

Integrated Information Platform over PSTN: ZXF118

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It is generally known that there are millions of fixed telephone subscribers worldwide, and fixed network carriers have invested a lot in network infrastructure construction, yet up till now, very little has been done to enable value-added services over it. When the number of mobile subscribers exceeds that of fixed subscribers, deployment of value-added services should be a necessity. SMS, based on fixed networks, will no doubt help increase the utilization of fixed networks. The SMS market has shown considerable growth in recent days. The number of short messages delivered every day has reached 20 million in Europe, and for GSM carriers, 8%~20% of earnings come from SMS. What's more, a return of 250 million Euros is acquired globally per month on SMS. The integrated information platform over PSTN is capable of transferring information to fixed telephones and brings more value-added

services for telephone service providers. ZTE Corporation is a pioneer in the development of integrated information platforms. ZTE's integrated information platform ZXF118 has been widely used over China Telecom's fixed line networks.

1 System Architecture of ZXF118

ZXF118 adopts the advanced idea of multi-layer design. It is composed of a user access layer, a service logic layer, a short message center layer, and a gateway routing layer, so the networking of the system is flexible. With the open architecture design, the system capacity can be expanded linearly. Figure 1 shows the architecture of ZXF118.

(1) FSK Access Server

The frequency shift keying (FSK) access server receives incoming calls from, and initiates calls to the information terminal. It also receives upstream double tone multiple frequency (DTMF) or FSK signals from, and sends downstream FSK information to intelligent information terminals. This implements the functions of the physical layer and link layer of the Chinese terminal service interface (CTSI) protocol.

ZTE's FSK access server has the following features:

- It supports ISUP/TUP, 14 bits and 24 bits long No.7 signaling point coding and interoperates with multi-type machines.
- It adopts a multiple-level distributed control system which uses clustered CPU. All of the important components adopt 1+1 backup, to fully implement the "dual-machine and

dual-bus” and “dual-network and dual-plane” design.

- The BHCA value, representing the call processing capability, of ZTE’s FSK access server exceeds 600 K and the BHCA value of multiple modules equals $600\text{ K} \times N \times 0.8$ (N is the number of modules and 0.8 is the reduction factor).

- A capacity of 390 000 users (8 K board) or 750 000 users (16 K board) can be obtained and different kinds of transmission ports are provided (e.g. E1, 155 Mbit/s optical port) for single modules. The number of modules can be easily expanded to 62, so the FSK access server can achieve a large capacity.

- It features flexible networking capability, high capacity, high integration level and very flexible resource configuration.

- It provides a perfect diagnostic and testing solution and a number of open interfaces.

(2) CTSI Service Processor

The CTSI service processor accomplishes service logic and provides dynamic menus at different levels. It receives and processes information sent by terminals and platforms, to support the user prepay function and the management function for all kinds of statistical information.

ZTE’s CTSI service processor has the following features:

- Its processing capacity can be smoothly expanded with multiple modules.

- It adopts a general-purpose, open and standard software and hardware platform, which makes the integrated management and unified service provision possible.

- The system software adopts a layered module design and the communication between modules is in accord with corresponding international standards.

- It is a fault-tolerant system with high reliability and flexible configuration. It can meet a variety of service demands.

- By adopting the intelligent network technology, the system provides perfect functions.

(3) AAA Server

The AAA server adopts the extended remote authorization dial input user service (RADIUS) protocol to carry out the accounting, authentication and authorization functions according to the caller number. ZTE’s AAA server possesses

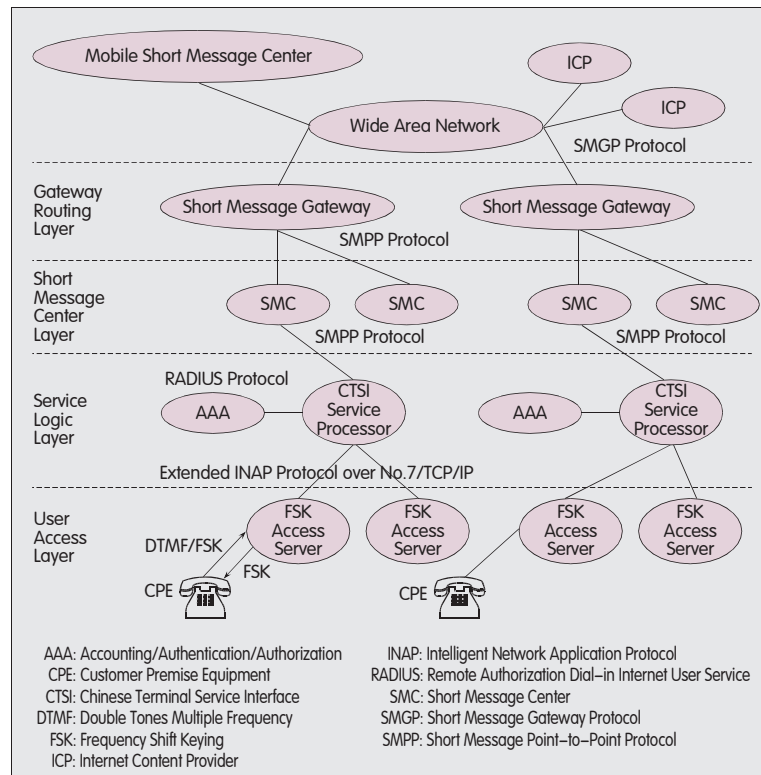


Figure 1. Architecture of the ZXF118 system.

es the following features:

- It is a distributed RADIUS system with tree-topology, and has high scalability.

- Adding more nodes can easily expand its capacity.

(4) Short Message Center

The short message center follows the short message point-to-point protocol (SMPP) and uses function entities such as the mobile short message center and information station to carry out the storage, transmission and forwarding of short messages. The short message center is connected with the short message gateway and obtains information from service providers (ICP), which provides customized information channels. ZTE’s short message center includes the following features:

- A single module’s processing capability can reach 300 pieces of information per second.

- With the advanced system design and patent technologies such as the EMS memory database, ZTE’s short message center provides best system performance.

- It adopts a cascaded multi-module structure and the system configuration can be flexible. Maximum 8 operation server modules can

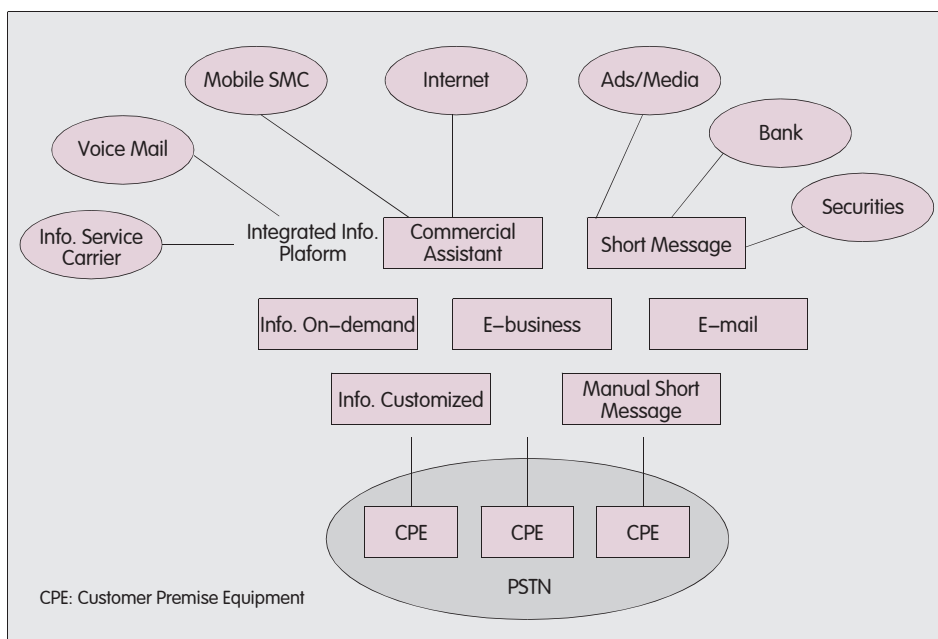


Figure 2. Applications of the integrated information platform ZXF118.

support 7 600 000 users.

- All key hardware components adopt redundant backup design, which ensures the reliability of the center. The “dual-network and dual-plane” design enables the system to operate in a shared traffic mode. The redundant backup of network card and switch hub guarantees the machine down time to be under one second.

(5) SMPP Agent Server

SMPP is adopted between the short message center and the CTSI service logic control points to implement the receiving and transmitting of short messages. The SMPP agent server accomplishes the access to the expanded short message entities (ESME) based on TCP/IP or X.25.

(6) Short Message Gateway

The short message gateway is connected with short message centers and adopts SMPP to obtain information from short message centers. It performs the routing function between short message centers and enables the connection with Internet content providers (ICP) and mobile short message centers.

2 Features of ZXF118

The ZXF118 system has the following technical features:

- It provides large capacity and flexible networking modes such as LAN, intelligent

network, data network, etc., so it can be conveniently connected with other short message sources (for example, mobile short message center).

- It is easy to develop new services since the system has sufficient application programming interfaces (API).

- It can be upgraded easily. New services can be introduced online and existing services can be modified or stopped.

- It offers high security and reliability and the main components of the hardware adopt 1+1 backup.

- It provides a perfect load equalization control mechanism, which works on the FSK access server, CTSI service processor and

short message center.

- It adopts the advanced “dual-network and dual-plane” technology to ensure the stability and reliability of the system.

- It offers perfect management functions.

3 Applications of ZXF118

The services provided by ZXF118 include: short message, electronic mail, information customization, information on demand, telecommunication QQ, telecommunication service inquiry and notification, banking inquiry and payment instruction, stock information service, lottery service, information releasing, advertisement, reservation service, voice short message and short message fax, as shown in Figure 2.

By March 2002, ZTE's ZXF118 system had been successfully deployed in Jiangsu, Shandong, Liaoning, Henan, Hubei, Yunnan, Shanxi and Shenzhen, in a total of 8 out of 12 provinces and cities where China Telecom launched the short message service over PSTN. In June 2002, ZTE won the PSTN SMS Project of China Railcom.

There is no doubt that the integrated information platform over PSTN will benefit network operators, fixed terminal manufactures and service providers as well as terminal users and ZXF118 will play an important role in the market.

ZTE