China Mobile

Safe Cities are smart business for operators

China Mobile Hefei has emerged as a key solution provider thanks to its advantages in technical and delivery capabilities, O&M assurance, and competitive construction costs. The operator's success at expanding its B2B market presence by providing video surveillance solutions on its backhaul network is reflected in remarkable business results.

By He Dawei, General Manager of China Mobile Hefei

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With a greater commitment from governments to build safe cities, the demand for high-quality video surveillance networks is increasing.

Located in Anhui province, Hefei is a major hub both in China's Belt and Road Initiative and in the Yangtze River Delta Economic Zone. Since the inception of China Mobile Hefei's video surveillance project in September 2017, Hefei city has seen the deployment of nine video platforms and 12,000 cameras covering more than 1,000 communities and streets, helping local law enforcement departments achieve a safer city environment.

Video surveillance systems need to be deployed by operators that possess sufficient network resources and strong investment capabilities. They also involve corresponding maintenance departments and personnel that are familiar with video surveillance technology. Telcos have strong sales capabilities and large-scale network infrastructures that span regions and even countries, making them able to deliver carrier-grade service quality for users.

GPON: The best choice for public camera backhaul

The market applications of video surveillance address strict requirements.

The Hefei video surveillance project involved constructing a backhaul network with 12,000 cameras, service availability of more than 99 percent, and MTTR of less than 2 hours — all delivered within a six-month timeframe. China Mobile Hefei took over the construction and maintenance of all backhaul lines.

The project team initially studied the camera deployment scenario, environment, and traffic models. They came up with two feasible camera backhaul solutions: LAN switch access and passive optical network (PON) access.

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In enterprise campus scenarios, the LAN switch access solution is already commonly deployed for video backhaul scenarios featuring between 100 and 200 cameras. Although this solution has multiple suppliers and is cost-effective, it has obvious disadvantages in backhaul scenarios with more than 500 cameras in public areas.

First, there are hundreds of access and aggregation switches, and network designs are very complex. Any design or construction error can cause a logical loop on the network, resulting in a Layer 2 broadcast storm that can cause a large number of cameras to disconnect.

Second, the P2P networking design of switches occupies many end fibers and requires fiber re-deployment in 50 percent of areas, which fails to meet fast service provisioning requirements. Unlike the switch access solution, PON technology was designed for massive access scenarios such as home broadband.

As a fixed-mobile convergence (FMC) operator, China Mobile Hefei serves 1.4 million home broadband subscribers and owns 5 million lines of local fiber resources. Its research found that

the average distance between these cameras and the PON optical access points was relatively short at 50 to 80 meters. With reuse by the fiber to the home (FTTH) installation and maintenance team, a single camera can be set up and operational within one day.

The major challenges

As public security cameras tend to be deployed outdoors, optical network units (ONUs) should operate in relatively harsh environments, as they're resistant to high temperatures and high humidity, and they offer protection from lightning. Additionally, requirements for data network security are high. Common home broadband FTTH solutions fail to meet any of these requirements. After comprehensive evaluation, Huawei's PON private line backhaul solution proved to be the best choice.

Outdoor ONUs are deployed next to cameras. They can adapt to wide temperatures ranging from -40°C to 55°C with 6 kV surge protection, guaranteeing high reliability and a low failure rate. AES-128 encryption is supported for data security, while MAC address binding is supported to prevent unauthorized access and improve network security.

Distributed optical line terminals (OLTs) are deployed inside base stations. They reuse the backhaul fibers of base stations, which greatly reduces service provisioning time. In addition, distributed OLTs can support network slicing to isolate the traffic of all public surveillance cameras from home broadband traffic on the same fiber network. This ensures that the network is free from congestion and packet loss 24/7, and provides clear surveillance images at all times.

Additionally, the intelligent ODN management and warning solution of Huawei's network cloud engine (NCE)-FAN allows China Mobile Hefei to predict fiber quality deterioration in advance and quickly locate faults to meet strict SLA requirements. The NCE-FAN supports quick fault management on network-wide cameras, achieving 99.9 percent availability and an MTTR of less than 2 hours.

Expanding the backhaul boundary

Video surveillance has expanded from the traditional security domain to other verticals, with digital and network-based video surveillance systems becoming increasingly mainstream. Enterprise users hope to improve their management efficiency and service quality. Applications include remote loss estimation in insurance, customs clearance in logistics, and remote outlet management in supply chains. The sharp increase in video surveillance requirements makes video surveillance based on fixed broadband another major opportunity for operators to increase their revenues.

Based on the video backhaul solution
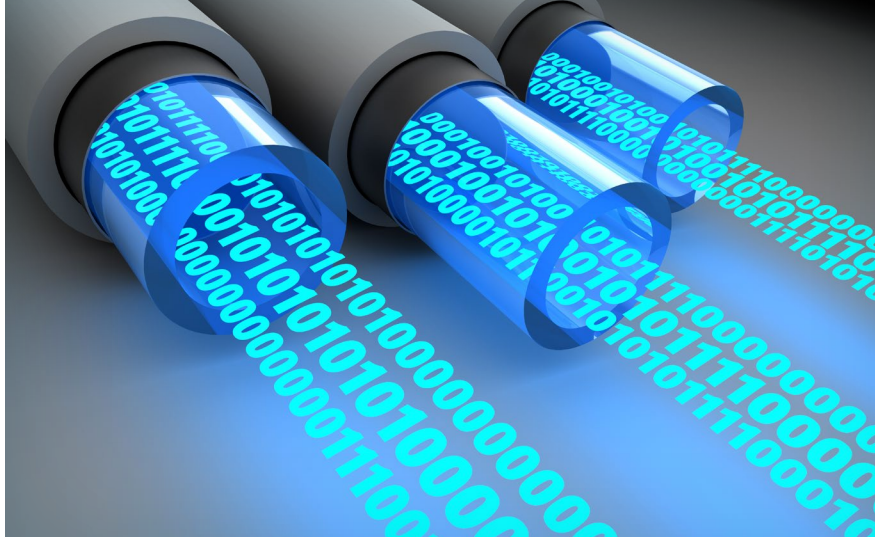
developed for the project, China Mobile Hefei is also considering packaging its video cloud platform to expand video surveillance services for SME customers like Safe Campus and Smart Store. In actual application, the distributed OLT + intelligent gateway + Hemu camera + cloud storage solution has so far been well received by micro and small enterprises.

Outstanding business solutions also provide other added value. For example, "Sunshine Kitchen" facilitates interaction and trust between merchants and consumers. "Happy Family" helps guarantee real-time home security with nursing applications, alarms, and cloud storage playback. In addition, O2O takeaway vendors can use the video cloud storage function to share information with customers and ensure a better ordering experience.

In 2019, China Mobile Hefei will continue expanding the Safe City project and explore the market presence of value-added broadband services in campuses, hotels, and industrial parks.

China Mobile Hefei will work with Huawei to explore more business solutions for enterprise services based on the application of PON private line video surveillance. ▄▄▄