A Discussion on the FTTdp@G.fast Network Construction Mode

In recent years, new technologies are developing faster than ever, new services are continuously emerging, and the users' demands for bandwidth are increasingly urgent, which spur the operators to speed up their broadband networks to suit the changing situation and to face the competition. In the industrial background of fiber-in and copper-out, the fiber access is developing on a large scale and FTTH (fiber-to-the-home) has become an inevitable trend for network construction. The deployment of FTTH networks requires pipe laying, site lease, device installation or even the construction of new ODN networks; however, these requirements cannot be met in some scenarios such as the old residential communities where the secondary engineering is difficult, the pipeline resources and cabling spaces are unavailable, the land is owned privately, and the fibers are difficult or impossible to be deployed in users' premises due to other reasons. At the same time, FTTH requires high initial investment but relatively longer investment recovery cycle, which is especially difficult for cash-strapped operators.

The copper-based G.fast technology can reuse the huge amount of copper cable resources deployed in existing networks to offer FTTH-like bandwidth within certain copper loop lengths. The network deployment cost of FTTdp is lower and the investment recovery cycle is shorter than that of FTTH. It can be estimated that FTTdp will coexist with FTTH for a long term in the ultra-100M or even the 1000M broadband access era.

FTTdp network construction is a systematic project, involving several stages from deployment to commissioning. The following three aspects should be paid attention to during the FTTdp network construction process.

Application deployment

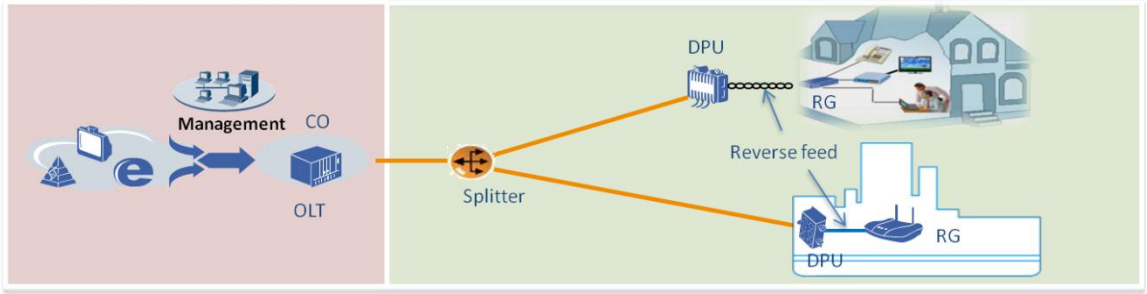

Fig. FTTdp Networking

The FTTdp solution offers 1000M ultra-high bandwidth on loops less than 100m. It provides flexible uplink options including GE, 10GE, GPON, XG-PON, XGS-PON and DSL Bonding according to the situation of the upper-layer network; thereby implementing on-demand network upgrade and deployment as well as rapid service provisioning at a reduced cost.

Because the devices are much closer to users, and the installation environments are

complicated in FTTdp network deployment, the operators need to choose an appropriate power supply mode according to the installation environment. Besides the traditional local AC power supply, remote power supply, and storage battery power supply, the operators can choose fair, safe and manageable RPF (Reverse Power Feeding), which ensures a fair distribution of power supply over active users, and provides alarm and security detection functions to guarantee the security and reliability.

Smooth migration

Under a tight budget, the operators can upgrade their networks gradually: upgrade some high-end users first and then migrate the rest of the users according to business development and resource situations. In this case, the original CO-end OLTs are preserved and in the meantime the G.fast DPUs are deployed as per demand on the user side. Providing the capabilities to automatically identifying common VDSL2 CPEs and G.fast CPEs, the G.fast DPU helps the operators implement automatic remote control during network switchover. It provides G.fast services to high-end users, connects the common users to the existing access equipment in the CO, and the removes all the access equipment in the CO after all the users are migrated to G.fast CPEs. Therefore, it makes the network switchover smoother, quickly improves the operators' competitiveness, and reduces the initial investment and the O&M pressures in later stages.

O&M management

O&M management is an important part for the FTTdp network construction mode. The G.fast DPUs deployed in the network should provide automatic, batch and flexible management capabilities.

Firstly, both online and offline G.fast DPUs should support automatic configuration. In a PMA (Persistent Management Agent) architecture, the PMA resides inside the EMS, and each PMA acts as an agent of a unique G.fast DPU. When the G.fast DPU is offline, all the G.fast DPU configurations on the EMS are migrated to the PMA. After the G.fast DPU powers on, the EMS automatically synchronizes and validates the G.fast DPU configurations.

Secondly, G.fast DPU supports batch operation and maintenance. The PMA supports domain-based management. The DPUs within the same domain have the same version and the basic configurations. The PMA joins the G.fast DPUs with the same user properties in the same domain to for batch operation.

In the actual DPU management process and based on the scenario differences as well as the operation requirements, some operators hope to flexibly manage the DPU versions and basic configurations to address diverse management requirements. For example,

1. Configure different basic configuration files for the equipment deployed in different regions.

2. Upgrade the version files and the basic configuration files in batches and at different

times to improve the upgrade efficiency and reliability during unified DPU version upgrade.

Based on the profound understanding of the access network development, ZTE provides series of G.fast solutions and products to satisfy the operators' requirements for FTTdp&G.fast network construction.

The G.fast DPU provides innovative DSL Bonding uplink, and reuses existing copper cable resources to offer 1000M uplink bandwidth to the buildings where the fibers are unavailable, enabling the users in the buildings to obtain G.fast services.

The G.fast DPU complies with RPF SR2, and provides the industry's first AC+RPF power supply to help the operators construct their networks efficiently and provision new services timely.

ZTE proposed the industry's first 10G PON+G.fast platinum combination. ZTE G.fast DPU supports multiple uplink modes. At the early stage of network construction, it leverages GPON uplink, and in future it implements 10G-PON uplink through optical module replacement, which ensures smooth network evolution and upgrade.

ZTE G.fast DPU is the industry's first G.fast 212MHz DPU. It provides access bandwidth of approximately 2G, and helps the operators build best-of-breed high-bandwidth networks at a minimal cost to speed up the broadband network and to shorten the TTM.