NETGEAR®
Case Study

NETGEAR Helps Dianbai, Maoming Launch a Smart Campus Project

Case Overview

User Industry
Education

User Profile
183 secondary and high schools in Dianbai, Maoming

Technical Solutions
As the tiered storage and data protection for the regular recording and broadcasting system (Spaceflight Teaching), the NETGEAR RR4360S, RR2304, and RR2312 provide mass storage space for the secondary and high schools in Dianbai District, meet their recording and broadcasting requirements, and implement backup for disaster recovery. Regarding the basic backbone network for the entire smart campus, products such as NETGEAR's M5300, M4100, and GS724T laid a solid foundation for the network.

Products Used
RR4360S x 2 units
RR2304 x 65 units
RR2312 x 18 units
SRK60 x 150 sets
M4100-26G x 365 units
GS724T x 215 units
GS750E x 33 units
M5300-28GF3 x 8 units

User Profile

Dianbai District, in Maoming city district in Guangdong Province, is located on the southwest coast of Guangdong. It borders Gaozhou and Yangchun to its north, Yangxi to the east, Maonan District and Wuchuan to the west, and Nanhai to the south. It was established on April 18, 2014, when the original Dianbai County was merged with Maoming City and Maogang District. Dianbai District is the only coastal county-level administrative district in the Maoming area, and its coastal area is an important part of the Guangdong Maoming Binhai New District (with the two towns of Diancheng and Bohe as the original area). Education in Dianbai is developing rapidly. According to statistics for the district, in 2017 there were 83,266 general secondary school students, of whom 28,932 graduated, as well as 126,439 elementary school children, of whom 18,388 graduated.

Project Requirements

Elementary and secondary schools in Dianbai District represent the modernization of education and information technology project planning in the county (city, district) and content construction, which includes the Dianbai District Education Bureau data center, the Education Cloud Platform, campus networks, video classrooms, synchronized classrooms, interactive and e-school smart classrooms, e-teaching platforms, and computer classrooms. The data center uses enterprise grade storage, backs up recordings and broadcasts for each elementary and secondary school in the district, and improves the sharing of class material within the district.

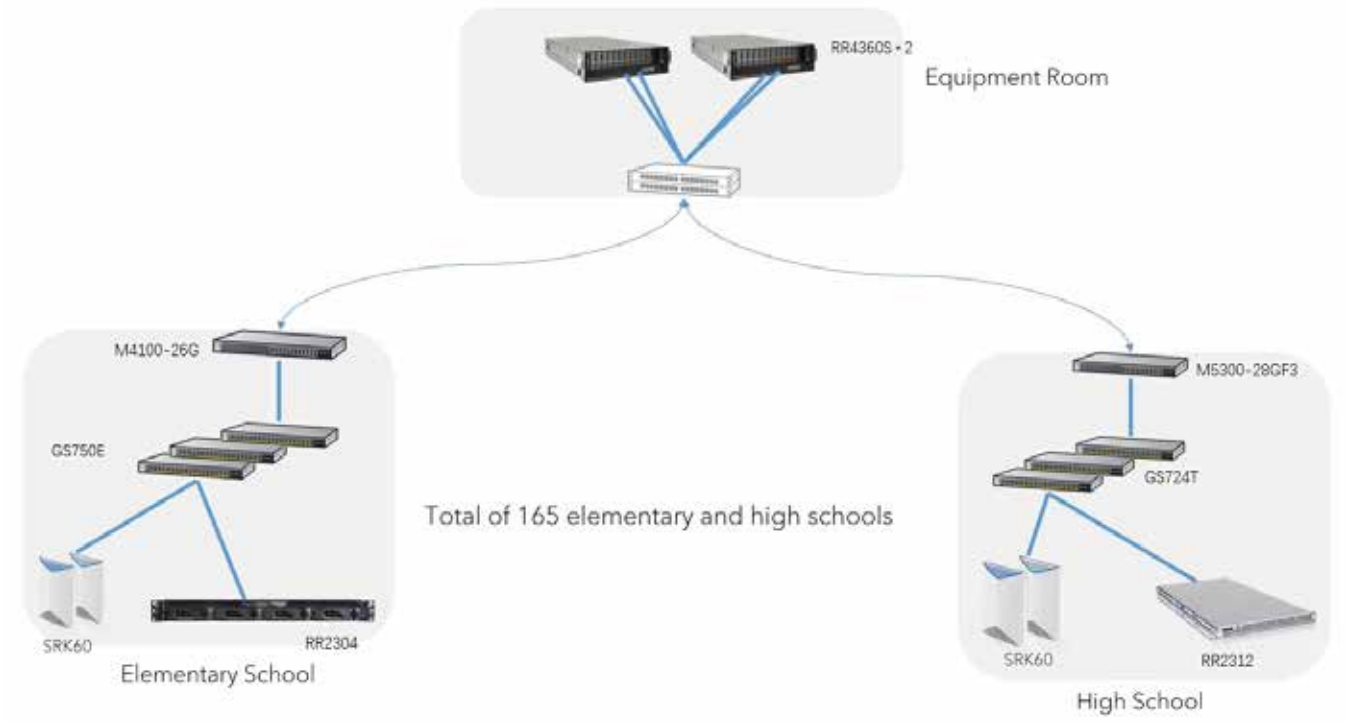
The creation of the education cloud platform covers aspects such as education management, teaching services, and student learning/home school interconnection, including: collaborative offices, educational administration, teacher management, personnel management, resource management, use of WeChat-integrated apps, use of apps, and ITV learning platforms. This meets the overall needs of teachers in terms of daily management, services, and learning. The development of educational big data by the district's Education Bureau enables easier management for decision-making, joint building and sharing of resources, and realization of the overall outcome of "Learning for everyone, learning continuously, and learning everywhere."

With the joint building and sharing of educational resources, core functional modules in the education system, such as work platforms, resource centers, learning spaces, and application centers were integrated. Customized portals, resource displays, district resource management, and localization resource management for the district were provided, while problems such as fragmented systems in the district, information silos, data inconsistencies, and uneven educational resources were solved.

Technical Solutions

The NETGEAR products are mainly for use with the Spaceflight Teaching video broadcasting system for regular educational recording and broadcasting. They helped Dianbai District implement school-to-school and class-to-class connectivity, and build a solid infrastructure for regular video classrooms. Each elementary school in the district deployed an M4100-26G core switch and a GS750E access switch to implement school-to-school networks. In video classrooms, an Orbi Pro Wire-Free 3-band WiFi set was deployed to meet the requirements of e-school. Matching with Spaceflight Teaching's regular recording and broadcasting system, each elementary school deployed an RR2304 as local storage and regularly backs up the RR2304 data to the RR4360S, which acts as a centralized backup for disaster recovery.

For secondary schools, the M5300-28GF3 is used as a core switch, and the GS724T is used as an access switch to build a high-performance base network. Given that the quantity of data recorded and broadcast is higher in secondary schools than in elementary schools, the use of the very special high-density storage RR2312 with 1U12 disks for video storage, in comparison with the RR2304 deployed in elementary schools, can assure the higher capacity per unit area needs are met. In order to avoid data loss due to various natural and man-made disasters, each secondary and high school's local storage in Dianbai County is backed up for disaster recovery to the RR4360S in the district's data center. As well as meeting the needs for disaster preparedness, it also centralizes sharing and analysis, and collects basic data for future big data analysis.



Advantages and Features of the Solutions

High-density mass storage brought savings in equipment room space. With today's high-resolution recording and broadcasting systems, the recording results were improved, and the more high-quality course recordings were able to meet more needs. In a 4U space, NETGEAR's RR4360S can include 60 high-capacity SATA hard drives to create a theoretical 4U 720 TB storage capacity. In addition, for RR2312 deployment in secondary schools, a 1U height can include 12 hard drives and is a quite a special product on the market in this regard. A 1U height can support a maximum of 144 TB of space.

One set of the Orbi Pro Wire-free Tri-band Wireless System, used in recording and broadcasting classrooms, can easily meet the requirements of 50-60 smart terminals running smart lesson apps, and meet the high-density wireless connectivity requirements. Since the Orbi Pro router only needs one external IP address, the smart terminal goes out to the external network through NAT, therefore it can save on IP address allocation by the internal network. Orbi Pro supports Tri-band wireless networks, for which the WiFi used for the backbone has a bandwidth of 1733 Mbps, which meets the demand for high-speed WiFi for smart classroom applications. Its ease-of-use has teachers and students alike singing its praise. Wire-free connectivity is especially convenient and means teachers can move equipment with ease as needed for classroom recording and broadcasting.

For high-speed wired infrastructure, each elementary school is equipped with one M4100-26G as the core switch and multiple GS750E units as access switches to meet the basic networking requirements of the elementary school. The M4100-26G's full network management functions and the

GS750E's basic management functions and high-density ports are ideal choices. Each secondary school deploys an M5300-28GF as the core switch, and the GS724T acts as an access switch. It has higher speed and more powerful management functions to meet the networking needs of more students and more intelligent classroom applications.

Introduction to Key Products

1. RR4360S

The RR4360S is a 4U 60-bay high-density storage system which supports SATA/SAS/SSD hard drives. With a high-performance Intel Xeon processor and 16 GB ECC memory, the software level provides comprehensive data protection with 5 levels of data protection. Mainstream RAID levels such as RAID 50/60/10/6/5 are supported. High-density storage meets the stringent requirements of space/capacity.

2. RR2312

The RR2312 is one of a few storage devices on the market that can provide 12 hard drives at 1U heights. Higher density storage can better meet the needs for mass storage space.

3. RR2304

RR2304 is a 1U 4 disk storage device. These are cost-effective departmental storage devices that can meet the needs of elementary school video applications with 5 levels of data protection.

4. Orbi Pro Tri-band Mesh wireless system

The Orbi Pro Wireless Mesh System, consisting of one router and one satellite, offers a total of eight Gigabit Ethernet ports, as well as three 2.4G/5G/5G wireless channels and 4x4 antenna design. It supports independent SSIDs such as guest WiFi, staff WiFi, and management WiFi, as well as web portal certification. It can also be installed on the ceiling or mounted on walls. Mesh wire-free solutions can be provided by means of satellite add-ons and zero-wiring.

Evaluation of Partners

The project was a collaboration between NETGEAR and Guangdong Qijiao Technology to create a state-of-the-art recording and broadcasting platform for 183 schools in Dianbai County. Mr. Deng, general manager of Guangdong Qijiao Technology, explained that the RR2304 and RR2312 equipment provided mass storage space for recording and broadcasting, and was ideal in terms of cost effectiveness. The district data center's RR4360S for disaster recovery was another step towards overcoming the challenge of long-term data disaster recovery. The above configuration for the storage is simple, and another big advantage is the fact that there is basically no need for daily maintenance by teachers.

Regarding Orbi Pro Wire-Free WiFi systems, Mr. Deng said that one Orbi Pro set only needs one Local Area Network (LAN) IP address, because its own NAT function can allocate IP addresses for smart terminals. Therefore, it can save on a lot of IP address allocation for the intranet as well as provide specific network segmentation features. In addition, since one Orbi Pro set can support 50-60 smart terminals, it is very practical, because current smart terminals generally run relatively high-traffic applications, such as videos. Therefore, a single set can meet the needs of one audiovisual classroom, thus being very cost-effective.