Why you should become a CloudFAN

As the ICT industry steps into the cloud era, broadband infrastructure needs to keep pace with rapid service innovation. But, broadband access infrastructure is asset-heavy and investment-hungry, with a lengthy engineering lead time. Operators need to assess the ROI timeframe and choose the right architecture for maximizing network utilization and boosting competiveness.

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Enter CloudFAN

The cloud architecture in Huawei's CloudFAN solution optimizes resource sharing, flexibly configures resources, and simplifies service development. It aligns with changes in home and enterprise services, and builds in core competitiveness for operators in home broadband and enterprise access scenarios.

Moreover, it uses one network to carry multiple services, maximizing the resource utilization of access devices.

The cause of complaints

A good user experience sits at the heart of home broadband, with 100 Mbps gradually removing the QoS bottleneck associated with bandwidth. Now, though, home users are accessing more Internet services on more devices through Wi-Fi, creating a new bottleneck that negates the benefits of high bandwidth and makes ultra-broadband services meaningless. According to Shanghai Telecom, 34 percent of its home user complaints relate to home Wi-Fi.

As a result, many operators are hesitant to provide Wi-Fi services. However, Ovum observed in its latest report that, "Whether operators admit it or not, users regard providing home Wi-Fi services as a responsibility of operators." Thus operators require a home network solution that manages internal home connections, meets user requirements, and minimizes service risks.

Home Wi-Fi networks differ from broadband access networks in that each home network is a mini Wi-Fi network accessed by different wireless devices that interfere with each other. Additionally, service types

are diverse and home environments vary, with family activities greatly impacting Wi-Fi use.

Time for a cloudy home

Cloud architecture that supports central management and optimizes synergy for thousands of home networks can ensure a consistent broadband experience.

The architecture must also monitor performance, simplify O&M, optimize user experience, and support remote troubleshooting.

Smart homes are the next home service blue ocean for operators. Traditionally, solutions are based on integrating universal services such as broadband, video, and home networks. However, there are more smart home services than traditional services, they have obvious regional characteristics plus different service combinations, and different users can use them in different ways. Smart homes also require smart device integration and continuous service development, which traditional construction models cannot achieve.

Instead, an architecture that supports terminal-cloud synergy can rapidly introduce third-party services, integrate smart services, and develop iterations of service applications to realize quasi-Internet service operations.

Thus, operators need to switch from traditional broadband network architectures to open, cloud-based architectures.

Best choice for SMEs

SME services are evolving towards cloud. SMEs have higher requirements on leased line deployment efficiency than before, as previously it took up to a month to prepare and configure a leased line. But, the cloudification of enterprise applications means that operators face competition from Internet companies. For example, Amazon Web Services (AWS) Direct Connect offers dedicated networks that rapidly and easily connect local facilities to AWS. To compete, operators must provide SMEs with leased line services that support DIY configuration in real time.

Operators plan to provide network hosting services for vertical industries. Part of the new economic paradigm is sharing, integral to which is maximizing efficiency across the ecosystem. Operators can play an important role in this new era by applying their expertise in building and maintaining infrastructure networks in enterprise campuses.

Enterprise campuses often serve hundreds of SMEs, most of which aren't telcos or IT enterprises. Previously, enterprises had to waste resources by hiring specialist personnel to construct and maintain their networks. Traditional enterprise campus networks are now evolving from switch networks to all-optical networks, which benefits operators because of their strong capabilities in all-optical network construction and O&M. They can also build multi-tenant hosted networks for enterprise campuses. SMEs can create applications based on demand and receive network services, while operators can maximize network utilization.

All SME access services require cloud network architecture to centralize resource management and sharing, eliminate redundant and complex service configurations, and support business transformation for operators.

FTTx

The core of traditional broadband network operations is to improve installation rates, ensuring assets are efficiently utilized and infrastructure ROI is improved.

There are two methods for improving network utilization: one, using a network for multiple services, and two, wholesaling services. In the first, FTTH networks can bear home, enterprise, and mobile bearer services. However, traditional FTTH networks are oriented to homes and don't support differentiated SLA quality assurance for enterprise and mobile bearer services. Moreover, for service planning, VLAN resources need to be isolated for different services. However, a traditional

FTTH network supports 4,096 VLANs, but not service expansion. When operators lease idle network resources to other operators, they have similar demands on network capabilities.

To put multi-service networks into commercial use, FTTx networks must support slicing and resource isolation, including MAC addresses, VLANs, and IP addresses. One physical network needs to be virtualized into multiple networks, with each supporting the same SLA attributes for different services as the physical network. Inefficient network resources, especially VLANs, are expandable and independent.

Technical close up

CloudFAN's networking structure comprises the physical component and cloud platform, and they communicate using management control protocols. General servers use cloud computing technologies to implement network cloud engines (NCEs) on the cloud. These servers are deployed in operators' CO equipment rooms or edge data centers, and include the FAN manager, VPN enabler, and home enhancer modules. They respectively implement service management, E2E connection management, and VAS processing for physical devices on access networks.

Huawei's CloudFAN solution uses three key technologies – cloud management, one-stop cloud access, and network slicing – to manage home Wi-Fi on the cloud, provision new services quickly for home users, and provide cloud access and fast provision of leased line services for SMEs. It improves FTTx network utilization, optimizes Wi-Fi capabilities, and enables operators to improve network utilization and deploy network wholesale services.

The three technologies in focus

Cloud management: Cloud architecture automates plug-and-play for home terminals and enterprise access devices. It automates service provision and subscriptions, and provides easy-to-customize interfaces, so operators can provide third-party applications through upper-layer adaptation. For example, they can provide wholesale services and analyze network quality and operating data.

NCEs execute cloud O&M on access networks, with system management possible in hosting or sharing mode. Self-installation, self-reliant procurement and installation, and auto-provision and auto-maintenance reduce network construction complexity and cut O&M costs.

One-stop cloud access: To provide leased lines for enterprises, operators previously had to configure devices individually, leading to slow service provision and overly complex O&M. However, CloudFAN connects FTTx networks to the cloud with one pipe, so only the start and end points need to be configured while the intermediate network supports transparent transmission.

Cloud authorization lets enterprises implement self-reliant network management, define service attributes, and freely adjust bandwidths and policies.

Network slicing: CloudFAN uses virtual access network (vAN), virtual extensible LAN (VXLAN), and hierarchical QoS (HQoS) to implement network slicing on physical devices. User- or port-level vAN division and definition can segment and isolate devices' logical resources, so operators can isolate user resources and prevent services from overlapping. When upper-layer services are transmitted over a uniform bearer network, the CloudFAN solution establishes tunnels using VXLAN technology. Packets can be transparently transmitted through the intermediate network. HQoS technology provides SLA assurance for every user and service, and bandwidth can be dynamically adjusted.

These technologies can plan service identifier decoupling and isolate and transmit various types of services from different content providers over the same access network, creating networks that can support multiple services and tenants.