

ZTE TECHNOLOGIES

Vol. 10 No. 3

3 / 2008

Wireless Technologies Special Issue

SDR

**Creates Possibility of
Smooth Upgrade**



3G

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Harvest from our investments in all 3G standards.

Only ZTE can deliver end-to-end equipment for all 3G standards-WCDMA, CDMA2000, TD-SCDMA and WiMAX.

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ZTE中兴

ZTE TECHNOLOGIES

A Monthly Publication

Vol. 10 No. 3 Issue 98 **March/2008**

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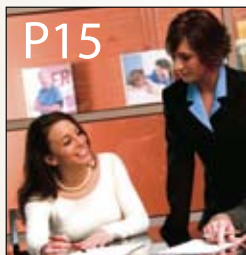
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ZTE中兴 ZTE CORPORATION

ZTE Profile

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.



ZTE Announces 2007 Annual Results

On 19 March 2008, ZTE announced its audited annual results for the year ended 31 December 2007. Based on HKAS, the company recorded a revenue of approximately RMB34,777 million in 2007, representing an increase of 49.8% against 2006. Net profit was RMB1,252 million. Basic earnings per share were RMB1.30.

The Board of Directors recommended payment of a final dividend of RMB2.5 (including tax) per 10 shares and the

company proposed to increase issued capital by Reserve on a basis of 4 shares for every 10 shares for the year ended 2007.

During the year, ZTE's revenue from domestic operations amounted to RMB14,687 million, representing a year-on-year growth of 13.8%. The company continued to implement the strategies of product differentiation and cost leadership heeding development trends in the domestic communications market. At the same time, it strengthened

ties with domestic mainstream carriers in China by providing them with quality products and services.

ZTE's revenue from international principal operations grew 94.8% to RMB20,091 million and accounted for 57.8% of its total revenue, which was 13.4% higher compared with the previous year. The revenue growth was driven by continued growth of income from emerging markets and increased sales in developed countries.

(ZTE Corporation)

ZTE Teams with Two Leading European Telecom System Integrators

ZTE signed strategic telecommunications software agreement with two leading providers in Europe and Latin America to optimize its offerings for target customers in developed markets. The two partners are ATOS Origin ("ATOS"), the second largest consulting company in Europe, and Indra, the largest IT integrator in Spain.

ZTEsoft, a holding subsidiary software company of ZTE, which focuses on global telecommunications

IT system software, facilitated the two significant deals. The unit's flagship product ZSmart BSS/OSS has been attracting tremendous interest in the market, resulting in ZTE forging several key collaborations with providers globally. Under the ATOS partnership agreement, both companies will jointly manage market bids and collaboratively implement projects, enabling ZTE's ZSmart series of software solutions to smoothly penetrate European markets where ATOS has a strong foothold.

On the other hand, ZTE's partnership with Indra will allow the company to effectively expand its global outreach. The agreement is a win-win situation for both companies—ZTE will help enhance Indra's competitiveness in the telecommunications technology field, while Indra's rich experience in high-end markets and solid IT software integration capability will help ZTE to get a solid presence in the Latin American telecom markets.

(ZTE Corporation)

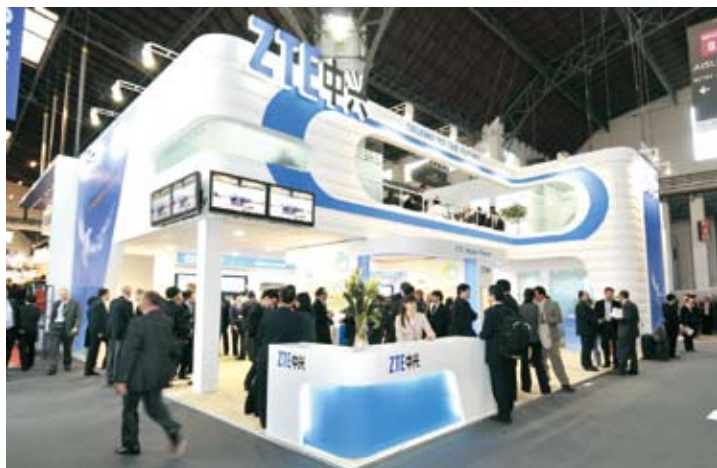
ZTE Launches First SDR Base Station at GSMA Mobile World Congress 2008

ZTE launched the ZXGW B8036, the world's first pre-commercial Software Defined Radio (SDR) base station at the GSMA Mobile World Congress 2008. The ZXGW B8036 supports GSM and WCDMA simultaneously within software rather than requiring separate hardware components like current base stations as well as providing LTE readiness and a smooth evolution path. It can significantly lower network infrastructure costs for operators, while improving network integrity, continuity and stability.

SDR can tune to different frequency bands and receive any modulation across a large frequency spectrum by using software to process digitized signals. With SDR technology, mobile operators will be able to extend the lifespan of their network systems, hence decreasing total cost of ownership (TCO) and significantly lowering investment

risks. In addition, the ZTE SDR base station is built on an innovative μ TCA platform that offers additional savings compared to a traditional design; its modular and scalable architecture allows flexible network design capabilities thus reducing OPEX and CAPEX for the operators. The technology, which runs radio functionality as software modules on an integrated and unified hardware platform, also enables operators to easily roll out new mobile services and features.

"Integrating key functions into one unified solution is a critical trend in mobile networks today," said Fang Hui, ZTE's General Manager, WCDMA Products. "With ZTE's SDR technology, we take pride in introducing



a new breakthrough in base station development for all waveforms. The ZXGW B8036 can also be designed to support CDMA and WiMAX in the future, and so meets telecom operators' demands for a solution for network integration and smooth LTE evolution, which we expect to help them increase competitive advantage and add on new features." (ZTE Corporation)

ZTE Helps Hutchison 3G Enhance Mobile Broadband Services

ZTE signed a global deal with Hutchison 3G UK Limited ("H3G"), the world's leading 3G operator and the largest 3G network operator in the UK and Europe, to make its 3G modems available to all Hutchison operating companies.

Under the agreement, ZTE will deliver its HSDPA MF622 modem to

3UK and 3 Ireland to enhance H3G's efficiency of its supply chain capability. ZTE's MF622 modem supports a signal boosting technology called "Receive Diversity", a unique feature that improves cell efficiency and data throughput rate, particularly under "edge of cell" conditions. Cell efficiency is particularly important to operators,

as more data traffic is allowed to pass through a cell. It boosts receiver signal strength and consequently reduces the energy required to be transmitted to any given subscriber. This increases a network's subscriber capacity which can be translated into significant cost savings.

(ZTE Corporation)

4G Subscribers to Hit 90 Million by 2013

February 29, 2008

The number of subscribers to next generation wireless services worldwide, including both LTE and WiMAX, is expected to top 90 million by 2013.

Analyst house ABI Research said that it expects migration to HSPA+ to begin in early 2010, with migration to 4G technology LTE commencing by the middle of the same year.

ABI forecasts the total number of WCDMA and HSPA subscribers to approach 720 million in 2013.

(www.telecoms.com)

Tata Plans World's Largest WiMAX Network

March 6, 2008

Tata Communications is planning the world's largest commercial WiMAX rollout, with full coverage in 15 cities across India.

The Indian telco has contracted US vendor Telsima to build the network, which it expects to capture 200,000 retail customers in 2009.

The network of 3000 base stations will provide limited coverage for enterprises in 110 cities and full retail coverage in 15 major cities. The first phase will cover Delhi, Mumbai, Pune, Bangalore, Chennai, Hyderabad, Cochin, Chandigarh, and Kolkata.

(www.telecomasia.net)

Sony Ericsson Says Reviewing Ties with NTT DoCoMo

March 10, 2008

Sony Ericsson said that it was reviewing its business ties with NTT DoCoMo, Japan's top mobile telephone operator, which is struggling amid an industry price war.

But the company, a joint venture between Japan's Sony Corp and Sweden's LM Ericsson, declined to confirm reports that it will stop making handsets for DoCoMo.

"It is true that Sony Ericsson is reviewing part of its product development plans with DoCoMo," said company spokesman Toshiyuki Kawamura. But he said the firm would continue to provide products to DoCoMo.

(www.cn-c114.net)

T-Mobile Tests Femto Indoor Mobile Technology

March 10, 2008

T-Mobile's venture capital arm T-Ventures has put money into femtocell maker Ubiquisys, and the operator says it plans to run a trial of the indoor base station technology. T-Mobile is following rival operator O2, which announced a femto trial with Ubiquisys at the Mobile World Congress 2008.

Femtocells are consumer devices which deliver 3G access in a building, and connect to the mobile network over broadband, improving indoor coverage and offering cheaper calls and better data traffic while indoors. Currently, the devices are being tested in operators' labs, with user trials expected from the end of 2008.

(www.cn-c114.net)

Rivals Challenge Virgin-Tata Deal

March 7, 2008

Tata Teleservices and Virgin Mobile have spent all week defending their brand partnership in India as rival operators have kicked up a stink over the deal, claiming it is a roundabout way for Virgin to become an illegal mobile virtual network operator (MVNO).

Even before the two companies announced their joint venture on March 2, 2008, the Cellular Operators Association of India, which represents India's GSM-based operators, was insisting to the Department of Telecom (DOT) that the deal violates regulations.

(www.unstrung.com)

New World Order

(Selected from the February 2008 issue of *Mobile Communications International* magazine)

According to one analyst firm, ZTE won more network contracts than any vendor in 2007. And the company has its sights set on more growth in 2008.



Founded in Shenzhen in 1985 as the Zhongxing Semiconductor Co. Ltd, ZTE listed on the Shenzhen Stock Exchange in 1997. The following year it won a \$95m turkey contract in Pakistan, which it claims was the first major overseas telecoms project to be awarded to a Chinese vendor, and opened its first research and development operation in the US. Today ZTE operates 14 R&D centres across North America, Europe and Asia.

Being one of the largest Chinese telecommunications infrastructure and handset vendors that are gaining in international market share and recognition, ZTE is doing its bit to change the mobile industry. As established Western vendors have embarked on mergers and acquisitions in a bid to manage expenditure and improve scale, ZTE has taken advantage of the cost structure that comes with being headquartered in China.

ZTE is performing strongly. According to a report published by analyst Gartner, the firm won more mobile network contracts in the first half of 2007 than any other vendor. For the

same period, the firm's revenues were \$2.1bn, an increase of 43.9% on the corresponding half year for 2006. Profits in the six months to June 2007 were \$63.7m, up 32.5% year on year.

ZTE has built market share by targeting operators in emerging markets, where cost is more likely to be a dominant factor in supplier selection, and through strong relationships with carriers in its home market.

ZTE is likely to be a big winner in the TD-SCDMA space, should that be the technology that China's mobile carriers select for their 3G deployments. Even if those carriers opt for another technology, or decide to wait and leapfrog to a flavour of 4G, the nature of the Chinese market means that ZTE will likely score a sizeable win. It's biggest customer, China Mobile, is also the largest operator in the world by subscriber base.

ZTE's initial strength was in 2G CDMA, with GSM and subsequently WCDMA disciplines developed later. Latterly the firm has been investing its time and budget in WiMAX—it won a commercial deployment contract for the technology in Libya early in 2008. The contract will see ZTE deploy an 802.16e

network covering eight major Libyan cities, including the capital, Tripoli.

This was the first WiMAX deployment in Africa, and the vendor's chief representative in Libya says that he expects it to stimulate further contract wins, which it feels well positioned to capitalize on. ZTE is the only Chinese firm to sit on the board of the WiMAX Forum and has 21 commercial trials of the technology underway in markets including Singapore, Thailand and Saudi Arabia.

In China, according to a report from analyst firm Forward Concepts entitled *WiMAX'08: The 3G+ Broadband Alternative*, ZTE envisions the technology working in conjunction with GSM and CDMA voice services and is working to support dual-mode terminals that could provide end users with a single handset solution. ZTE has already won a deal to supply WiMAX terminals to US carrier Sprint Nextel.

According to ZTE, 33% of the contracts that it won in the first half of 2007—there were 188 deals in total—were in Asia Pacific and emerging markets. As well as China Mobile and China Unicom, it highlighted



key relationships with Indian player Reliance, Middle Eastern specialist Etisalat and Norwegian carrier Telenor, which has a portfolio of operations in the less developed markets of Eastern Europe.

India alone is of vital strategic importance to ZTE, which revealed late in 2007 that it is aiming to generate \$1bn in revenues from the Indian market in 2008. India generated more than \$800m in revenues for ZTE in 2007 and the firm has marked it out as the second most important market for its business outside of China.

Handsets represent a significant part of ZTE's play, with Informa Telecoms & Media ranking the firm just inside the top six handset vendor listing worldwide. 2007 saw ZTE win a handset supply deal with Vodafone for terminals carrying the operator brand, and the combined handset and infrastructure offering is a strength that ZTE is looking to leverage going forward.

Scale built at home and in emerging markets is being used by ZTE to push into advanced Western territories and ZTE says it has established partnerships with more than 500 carriers in more

than 120 countries around the world. Its mobile infrastructure has been deployed by 120 operators in 70 countries, the firm says.

R&D has been a victim of the downturn at many Western Vendors, which have had to slash headcount in a bid to remain competitive. ZTE is keen to stress its continued investment in research as an advantage over other players. The firm says that 40% of its workforce is employed in research and development, and that 10% of annual revenues are ploughed back into its various research projects. By 2005, says ZTE, this had resulted in 3,000 national and international patents applied for, the vast majority of which are IPR related.

Like all big vendors in the mobile industry, ZTE sets great store by the quality of its people. It has an employee base of 27,000, with over 70% educated to degree level or higher. It is perhaps unusual in that the average age of its employee base is just 30 years old.

There is little doubt that the rapid growth of the Chinese vendor community has given more established Western players serious cause for

concern. Given the relatively low cost of operations that companies like ZTE enjoy, they simply have not faced the kind of pressures that have forced European and North American players into round after round of redundancies and mergers and acquisitions that, at best, have yet to prove themselves strategically and commercially rewarding.

When ZTE first appeared on the wireless scene, it was often portrayed as a company that had little to recommend itself other than the low cost of its products. But as more and more operators—including, crucially, those in the upper tier—have given these vendors trials and commercial deals, writing them off simply as cheap is no longer acceptable.

All of the Western vendors have made inroads into the Chinese market, attracted by the sheer scale of the opportunity. Simultaneously, that nation has been exporting its own firms, like ZTE. It simply remains to be seen whether or not the Western players can do as well in ZTE's market as it clearly hopes to do in theirs.

ZTE TECHNOLOGIES

SDR Creates Possibility of Smooth Upgrade

Li Liangbo

What is SDR?

Software Defined Radio (SDR) is a term adopted by the international Software Defined Radio Forum (SDRF) to describe radios that provides software control of a variety of modulation techniques, wide-band or narrow-band operation, communications security functions (such as hopping), and waveform requirements of current and evolving standards over a broad frequency range. This technology uses a generic hardware platform to accommodate different communications standards, frequencies and modulation schemes via software modules. A wide range of radio applications like Bluetooth, WLAN, CDMA, GMS, WCDMA and WiMAX can be implemented using SDR technology.

SDR is a cost-effective and perfect solution for 2G/3G network integration and future HSPA+ and LTE evolvement. Using SDR, hardware resources can be shared and base stations need only a software adjustment to handle a new standard, saving considerable expense.

Benefits from SDR

SDR is a rapidly evolving technology that is receiving widespread popularity in the commercial wireless communication industry. It facilitates implementation of multi-band and multi-standard wireless communications systems. Mobile operators, manufacturers and subscribers will all benefit from the vastly improved communications available through SDR.

With the SDR technology, mobile operators will be able to upgrade their network systems to the latest version without any hardware change, hence decreasing total cost of ownership (TCO). They can roll out new services tailored to the various tiers of users on a common hardware platform. The deployment of SDR equipment can help operators transit from “network providers” to “service providers”, which will create a substantial new source of revenue. Moreover, the SDR equipment offers improved time to market, significantly reducing the operators’ investment risks.

From the manufacturers’ perspective, the SDR technology is adopted to remove the development gap among different technologies, which can lower the R&D cost and shorten the time to market for new products and services. As the SDR-based air interfaces and frequency bands accommodate multiple and evolving technical standards, the SDR platform addresses a wide range of market requirements. The SDR products are modularized and enable “soft” update of new services, features and security mechanisms. With the SDR technology, the manufacturers can enhance product integrity, continuity and stability.

For subscribers, the SDR terminal means a single platform for multiple technical standards that allows customization and access to a variety of new features and services with an easy upgrade path. Subscribers can use

the SDR terminals to seamlessly roam across operator boundaries and achieve true mobility. The SDR technology increases the lifetime of a terminal investment and provides insurance against obsolescence.

ZTE's SDR System Solution

ZTE is a pioneer in the SDR technology development. The company plans to commercially launch its SDR product series in the Q3 2008. ZTE’s SDR products based on the innovative μ TCA platform feature modular design, distributed architecture and high integration. Through software upgrade, they can be implemented on multiple technical standards including GSM, WCDMA/HSPA, CDMA2000 1X EV-DO and WiMAX. Therefore, operators can easily expand, manage and maintain their communications systems while effectively reducing TCO. The development roadmap of ZTE’s NodeB series is shown in Figure 1.

ZTE’s SDR products include dual-mode RNC and SDR BTS series. In the dual-mode RNC, BSC and RNC are co-located in the same cabinet to save equipment room. The SDR BTS series consists of indoor BTS, outdoor BTS, macro BTS, BBU and RRU. The

baseband unit (BB) supports GSM/WCDMA/CDMA standards and the radio unit (RU) supports multi-band solutions. The combination of different BBs and RUs forms different types of SDR BTS. ZTE’s SDR products have the following key features:

Large-capacity and multi-band capabilities

In the GSM/WCDMA dual modes, one macro BTS can support a maximum capacity of 24 TRXs and 12 CSs. In a GSM or WCDMA single mode, it can support 36 TRXs or 12 CSs. ZTE’s SDR products support multi-frequency bands including 850 MHz, 900 MHz, 1800 MHz, 1900 MHz and 2100 MHz. One BTS normally contains 6 RF modules, each supporting 1 WCDMA carrier and 4 GSM TRXs. With large-capacity and multi-band capabilities, the SDR system ensures smooth upgrade and CAPEX savings.

High-efficiency power amplifier

ZTE’s SDR products adopt the unique digital predistortion (DPD) and Doherty PA technology to reach a PA efficiency of 33% at present and 50% in future. The high-efficiency PA considerably reduces the power consumption of RF modules and hence decreases the operator’s OPEX.

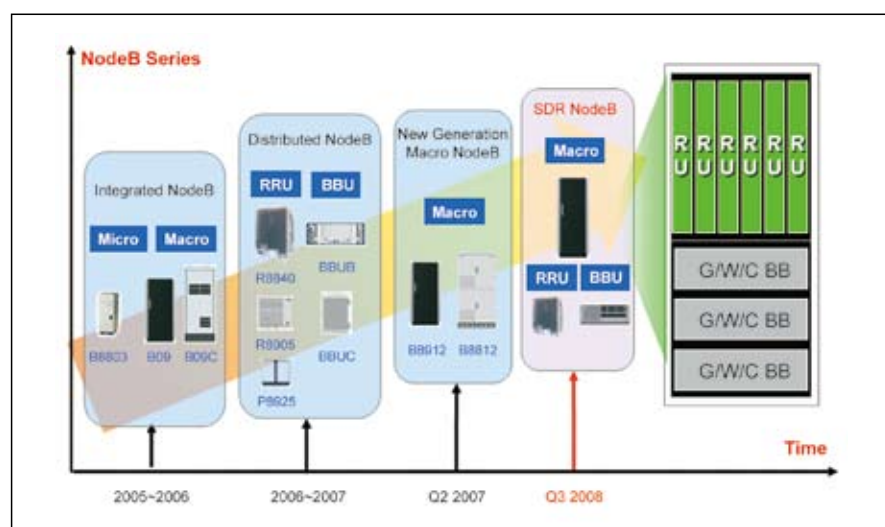


Figure 1 Development roadmap of ZTE's NodeB series

Unified μ TCA platform

ZTE's SDR products are built on a unified μ TCA hardware platform that delivers a bandwidth as high as 40 Gbps. Its baseband units can be connected to the radio modules in star, chain and ring networking topologies. With the same hardware structure, the SDR products can support GSM, WCDMA/HSPA, CDMA2000 1X EV-DO and WiMAX standards by software upgrade, helping operators reduce construction and management costs and facilitate the smooth evolution from 2G to 3G.

Smooth evolution

ZTE's SDR products are capable of meeting the requirements for multi-bands and mixed networking of GSM/EDGE/CDMA/WCDMA/HSPA. They can operate over a wide frequency range from 850 MHz to 2100 MHz. For example, the operator who owns both GSM900/1800 and UMTS2100 networks can use one SDR BTS to replace the two kinds of BTS hardware previously required. The SDR products support co-frequency and inter-frequency networking. For the same frequency, the UMTS900 and GSM900 can be implemented in one SDR BTS; for different frequencies, the UMTS2100 and GSM900 can also be implemented in one SDR BTS. As shown in Figure 2, the conventional GSM900 BTS is replaced by a dual-mode SDR BTS and it will evolve to the UMTS900/2100 NodeB in the future.

Field-proven 2G/3G interoperation

With significant R&D investment on 2G/3G integrated networks, ZTE has gained experience in delivering total 2G/3G network interoperation solutions ranging from business platform, core networks and access networks to terminals, as well as comprehensive and versatile end-to-end infrastructure technologies. Its unified core network, HLR, and dual-mode BBU/RRU are

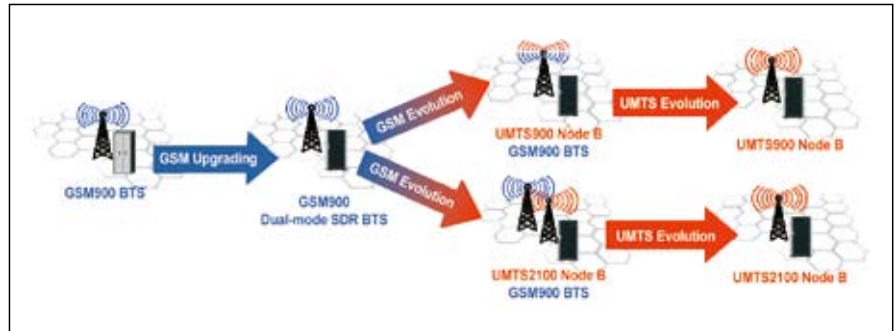


Figure 2 Smooth upgrade with SDR BTS

widely deployed, while PLMN, NMP and 2G/3G interoperable technologies have been implemented in more than 20 countries in Western Europe, South Asia and Africa. ZTE's SDR products are fully compatible with legacy network equipment.

High-performance HSPA

ZTE's SDR products support HSPA functions, allowing simultaneous access by 64 HSDPA subscribers in each cell at 14.4 Mbps peak rates on the downlink and 5.76 Mbps peak rates on the uplink. The high-performance HSPA

helps operators offer varieties of high-speed data services. Additionally, the SDR products are future proof and can software upgrade to support HSPA+ and LTE.

The SDR technology is evolving to support more flexible and low-cost applications. More and more companies and organizations will join the SDR family. With continuous investment in the SDR-related research and development, ZTE will provide competitive SDR product series to meet various market requirements.

ZTE TECHNOLOGIES

ZTE Challenges with Software Defined Base Station

Some day all base stations will be soft

February 14, 2008, Tony Dennis

A challenge to the established way of building cellular infrastructure was thrown down at Mobile World Congress (MCW) 2008 in Barcelona. ZTE claims to have shown the world's first SDR base station.

Although presently at a "pre-commercial" stage, when ZTE initially ships the ZXGW B8036 it will support both standard 2G (GSM) plus 3G (W-CDMA) for any territory in the world.

Given that the B8036 can be tuned to almost any frequency using software to process digitized signals, it should readily support esoteric versions of GSM operating at 450 MHz and 800 MHz. It could do 700 MHz if you were mad enough to waste that spectrum.

The beauty of SDR is that it makes the base station almost future proof. So if a network operator installs this bit of kit now, when 4G (in the shape of LTE) eventually becomes a reality, the B8036 will be ready for it.

(www.theinquirer.net)

ZTE's Distributed Soft BTS Solution

Mou Yongjian

Requirements for 3G BTS Equipment

With the increase of voice traffic and wide applications of high-speed packet data services, larger capacity for voice services and broader bandwidth for data services are required. To meet these requirements, most traditional mobile operators have to construct 3G networks based on their current 2G networks. However, the Base Transceiver Station (BTS) equipment used in the existing 2G networks is generally unable to be directly upgraded to support 3G services. As a result, new BTS equipment is needed in constructing 3G networks.

One critical problem most operators face is selecting a proper site and finding enough installation space for the new BTS equipment. Most operators have difficulties in site selection, and their equipment room spaces are often insufficient. Therefore, among others, an important requirement for 3G BTS equipment is that it should be designed to save the installation space and be flexibly applied in different installation scenarios.

Another problem in 3G network construction is standard selection. At present, there are three mainstream 3G standards: CDMA, WCDMA and TD-

SCDMA. Each standard has several versions used for different evolutionary steps. For example, the CDMA2000 1xEV-DO involves Rel.0, Rev.A and Rev.B. Most operators have already decided which 3G standard is to be used, but as to the evolution from 3G to 4G (UMB, LTE and WiMAX), or to the transitional releases (e.g., EVDO Rev.B), they are still adopting a wait-and-see attitude. Before investing in 3G networks, they have to consider how to evolve their networks, hoping that the evolution route they choose can facilitate a graceful and lowest-cost upgrade from 3G to 4G in the future. Hence, the BTS equipment for 3G networks should be upgradeable to support the 4G standard the operators choose, thus, better protecting their investment in 3G networks.

ZTE's Distributed Soft BTS Solution

To solve the above problems, ZTE first proposed the distributed BTS solution in the telecom industry. Unlike the traditional centralized BTS, the distributed BTS physically separates its baseband unit and radio frequency (RF) unit and connects them via the standard baseband/RF interface (e.g., Common Public Radio Interface/Open Base Station Architecture Initiative, or CPRI/OBSAI). As shown in Figure 1, the baseband unit and the RF unit of the traditional BTS are separated into two independent function modules in the distributed BTS: Base Band Unit (BBU) and Remote RF Unit (RRU).

The RRU of distributed BTS integrates three RF units of traditional BTS: Transceiver and Receiver (TRX), Power Amplifier (PA) and RF Front

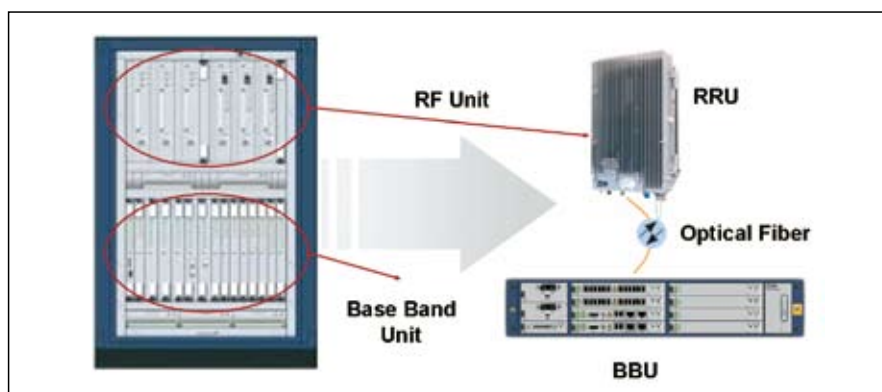


Figure 1 Traditional BTS vs. distributed BTS

End (RFE). With a protective enclosure that meets the IP55 standard, the RRU can be directly installed in an outdoor environment and in several modes: on a pole, on a wall, on a tower or in an integrated cabinet. Therefore, no equipment room space is required.

Being highly integrated, the BBU supports the same capacity as the baseband unit of traditional BTS but is much smaller. In an indoor environment, it can be installed on a wall or on an existing rack; thus, no extra indoor space is occupied. In an outdoor environment, it can be easily placed into the power supply cabinet or transmission cabinet of the BTS.

The distributed BTS is suitable for various installation scenarios as shown in Figure 2. If the equipment room has space constraints, the BBU can be installed in the equipment room, while the RRU is installed outdoors together with the antenna. In case the indoor installation space is not available, the BBU can be installed in the outdoor accessory cabinet, where the accessory equipment such as power supply, battery and transmission are placed, and the RRU can be directly installed outdoors, either with the antenna or in an integrated BBU & RRU cabinet. This integrated cabinet and the accessory cabinet can be installed on the ground or on top of the building; consequently, no indoor space is required. In the case of indoor coverage, the BBU can be installed in the basement or corridor, while the RRU can be mounted on the wall of the storey to be covered.

To support a smooth evolution in the future, ZTE adopts the Soft Defined Radio (SDR) technology in its distributed BTS, called distributed soft BTS. With this technology, the BTS can be applied in a 4G network by only upgrading the software or replacing some baseband boards. ZTE's distributed soft BTS has the following attractions:

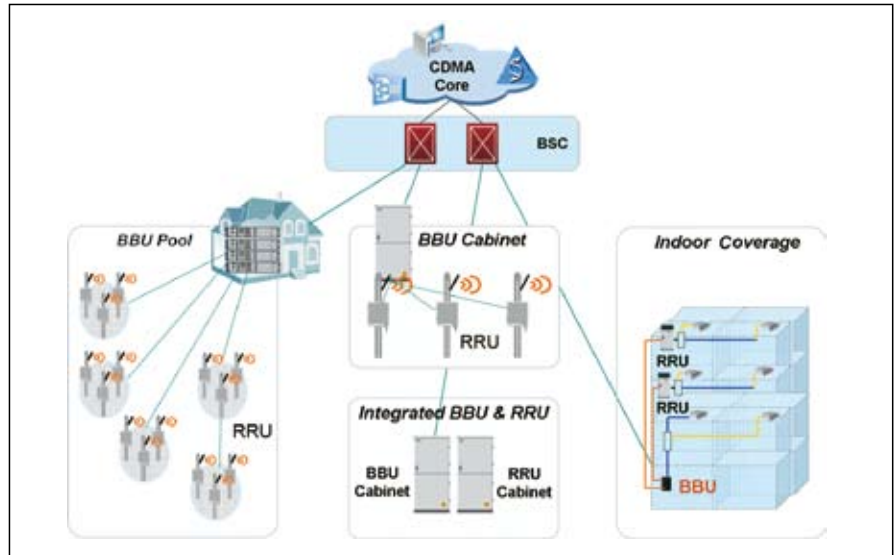


Figure 2 Installation scenarios of distributed BTS

- Real SDR technology supports hardware of different standards, maximally protecting operators' investment.

The BBU can support different standards such as CDMA, WCDMA, GSM, WiMAX, UMB and LTE by installing the related software. But the Channel Processing Module (CHM) board has to be replaced for other standards only when special chips are used on the board (at present, only the CDMA system uses special chips, i.e., Application-specific Integrated Circuit, or ASIC). As to the RRU, if the frequency band remains unchanged, it is only necessary to install the related software when supporting a different standard.

- A variety of BBU/RRU products deliver full coverage solutions, meeting operators' various requirements for network construction.

The RRU products with different power specifications, such as 60 W, 40 W and 5 W, are available, and they can meet the coverage needs in urban dense areas, suburbs and countryside. Moreover, the 200 mW pico RRU can be applied for indoor coverage.

- BBU/RRU products feature high integration, large capacity, small size and light weight, making easy installation and maintenance while reducing operators' CAPEX.

With the standard 2U height design, the BBU can support a capacity of 36 carrier-sectors for the CDMA2000 1X or EV-DO system. The RRU, which is 16.5 kg in weight and has a dimension of 380 × 330.2 × 152.4 mm (H × W × D), can support a maximum capacity of 6 CDMA2000 1X or EV-DO carriers and a maximum transmit power of 60 W at the cabinet top. Both the BBU and RRU provide the highest integration among the like products in the industry.

Conclusion

The distributed soft BTS solution can effectively solve the problems operator face in constructing their 3G networks: insufficient equipment room space and difficult site selection, helping them quickly deploy their networks at a low cost. Adopting the SDR technology, ZTE's distributed soft BTS solution allows a smooth upgrade of the BTS in the future, maximally protecting the operators' investment in 3G networks.



IP GERAN BSS Solution

Chang Jian, Ran Li

With the advent of the converged network era, IP services are driving the IP network transformation. The IP-based services like EDGE and 3G require operators to provide a high-bandwidth, high-efficiency and low-cost network infrastructure suitable for carrying IP services. The IP-based GSM/EDGE Radio Access Network (IP GERAN) leads the trend of network transformation. The IP-based GERAN adapts to the network evolution, and is of strategic significance to network investments protection. After the core network has fulfilled IP transform, it can save transcoder and transmission resources, enable reliable and flexible networking, and improve QoS and

resource utilization, bringing huge profits to operators.

ZTE started R&D work on unified IP hardware platform in 2003. Designed with new digital signal processing (DSP) technology, its hardware platform has the advantages of large capacity, high integration and small footprint. ZTE's GERAN and UMTS equipment are all based on this innovative IP platform. By far, this platform has been put into large-scale commercial applications in more than 20 countries around the world. ZTE is poised to lead the industry in the research of related patents, standards, BSS equipment, terminal, network optimization and value-added services, offering a successful evolution path to all-IP networks.

As shown in Figure 1, IP GERAN

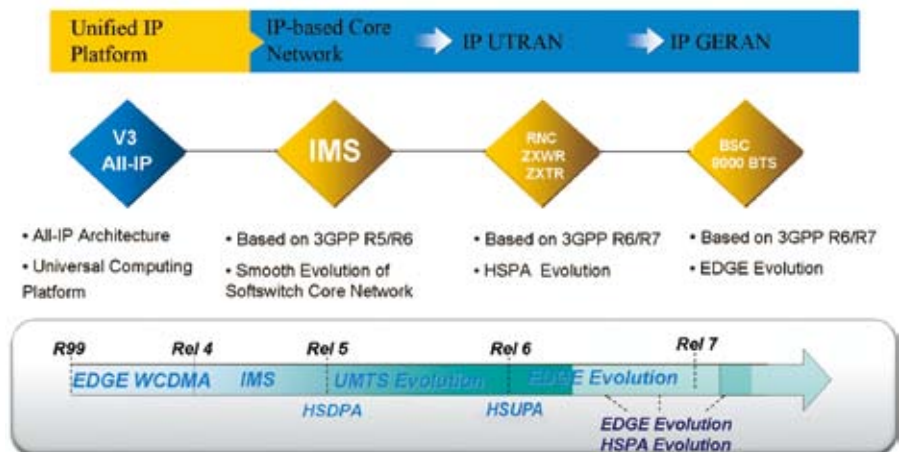


Figure 1 ZTE's all-IP mobile broadband network convergence

BSS is an important part of ZTE's all-IP network solution. ZTE's GERAN IP BSS equipment mainly includes the base station controller (ZXG10 iBSC) and the pico base transceiver station (ZXG10 S8001).

The ZXG10 iBSC, based on the all-IP hardware platform, is compatible with the ZXWR RNC (WCDMA) and ZXTR RNC (TD-SCDMA) in hardware architecture. It can be dual-rack mounted, supporting the industry's largest capacity of 3072 TRXs. Moreover, it supports smooth upgrade to future mobile technologies, enabling integration with AP controllers (RNC and UNC) into a universal physical NE compatible with a multitude of authorized radio access technologies such as GSM/EDGE/WCDMA/TD-SCDMA and unauthorized radio access technologies such as WiFi and WiMAX.

The ZXG10 iBSC supports Abis, Gb and A interfaces over IP, as shown in Table 1. In addition to the traditional E1/T1 or STM-1, they all support FE ports.

Table 1 Interfaces supported by the ZXG10-iBSC

Interface	NE Connection	Bearer Type
A	MGW	STM-1, E1/T1, FE
Gb	SGSN	E1/T1, FE
Abis	BTS	E1/T1, FE

The ZXG10 S8001 is the newest pico IP BTS released by ZTE. It is small in size and weighs only 2 kg. Its physical dimensions make it easier to deploy, install and swap. It adopts the Abis over IP technology to provide fast and low-cost deployment, helping operators solve the problem of indoor coverage and emergency communications in hotspot areas, as shown in Figure 2.

The ZXG10 S8001 is ideal for



Figure 2 ZXG10 S8001 for indoor coverage

indoor mobile coverage and wireless connection with high-speed data communications. Its distinct advantages include good coverage performance, effectively satisfying voice and data services requirements, IP transmission for fast networking, and voice QoS guarantee.

Good coverage performance

One S8001 can cover two to three floors of a building. For 900 MHz frequency band, the average wall attenuation of each floor is 15 to 20 dBm. The S8001 can provide a transmit power of 23 dBm. Therefore, one S8000 used for two to three floors can well satisfy the coverage need.

Effectively satisfying voice and data services requirements

Each S8001 supports one TRX. With the traffic model (0.025 Erl per user, GOS=2%), if one control channel and seven traffic channels are configured, one S8001 have the capacity support of up to 117 lines; if one of the seven traffic channels is configured for EGPRS, one S8001 can support a capacity of 91

lines.

IP transmission for fast networking

As the S8001 adopts the IP-based Abis interface, mobile operators can build its own IP network or rent the existing IP network for rapid and cost-effective transmission deployment. When the S8001 is fully loaded, the bandwidth it occupies over IP connection is about 180 kbps.

Voice QoS guarantee

The S8001 delivers a voice quality comparable to that of the conventional BTS. Even in case of 200 ms IP transmission latency and 2% packet loss rate, it can guarantee good voice quality, which reaches MOS3 level.

The IP BSS solves the "last kilometer" problem in mobile IP networks. On one hand, the communications network needs fixed-mobile convergence to deliver and manage IP services in a unified manner and to break the operating barrier; on the other hand, IP radio access applications are necessary for saving resources and energy costs.

ZTE's MVNO Solution

Wu Changyong

General

A Mobile Virtual Network Operator (MVNO) is a new telecom service provider that has no licensed wireless frequency spectrum, but it utilizes infrastructure and spectrum owned by another mobile operator to provide wireless services under its own brand name.

MVNO is a new business mode of delivering mobile services in the telecom value chain, which must rely on the networks of Mobile Network Operators (MNO). The possible MVNO scenarios are as follows:

- 2G operators having no 3G license may rent 3G wireless networks to

deploy 3G services.

- New 3G operators having no 2G network may rent 2G networks to provide complete network coverage, especially in the early stage of their network construction.
- Fixed network operators may rent wireless networks to tap into the mobile market.
- Value-added services providers may invest a wealth of services to explore more market opportunities.
- Other operators without licensed frequency spectrum may leverage their own advantages such as international lines to deliver mobile services.

Because there are no complete specifications for MVNO, the



requirements for mobile virtual network operation change frequently. This may involve changes in the terminal, radio network, core network, and service platform. This article mainly introduces the MVNO solution based on core network equipment.

MVNO Development

The concept of MVNO originated from Europe in 1998. Today, Europe is still the best booming market for MVNO. There are more than 100 MVNOs in the European market, among which, the most successful is Virgin Mobile UK.

When Virgin entered the United States in 2002, MVNO got development boost in the North American telecom market. At present, nearly 30 MVNOs have emerged in the United States. The prepaid MVNO services have attracted over 9 million users, providing a promising growth prospect.

In contrast, the MVNO development in the Asia-Pacific region is relatively slow. It was not until the end of 2005 when MVNOs began successful operations in Australia, New Zealand, Japan and Hong Kong.

There are four major attributes to the emergence and development of MVNO:

- Support of government regulation policies
- Booming of mobile multi-media services
- Fierce competition and surplus network capacity in mobile communications industry
- MVNO brand recognition

In the past few years, the MVNO market has grown at an enormous rate. According to a report by the Yankee Group, MVNO subscribers will reach hundreds of millions by the end of 2010. With the support of government regulation policies, growing demands for feature-rich services, and open competition environment, MVNOs will

be flourishing all over the world.

MVNO Operation Mode

MVNOs may adopt different network operation modes based on their telecom background and current network status. Typical operation modes include wholesaler, simple MVNO and full MVNO, as listed in Table 1.

A wholesaler can implement independent management and marketing to attract customers under its own brand name after entering into an agreement with the mobile operator. However, it has difficulty in delivering varieties of services, because it has no value-added service platform. Virgin Mobile USA is a typical wholesaler.

A simple MVNO has its own value-added service platform, HLR (or Virtual HLR) and billing system to deliver differentiated services through the self-developed information and interface. Virgin Mobile UK is a typical simple MVNO.

A full MVNO has its own switch and HLR to deliver voice and value-added

data services. Virgin Mobile Australia and Tele2 Norway are typical full MVNOs.

ZTE's MVNO Solution

Based on the advanced V3 all-IP unified hardware platform, ZTE can provide all core network entities including ZXWN HLR, MSC Server (MSCS), MGW, GGSN and Serving GPRS Support Node (SGSN). These network entities are all designed with MVNO features to meet the multi-level virtual operation needs.

Simple MVNO solution

As shown in Figure 1, a simple MVNO can usually construct its own HLR (or virtual HLR), WIN/CAMEL platform, billing center and customer center.

The ZXWN HLR is able to deliver a super-large capacity of up to 40M dynamic subscribers, and it can support virtual HLR functions. ZTE's simple MVNO solution enables the MNO to maximally benefit from the existing HLR while allowing the MVNO to

Table 1 Three MVNO operation modes

Wholesaler	Simple MVNO	Full MVNO
Having no licensed frequency spectrum	Having no licensed frequency spectrum	Having no licensed frequency spectrum
Issuing its own SIM cards	Issuing its own SIM cards	Issuing its own SIM cards
Building its own billing center and customer center, etc.	Building its own Home Location Register (HLR) or adopting virtual HLR; building its own Wireless Intelligent Network (WIN), billing center, and customer center	Building its own Gateway Mobile Switching Center (GMSC), Gateway GPRS Support Node (GGSN), HLR, WIN, and billing center
Having no independent services	Having partially independent services	Having independent services
Having no independent price	Having independent price	Having independent price
Owning independent brand	Owning independent brand	Owning independent brand

greatly decrease HLR investment, to shorten service deployment time, and to independently manage its own user data.

The call detail records (CDRs) generated in both the MNO's MSC/GMSC/SGSN/GGSN and the MVNO's Service Control Point (SCP) are sent to the MVNO's billing system for final settlement.

The pre-paid MVNO calls are triggered in the MNO's Visited Mobile Switching Center/Gateway Mobile Switching Center (VMSC/GMSC) and sent to the MVNO's SCP system.

Full MVNO solution

ZTE's core network entities support MSC Server Pool and SGSN Pool. If the pool technology is supported at the radio network, a full MVNO can build a complete suite of core network equipment including VMSC Server, GMSC Server, HLR, SGSN and GGSN; service platform including SCP, Short Messaging Service Center (SMSC), Multimedia Messaging Service Center (MMSC), streaming platform and Content Delivery Server (CDS); as well as billing and customer center. In this case, the MVNO only needs to rent the MNO's radio access network.

If the radio network does not support the pool technology, a full MVNO can build parts of core network equipment such as HLR, GMSC Server and GGSN; service platforms such as SCP, SMSC, MMSC, streaming platform and CDS; as well as billing and customer center. However, the MVNO needs to rent the MNO's VMSC Server, SGSN and radio access network.

ZTE's full MVNO solution is shown in Figure 2.

ZTE's MVNO solution has the following attractions:

- Flexible network capacity control
- Expandable CDR type and content for easy settlement between MNO and MVNO
- Support for pre-paid MVNO services

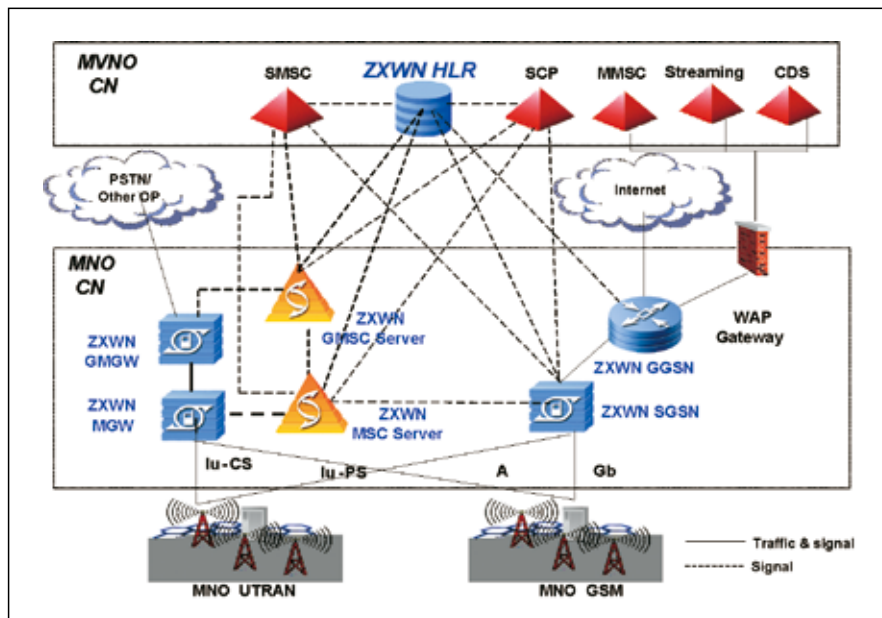


Figure 1 ZTE's simple MVNO network structure

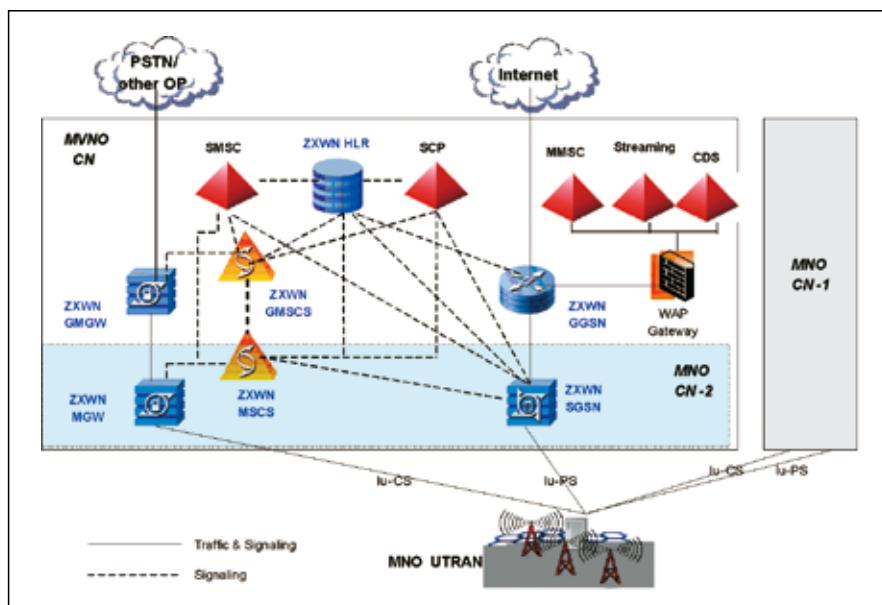


Figure 2 ZTE's full MVNO network structure

- Customized report system to meet the statistical requirement

Conclusion

With increasing fierce competition in the telecom industry, it is urgent to integrate all kinds of telecom networks, improve resource efficiency and perfect relative government regulation policies.

The MVNO business will continue to see a great deal of growth potential. ZTE's MVNO solution, based on its self-developed V3 all-IP unified platform, adopts high-performance, high-integration and versatile equipment to offer flexible MVNO networking, meeting the multi-level MVNO needs.

ZTE TECHNOLOGIES

TD-SCDMA Industry Development

Liu Min

Industry Chain

The TD-SCDMA industry chain has been well-established and is now expanding rapidly in China. Currently, a total of over 50 enterprises are dedicated to the research and development of TD-SCDMA. Among them, Datang Mobile (DT Mobile), ZTE, TD Tech are major TD-SCDMA infrastructure suppliers in China; Ericsson, Alcatel and Nokia-Siemens are overseas TD-SCDMA equipment vendors; Spreadtrum, Commit, T3G, CYIT, and MTK are actively involved in the development of TD-SCDMA chipsets; DT Mobile, ZTE, Chinabird, Lenovo, Hisense, Amoi, Samsung and LG are active players in the terminal market; Tektronix, Shibasoku, Agilent and Rohde & Schwarz (R&S) are major TD-SCDMA testing equipment providers, as shown in Figure 1. The booming of each link in the industry chain will undoubtedly promote a healthy, open and stable development of TD-SCDMA.



Figure 1 TD-SCDMA industry chain

Technical Innovations

To drive the industry growth and generate more revenue for operators,

TD-SCDMA equipment vendors are constantly keeping pace with technical advances. The most remarkable technical innovations they have achieved in the TD-SCDMA field are given as follows.

■ Compact smart antenna

How to minimize the physical size of the smart antenna (SA) to lower wind resistance and enable easy installation has always been a major concern of TD-SCDMA equipment vendors. Today they have rolled out the SA designed with orthogonal dual-polarization and compact structure, as shown in Figure 2. Compared with the conventional SA, the enhanced SA is reduced by half in size and by two-thirds in weight. The research and development on TD-SCDMA SA lays a solid foundation for future development of the multiple input multiple output (MIMO) system in the coming 4G era.

■ Power saving

By adopting the technology of smart shutdown of boards and timeslots, the environment-protected TD-SCDMA NodeB series supplied by ZTE is touted



Figure 2 Smart antenna

consumption.

■ MBMS

The Multimedia Broadcast/Multicast Service (MBMS) is defined in 3GPP as a point-to-multipoint service in which data is transmitted from a single source entity to multiple recipients, allowing the network resources to be shared. As a pure downlink service, MBMS is well suited for time division duplex (TDD) operation. ZTE is capable of delivering MBMS service on the TD-SCDMA system simply through software upgrade.

As a major vendor for China Mobile's TD-SCDMA commercial trials, ZTE was chosen to build radio networks in cities such as Beijing, Tianjin, Shenyang, Shenzhen, Xiamen, Qinghuangdao and Qingdao, accounting for 50% of the total deployment; and to build core networks in cities such as Beijing, Guangzhou, Xiamen, Qinghuangdao, and Qingdao. It has also made a strategic breakthrough in the overseas market by building the TD-SCDMA network for SKT, the major carrier in South Korea. **ZTE TECHNOLOGIES**



IMS: Restructuring Communications Services

Muhammad Asaf Siddiqi

General

The industry is interested in the value proposition of IP Multimedia Subsystem (IMS) because it is an enabling technology for a variety of new services and allows the operators to have greater control over their own network while increasing operational efficiency. The operators need to overcome the danger of becoming a data pipe for end users that rely on broadband connections for voice.

All network operators benefit from the operational efficiency of IMS. They will be able to launch new services through reusing their existing IMS infrastructure, will be able to shape their business model according to the requirements of users and will be able to provide much richer services than the traditional voice/data offerings. IMS presents major opportunities for the infrastructure provider, new revenue streams for third-party service providers and quicker response to user's needs. In short, IMS is characterized by the following benefits for the operators: new revenue opportunities, new services, faster time-to-market, investment protection, lower OPEX, fixed-mobile convergence, and higher control of the network.

IMS is an open and standard architecture for mobile and fixed IP-based networks, using the Session Initiation Protocol (SIP) and Voice over IP (VoIP) over communication networks in order to offer multimedia services to end users. The user can access services through any terminal, while these are network agnostic. A non-exhaustive list of services that are most likely to emerge with IMS are as follows: IP Telephony (VoIP), Video Calling, Web Browsing, Presence, Push-To-Talk/Push-To-Show, Instant Messaging (IM), Multimedia Conferencing, and Personal Information Management (PIM) services.

ZTE's IMS Service Solution

ZTE, as a leading global provider of telecommunications equipment and network solutions, offers a standard-based, state-of-the-art, and carrier-grade IMS solution to wireless, wireline, and integrated operators. ZTE's IMS service solution can be tailored for operator specific requirement. ZTE puts forwards the integrated Service Delivery Platform (SDP) that provides a set of 3G/NGN/IMS-oriented solutions and lies in the control layer of service solution. Its architecture is shown in Figure 1.

The SDP system is divided into five functional parts: interface encapsulation layer, service logic execution environment (SLEE), adaptation layer, service development test environment, and integrated service management platform (ISMP).

Interface encapsulation layer

The interface encapsulation layer is used to encapsulate network capability

interfaces into standard API functions for invocation by third parties. It supports Parlay X API, Web Service, and Parlay API interfaces.

ZTE puts forwards the integrated Service Delivery Platform (SDP) that provides a set of 3G/NGN/IMS-oriented solutions and lies in the control layer of service solution"

SLEE

SLEE is the control center of the whole OMA Service Environment (OSE) service logic. It implements service logic capability control such as CP/SP access authentication, authorization, log statistics, capability management, SLA control, and check on black and white lists. It uses the Service Creation Environment (SCE) of the OSE to load services that have been developed and tested.

Adaptation layer

The adaptation layer is southbound

interface of SDP with lower layer network element. It adopts different protocols to communicate with service enablers for both voice and data services.

Service development test environment

This part consists of SCE and Service Test Environment (STE). SCE acts as an interface between a telecom network and a service designer, helping the service designer rapidly introduce value added services in the network. Service logic is created using SIBs and is simulated. Finally, STE is used to test the service to ensure that it is safe in the telecom network.

ISMP

ISMP provides unified service management functions such as authentication, billing management, user management, SP management, service management, content management, and Operation & Maintenance (O&M). It is essential to set up a data and management center for operation and control.

Salient Features of SDP

Among abundant powerful features of SDP, some are presented below:

- It provides unified portal, access, authentication, charging, and service management.
- It provides standard and open third party interfaces for their active participation so that services are provided by a market-driven mode.
- It adopts different interface protocols such as ISC, INAP, CAP, SMPP, SMGP, MM7, Le, PAP, and SIMPLE to communicate with different networks and service enablers for network convergence. Through this convergent platform, feature-rich integrated multimedia services can be cost-effectively deployed and managed in different networks.
- It supports three application server

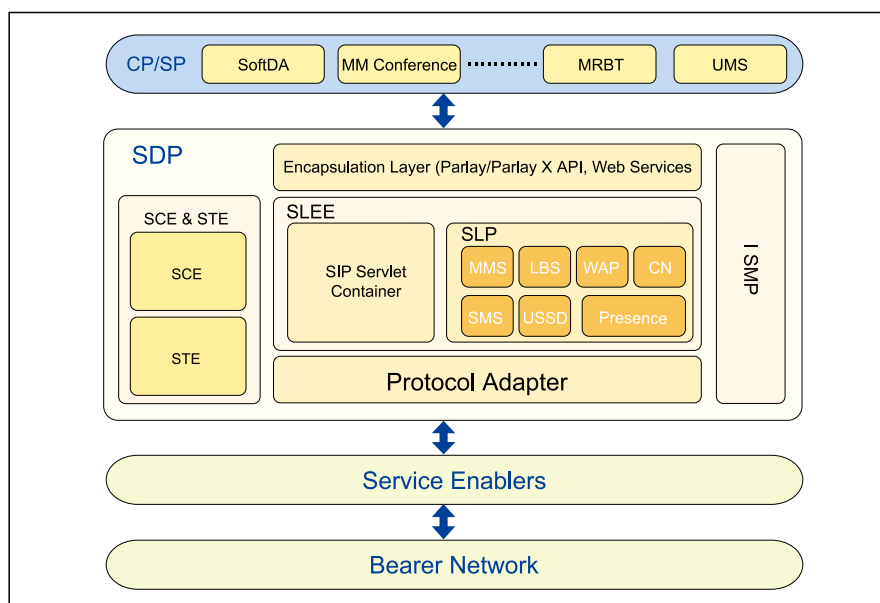


Figure 1 ZTE's integrated SDP

modes defined for IMS: OSA/Parlay gateway mode, SIP application server mode, and traditional intelligent network mode.

- It provides powerful and flexible charging functions, supporting charging based on duration, traffic, contents, and QoS.

ZTE's IMS Services

Voice and text message services are no longer sufficient for today's communication services. Multimedia communication services are emerging at a fast pace. With the introduction of IMS, a lot of multimedia services are enabled such as multimedia conferencing, IMS messaging and Multimedia Ring Back Tone (MRBT).

ZTE has put forward a lot of integrated multimedia services. IP telephony service and IP Centrex supporting point-to-point voice and video calls are implemented through core network PSS server. ZTE offers 2G and 3G services through the same unified and converged platform. The services include Account Card Calling (ACC), One Number Link You (ONLY), Click-to-dial, MRBT, Multimedia Ring Alert Tone (MRAT), Unified Message Service (UMS), Instant Messaging (IM), Presence, Group Management (GM), Multimedia Conference, Video Mail, Multimedia Sharing, Soft Digital Assistant (SoftDA) and so on, as shown in Figure 2. Some important multimedia services are introduced here.

MRBT/MRAT

MRBT is an advanced service of CRBT in which called party's customized multimedia contents are displayed on caller's terminal during the alert period.

MRAT, unlike CRBT and MRBT, is caller's service in which caller's customized multimedia contents are displayed on called party's terminal.

ZTE provides colorful GUI interfaced



Figure 2 Feature-rich IMS services

management portals for operators, SPs/CPs, and end users.

Multimedia sharing

Multimedia sharing includes photo, audio, and video sharing. It is a new multimedia service that enriches 3G mobile users' communication by allowing them to share a photo, an audio clip, or a live camera view or a video clip while speaking on their mobile. It provides the users with an instant way of adding a visual element into a phone conversation. During the conversation, sharing can be initiated or terminated either by the calling party or called party. When the conversation is over, this feature is closed as well.

Multimedia conference

Multimedia conference can be divided into three kinds of conference: audio conference, video conference, and data conference.

Data Conference is composed of electronic whiteboard, application sharing, and file transfer in order to assist collaborative work.

Some of the abundant features supported by Multimedia Conference are listed below:

- Conference can be an instant conference or a reserved one. Notification of a conference can be sent to the members through SMS or voice call.

- Conference chairman can manage the conference in real-time on a GUI interface.
- Sub-conferences can be created within a conference and participants can be moved from and into a sub-conference by the chairman.
- Conference members' rights can be modified. For instance, speaking rights can be withdrawn or granted to a member.
- Conference can be set to be recorded at the time of reservation. Later it can be listened by dialing specific service code, conference number, and entering password.

SoftDA

SoftDA is an IMS client designed by ZTE that can offer rich integrated multimedia services to assist common users as well as enterprise users. Aimed at the business sector, it is a personal telecoms portal offering a wide variety of data and voice applications. It runs on all type of terminals regardless of whether it is fixed telephone, 2G/3G mobile, PC, or WLAN phone and converges all types of access means. The telecom and IT applications and their features supported by SoftDA include voice/video calling, voice/video conferencing, instant messaging and presence, unified messaging and collaborative working. **ZTE TECHNOLOGIES**

ZTE's IMS-based Multi-network Convergence Solution

Zhang Jian

With the continuous tracking of network evolution and many years of accumulated technical advantages, ZTE rolled out ZIMS™, a complete IMS-based innovative solution supporting the Fixed Mobile Convergence (FMC) and CT-IT convergence. ZIMS™ helps a traditional telecom operator to transform into an integrated communication and information service provider that can deploy a convergent Next Generation Network (NGN).

ZIMS™ is an end-to-end solution including terminal, access, core, and service platform. Based on a number of standards like 3GPP, 3GPP2, TISPAN, ITU-T and OMA, ZIMS™ features open architecture, integrated services platform and unified user data management system. It has proven interoperability with various access technologies such as WCDMA, TD-SCDMA, CDMA2000, WLAN/LAN, WiMAX, cable broadband access and xDSL. Moreover, it simplifies service creative environment, enabling powerful service provisioning; it supports flexible network deployment, enabling centralized and distributed network planning; and it is built on the unified all-IP hardware platform

to support smooth evolution to NGN, protecting the operators' investment. ZTE's IMS solution leads the industry in quality, interoperability and technology innovation.

■ Flexible system design

ZIMS™ is designed with open architecture to provide unified session control and home services to fixed, mobile and other networks with different IP accesses, bringing great convenience to full-service operators while reducing

their OPEX.

To create IMS-vendor operation environment, ZIMS™ provides standard and open interfaces that ensure smooth interworking with IMS equipment from other vendors. ZTE's IMS-based core network (CN) products have successfully passed IMS interoperability testing at the Global MSF Interoperability (GMI) 2006 event, demonstrating excellent compatibility, flexibility and stability. They support

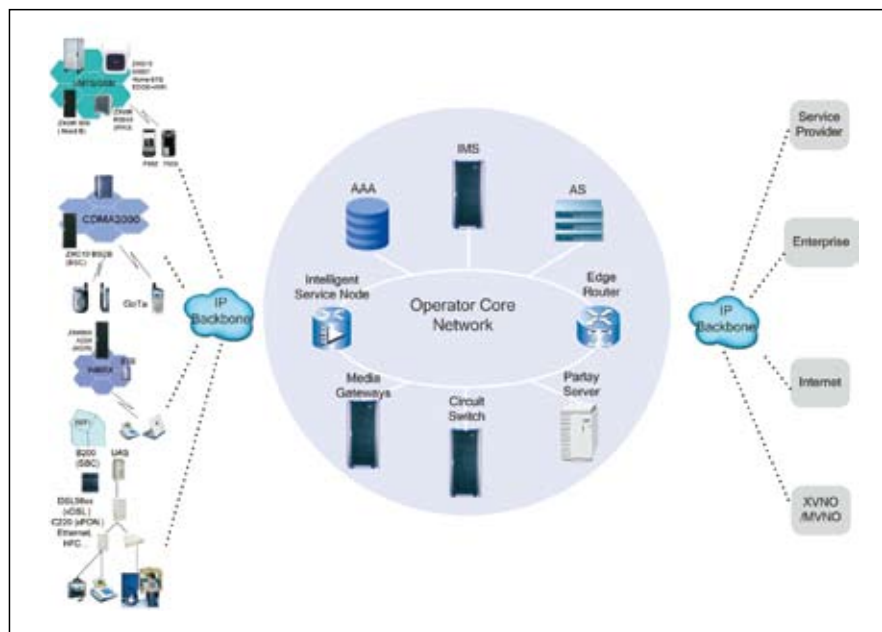


Figure 1 ZTE's IMS-based multi-network convergence solution

interconnection with different external networks while delivering topology-hiding function to prevent outsiders from knowing about the internal details.

ZIMS™ can optimize network resources as required, providing enhanced IP-based QoS management and service-based local control. With advanced network resource reservation capabilities, it can deliver classified services to authorized subscribers.

With a highly integrated and flexible design, ZIMS™ can be deployed to meet the actual requirements. For a small-scale application, its Proxy-Call Session Control Function (P-CSCF), Interrogating-CSCF (I-CSCF), Serving-CSCF (S-CSCF) and Breakout Gateway Call Function (BGCF) are integrated; for a middle-scale application, its I-CSCF, S-CSCF and BGCF are co-located while P-CSCF is independently deployed; for a large-scale application, P-CSCF, I-CSCF, S-CSCF and BGCF are all distributed independently.

■ Unified service platform

The key of FMC lies in the convergence of the service layer. ZIMS™ provides an integrated service platform (ZXUP10) to support fully converged IMS multimedia application environment.

ZXUP10 supports three IMS-based service provision modes: Session Initiation Protocol Application Server (SIP-AS), Open Service Access Application Server (OSA-AS) and CAMEL IP Multimedia Services Switching Function (CAMEL IM-SSF) to facilitate deployment of multimedia services. It has standard and open interfaces, allowing more service and content providers to be introduced in the IMS industry chain; it provides horizontal service structure that supports both ISC and CAMEL protocols, allowing simultaneous service delivery across different networks; it incorporates a flexible charging mechanism that

supports time, flow, content and QoS based charging capabilities; it adopts a distributed structure that shares the workload among application servers, avoiding traffic congestion and enhancing system stability.

Field-proven applications

ZTE started the research and

deal from China Mobile. ZTE provided China Mobile with IMS communications services on the unified service platform, bearer network and terminals. The convergence of multiple means of communication such as fixed phone, mobile and PC helps users increase their work efficiency while saving costs.

ZTE has also scored victories



Figure 2 IMS-based Services

development of IMS strategic products in 2002. As one of the few vendors in the industry that can provide end-to-end solutions, ZTE has developed a complete IMS solution, ZIMS™, using 3GPP Releases 6,7 and TISPAN NGN Release 1. By focusing on FMC, ZIMS™ provides a graceful solution without any misalignment between fixed and mobile roadmaps.

In March 2006, ZTE partnered with China Unicom to trial the IMS FMC network, which is the world's first convergence of WCDMA, CDMA2000 and fixed networks. The strategic cooperation for NGN between ZTE and China Unicom paved the way for active exploration and practice on FMC.

At the end of 2006, ZTE was the sole vendor to win an IMS commercial

one after another in the global IMS market. Early in 2006, the company partnered with France Telecom (FT) to develop IMS clients and handsets and was shortlisted in April 2007 for the FT's IMS project. In November 2007, it demonstrated the integration of its innovative IMS products with Telemanagement Forum's (TMF) New Generation Operations Systems and Software (NGOSS) framework as part of the TMF's Catalyst Project. In December 2007, it worked with Orange Poland to successfully launch the first IMS trial based on the EV-DO Rev.A technology. In January 2008, it inked a framework agreement with Libya Telecom & Technology (LTT) to build an end-to-end IMS network based on WiMAX access.

ZTE TECHNOLOGIES

Continued Development Road of Vietnam's EVN Telecom

Bai Xiaomei, Hu Yuan

Milestones of Cooperation between ZTE and EVN Telecom

July 2003 | ZTE started the cooperation with EVN Telecom by signing a contract to build the Phase 1 CDMA2000 1X network in Southern Vietnam.

March 2004 | ZTE signed a contract with EVN Telecom to build the Phase 1 CDMA2000 1X & EV-DO network in Ho Chi Minh City.

May 2005 | ZTE signed a network expansion contract with EVN Telecom to build the Phase 2 CDMA2000 1X network in Southern Vietnam.

November 2006 | ZTE signed a network expansion contract with EVN Telecom to build the Phase 3 CDMA2000 1X network in Southern Vietnam.

May 2007 | ZTE signed a network expansion contract with EVN Telecom to build the Phase 4 CDMA2000 1X network in Southern Vietnam.

June 2007 | ZTE signed a network expansion contract with EVN Telecom to build the Phase 2 CDMA2000 1X & EV-DO network in Ho Chi Minh City.

November 2007 | ZTE signed a network expansion contract with EVN Telecom to build the Phase 5 CDMA2000 1X network in Southern Vietnam.

December 2007 | ZTE signed a network expansion contract with EVN Telecom to build the Phase 3 CDMA2000 1X & EV-DO network in Ho Chi Minh City.

In 1995, Vietnam government issued licenses to encourage competition in the communications industry for the purpose of achieving a telephone penetration rate of 35% across the country. From then on, the communications industry gained rapid development and Vietnam became one of the fastest growing countries in terms of telephone penetration. In such a competition environment, all operators endeavor to provide customers with satisfactory service, maintain robust growth in subscriber base, and to generate more revenue to their business.

EVN Telecom, a subsidiary of the Electricity of Vietnam (EVN), was established in 1995. The company is licensed to run a nationwide 450 MHz band CDMA network and its business range covers fixed wireless phone (E-Com), inter-provincial mobile phone (E-Phone) and mobile phone (E-Mobile) telecommunications services. EVN Telecom is committed to providing affordable communication services in Vietnam. Within just 2 years, its subscriber base has exceeded 1.5 million and it is regarded as the fastest-growing telecom operator in the country.

Differentiated Services to Seize the Market

To secure a position in the Vietnam communications industry, EVN Telecom needs to explore a new way in the market. As a leader in the CDMA market, ZTE leverages its CDMA technical advantages to help EVN Telecom find solutions for continued development that can fully exploit its potentials.

To survive the competition, EVN Telecom needs to enhance service expansion capability while reducing total network operation costs. Considering customers' different needs for voice and data services, ZTE

provides network deployment solutions designed for developed regions and rural areas respectively. Flexible service modes are created to take advantage of the 450 MHz frequency band: E-Com is pretty popular among average consumers as it can solve the problem of voice coverage in the rural areas; E-Phone and E-Mobile can meet the needs of consumers for mobile services. EVN Telecom achieved over one million subscribers 18 months after rolling out CDMA service package.

Creditable Service to Strengthen Cooperation

To speed time to market and create new revenue opportunities, EVN Telecom's Southern Network Maintenance Department requires that the network equipment provider complete each phase of network construction in 120 days. During the several phases of network capacity expansion, ZTE is highly recognized by EVN Telecom for its honest and creditable service, which lays a solid foundation for further strategic cooperation in the years to come. ZTE is viewed as the most capable supplier that can guarantee the project execution and meet the commercialization plans. It helps EVN Telecom achieve the goal of fast deployment, wide coverage, large capacity and high voice quality set for its CDMA network project.

With the joint effort of both sides, the customer satisfaction is greatly increased and EVN Telecom becomes the operator with the highest subscriber growth rate in Vietnam.

All-IP Network to Enable Smooth Migration While Reducing TOC

From the perspective of network evolution and technical innovation, all-IP is the key to success in the future. ZTE's all-IP solution helps EVN Telecom to save CAPEX and OPEX using more flexible networking modes and to cost-effectively introduce information technology to outermost regions. Its Softswitch and IP transmission can save up to 60% transmission resources and over 30% vocoder resources; its large-capacity centralized core network can also reduce maintenance costs.

ZTE is actively delivering state-of-the-art technical solutions for EVN Telecom. By now, the network equipment in Ho Chi Min city has all been based on the all-IP platform, which not only reduces TCO



for the operator but also offers a smooth evolution path for future enhancements. This is the first all-IP solution in Vietnam and ZTE is so far the only vendor that supplies all-IP network equipment in the Vietnam market.

ZTE's all-IP solution is designed to meet future trends of mobile communications, laying a sound foundation for EVN Telecom to smoothly upgrade existing networks to deliver EV-DO Rev.A broadband data services.

ZTE TECHNOLOGIES

Domain-based NMS Solution for an MSAN Project

Yue Wande

Background

One of the largest telecom operators in Middle East issued a Multi-Service Access Node (MSAN) tender for the upgrade of its existing Remote Access Node (RAN) and in preparation of the coming Next Generation Network (NGN). In addition to the common MSAN requirements in the tender, the operator asked for 10 GE interfaces for the optical line terminal (OLT) transmission. It also required a unified network management system (NMS) for transmission at both the core and access layers. The MSAN is located in the access domain, while the 10 GE interfaces belong to the core layer instead of the access layer. Therefore, the boundary of the core and access layers is, however, blurred in this NMS solution, which would result in a series of problems.

NMS Requirements of the Operator

The NMS solution required by the operator is illustrated in Figure 1, where the big white blocks in the STM-64 ring are transmission network elements (NEs) at the core layer, the small white blocks in the MSAN STM-16 ring are transmission NEs at the access layer, and the small grey blocks in the MSAN ring are optical network units (ONUs).

All transmission equipment used in both the core and access layers should be managed by a unified transmission NMS, which is a product-based NMS

solution. However, this solution has some distinct disadvantages, and they are the following:

- The network structure is not clear.
- It is hard to implement unified equipment management at the access layer, unified alarm management and unified performance monitoring.
- End-to-end services configuration is complex.
- It doesn't support a smooth evolution to NGN.

managed by the MSAN NMS, and they are then connected to the higher level NGOSS through the standard interfaces.

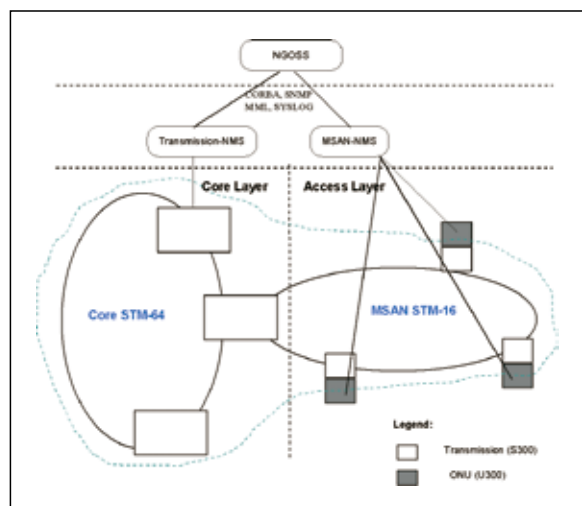


Figure 1 Product-based NMS solution

ZTE's Domain-based NMS Solution

ZTE's domain-based NMS solution is shown in Figure 2. In this solution, ZTE considers the ONU unit (U300) and the transmission unit (S300) in the ONU as a whole (or a domain) at the access layer, which complies with the telecommunication management network (TMN) structure. The transmission NEs in the core layer are managed by the core NMS; and then, they are connected to the higher level Generation Operation Support System (NGOSS) through the standard interfaces such as CORBA, SNMP, MML and SYSLOG. Meanwhile, the NEs in the access layer including U300 (ONU) and S300 (embedded transmission NE) are

This domain-based NMS provides the following benefits:

Configuration of end-to-end services

The end-to-end service configuration process of NetNumentTM N31 is introduced here using PSTN and DSL services for example.

PSTN services

Without the domain-based NMS, a typical configuration process of PSTN services is described as follows:

- ◆ Search the E1 connection relation of S300 and U300
- ◆ Configure E1 cross-connected time slots on S300
- ◆ Enable E1 on U300
- ◆ Configure V5 ports and V5 links on U300

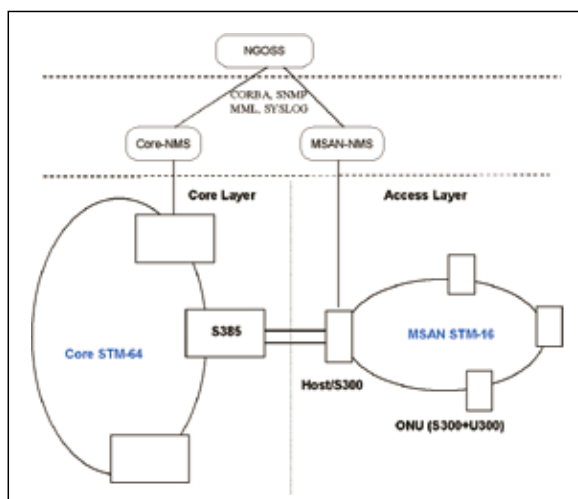


Figure 2 ZTE's Domain-based NMS solution

◆ Configure service parameters

With the domain-based NMS of NetNumenTM N31, operators only need to provide service parameters. The corresponding V5 links, E1, and timeslots will be automatically searched, matched, or configured by the network management system. The whole process of service configuration becomes rather simple.

DSL services

Without the domain-based NMS, a typical configuration process of DSL services is as follows:

- ◆ Search the Ethernet connection relation of S300 and U300
- ◆ Configure the uplink bandwidth of the Ethernet board on S300 (VLAN, bandwidth and EOS encapsulation configuration)
- ◆ Configure the VLAN of the uplink port on U300
- ◆ Configure the VLAN of the DSL port on U300

The maintenance personnel have to manually maintain the VLAN relationship of S300 and U300. Certainly, it is easy to commit errors in completing the above process.

By using the domain-based NMS, operators only need to input the VLAN attributes of a certain DSL port, and the VLAN and other configurations of the

whole uplink will be automatically completed by the NMS.

Unified alarm management

The unified alarm management allows operators to locate the failure by analyzing the reported alarms. Take these situations for examples: when a loss of frame (LOF) alarm is reported on U300 due to an error in the configuration of

cross-connected time slots on S300, the domain-based NMS can locate the error by tracking a byte on S300; when an E1 alarm occurs, the system can know whether the E1 cable is connected properly or not by judging the receiving and sending alarm of the E1 on S300 and U300; when an EOS encapsulation alarm appears on S300, the system NMS can automatically find out the services related to the EOS channel and tell the maintenance personnel that these services will be affected.

Unified performance monitoring

As the domain-based NMS supports unified service configuration, it is able to perform end-to-end QoS monitoring for services. In case of service failure, the system can automatically monitor the performance of its related nodes, make a careful analysis, and finally send information about possible failure happening in the system.

Take DSL services for example. The system first checks whether the number of packets received and sent via an uplink port of U300 is consistent with that of packets received and sent via the related Ethernet port of S300. Then, it checks the bit error rate of the S300

transmission channels. Finally, it checks the number of packets received and sent by the uplink port of S300 to locate the faulty node.

Smooth NGN evolution

Although V5.2 and H.248 protocols are configured for the MSAN project, the operator's network needs to be transformed to NGN on a step-by-step manner.

ZTE's domain-based NMS solution provides well-defined network architecture. Different interfaces and interconnection protocols are specified for NEs at different layers, allowing independent evolution of each NE. When operators need broadband services in the future, they can use Passive Optical Network (PON) or other advanced technology to replace MSAN to upgrade the equipment at the access layer without any alteration to the equipment at the core transport layer.

To meet the requirements for NGN hierarchical architecture, operators must adjust their operation system, and deploy and operate their network management system in a hierarchical way. ZTE's domain-based NMS solution makes possible end-to-end service configuration and monitoring, allowing a smooth and step-by-step transition to NGN.

Conclusion

ZTE's domain-based NMS solution complies with the layered (TMN) structure. The access layer transmission is one part of the MSAN, which implements transmission function in the TMN structure for access network. In terms of service configuration and monitoring, ZTE's domain-based NMS is much easier to operate and maintain. Due to the independence of the access layer and the NMS, the solution allows an easy and smooth evolution to NGN.

ZTE USA Launches First Handset for U.S. Market

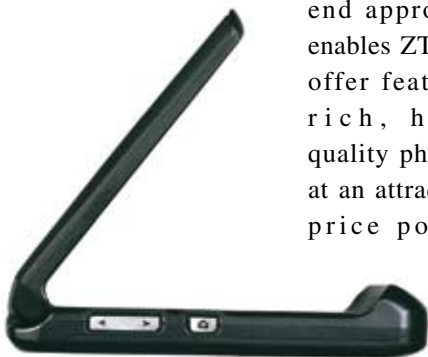
High quality, innovative and affordable handset from ZTE is now available in MetroPCS markets across the country

ZTE USA, Inc. a subsidiary of ZTE, recently announced the general availability of its first handset for the U.S. market, the ZTE C88. The C88 delivers a cost-effective option for consumers who want a high quality, full featured handset at an affordable price point. The phone is now available for purchase through MetroPCS stores, website and resellers in all markets the carrier serves.

ZTE both designs and manufactures its handsets in-house. This end-to-end approach enables ZTE to offer feature-rich, high quality phones at an attractive price point.

Offered as a sleek flip phone, the C88 handset operates at the PCS and Cellular bands (1900 MHz and 850 MHz) and delivers a wide range of enhanced features including 2 inch color screen, Internet (WAP) browsing, bluetooth headset support, camera, text messaging on a large, easy-to-use keypad, MMS/picture messaging, 60 MB internal memory, capability to store 500 contacts, embedded applications—mail@metro, metro411, mobile IM, preloaded (Sudoku) as well as downloadable games, ringtones and wallpapers.

“The C88 as our first handset for the U.S. market is a major milestone for ZTE,” said Dr. George Sun, CEO of ZTE USA. “The C88 handset demonstrates our ability to align our products with the U.S. market’s needs. Consumers will find that the C88 offers the perfect mix of affordability, quality, and a broad feature set.”



ZTE Aims for 50 Million Handset Sales in 2008

February 13, 2008 Source: Cellular-News

ZTE’s mobile phone sales will surge 60% year-on-year in 2008 and the world’s sixth biggest handset maker aims to “significantly lift the portion” of sales with its own brands.

In 2007, ZTE sold just over 31 million mobile phones and has a target of breaching the 50 million mark in 2008, according to Gu Yongchen, General Director of ZTE’s Corporate

Branding and Communications Department.

“We can achieve the target through deep cooperation with carriers and improved handset designs,” Gu said at ZTE’s booth at the Mobile World Congress 2008 held in Barcelona.

ZTE started handset business as a contract manufacturer and provided phones for the world’s top carriers

such as Vodafone and China Mobile. ZTE aims to establish its brands in the middle and even high-end market from the entry-level segment now, industry insiders said.

In 2007, about 46% of ZTE’s sold phones were with its brand (including co-brand) and the figure will surge in 2008.

ZTE, 3 Italia and MOMODESIGN Partner to Develop MD2 and MD3 Handsets

ZTE Corporation, a global provider of telecommunications equipment and network solutions, and 3 Italia, the Italian Mobile Media Company of Hutchison Whampoa Ltd. have come together to develop the MD2 and MD3 handsets in collaboration with MOMODESIGN, the Italian Design Center.

MD2 is a fashionable UMTS clamshell handset with an up-to-date design and equipped with the latest generation technology. MD3 is a Digital Video Broadcasting-Handheld (DVB-H) and HSDPA videophone with the Qualcomm MSM 6280 chipset and an innovative design featuring touch screen functions and a screen that rotates 360°, facilitating all-rounded video viewing.

"We are delighted to be chosen by 3 Italia to develop their fashionable

and stylish MOMODESIGN MD2 and MD3 mobile devices," said Fang Rong, Senior Vice President of ZTE Corporation. "With our proven track record and capability in customizing terminals, we are confident that we can help 3 Italia to develop and manufacture new generation handsets that meet their specifications and allow them to widen their multimedia device offer."

"The joint activity with a large manufacturer like ZTE, with its extensive expertise in handsets production, was very valuable in the development of our Videophones and TVphones in terms of both their customization abilities and their quick response around time", said Mr. Massimiliano Zuco, Consumer Division Director at 3 Italia. "We must also underline the important role played

by MOMODESIGN in making our technologically advanced multimedia devices truly exclusive and desirable objects", added Mr. Zuco.

"Technology, innovation, research and style are the core values that have been inspiring MOMODESIGN for more than twenty five years. The knowledge and expertise of the MOMODESIGN Style Center are further confirmed by the close collaboration with leading and cutting edge multinationals such as 3 Italia", said Marco Cattaneo, CEO of MOMODESIGN.

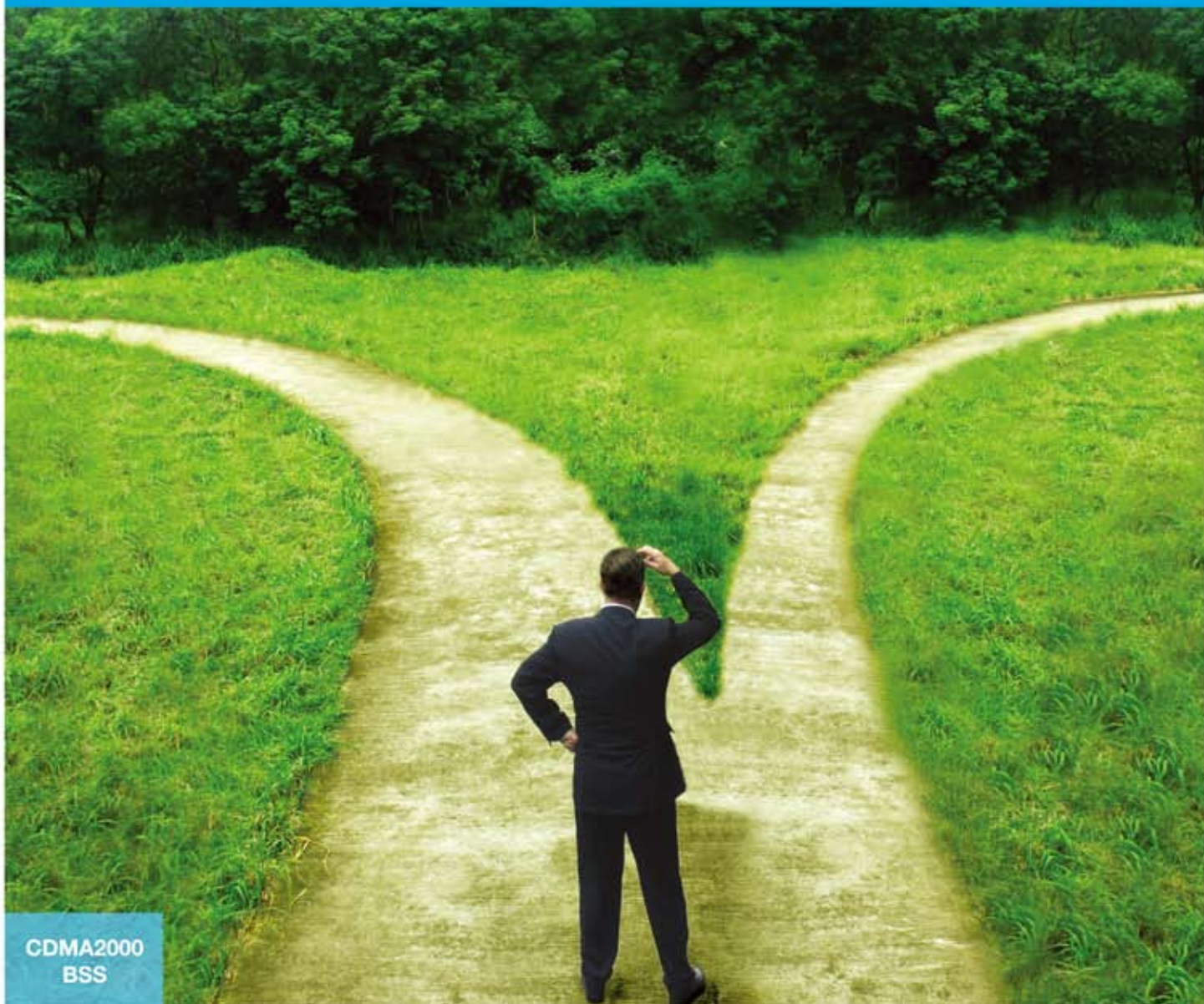
Besides the production of MD2 and MD3 handsets, the companies have plans to expand their partnership and collaborate to develop new projects that will be presented in the second half of 2008.

About 3 Italia

3 Italia, the Hutchison Whampoa Group's Mobile Media Company, is the leader of the UMTS market in Italy with over 8 million customers thanks to a wide offer of multimedia, video communication and Internet services, in addition to entertainment, music, information, cinema, sport and Mobile TV. 3 Italia acquired the national license as digital TV operator in 2005 and launched the first Digital Mobile TV based on DVB-H technology in the world the following June. 3 Italia has established itself on the cutting-edge of 3G mobile technology development by launching the first HSDPA commercial offer in Italy and implementing HSUPA to access broadband in mobility with data transmission rates up to 7.2 Mbps in download and 1.4 Mbps in upload.

About MOMODESIGN

MOMODESIGN is a style centre headquartered in Milan. The company designs and develops its own brand products and also works on design projects for third parties and international clients. Technology, innovation, research and style are the values that have been inspiring MOMODESIGN for over twenty-five years, setting the company in the international survey as a point of reference for all the style and design enthusiasts.



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ALL-IP BSS
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You can choose a macro or a micro, or even a super base station supporting 120 carrier-sectors. Whichever combination you choose, it gives you an All-IP solution and you don't have to invest big-time for a small step upgrade.

Now, we are ready to serve you.

ZTE is a leading global provider of telecommunications equipment and network solutions.

We deliver innovative, custom-made products and services to customers in more than 120 countries, helping them achieve continued revenue growth, while shaping the future of the world's communications.

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