The ROADS to MBB 2020
with CloudRAN

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Mobile operators must continue improving the value of their networks, evolve connectivity capabilities, and build a future-oriented mobile industry. To do so, they need to create new markets by opening platforms and network capabilities and target new segments and consumers, for example, households and verticals. CloudRAN is a key support technology for achieving this.

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The MBB 2020 vision

We're fast approaching a key stage of development for the mobile industry: MBB 2020. Rather than describing a type of network and particular point in time, MBB 2020 represents a commercial and solution-led vision of mobile network development over the next five to ten years.

Huawei proposed the ROADS concept for the MBB 2020 vision at the end of 2015, setting out a path of continual evolution for the commercial capabilities of mobile networks and the construction process for the network technologies that will support this. Huawei hopes to help operators improve the commercial value of their networks and evolve the connectivity capabilities of their networks to build a future-oriented mobile industry.

CloudRAN is a key support technology for achieving this vision. Huawei will use CloudRAN as the bridge linking 4G and 5G. How will this and MBB 2020 be achieved? We asked Wang Yufeng, Director of the MBB Solution Support Department, to share his views.

Exploring new markets is a must for mobile operators

COMMUNICATE: MBB 2020 is a commercial vision. What are the main differences between MBB 2020 and operators' aims?

Wang Yufeng: The next five years will see dramatic changes in basic connectivity capabilities, and mobile operators will need to expand the scope of their current services and introduce innovative business models to create new revenue streams. With the rapid development of wireless technology, wireless networks can now carry services that they previously couldn't. This forces us to redefine the business models and target markets of wireless networks. Business models now include Connectivity as a Service, Platform as a Service, and – to open network capabilities – Infrastructure as a Service. Wireless commercial markets have expanded from Business to Customer (connectivity services for individual users) to Business to Household (B2H) and Business to Business (B2B).

B2H: An interesting fact is the B2H market, for example, family plans with shared data and bundled fixed broadband and mobile services, has the lowest churn rate. User loyalty increases greatly once services extend from an individual user to a household. Mobile operators can offer home

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broadband access for the B2H market using their wireless networks to increase revenues. These services also provide a solid foundation for providing smart home and home automation services.

B2B: The Internet of Things (IoT) is expected to grow into a trillion-dollar market. Operators need to build more IoT networks and leverage Low Power Wide Area (LPWA) technology to increase the share of cellular IoT (CIoT) from its current figure of 6 percent to 50 percent. Operators' wireless networks can also provide services for previously closed but lucrative markets such as public safety. Current wireless networks can meet the needs of specialist applications for high levels of security and quality, and provide wide coverage, low cost, and fast service rollout. B2B services represent a new blue ocean market for operators. Diving into this market will help them increase revenue.

COMMUNICATE: Do mobile operators have unique advantages in these new markets?

Wang Yufeng: Mobile operators have huge unique advantages in the new business scenarios of home broadband and CIoT.

Home broadband market: Mobile operators can use wireless home broadband access as a way to quickly boost their market share. When it comes to coverage, traditional fixed-line networks are hindered by trenching and deployment difficulties as well as high costs. Mobile broadband (MBB) networks, however, can cover dozens of square kilometres from a single well-located base station, with peak speeds of 1 Gbps and high-speed services that average 30 Mbps. According to ITU, the average global cost of FBB is 1.7 times higher than MBB, which makes it easier to create a wireless home broadband network. MBB enables coverage to be rapidly extended to rural and urban areas where FBB coverage is limited and shortens ROI from six years

to two.

CIoT market: Operators have natural advantages in system security, wide area coverage, QoS guarantees, and ecosystem maturity. A good IoT network should meet the following four requirements: 1) Network security; 2) Seamless network coverage; 3) Support for a mature ecosystem; and 4) Affordable terminals. CIoT technology meets these four requirements.

Wireless network technology has innate advantages in security and wide coverage, and it's easy to accelerate ecosystem maturity and make devices affordable. LPWA is expected to account for 70 percent of the CIoT market by 2020, with up to 2 billion connected devices. LPWA will be vital for enabling operators to increase the number of CIoT devices.

Reshaping commercial capabilities

COMMUNICATE: In the future, mobile operators will meet many new commercial opportunities. Will their networks provide sufficient support?

Wang Yufeng: To access these strategic opportunities, mobile operators need to rebuild the commercial capabilities across their entire networks. This will be divided into two steps. First, they need basic capabilities to generate new value and cope with the coming network traffic explosion by eliminating capacity bottlenecks, utilizing spectrum, well-planned base station solutions, innovating, and indoor digitalization – factors unrelated to technology. Second, operators will need to deal with the problem of the generational evolution of network technologies, including strategic positioning and the coexistence of multiple generations of technologies like 3G, 4G, 4.5G, and 5G.

Increasing air interface capacity

The three types of infrastructure involved in increasing air interface capacity are base stations, spectrum, and indoor digitalization. The formula for air interface capacity is as follows: Network capacity = no. of sites × spatial gain (no. of cells and MIMO etc.) × amount of spectrum. The following methods can thus be used to increase network capacity:

Building more base stations: Crowd sourcing when acquiring new types of sites, such as street light sites and wall sites, to accelerate the deployment of micro base sites and enable precision investment.

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Innovating solutions: New splitting solutions that create parallel data streams over the air interface, enhancing investment efficiency.

Obtaining more spectrum: By 2020, MBB networks will require 1340 to 1960 MHz of total spectrum. This means that most countries will need to add 600 to 800 MHz of spectrum. If this is insufficient, unlicensed spectrum for on-demand use will be required.

The evolution and coexistence of multiple generations of technology: Looking to the future and the advancement of IoT technology, all verticals will become digitalized, intelligent, and more efficient. However, different verticals require different things from mobile networks. For operators, the best approach is to fully use their existing network resources.

Operators must continue to evolve networks from 4G to 4.5G: The 4.5G evolution of networks – that is, incorporating 5G technology into 4G networks – will help operators increase the value of their 4G networks and maximize the value of network resources.

5G is the future of wireless networking and is a mid- to long-term evolution target: 5G will bring higher speeds (> 10 Gbps), shorter latency (< 1ms), and enable many verticals by acting as a cross-industry point of integration.

The use of GSM/UMTS may persist over the long term because of commercial considerations: Whether or not a technology remains in use depends on its commercial viability. GSM, which is a long-term basic voice and universal access network, will continue to be used as a thin network for supporting roaming and low-end users. UMTS will become a basic data access network, and due to its maturity and low-cost industry chain support, will continue to deliver commercial returns over the long term.

CloudRAN is the bridge

COMMUNICATE: Can you give more detail about the solution and how it will work?

Wang Yufeng: Huawei's answer to the complex business objectives of the future is CloudRAN, a solution that considers the unique traits of wireless networking. CloudRAN enables completely different network capabilities than the simple base station as access capability center model of the past.

CloudRAN incorporates cloud technology into wireless access networks and supports access for different air interface technologies. By modernizing 4G network architecture in advance using CloudRAN, operators won't need to modify network architecture when 5G is introduced. Deploying CloudRAN architecture will enable operators to improve 4G performance. And because the architecture is 5G-based, operators only have to carry out simple air interface upgrades to support 5G when it's rolled out.

CloudRAN can improve the experience for end users. Current mobile phones can only receive one type of signal and connect to a single base station. In the future, they'll be able to receive multiple signals and connect to multiple base stations, which will increase mobile speeds by many times.

In the future, mobile networks will carry people-to-things communication as well as people-to-people communication. CloudRAN supports the flexible deployment of different services, meeting the QoS requirements of different types of service.

COMMUNICATE: What challenges will operators face when deploying CloudRAN? What does the commercial progress and timeline look like?

Wang Yufeng: CloudRAN architecture is flexible and it can meet different usage scenarios. It's no secret that operators' transmission networks have widely varying conditions and quality. Deploying CloudRAN on different transmission networks with differing conditions is a huge challenge. Huawei's CloudRAN is a complete solution, with a hierarchical design for network function elements. Real-time and non-real-time layers that can be deployed on different network

nodes on an on-demand basis according to service requirements, and flexible architecture that adapts to different transmission network conditions, to maximize network efficiency and user experience.

CloudRAN deployment will be divided into two stages. In the current stage of 4G and 4.5G construction, deploying CloudRAN will allow operators to better support technologies such as LTE Dual Connectivity, LWA, and LAA. In the next stage, when 5G is introduced, CloudRAN network architecture will be ready to support new 5G air interfaces and standards without needing any changes.

Huawei has been talking with top-tier operators around the world for the past two years, and will begin testing CloudRAN with a number of them this year. In addition, initial commercial adoption is expected to commence at the end of 2017.

COMMUNICATE: Will standards need to be developed for CloudRAN? When will the standardization process be completed?

Wang Yufeng: Mobile communication systems are made up of two main things:

interoperable interface technologies and implementation systems. Interoperable interfaces include GSM, UMTS, and LTE, which are defined by standards. These ensure seamless connection between terminals and networks, enabling end users to roam seamlessly anywhere in the world. SingleRAN (which was defined by Huawei) is a type of implementation system that operators can use to implement standardized technologies such as GSM, UMTS, or LTE. Operators favor SingleRAN over other methods because it guarantees the lowest TCO. Likewise, CloudRAN is a type of implementation architecture that can implement LTE and 5G. We believe that CloudRAN architecture is the best choice for operators to deliver better end-user experiences, minimize TCO for whole network deployment and O&M, and better tap into future new business opportunities other than people-to-people communication.

The future of MBB is impossible to predict. Looking back at history, transformation in infrastructure has driven huge socioeconomic and cultural advances. The ongoing and future evolution of communications technology will transform the basic capability infrastructure of society and usher in a Better Connected World. H