A cloudy view from the fragrant harbor

China Mobile Hong Kong pioneers cloud solutions

In February 2017, China Mobile Hong Kong (CMHK) commercially launched its NFV-based cloud core network. CMHK is the first operator in the Hong Kong market to cloudify its core network, with successful switchover marking the dawn of the cloud era in the financial hub.

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Three drivers

Services

Hong Kong is one of the world's most developed and fiercely competitive telecom markets. At the end of 2016, the number of mobile subscriptions in the territory had grown to over 17 million, achieving a subscriber rate of 230 percent based on its population of 7.3 million.

To stand out in this highly-saturated market, CMHK has been developing new services to retain old customers and attract new ones. In the future, operators' main services will be cloud services, video, AR, VR, IoT, and new 5G applications. As such, CMHK's future network will need to simultaneously meet the different network demands that each of these services has, for example, low latency, high bandwidth, reliability, huge numbers of concurrent connections, and seamless connectivity. It must also satisfy requirements such as fast service provisioning and rapid customization.

User experience

In today's world where experience is king,

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customers expect operators to be able to provide ROADS (real-time, on-demand, all-online, DIY, and social) services in the same way that Internet companies do; however, this is impossible with legacy network architecture. They need agile networks to build open and collaborative ecosystems.

TCO

The city-wide explosion in data traffic means that carriers have to constantly increase infrastructure investment, driving up TCO. Moreover, the use of primary-standby disaster recovery for network elements in legacy networks lowers resource utilization, but the cost of expansion is high. Cloudifying networks can better utilize resources since the network elements installed on the infrastructure can share computing, network, and storage resources.

All-Cloud in 3 phases

NFV is a disruptive network reconstruction technology that telcos need to assess in terms of whether it can retain carrier-class reliability, smoothly evolve services, and overcome possible challenges.

As a result, CMHK chose Huawei to deploy China Mobile Group's first ever All-Cloud core network for commercial use in 2016. Underpinned by decades of IT and CT experience, Huawei launched its All-Cloud software-defined network architecture – SoftCOM – back in 2012. The solution is designed to help operators cloudify hardware, networks, services, and operations with unified and open ICT infrastructure.

The All-Cloud project kicked off in June 2016, prioritizing the operator's goal of being first past the post in Hong Kong to bring cloudified services to market.

Phase 1 of the project saw cloud deployment of Evolved Packet Core (EPC), Diameter Routing Agent (DRA), and Policy and Charging Rules Function (PCRF). **Phase 2** deployed cloud-based user database (HSS/HLP), VoLTE, VoWiFi, and RCS (Rich Communication Suite). And **Phase 3** finished off the scheme by deploying the Circuit Switched domain (CS) on the cloud.

Preparations for full network cloudification were completed in six months, including research on requirements, network planning, and network deployment. CMHK also gained experience in co-deploying network elements (NEs), ensuring the smooth cutover of existing network services, and constructing NFV O&M systems, all of which can provide a useful reference point for future projects.

A global first for hardware

The project involved cloudifying the CS, PS, and IMS (IP Multimedia Subsystem), covering more than 20 NEs for the signaling and data planes. Deploying so many NEs on the same IT infrastructure had never been done before – anywhere.

During deployment, CMHK opted for the cloudified NEs to share management nodes, so all NE resources could be shared. Not using a separate management node for each NE cut hardware usage, slashed the space needed for cabinets, and provided unified

O&M access.

Smooth cutover

CMHK's existing platform used equipment from several different vendors. To ensure smooth service cutover from the legacy platform to the new cloud platform, the operator leveraged a hybrid pool solution. A hybrid pool is built from the same NEs on different platforms or NEs from different vendors. All resources are shared and can be flexibly allocated by percentage without the end user being aware. The solution minimizes impact on the current network and protects the operator's investment by reusing existing network equipment.

By the end of 2016, the partners had deployed a heterogeneous pool comprising Huawei's cloudified Mobile Management Entity (MME) and other vendors' legacy platform MMEs on CMHK's commercial network, with the same approach soon adopted for the Mobile Switching Center (MSC).

The team

CMHK faced a series of O&M challenges after network cloudification, including changing organizational management from vertical to layered; coordinating management and maintenance on the legacy and cloud network; correlating physical hardware warnings; implementing cloudified software; constructing unified demarcation and location methods; and implementing end-to-end fault detection and healing mechanisms that work between multi-layer heterogeneous entities.

At the start of the cloudification project, CMHK formed a virtual NFV team comprising personnel with different technical backgrounds and differnt business lines, and adjusted the structure in accordance with project progress.

Comprehensive system assessments were conducted based on the information gathered during maintenance, including diagnoses for services, software, and infrastructure. The network would be optimized and adjusted based on the outcome of the assessment.

Repeating this process helps to ensure service continuity, stability, and user experience, and enables an NFV network with high availability.

Cloud leads the way

CMHK completed the first phase of EPC and DRA cloud deployment in June 2017. Once full cloudification was completed, CMHK will be able to deliver quality services to its subscribers. This cloud project represents China Mobile's first successful commercial deployment of an NFV network, and will provide invaluable experience for the group going forward.

The All-Cloud platform also provides CMHK with better network infrastructure for developing enterprise services, IoT, and future 5G services. In the future, CMHK will be able to create more value from the network infrastructure through continued innovation in new tech areas such as network slicing and edge computing.