

China Unicom

Beijing selects 4G IP RAN evolution to build its 5G transport network

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5G, the next-generation standard in mobile communications, will not only boost user experience, but also enable the large-scale networking of billions of IoT devices. It will allow everything to be connected and facilitate the deep integration of many important industries, such as manufacturing, healthcare, and transportation, creating a smarter and better connected world.

4G is no longer enough

While it will bring great benefits to people's lives and society, 5G also brings huge challenges to existing networks. It requires higher transmission speeds, more bandwidth, lower delays, and wider connections – requirements that 4G transport networks cannot meet. Transport networks must therefore become more flexible and intelligent to be ready for the coming 5G era. China Unicom Beijing believes that the readiness of the transport network is critical to bringing 5G to market quickly. Therefore, infrastructure resources need to be reserved, and 5G-oriented planning and reconstruction must be completed for transport networks before

reconstructing wireless and core networks.

Reserving infrastructure resources in preparation for 5G

5G also requires wireless sites to be distributed more densely, with built in support for CRAN and DRAN construction.

Therefore, before approaching 5G construction, China Unicom Beijing evaluated the infrastructure resource requirements of different construction methods on wireless, transport, and core networks.

In 2017, the operator began checking resources, such as equipment room and optical fiber resources, for each service access area. These checks allowed it to identify resource gaps and bottlenecks that would affect 5G construction. Based on its findings, China Unicom Beijing accelerated the removal of copper cables, integration of equipment rooms, and reservation of resources. It also set out a plan for infrastructure resource reconstruction.



Currently, China Unicom Beijing has reconstructed equipment rooms in pilot areas and some hotspots, gaining valuable experience that will help with subsequent reconstruction and lay a foundation for 5G commercialization.

Selecting the 4G IP RAN and 5G co-transport solution

In 2018, China Unicom Beijing launched its pilot 5G project. The ability to commercialize 5G was one of the key factors in determining what pilot solution to use. It found that the most feasible and cost effective solution was 4G based on 4G IP RAN and 5G co-transport solution.

All core and aggregation devices and more than 96 percent of access devices on China Unicom Beijing's 4G IP RAN can evolve to support 5G. In addition, it has deployed a Layer 3-to-edge solution on its live network to meet low-delay forwarding requirements. Both flexible connections and 5G time synchronization requirements can be met. For device capabilities and solution deployment, 4G IP RAN has a high degree of 5G readiness and

can be used to implement 5G transport through evolution and capacity expansion.

The 4G IP RAN-based 4G and 5G co-transport solution can minimize infrastructure resource and power consumption, speed up network construction, protect 5G construction investment, and improve network O&M efficiency.

On July 28, 2018, China Unicom Beijing opened its first 5G site on Daoxianghu Road, Beijing, trialing driverless vehicles with Huawei and Baidu. It then completed service provisioning at a site in Financial Street, and verified that the network could carry both 4G and 5G services.

To keep pace with network evolution and develop strong technical capabilities in preparation for 5G, China Unicom Beijing has verified a clutch of new technologies, including 50GE on a single interface, segment routing (SR), and FlexE slicing.

Piloting Network Cloud Engine (NCE) together with Huawei

5G services drive cloudification, the downstream move of core networks, and ubiquitous connectivity. China Unicom Beijing believes that future networks must be more flexible and intelligent, and as such has piloted Huawei's NCE with Segment Routing (SR) enabled to implement agile tunnel adjustment and meet flexible 5G access requirements in the initial phase. The NCE will replace existing network management systems on the live network to power fast service provisioning, automatic site deployment, and intelligent maintenance to meet requirements for fast commercial deployment and intelligent O&M on 5G services.

Future-oriented 5G transport network planning

The pilot use of 5G is just the beginning. China Unicom Beijing is planning a target transport network that can meet requirements over the next three to five years. Planning is based on the unlimited 4G package currently in use and the requirements for 5G service development. It also takes into account the predicted service model of each service area and even each node, and considers whether existing networks and devices can meet 5G service requirements.

China Unicom Beijing will upgrade or expand the platforms at the core and aggregation layers, and upgrade or reconstruct the existing access network based on whether DRAN or CRAN is used, and whether an area is a hotspot. The pace of transport network construction will be determined by the pace of wireless network construction, ensuring that the transport network is 5G ready before the wireless network. Currently, China Unicom Beijing has completed the planning

of its target 5G transport network in the main aggregation areas and formulated the implementation plan.

Building a 5G-capable Beijing

China Unicom Beijing not only researches 5G technologies, standards, and applications, but also promotes the development of 5G industries and applications, especially applications that combine production, life, society, and culture, as well as IoT service applications.

At the beginning of 2018, the operator signed a strategic cooperation agreement with Huawei. The two parties set up a joint work team to build a demo 5G network, provide intelligent communication services for the 2022 Winter Olympics, fully verify 5G solutions, incubate 5G industry applications, and attract and foster 5G talent. Since then, China Unicom Beijing's 5G strategy has been put into practice.

On August 13, 2018, China Unicom Beijing officially launched its 5G NEXT plan, covering five key scenarios and five key applications, to promote the development of the 5G industry and build a future-oriented 5G network in Beijing. The five scenarios are Beijing's sub-civic center, new airport, World Garden 2019, Winter Olympics 2022, and Chang'an Street. The five applications are autonomous driving, big healthcare, industrial Internet, smart city, and ultra HD videos.

China Unicom Beijing will continue to focus on these key scenarios and applications, and keep pushing for technological innovation that focuses on setting benchmarks and guaranteeing user experience to implement 5G for Beijing. [www](#)