



# Ready for the future with Cloud Core Networks

*With the increasing maturity of Network Functions Virtualization (NFV) technology, the world's leading operators have already begun rolling out All Cloud Networks. Many also started formulating roadmaps for commercial 5G deployment after the first 3GPP 5G standards were fixed, setting the wheels of 5G network construction in motion. And it all starts with the core.*

By Yuan Gang

**T**ransforming the core network is the first step on the path to full cloudification. Huawei believes that to meet the needs of existing services and smoothly evolve to 5G, fully cloudified core

networks need to be flexible, robust, and agile. Control plane and user plane separation (CUPS) is a must for constructing distributed networks with lower latency. And DevOps is required to improve deployment and O&M efficiency to meet the needs

of more industries and achieve network transformation.

## "Cloud Native" flexibility

Building 5G-ready core networks

and All Cloud Networks that are elastic, robust, and agile requires the reconstruction and optimization of software architecture for virtual network functions (VNF).

Huawei's Cloud Core Network is based on Cloud Native architecture and key technologies such as stateless design, service-based decomposition, and lightweight virtualization (containers). To meet the requirements of different applications, the solution can be used to construct flexible networks with service awareness, on-demand resource allocation, a service capacity that's unconstrained by single pieces of physical hardware, and network functions that can be dynamically generated and deployed on-demand.

**Stateless design:** Service status and session data are separated from service processing units and stored in a separate distributed database. This creates a stateless design for service processing units that enables on-demand elastic scalability and ensures that services remain unaffected even when single or multiple service processing units fail, greatly enhancing the flexibility and robustness of virtual software.

**Service decomposition:** The microservices decomposition of virtualized software can be realized according to the service application scenario and network model. When it comes to decomposition granularity, smaller is not necessarily better. Instead, the focus should be on independent upgradability, independent scalability, and reusability. The size of post-decomposition microservices will

differ markedly between applications that change rapidly and have a high number of customized requirements, such as IoT and enterprise communications, and those where functions are comparatively stable, like IMS and EPC.

**Lightweight virtualization (containers):**

Containers are a lightweight virtualization technology that greatly benefit resource efficiency, performance, deployment, startup speed, and mobility. Virtual machines (VMs) are a heavyweight virtualization technology with clear advantages in security and resource isolation. In the future, the two types of virtualization technologies will coexist, so operators can select the one that best suits a particular application.

## Distributed networks lower latency and boost user experience

Emerging services such as AR and VR have higher requirements on network latency, bandwidth, and security. Core network CUPS enables the construction of distributed networks, where the user plane is moved down to the network edge nearer the service. This significantly reduces network latency and improves user experience. Local data processing also guarantees enterprise users' data security, helping operators to enter the enterprise market.

Huawei's MEC@CloudEdge is based on Cloud Native architecture and is 5G-ready. The solution harnesses new technologies based on CUPS to optimize the edge user

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experience. It enables local traffic offloading; reduces latency; supports local service charges, management and control; opens pipeline capabilities; and can integrate third-party applications.

Huawei has worked with world-leading operators like China Telecom, China Mobile, and Vodafone to deploy MEC@CloudEdge commercially in various scenarios, including private networks for governments and enterprises, smart factories, smart venues, and IPTV over WTTx.

Over the past couple of years, Huawei's MEC@CloudEdge solution has picked up numerous awards for its outstanding technical and commercial contributions to the industry, including Best Edge Computing Technology award at MEC Congress 2016 and Best Commercial Deployment of MEC at MEC Congress in September 2017. At this event, China Telecom Ningbo also won the Operator Award for MEC Development for its joint Smart Factory project, Zhenhai Refinery, with Huawei, marking the first award for commercial MEC deployment received by a carrier. Huawei's MEC@CloudEdge also won the Annual Technology Architecture Excellence Award for MEC and Annual Scenario Excellence Award for MEC at the 2017 China International Information and

Communication Exhibition. These awards reflect the strong industry recognition for Huawei's MEC@CloudEdge architecture, technology, and successful commercial deployment.

Huawei has deployed MEC@CloudEdge solutions in more than 10 scenarios for multiple operators worldwide, including carriers in China, UAE, Portugal, and Thailand. Huawei will continue to work with industry partners to explore more MEC application scenarios to create a prosperous MEC ecosystem and boost business value for the entire industry.

## Acceleration with DevOps

Operators are facing competitive homogeneity in telecom services and fierce competition from OTTs. However, quickly developing new, innovative services to compete increases the pressure to deploy network resources rapidly, share capabilities and resources, and implement flexible management and scheduling.

DevOps can be used to integrate equipment vendors and operators' development and operations processes, enabling rapid network deployment, gray upgrades, and service innovations that boost operational efficiency and accelerate

service provisioning. Gray upgrades are one of the most important DevOps practices. Due to the outstanding business value they offer, operators are starting to notice this key feature.

The advantages of gray upgrades include lossless service upgrades using the least backup resources. Moreover, the whole upgrade process is fully automated, and designated services can be easily upgraded, accelerating service provisioning from months to weeks.

## Evolving to the 5G core

Huawei's Cloud Core Network supports smooth evolution to 5G core networks. It can also integrate 2G, 3G, 4G, and 5G services to protect operators' legacy investments.

Huawei is the first manufacturer in the industry to offer Cloud Native with three-tier architecture. Huawei has worked with the world's top operators to test the technology and commercially deploy CUPS, where it continues to lead the way. Huawei's Cloud Core Network solution features Cloud Native software architecture capabilities and CUPS distributed cloud network architecture. It supports lightweight virtualization technologies, including virtualized software-based microservice decomposition, core network static slicing, and containers. When it comes to O&M, the solution allows operators to build telco DevOps platforms and smart O&M systems based on big data,

helping them implement organizational transformation and boost the flexibility of existing networks. This guarantees carrier-grade reliability and lays the foundation for the smooth introduction of 5G services.

The initial 5G NSA phase focuses on deploying eMBB. Service requirements on networks include ultra-high bandwidth for individual users and 5G charging and networking, which in turn requires verifying 5G eMBB deployment and building up experience at operating networks. In 2018, Huawei will provide a commercial version of its Cloud Core Network for eMBB services as part of the NSA stage.

In the later 5G SA stage, we will see the commercial adoption of multiple services. Here, service-based architecture (SBA) will support 5G commercial slicing products and services. Of more than 30 SBA PoCs and pre-commercial deployment cases, Huawei's 5G core network has a significant lead in both architecture and performance. Huawei is a major contributor to SBA and has already demonstrated a 5G slicing prototype.

As of 1Q 2018, Huawei's 5G core network has been deployed in over 100 commercial sites. Step by step, we can go far. Huawei will join forces with operators, jointly promote All Cloud, and accelerate the arrival of the 5G era. 