Huangcun IDC of China Unicom Beijing: 
China's First Warehouse Micro-modular IDC

China Unicom Beijing (hereinafter referred to as Beijing Unicom below) has reconstructed its two unused warehouses in Huangcun, Beijing, with a total area of 5600 square meters, into an Internet data center (IDC) using a warehouse micro-modular IDC solution. It is the first warehouse micro-modular IDC project in China. This project reuses idle assets to improve asset utilization and rapidly completes IDC deployment using on-demand planning, component prefabrication, and field assembling, helping Beijing Unicom seize market opportunities. The new IDC contributes to 50% of China Unicom Group’s IDC business revenue. Beijing Unicom is planning its phase-2 IDC project, which will be composed of two equipment rooms covering a total area of 37,000 square meters. This new warehouse data center design won the "Innovation in Medium Data Center" award of Data Center Dynamics (DCD), which is considered as the "Oscar" in the data center industry.
Cutting-edge data center construction technology to ensure fast delivery

Beijing is at the center of China’s Internet and is home to a large number of IT and Internet companies. With the development of cloud computing, Internet of Things, and Big Data, these enterprises are growing rapidly, thus increasing the demand for data centers. Data center construction must be agile enough to keep pace with the development of IT and Internet companies.

In line with China Unicom’s asset recovery requirement, Beijing Unicom wanted to reconstruct two unused warehouses as a data center. The warehouses cover more than 5,000 square meters and can accommodate more than 1000 IT cabinets. Beijing Unicom hoped to deploy as many cabinets as possible in the equipment room and build a high-quality data center with the minimum investment. Additionally, Beijing Unicom expected that the data center be fully functional within six months using prefabricated components that can be quickly assembled onsite.
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However, constructing a data center usually takes six months to two years in China, and data center energy consumption is very high. Meeting Beijing Unicom’s requirements is a serious challenge for solution vendors. Huawei took on the challenge and successfully completed the task. With a commitment to delivering customer-centric data center service and the experience gained from implementing more than 330 successful data center projects around the world, Huawei offered Beijing Unicom an innovative warehouse micro-modular integrated data center solution, which is suitable for data center deployment in traditional buildings. This solution enabled Beijing Unicom to build a modular and agile data center that can be delivered and expanded quickly.

Facing a tight schedule and difficult tasks, Huawei adopted a flexible modular design (in terms of buildings, rooms, and cabinets) to meet Beijing Unicom’s service requirements. The design used three types of micro-modules to fully use building space based on the load bearing capability of each floor. The micro-modules are water-proof in compliance with IP44 and can be flexibly deployed in warehouses. The devices in each module, including cabinets, air conditioners, water supply and drainage appliances, power distribution system, gaseous fire suppression system, alarm system, security system, wiring, and monitoring system, all use an integrated design and are prefabricated before delivery. After they are shipped to the installation site, field personnel only need to install the containers, connect them to external power sources, and perform simple operations on the devices. The data center can be easily expanded to support future business development by simply deploying additional modules. Using this micro-modular design, Huawei delivered a data center with 1100 IT cabinets in as short as three months, helping the customer seize market opportunities.
In addition, the data center isolates cold and hot air flows, uses closed air channels, and deploys air conditioners between rows of cabinets to improve per cabinet power density and energy efficiency. This cooling system design achieves a per module power usage effectiveness (PUE) of 1.05 and an overall PUE of less than 1.4, which is much lower than the average PUE of data centers in China and comparable with the energy efficiency of leading international data centers. This energy-efficient IDC greatly reduces the OPEX for Beijing Unicom.

**E2E integration to enable carriers to focus on business development**

Each data center has eight systems and dozens of subsystems regardless of its size. The complicated systems involve different technologies, standards, and specifications, imposing high requirements on operation and maintenance. Subsystems and their respective inputs and outputs are closely interconnected with one another. Any change in one subsystem will affect other subsystems. These ripple effects can make data center construction challenging.

To deliver a high-quality data center on a tight schedule, Huawei designed an end-to-end integration solution and convinced Beijing Unicom to choose Huawei as the general integrator instead of dividing the project into 13 bidding projects. Huawei coordinated all the involved vendors, controlled the project progress, assumed the responsibility for project quality and costs, and ultimately delivered the project within three months. Since Huawei took on the entire data center construction project, Beijing Unicom is in a better position to concentrate on business development. Huangcun data center contributes to 50% of China Unicom’s IDC business revenue.
Standardized processes for high-quality project delivery

Having successfully delivered more than 330 data center projects, Huawei has condensed the project quality management process into 4 stages with a total of 16 steps. Through the four stages of quality planning, quality assurance, quality control, and quality evaluation, Huawei can efficiently supervise the project to ensure quality and timely project delivery in accordance with the contract signed with the customer.

Huawei’s industry-leading warehouse modular data center solution provides fast and high-quality delivery of the entire project, including power distribution, air conditioning, water-proofing, and fire protection systems. The project delivery process fully meets customer requirements. This solution has been verified by pre-integration tests conducted in Huawei’s professional integration testing labs (an IT lab and an equipment room energy lab). The project materials have also been tested by Huawei’s Global Compliance and Testing Center (GCTC), which has been certified and authorized by over 18 international and national organizations (including FCC and CNAS) for EMC, safety, and other related standards compliance tests.

After visiting Huangcun IDC project phase 1, executives of Beijing Unicom spoke highly of the project, saying “This project adopts a new model of IDC equipment room construction by deploying high-density micro-modular equipment rooms in idle warehouses. It is of strategic importance to China Unicom’s IDC business development and operations. We hope that China Unicom and Huawei will continue working together to improve and popularize the warehouse IDC solution.”

By Liu Junli