aims at providing high bit rate to high-end dwellings or offices such as villas, commercial buildings and Internet bars, to ensure high return on investment.
investment (ROI). It can be specially used when it is necessary to install new loop cables or to replace the old ones. It targets those users who demand enhanced high bandwidth applications such as high-definition television (HDTV), video on demand (VoD) and L2/L3 VPN.

**Fiber to the Building (FTTB)**

The FTTB network is illustrated in Fig. 2. In such a deployment scenario, the fiber goes all the way to an ONU located in a building. Users can have internet access with connections to the ONU through LAN over UTP-5 cables. The usual length of the copper loop should be no more than 100 m.

By making full use of the legacy resources, FTTB+LAN can greatly save on construction costs. Moreover, the short distance between the ONU and subscriber terminal equipment allows a smooth evolution from FTTB+LAN to FTTH/FTTO network. The FTTB mode is applicable to buildings with high-density business users that have potential large bandwidth requirements, especially those buildings covered with LAN based on UTP-5 cabling. FTTB is not a suitable solution for individual homes as few home networking environments have UTP-5 connections.

**Fiber to the Curb (FTTC)**

In the FTTC deployment scenario, the fiber is laid up to an ONU located in the curb. One or more buildings attached to such an ONU can be served by the PON system via such an ONU. The ONU presents POTS and VDSL2 interfaces for broadband internet access. In this scenario, the copper loop length is generally of several hundred meters, which could be defined according to the actual bandwidth requirements.

Compared with FTTB, FTTC can serve more users, as well as allow operators to save more on cost as it requires no extra UTP-5. The FTTC approach is recommended to be used in residential areas with relatively high density, especially those areas where the existing copper loops can be reused, or the fiber optics are difficult to be installed. It is a suitable access method for users who have demands for voice over IP (VoIP), high speed internet access and VoD services.

**Fiber to the Node (FTTN)**

In FTTN network, the fiber goes to an ONU sited in a neighborhood access node and accommodates users in the service area of the node. The ONU provides POTS, ADSL2+, VDSL2 and SHDSL interfaces for integrated services access. In this scenario, the length of the copper loop usually measures up to several thousand kilometers and could be adaptively adjusted according to the actual bandwidth requirements.

The last leg distance from the ONU to subscribers is longer in FTTN than in FTTC. However, it is very easy to evolve FTTN into FTTC. It is recommended to deploy FTTN architecture in low population density residential areas, and when users have a demand for VoIP and high speed internet access services.

Operators have a lot of things to consider when selecting the proper fiber architecture, which includes subscriber density and legacy architecture, planned services, and the likes. As a leading vendor in the access network field, ZTE can help them deliver a competitive FTTx solution. ZTE has launched its gigabit/Ethernet passive optical network (GPON/EPON) solution, which can be used as the deployment technology for FTTH/O, FTTB, FTTC and FTTN applications, to serve a single family unit, business buildings, commercial districts, office parks and multi-tenant units as needed.
Problems Confronting Operators

GSM was initiated as a European standard in 1982 and went into commercial service in 1992. As the choice of 80 percent of all new mobile customers, it is the world’s most popular cellular standard. It is predicted that there will be almost three billion GSM/EDGE subscribers by 2010, and GSM will still be the leading standard. However, as subscribers continue to increase, new problems have occurred and have to be addressed with urgency. These problems are listed as follows:

- With the capacity increase in GSM networks, it is necessary to add the main and supplementary system equipment, which will surely present problems such as insufficient equipment rooms and weight bearing. Meanwhile, the equipment rooms are getting more and more difficult to obtain, and the equipment rooms’ rental and construction fees are becoming increasingly expensive. The shortage of equipment rooms sets limits on the fast development of GSM network and needs to be resolved.

- The traffic load has the characteristic of periodic migration. In order to maximize the efficiency of network resources, it is required that the radio resources be shared, which can’t be enabled by the existing integrated base stations.

- The focus on deep coverage and service quality in enclosed buildings has given rise to the increasing need to provide indoor coverage. However, the traditional indoor coverage solutions are costly and inflexible in terms of cabling and capacity expansion.

- The number of hot spots—temporary high density spots such as sports stadium and exhibition halls—is increasing. The traditional base stations can’t flexibly and quickly adapt to the bursty traffic load.

- Mobile operators, locked in intense competition, are seeking ways to reduce CAPEX and OPEX. For operators who have GSM/EDGE networks, the challenge will be to protect their existing investments while speedily and economically deploying WCDMA/HSPA services.

New Technological Development

In order to create an open market for BTS equipment that ensures the availability of standard modules and components, reducing product development cycles and costs, base station vendors and module and component manufacturers founded Open Base Station Architecture Initiative (OBSAI) in October 2002. With 122 members including Nokia, Motorola and ZTE, OBSAI aims to define a modular base station architecture and detailed specifications for the interfaces between the modules. On the other hand, another industry group called Common Public Radio Interface (CPRI) has been formed.

The OBSAI and CPRI initiatives and their specifications help manufacturers focus on their core competencies and buy standard radio base station modules. In return, operators will benefit from more extensive products, more flexible base station solutions and more cost-effective network deployment.

SRRP Base Stations

By adopting advanced technologies, ZTE has launched a series of smart radio resource pool (SRRP) base stations, which are based on the baseband unit (BBU) + the remote radio unit (RRU) structure (Fig. 1).
However, ZTE’s BBU+RRU dynamic resources pool structure enables sharing of baseband resources and greater resource allocation flexibility (different resources scheduled at different times).

**Benefits of BBU+RRU Structure**

- **Saving costs on equipment rooms**
  
  With a small size, the BBU can be installed in residential and business buildings. It can also be located in the integrated power cabinets, in a basement, or in a 2G cabinet, solving the problem of insufficient equipment rooms.

- **Reducing the feeder line losses by 2 to 3dB**
  
  Traditionally, the macro base station is connected to the antenna via 7/8-inch feeder cable. The BTS output power lost in feeder lines is 2 to 3dB at an average. In the BBU+RRU structure, the remote RF module is connected to the antenna via the flexible jumper, avoiding feeder line losses.

- **Shortening the construction time**
  
  The BBU+RRU solution has no special needs for equipment rooms and requires only the installation of the auxiliary antenna feeder systems, enabling operators to speed up network construction to gain a first-mover advantage.

**BBU+RRU (a narrowband transceiver)**

BBU is in charge of GSM base station control and RF signals processing; it has a maximum capacity of 48 carrier frequencies within a single rack. It uses the same hardware platform as WCDMA and can support GSM and WCDMA mixed inserts in one baseband board to achieve dual mode operation. The BBU, which is 19 inches in width, can be flexibly installed. A single RRU supports two carriers and can naturally dissipate heat, reduce the feeder line loss and increase the coverage of the base station.

**BBU+ RRU (a broadband transceiver)**

By adopting the broadband transceiver unit and Multi Carrier Power Amplifier (MCPA), the solution provides a large bandwidth necessary for multiple carriers and can flexibly configure and schedule the carriers. The RRU can transmit and receive common-mode GSM/WCDMA signals, and when combined with the multi-mode BBU, makes up the highly integrated multi-mode GSM/EDGE/WCDMA products.

**The miniBSC+BBU+ RRU (a broadband transceiver)**

The BSC and BBU can be integrated into an intelligent base station that accomplishes wireless transmission, administrates radio resources management and realizes the integrated and intelligent scheduling of baseband and radio frequency resources.

**Dynamic Resources Pool**

The ZXG10 SRRP system is based on the innovative GSM/WCDMA dual mode BBU (B8048), the RRU (R8102) with low power consumption, and the dual mode RRU. The BBU and RRU form the distributed base station system where the baseband and radio frequency resources can be shared.

As the industrial and residential areas are currently separated, large traffic loads tend to occur in different areas over different periods of time. The traditional base station system needs to provide RF parts and baseband resources to meet the maximum traffic demands in both areas. When traffic is low in one area, the available network resources can’t be shared and reused, resulting in equipment investment waste.

However, ZTE’s BBU+RRU dynamic resources pool structure enables sharing of baseband resources and greater resource allocation flexibility (different resources scheduled at different times).
Foreword

As the commercial process of EV-DO Rev. A speeds up, the pace of next generation networks evolution has quickened to all-IP networks. Rev. A is an all IP-based air interface and integrates data and voice capabilities. It is generally agreed that next generation networks will be built around all-IP. Two 3G Partnership Projects (3GPP and 3GPP2) have defined an evolutionary path towards all-IP architecture powered by IP Multimedia Subsystem (IMS).

KDDI, a mobile operator in Japan, is changing to all IP network infrastructure for transmitting data and voice via IP in the “Ultra 3G” format. “3G is now a mass market in steady growth. IMS and all-IP is the next step ...” said Mr. Carl-Henric Svanberg, President and CEO of Ericsson.

ZTE is an active advocate for all-IP architecture. In April 2006, ZTE rolled out the world’s first commercial release of all-IP CDMA2000 based on IOS V5.0, using the IP-based Ap interface, offering Transcoder Free Operation (TrFO) and Remote Transcoder Operation (RTO).

Cost Advantages of All-IP

The all-IP architecture offers costs savings, voice quality improvement, and a clear technical evolution path.

The most significant feature of all-IP CDMA2000 networks is the implementation of Ap interface. The Ap interface is an A interface based on the IP network, that is, a Base Station Controller (BSC) interfaces with a Media Gateway (MGW) via the IP network.

The adoption of Ap interface can achieve significant Operating Expenditure (OPEX) and Capital Expenditure (CAPEX) savings as shown in the following four aspects:

● The transmission bandwidth between the BSC and the MGW can be reduced by as much as 80 percent. This can be converted into dollars for savings on transmission bandwidth rental or equipment.

● With TrFO and RTO functions, less vocoders are needed and up to 30-50% of vocoders can be saved. Moreover, with vocoders moved from BSC to MGW, the system can more easily share vocoder resources while enhancing network security.

● Another advantage of bandwidth saving is to be found in the need for less interface boards between the BSC and the MGW. Less interface boards mean less rack, less space and less power consumption.

● Ap interface deployment provides lower cost of migration towards IP Multimedia Subsystem (IMS). IMS is an important step towards all-IP. With ATM, operators, in their migration towards IMS, need to add the interfaces and equipment to convert ATM to all-IP. The Ap interface enables the smooth evolution towards IMS.

Besides cost savings for network construction, operation and maintenance, the Ap interface will provide better QoS for voice. The introduction of TrFO and RTO improves voice quality since the number of coding/decoding steps is reduced and the round trip delays are reduced.
Continuous Innovation

ZTE has shown early and consistent leadership in developing products for the CDMA market.

ZTE’s first-generation CDMA products have received widespread market recognition. So far, ZTE is the third largest supplier to China Unicom, the second largest mobile operator in China with a share of nearly 22 percent.

Its continuous R&D and innovation efforts have contributed in shaping the ZTE brand and reputation. As China’s top CDMA brand, ZTE has gradually established itself as one of the top global vendors of CDMA.

In March 2000, ZTE launched a complete CDMA mobile communications system, becoming the first Chinese vendor to offer end-to-end CDMA solutions, from base stations and switches to value-added services subsystems. ZTE was one of the manufacturers that successfully won a CDMA contract from China Unicom in 2001. To build high quality CDMA networks for China Unicom, ZTE consecutively rolled out multiple repeaters, micro BTSs and RF BTSs to provide wide, deep, or far-reaching coverage.

In 2001, ZTE launched a CDMA2000 1X mobile communications system and put through China’s first CDMA2000 1X voice call.

In 2002, ZTE’s CDMA architecture was changed from the self-developed HIRS system to the prevailing ATM architecture and finally to the all-IP architecture.

In 2004, ZTE delivered a whole package of all-IP CDMA products covering both the wireless and core network sides.

ZTE can provide the most complete portfolio of CDMA2000 base stations in the industry. Its BTS series include Super BTS, large-capacity BTS, compact BTS, outdoor BTS, micro BTS, integrated outdoor BTS and RF remote stations. The company took the lead in bringing about the “Super BTS” where the remote Radio Frequency and the baseband subsystems are separately installed. It has the highest capacity in the industry, providing powerful baseband processing capability for up to 120 sectors.

ZTE’s all-IP based BSC has received widespread industry recognition for performance excellence. A single BSC can support up to 2.5 million subscribers (0.02 Erlang per user), a maximum data throughput of 6 Gbps, and a maximum capacity of 15,360 carrier-sectors.

Fruitful Market Achievements

ZTE’s CDMA2000 system, based on an all-IP technology, has made great market achievements.

In 2006, ZTE shipped over 12,000 units of CDMA BTS equipment, topping the world CDMA equipment market by number of shipments. To date, ZTE has deployed over 75 million lines of CDMA equipment for over 120 carriers’ networks in more than 70 countries and regions including India, Indonesia, the Czech Republic and a variety of African countries, as well as in developed markets like the U.S.A. and Europe.

In Mongolia, ZTE helped Skytel, Mongolia’s largest CDMA mobile operator, build the world’s first EV-DO Rev A commercial network. Additionally, ZTE is building a CDMA network in Mongolia’s rangelands.

In India, ZTE has entered the markets of the country’s three largest CDMA operators—Reliance, TaTa and BSNL—on a large scale in 2006. ZTE equipment currently accounts for 85 percent of BSNL’s CDMA market. ZTE has also undertaken TaTa’s national rural telecoms project and has helped Reliance build CDMA softswitch gateways in many states of India.

In Indonesia, ZTE has been awarded a 2-million line 3G CDM2000 network contract by PT Telkom. ZTE is the largest CDMA equipment supplier to Indosat.

In the Caribbean region, ZTE completed the first 3G CDMA2000 network in Haiti. The CDMA2000 1X and EV-DO network with a capacity of 500,000 lines has been put to commercial use.

In the U.S., ZTE’s equipment is currently being tested in several tier one carriers’ laboratories.

In Europe, ZTE constructed the continent’s first EV-DO Rev A. national network in Czech Republic, and the EV-DO network constructed by ZTE has been put to commercial use in Norway.

Supported by advanced products and focused R&D, ZTE will continue to demonstrate leadership in global CDMA markets, paving the way for the company’s international expansion.
IMS Putting New Demands on Mobile Phone Terminal Software System

IP Multimedia Subsystem (IMS) specified in 3GPP Release 5 is an architecture that enables the provision of multimedia services and allows the migration towards fixed-mobile convergence (FMC). Mobile phone is an important part of IMS networks as it allows an end user to directly access new multimedia applications. However, new capabilities should be added to a mobile phone. Specifically speaking, the handset platform should provide an IP connection service to support (GM), Presence Service (PS), Dynamic Address Book (DAB) and Voice Call Continuity (VCC).

- When the handset-based Group Management, Presence Service are coupled with IM, end users will synchronize itself with the network so that end users can see the presence information of their contacts and decide the best way to communicate with the associated contacts based on their current status. This service eliminates the limitation of the static address book stored on the user’s mobile device. Its functions are scalable, and new services can be easily added, providing more service options for end users.

To support IMS services functions, the IMS terminal software should provide the protocols stack module, the internal and external interfaces of the frame module. It should not only support the existing standard-compliant service functions, but also easily integrate new services in the future. ZTE handsets are designed with these considerations in mind, and support IMS services by adding a new IMS service module to an existing mobile phone system. This module can be used across multiple network environments, as well as in multiple hardware and software platforms, with a number of features such as high reusability, maintainability,
expandability, and portability. Moreover, ZTE’s IMS terminal software is completely compliant with the 3GPP, OMA, IETF and W3C standards.

**ZTE IMS Terminal Software System**

ZTE’s IMS terminal software is shown in Fig. 1. The IMS client software frame is a system including service, protocol and interface submodule functions. It consists of four parts: API collection, service engine, signal engine and frame’s adapter.

The mobile phone operating system directly communicates with the platform adaptation layer and handset support system, hiding various mobile phone physical features along with the differences between the mobile phone operating and support systems from the upper layer. The operating system’s functions are encapsulated before they are used by the upper layer, facilitating the portability of the IMS terminal software module. The common signaling layer provides signaling interfaces to the upper layer services. The service logic layer is used for implementing the IMS client services.

The service interface layer at the top is used to provide Application Programming Interface (API) for the mobile phone system. This layer is implemented by either loading IMS services, which provide complete interfaces and service logic, onto the mobile phone application system, or by providing service interface function or message invoking, and Man-Machine Interface (MMI). Based on the above mentioned system design, the IMS terminal software module will effectively support IMS services and applications.

**Outlook**

ZTE will launch the commercial version of IMS terminal software module in July 2007. It can run on LINUX, WINDOWS MOBILE and other mainstream mobile phone operating systems, as well as support WCDMA, TD-SCDMA, WiFi and GPRS standards.

With years of technical accumulation and deep understanding of operators’ demands, ZTE has been striving to offer customized terminal products and services to operators, making it easier for them to evolve to IMS-based network convergence.
DON’T MISS A SINGLE CALLER.

WHEREVER HE IS CALLING FROM.

Our new CDMA2000 All-IP Core Network solutions give you a cost-effective platform for a smooth evolution to a full 3G network. You will have full interoperability between networks in different phases, and compatibility between networks from different vendors.

Even though the capacity is high (HLR: 6 million subscribers, MSCa/MGW: 2 million subscribers), the equipment is compact and low on energy. You could reduce footprint by up to 85% and decrease power consumption by up to 60%. This means a lot for your OpeX.

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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