

## **China Mobile and Huawei to Accelerate the Development of the Cloud-based CU-Separated BNG Architecture Standard**

In the recent Internet Engineering Task Force (IETF) 99<sup>th</sup> meeting, China Mobile Research Institute (CMRI) and Huawei jointly submitted multiple proposals for a cloud-based CU-separated broadband network gateway (BNG) architecture standard; C stands for the control plane and U the user plane, or forwarding plane. These proposals attracted wide interest from the experts in attendance from all over the world.

### **Three Major Challenges Facing Traditional FBB Services**

BNG is the core network element for fixed broadband (FBB) services. With the sharp increase in home broadband users and rapid development of new services such as 4K, cloud services, and the Internet of Things (IoT), the traditional BNG, as the core component for home broadband service access, is facing three major challenges:

First, the resource utilization rate is low. As the traditional BNG can serve as both the Layer 3 edge of IP network and the gateway for user access, authentication, and accounting, its control plane and user planes are closely coupled, affecting processing performance. As a result, the control plane and user planes cannot achieve their optimal performance.

Second, the O&M is complicated. To deploy a global service policy on a network that involves large numbers of traditional BNGs, you must configure these BNGs one by one. It is impossible to efficiently manage services and troubleshoot faults as the network scale grows and more services are deployed.

Third, service provisioning is slow. As the control plane and user planes are tightly coupled with each other under a distributed network control mechanism, the introduction of any new technology is heavily dependent on live-network devices and requires multiple devices to be upgraded synchronously. Deploying a new technology therefore takes a relatively long time, which significantly hampers network development.

Li Han, Deputy Director of the Network Technology Department of China Mobile Research Institute, said, "Although the current BNGs have strong forwarding capabilities, they differ considerably in resource utilization. In distributed manual control mode, the introduction of a

new service requires all BNGs to be upgraded, resulting in slow service provisioning and heavy O&M workload.

### **Cloud-based CU-Separated BNG Architecture: Solution to These Challenges**

Based on real-world requirements, China Mobile proposed the cloud-based CU-separated BNG architecture, completely solving the preceding problems. Thanks to this architecture, network resource pooling can be realized, more than 10 million users can be supported by a centralized virtual control plane, the access rate can increase five- to six-fold, O&M workload can decrease by 90% or more, and new service provisioning time can be shortened from several months to a matter of several weeks.

The core idea of the CU-separated architecture is to centralize the user management functions of multiple BNGs and move them onto a unified control plane, so that a BNG only needs to maintain the router control plane and BNG forwarding plane. In the new architecture, the control plane is deployed in the cloud and can take full advantage of the high computing capabilities of the cloud. The forwarding plane deployed on high-performance hardware can process high-bandwidth and low-latency services at a rate of Tbit/s per rack.

The CU-separated architecture is the key step toward the future cloud-based metro network architecture, and also an achievement of joint innovation and in-depth cooperation among industry partners. Huawei is also an active promoter of architecture evolution. During Mobile World Congress 2017, China Mobile joined hands with Huawei to formally issue the industry-first *Cloud-based BNG with Control Plane and User Plane Separated Architecture Technical White Paper*. During Huawei Global Analyst Summit 2017, CMRI and Huawei officially released the cloud-based CU-separated BNG architecture. In June 2017, China Mobile Shaanxi and Huawei jointly completed the world's first pilot of the CU-separated architecture on a live network.

### **Promoting Global Standards Progress and Leading Industry Chain Development**

Unified standards are the prerequisite for communication between devices. To promote the large-scale deployment of the CU-separated architecture in the industry, it is necessary to pool together the efforts of industry chain partners to promote the formulation of global standards and facilitate business success.

CMRI is working together with Huawei and other vendors to actively promote the standardization of the CU-separated architecture at multiple international standards

organizations. In February 2017, CMRI firstly proposed the CU-separated architecture and information models in the IETF in collaboration with Huawei. The information model document defines a set of information models for interaction between the control and forwarding planes in this architecture to facilitate device interoperability. During the IETF 99<sup>th</sup> meeting, the standard draft received positive feedback from industry experts, and many operators have expressed their willingness to participate in subsequent discussions on standardization requirements to promote industry standardization. This is all a great step forward toward the standardization of the cloud-based CU-separated BNG architecture. China Mobile and Huawei have been recognized by the industry for their active contributions.

CMRI and Huawei put forward a technology standard proposal for the cloud-based CU-separated BNG architecture at the Broadband Forum (BBF) in March 2017, which is currently a working text (WT-384, Cloud Central Office Reference Architectural Framework). The draft specifies in detail the architecture and deployment model of the centralized cloud-based control plane and the distributed high-performance forwarding plane that will come into use after the traditional BNG functions are decoupled. After its final revision is completed, this working text is expected to become an official technical standard by the end of 2017.

As a vendor representative, Huawei possesses extensive experience in the international standards field. By the end of 2016, Huawei had joined over 360 standards organizations, industry alliances, and open-source communities, undertaking more than 300 important positions. Huawei acts as a member of the Board of Directors in the IEEE-SA, BBF, ETSI, TMF, OpenStack, Linaro, OPNFV, CCSA, etc. In 2016, Huawei submitted about 6,000 standards proposals, bringing its total number of submitted standards proposals to more than 49,000.

China Mobile and Huawei will continuously innovate in CU-separated BNG architecture standards and work closely with other operators around the world to promote standards formulation, lead industry development, and speed up the development of cloud-based metro networks, thereby making greater contributions to the whole industry.