

Next Generation Network Enabled by ZTE's Softswitch Technology

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ZTE is dedicated to the research and development of Softswitch technology and has a self-owned intellectual property right for its Softswitch products.

Softswitch technology integrates the superiorities of both an intelligence network and the Internet, which embodies its maturity and advancement. With a hierarchical network model, it effectively solves problems of evolution and convergence of current communication networks. It also follows two trends of network construction and development: network convergence and service separation from network.

1 ZTE Softswitch Technology

ZTE is dedicated to the research and development of Softswitch technology and has a self-owned intellectual property right for its Softswitch products. The architecture of ZTE's Softswitch system is shown in Figure 1. It consists of a variety of network elements, which are involved in the whole next generation network (NGN) field. Based on a carrier-grade hardware platform, ZTE's Softswitch system uses an industrial standard rack and can smoothly expand its capacity by adding shelves and increasing the number of single boards. Furthermore, the embedded industrial-standard real-time operation system greatly improves the system's total performance.

ZTE's Softswitch has a powerful networking capability. It makes use of the widely distributed data networks as its bearer network to support various network topologies such as star, tree, ring, and star ring. It provides several solutions to satisfy different customer requirements through various combinations of Softswitch control equipment and all types of gateway equipment. At the same time, an im-

portant feature of ZTE's Softswitch networking is "double-control at one point"; it adopts a Master/Slave mechanism. When the Master equipment fails, Slave equipment will take over immediately so as to guarantee consistent system operation. This Master/Slave mechanism can also be extended to inter-domain. When Master equipment in one domain is working, Master equipment in other domains can be set as Slave equipment according to some specific strategies. Generally, the system can have several sets of Slave equipment to avoid disaster failure.

At the early stage of NGN construction, many networks exist, among which PSTN is dominant, therefore the Softswitch technology cannot be widely implemented, but database related functions can work inside the Softswitch equipment directly. When a network reaches a certain scale, ZTE's Softswitch can support its distributed database, and separate data containing user properties and routing information from the equipment, and realizes some functions correlating with routing and value-added services through standard interfaces such as lightweight directory access protocol (LDAP).

In order to build an NGN network successfully, the ZTE Softswitch proposed three bearer schemes, after considering the current condition of data networks. Customers can make a choice according to specific situations or just choose one temporary strategy and wait for more suitable schemes when conditions allow.

The first scheme is the private network mode. It physically separates the bearer net-

work of ZTE's Softswitch from the current data network. Both of them transfer data independently and do not interfere with each other. This mode has the advantage of resulting in a simple network and better QoS, but its disadvantage lies in the high cost. It is suitable for those operators already having private networks but handling little data traffic.

The second scheme is the virtual private network (VPN) mode. This mode uses VPN as ZTE's Softswitch bearer network. VPN here guarantees QoS and is logically independent of the existing data network (of course, they may be combined physically). This mode has the advantage of better QoS, and the disadvantage of being a complex network. It is suitable for those operators who have no private network or those who have one but run high traffic loads.

The third scheme is the public network mode. This mode uses the public network as the bearer network. It has the advantage of low cost, but the disadvantage that QoS is not guaranteed. It is suitable for future applications based on sophisticated broadband networks.

Inside ZTE's Softswitch system, the media transmission and signal transmission networks can be organized according to the principles as described above.

2 ZTE Softswitch Applications

Under current network situations, especially the network situation in China, ZTE's Softswitch technology enables the following applications:

- Provide local telecom services based on IP MAN.
- Provide long haul telecom services based on backbone data networks.
- Interconnect the existing PSTN and IN networks.
- Provide core network solution for 3G.

The following is an example from the Commercial Broadband Telephone Network Project

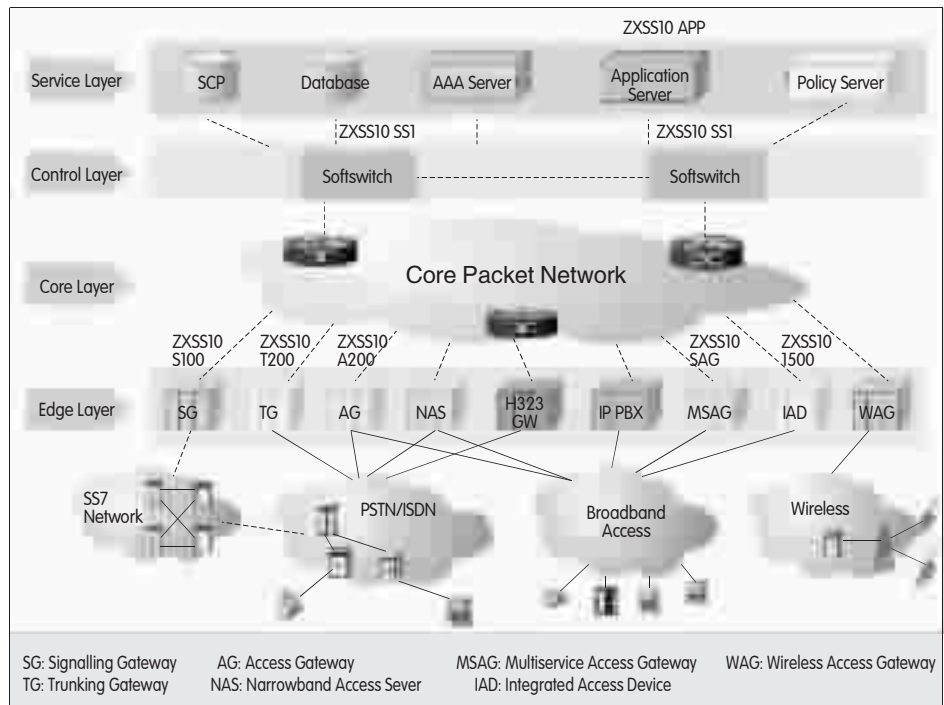


Figure 1. Architecture of ZTE's Softswitch system.

of China Netcom Corporation Ltd.(CNC) to describe the implementation scheme of ZTE's Softswitch technology that enables local telecom services over IP MAN.

The total transmission bandwidth of the CNC network is as high as 40 Gbit/s. CNC expected to make full use of MAN resources throughout the country and construct a new generation broadband telephone network based on the Softswitch technology. The capacity of this project is 50 000 users covering 10 cities.

CNC planned to construct a voice VPN throughout the country in order to ensure the QoS of voice services. Through VPN, CNC distinguishes voice traffic from data traffic so as to ensure the priority of voice traffic and make the voice network more convenient to manage. CNC uses private IP addresses within voice VPN. Voice interaction within the MAN is accomplished by routing within the MAN, and voice interactions between different MANs are accomplished through configuring MPLS VPN between adjacent MANs. Furthermore, communications with other CNC MANs or public networks will be accomplished via a network address translator (NAT), which is installed on the core layer MAN equipment. Aiming at CNC's requirements for this broad-

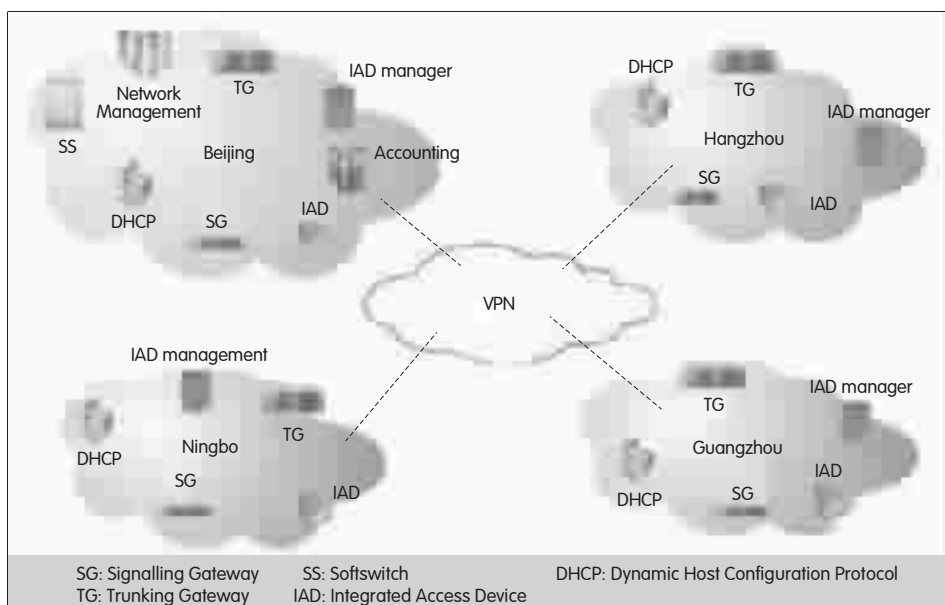


Figure 2. Application of ZTE's Softswitch system.

band commercial telephone trial network and current network condition, ZTE proposed a local voice service access solution using Softswitch + TG + SG + IAD mode, making use of current CNC network resources directly and efficiently. Users can gain access conveniently and quickly. The whole system consists of core Softswitch control equipment, trunk gateways, signalling gateways and user premises integrated access devices, as well as a whole set of network management and billing systems.

This project is being carried out in Beijing, Hangzhou, Ningbo, and Guangzhou at the

same time. ZTE ZXSS10 SS1, the core control equipment, is located in Beijing. The designed capacity of the system in the first installation stage is 50 000 users. The network infrastructure is shown in Figure 2.

ZTE's Softswitch is also undertaking the NGN project of China Telecom Corporation and the Softswitch project of China Railway Communication Corporation in Chongqing. Other operators and their sub-companies in various cities are all considering constructing Softswitch networks in due course. Possessing advanced applicable solutions and abundant practical experience in Softswitch technology, ZTE will take more responsibility in China's NGN network construction. **ZTE**

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Biographies

Yan Hua is currently in charge of the marketing of Softswitch products in the Nanjing R&D Center of ZTE Corporation. She holds a M.S. degree in optical electronics and science experimental instrumental engineering from Zhejiang University. She has conducted research on SS7 technology, network evolution and marketing analysis, next generation network technology and marketing analysis.

Lü Xuhong graduated from Southeast University with a M.S. in electronic engineering. From 1996 to 2000, she was an engineer with Nanjing Telecom Bureau. Now she works as a senior system engineer with ZTE Corporation. Her research focuses on Softswitch network design.¹

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scribers, more requirements are needed, especially for mobile intelligent services. It has become apparent and rather urgent to develop new intelligent network services to satisfy the need of the subscribers.

Based on CDMA wireless intelligent network equipment (SCP, SMP, SMAP, VC, etc.) of Unicom New Horizon of China Unicom Beijing Branch, the present solution is to add a set of intelligent peripherals and a set of CTI server used to process the service logical control. The first stage of integrated service platform of China Unicom Beijing Branch covers the following services:

- Integrated VPN service
- "For one Family" service

- Conference telephone service
- Notification of number change service

Among them, the integrated VPN services integrate such functions as conference telephone and VPN short message.

The construction of Integrated Service Platform of China Unicom Beijing Branch started in February 2002 and the system was put into use in May of the same year. **ZTE**

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Biography

Dai Shu graduated from the Electronics and Engineering Department of University of Science and Technology of China and gained bachelor's degree. He is a senior engineer with ZTE Corporation. His research interest is Intelligent Network.