

Shaping the future on the shoulders of a giant

-----ZTE Flagship Tbit Optical Platform

The rapid development of emerging services, including high definition (HD) video, virtual reality (VR), and cloud computing, has caused bandwidth delivered to end users to increase tenfold every seven years. This means that the existing access technologies must be upgraded in order to compete with soaring bandwidth demands. It has become a trend that the FTTH networking upgrades from GPON/EPON to 10G PON or even 100G PON/25G PON. The exponential bandwidth growth brings structural changes to the entire network, redefining the existing network functions and performance.

The must-have capabilities of these future networks are flexibility, scalability and simplicity, with provision-on-demand and reliable virtual networks essential. The development of said future infrastructure networks is ultimately influenced by the following aspects:

- The increase of big video services and internet-connected devices are the major incentive for bandwidth growth. Big video will eventually develop into a basic broadband service.
- The development of software defined networks (SDN) and network functions virtualization (NFV) brings structural changes to the network. Building elastic and integrated access networks has become a development trend.
- The expansion of smart homes revolutionizes the home networks.
- 4G/5G backhaul is the new driving force of wireline broadband development.

Due to these influences, the future-proof access equipment should in turn be able to provide high bandwidth, simplify the service operations and maintenance (O&M), support smooth network migration, and meet the requirements of big video, SDN/NFV, IOT and 4G/5G backhaul. To build wider, more simplified and economical networks and provide superior service experience, ZTE launched the Flagship Tbit Optical Platform.

ZTE Flagship Tbit Optical Platform has *four* key features:

1. The industry's strongest platform: All-Tbit architecture, 12 access modes

As the core equipment of the access network, the optical line termination (OLT) should have the ultimate Tbit capability to meet the requirements of diversified broadband applications, guaranteeing it a ticket to the future world.

The ZTE optical platform provides a large switching capacity, high uplink bandwidth, and a non-blocking line card slot bandwidth. The entire system provides high-density TWDM-PON/100G PON or 10G PON ports, and an overall capacity four times the industry's average; thereby meeting the service and bandwidth development requirements in the next ten to twenty years.

The optical platform provides ultra-high line card bandwidth to support the non-blocking access of 40G PON or 100G/25G PON. In the 4K era, the basic bandwidth demands of

homes is 100 Mbps; ZTE flagship Tbit optical platform provides an access capacity four times the industry' s average, and easily supports 8K or VR services.

The optical platform supports 12 optical access modes, and is a unified platform that supports GPON/EPON, 10G PON, 25G and 100G PON. It also supports on-demand deployment and flexible evolution to preserve the carriers investment as much as possible.

2. Simplified and integrated network equipment: Built-in OTN uplink, redefined OLT, flattened network architecture

ZTE flagship Tbit optical platform fully integrates the optical transport network (OTN) functions. It not only adds an uplink card but also redefines the OLT, simplifying the network layer and reducing the data transmission latency, better supporting low-latency applications such as big video. The traditional OLT connects the aggregation switch or the broadband remote access server (BRAS) in the upstream direction via the GE/10GE Ethernet interface, followed by the aggregation switch or the BRAS connection of the core router (CR), or the data center of the metropolitan area network (MAN) via the OTN transmission equipment.

The platform provides OTN transmission interfaces to reduce the optical module interfaces and fiber resources between the OLT and the OTN. The data center and the OLT are connected on the OTN transport layer in order to reduce the IP route hops for latency-sensitive services. The optical platform inherits the OTN management and switchover functions, leverages the rapid protection mechanism on the OTN layer, and provides lossless service protection on the packet layer. Tbit also supports cross-layer cooperative strategies for the packet layer and the transmission layer under the control of the SDN controller. The best-effort services are forwarded onto the low-speed packet layer and use hop-by-hop routing. The assured services are forwarded on to the OTN layer and connect directly to the data center.

By leveraging the built-in OTN technology, ZTE flagship Tbit optical platform reduces the L3 aggregation equipment and simplifies the network architecture, thus helping the carriers reduce network construction costs and data transmission latency as well as improve network management efficiency.

3. The most economical access device per bit: leverages leading-edge technologies to help the carriers cut down network construction costs

ZTE flagship Tbit optical platform leverages leading-edge technologies to help the carriers control network construction costs. As well as the aforementioned built-in OTN and high-density large-capacity platform, the optical platform leverages the all-in-one Combo PON solution to help the carriers achieve smooth network migration at a reduced cost. Leveraging the Combo PON solution to upgrade GPON to 10G PON or TWDM-PON/100G PON saves the equipment room footprint by more than 60%. The Combo PON solution also allows for on-demand optical network unit (ONU) upgrade as per the user's bandwidth demand to achieve light-asset PON upgrade and deployment, and avoids the huge costs incurred by upgrading all ONUs, guaranteeing an efficient return on investment (RoI).

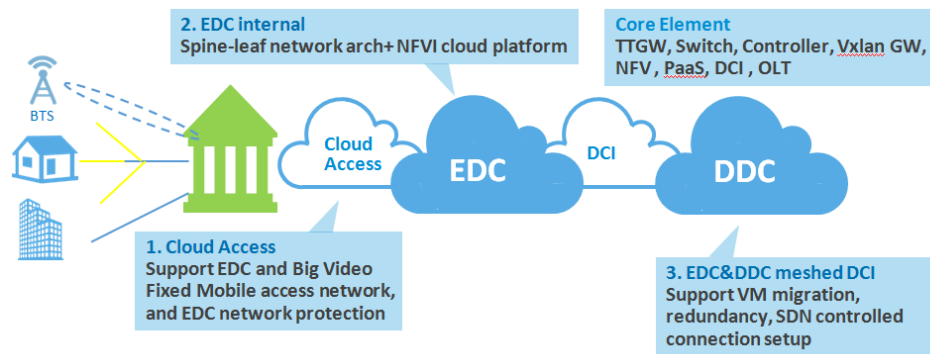
The optical platform also adheres to the green and energy-efficient philosophy. According to the calculations of the ZTE lab, the power consumption of its optical ports is more than 20% better than the CoC standard. The optical access platform enables the network configuration to be simplified, and the network operation more efficient.

4. Multi-scenario coverage: Supports big video services, CO re-architecture, 4G/5G backhaul, and massive access of IoT



Video services have developed from a rare service to a feature which we now take for granted. 4K video will come to dominate the video services and 8K and VR/AR will soon enter into our lives, with the number of video terminals to increase exponentially. 100 Mbps will be the basic bandwidth requirement of homes, and an increasing number of premium users will demand for an access speed of 1000 Mbps. ZTE platform provides an access capacity four times the industry' s average, satisfying the requirements under big video scenarios. To meet the low latency requirements of big video, ZTE' s optical platform provides resource virtualization capabilities, slices network resources, creates several OLT instances to allocate to the customers with different QoS, and builds a dedicated big video network.

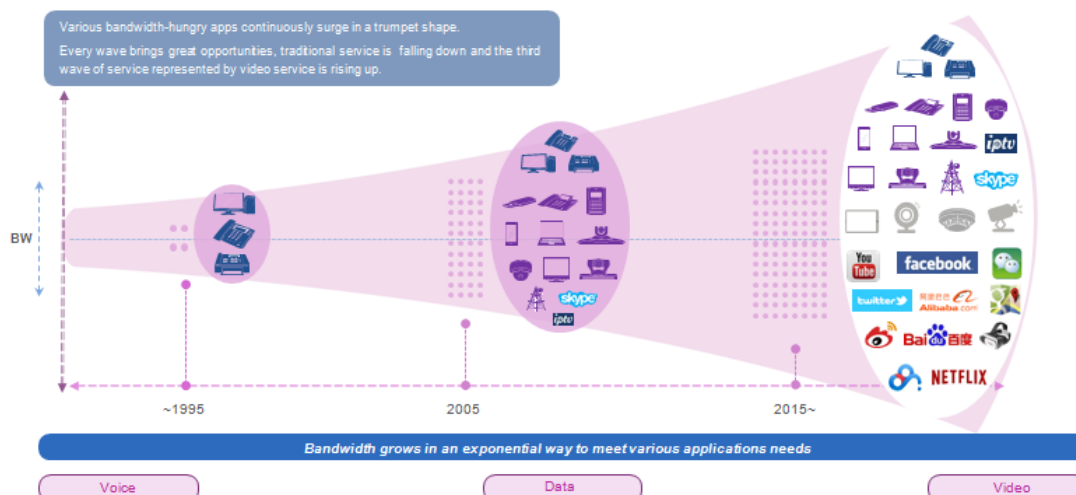
The data center is reconstructing the network value chain. Previously, carriers would only provide Internet connection pipelines, whereas they are now able to build an open IaaS and PaaS platform, on which they can share the values created by new services. The CO re-architecture is coupled with the introduction of the edge data center (EDC), whilst the service edge control functions gradually migrate from the broadband network gateway (BNG) to the EDC VNF (Virtual Network Function). As a leaf EDC node, ZTE flagship Tbit optical platform can be deployed local or remote of the EDC. It can be divided into a control layer and a forwarding layer by function. It leverages an SDN controller to control resources flexibly; thereby saving the network resources.



Henceforward, ultra-dense networks (UDN) will be the key technological means to meet the requirements of 5G and mobile data traffic. The 5G small cells are getting smaller, with high-density base station coverage bringing structural changes to mobile networks. The expanded scope and scenario of backhaul networks will be a fantastic opportunity for wireline broadband. By reusing the legacy access resources, the carriers can build a fiber network to meet the applications in a wide range of scenarios including homes, businesses and base stations. The ZTE flagship Tbit optical platform provides GE or 10GE access bandwidth and rapid forwarding capabilities to meet the latency KPI of 5G, and ensure reliable and high-quality services. It supports smooth network evolution, seamless service migration, protects legacy investment in backhaul networks, and supports high scalability.

With ever-increasing portable devices such as mobile phones, tablets and laptops, 80% of the mobile traffic will be carried by Wi-Fi with the increase of mobile devices becoming a major driving force for the development of wireline broadband. The increased number of mobile terminals spurs bandwidth growth, home network investment increase, and the popularity of Wi-Fi. The IoT cloud service and the smart home ecological system will be a great business opportunity.

ZTE flagship Tbit optical platform is a key access node of IoT and provides an access capacity four times the industry' s average. It supports diversified home services and applications as well as unified FTTH-like management and maintenance of terminals, shortens the Time to Market (TTM), and helps the carriers construct sustained networks.



ZTE flagship Tbit optical platform integrates the OTN functions to effectively reduce the number of telecommunications equipment and dramatically improve network efficiency. It extends the connotation of traditional optical access, deepens the OLT capabilities, and supports network transformation and rapid service development. It provides ultra-high access bandwidth to end users as well as more flexible and efficient networking capabilities to promote universal development of broadband services. Ultimately, it will play a pivotal role in network construction in the next ten years.