ZTE Enhances Telco Solutions for Fiber to the User (FTTx) Deployments

China Mobile Utilizes Next-Generation PON System to Meet Burgeoning Bandwidth Requirements

Case Study

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Featured Company: A Major Equipment Provider Serving the Mobile Telecommunications Industry

Founded in 1985, ZTE Corporation is China's largest listed telecommunications equipment manufacturer and wireless solutions provider. As a pioneer in China's telecommunications equipment manufacturing industry, ZTE leads in the production of telecommunications equipments, mobile terminals and services. ZTE's 62,000 employees serve customers in 140 countries and regions, including major telecoms operators in Asia Pacific, South Asia, North America, Europe, Latin America, Africa and the Commonwealth of Independent States. Based in Shenzhen, ZTE offers a wide variety of telecommunication products that enable value-added services such as video on demand and streaming media.

ZTE's primary customers are telecommunications service providers and mobile network operators such as China Mobile. China Mobile provides mobile voice and multimedia services through its nationwide mobile telecommunications network, the largest of its kind in the world. In addition to the world's largest mobile network, China Mobile has also the greatest number of mobile subscribers (508 million customers as of 2009).

Business Problem: The Need for Cost-Effective Uplink Burst-Mode Capability at 10G Speeds

Increasing demand for network bandwidth has spurred the development of high-speed passive optical networks (PONs) to enable more cost-effective deployments of Fiber-to-the-Home, Building or Premise (FTTx) services. Choosing the right strategy for these PON deployments is a challenge for telecommunications equipment manufacturers, particularly those operators that have mature supply chains and entrenched customer bases utilizing legacy communications technologies. These service providers must continually enhance their networks to support data-intensive applications such as Internet access, e-commerce, e-mail, Voice-over-Internet-Protocol (VoIP), video conferencing and Internet Protocol Television (IPTV).

A PON consists of an optical line terminal (OLT) at the service provider's central office and a number of optical network units (ONUs) near end users. This type of configuration reduces the amount of fiber and central office equipment required compared with point-to-point architectures. However, due to the topology of a PON, the transmission modes for downstream (i.e., from OLT to ONU) and upstream (i.e., from ONU to OLT) are different. For the downstream transmission, the OLT broadcasts optical signals to all the ONUs in continuous mode. In the upstream channel, ONUs can't transmit optical data signals in

continuous mode or they will converge and overlap with each other. To resolve this problem, PONs use burst-mode (BM) transmission for the upstream channels.

The Solution: The Industry's First Transceiver for 10G EPON FTTx Applications

ZTE turned to Vitesse Semiconductor to supply a chip set for its new Optical Network Units (ONUs). Vitesse developed the ONU PRO chipset to hasten the adoption of 10G Passive Optical Network (PON) and 10G-EPON (10 Gigabit Ethernet PON) deployments. It is the industry's first chipset to solve the E/GPON OLT burst mode receiver requirements while enabling a cost effective ONU/ONT solution.

With ten times the bandwidth of previous EPON solutions, the VSC8479 is ideal for bandwidth-hungry home entertainment and communication technologies such as high definition television (HDTV), voice over IP (VoIP), video on demand (VoD) and peer-to-peer networking. The Vitesse VSC8479 family is widely used in both 300-pin MSA transponder and XFP host applications.

"We selected the VSC8479-02 because it is the first 10G transceiver to meet our rigorous requirements for both burst and continuous mode performance, which is increasingly relevant for today's FTTx system deployments," says Ma Zhuang, project manager of 10GEPON at ZTE. "Vitesse has delivered this high-performance in a small form factor with low CMOS power requirements, which is precisely what we needed for our network devices."

The Vitesse transceiver supports both XFI and SFI module interfaces, making it ideal for XFP and SFP+ host applications alike. The 12 x 12 mm package size enables increased port counts and high densities on the system host card. In addition to 10G-EPON system applications, the VSC8479-01 supports data rates ranging from 9.95 Gbps to 11.35 Gbps specifically for multi-rate applications including 10 Gigabit Ethernet (10GE), 10G Fibre Channel (10G FC), OC-192 SONET/SDH, and optical transport networks (OTN).

Case in Point: A Flexible Solution for Mobile Carriers

ZTE's mobile operator customers need flexible chipsets that preserve existing investments while paving they way for a new era of bandwidth-intensive applications. ZTE leads the industry with its extensible passive optical network (PON) solutions for these operators.

For example, to help China Mobile satisfy all types of FTTx network requirements, ZTE launched the ZXA10 C300, a multi-service access platform that supports GPON, EPON and P2P as well as the emerging next generation IEEE 10G-EPON and FSAN/ITU-T XG-PON in a "one size fits all" solution.

Leveraging the Vitesse chipset, the ZXA10 C300 offers a series of benefits to customers and end users:

- Reduced power consumption: thanks to the ASIC & PCB design and the innovative methods to set boards, ports and modules at idle status, minimizing operating expenses and reducing CO2 emissions.
- Higher site savings: With 8 GPON ports per module and a 1:128 splitter ratio for each GPON port, the ZXA10 C300 allows more than 16 thousand users to share the same platform.
- A smooth and cost-effective upgrade path: carriers that wish to deploy both 10G-EPON and XG-PON from the same platform can lower their capital expenses by preserving existing investments.

As China Mobile can attest, the new PON equipment also improves the user experience, combining unmatched quality of service, security and control with extremely high bandwidth. 10G-EPON delivers at least 100Mbps to each ONT or end user (based on a 1:128 splitter ratio), boosting revenue possibilities for this operator.

Engineers at Vitesse engaged with ZTE's senior architects, R&D personnel and design engineers to pioneer various 10G physical-layer PON solutions, including 10G-EPON and XG-PON1. Recently Vitesse worked with its ecosystem members, MAC vendor Opulan and optical module vendor Hisense Broadband, and announced their live demonstration of a full operational 10G EPON system at P&T/Wireless & Networks China 2009. Across the industry, the full supply chain for 10G EPON has been established covering manufacturers for optical modules, chips and equipments.

ZTE also valued Vitesse's experience as a founding member of the FTTx Ecosystem, a forum that encourages collaboration and accelerates the deployment of 10G PON FTTx platforms. Vitesse works with Opulan Technologies, Hisense Broadband and other ecosystem members to create, test and promote these systems.

Reduced CAPEX and OPEX: A Proven Return on Investment

ZTE prepared a business case to verify the return on investment (ROI) associated with the network evolution to a 10G-EPON platform. They compared the short- and long-term costs associated with deploying the ZXA10 C300 versus a traditional solution for 8,000 home-connected subscribers. Deploying the ZXA10 C300 revealed a 60 percent savings in capital expenses (CAPEX) savings after one year and 36 percent after four years, compared to a traditional solution.

The ZXA10 C300 also lowered operating expenses (OPEX), with less site rentals, reduced maintenance and lower energy usage. Specifically, the team calculated that the ZXA10 C300 would yield 52 percent OPEX savings after one year and 39 percent after four years.

“Combined OPEX and CAPEX savings help operators lower their total cost of ownership and increase their revenues,” says Bei Jinsong, product manager of XPON at ZTE. “By building our platform on the Vitesse chipset, we are opening up new and expanded markets for our customers.”

ZTE has a very strong and innovative R&D team, which has achieved significant milestones in fixed broadband field. ZTE xPON products are recognized by the telecom industry for their innovation. ZXA10 C300 is a typical example.

The Vitesse-based devices support GPON, EPON and P2P as well as the emerging next generation IEEE 10G-EPON and FSAN/ITU-T XG-PON in a single platform, helping operators increase their revenues with lower TCO and higher performance levels.

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Snapshot

Challenge: The need for a 10G-EPON transceiver integrated circuit that supports both burst and continuous mode

Solution: Vitesse supplied a complete 10G BM chipset with a unified ONU, optimized form factor, and low CMOS power requirements as part of the maturing 10G PON ecosystem.

Results: Leveraging the Vitesse VSC8479-01 chipset, ZTE is now shipping its revolutionary ZXA10 C300 platform, a “one size fits for all” solution for China Mobile and other service providers.