Case Study

Billings Public Schools

Billings is the largest city in the state of Montana and continues to experience growth thanks to a diverse economy. Billings Public Schools serve approximately 16,000 students and manage one of the largest computer networks in the state of Montana. With such an extensive student and staff population to support, Billings Public Schools require a reliable, cost-effective plan to implement their mission of providing technology that allows students and staff to live, learn and work successfully in an increasingly complex and information rich society.

FiberLAN GPON: An Affordable, Reliable Network Solution for Budget-Minded Public Institutions

The Billings Public Schools technology department was tasked with upgrading the existing network infrastructure throughout the district's 22 elementary school sites. Outlined in the district's five-year-plan is the Billings Public Schools Technology Plan, which includes mandates for:

- Providing teachers with current technologies, training and support.
- Creating opportunities for students to become active participants in their own learning.
- Using technology as a tool to improve the education of their students to prepare them to become future leaders in the global community.

"A bond was passed that included an allocation for technology upgrades," said Larry Bybee, Network Manager, Billings Public Schools. "We wanted to rewire our elementary schools because they were running on old, failing copper wire." Bybee initially set out to implement the large-scale project using a traditional infrastructure based on copper wiring, but soon realized the bond wouldn't cover the costs. "As we started to research the project, we realized we couldn't upgrade all of the schools because the cost to rewire them all was too great," Bybee said. "Then our technology consultant, Kris Good of the CTA Architects Engineers, suggested we check out GPON."

GPON, or Gigabit Passive Optical Network, is a cost-effective, high-performance fiber-based solution that has several advantages over traditional copper-based implementations, including:

- Decreased power consumption
- Faster time to implement
- More cost effective
- Minimal space requirements
- Easier to install
- Fewer system disruptions post-installation

Through his extensive research, Bybee learned that by deploying a GPON LAN, Billings Public Schools could expect to benefit from significant cost savings, reduced square footage required to implement a large-scale system, and rapid speed of implementation when compared to a similar copper-based solution.

Bybee worked with Kyle Brucker, Director of Technology, Billings Public Schools, to draft a proposal for the Billings school board outlining their plan to implement GPON at a single school site. Arrowhead Elementary would act as a test case before a full-scale rollout across all 22 campuses in the Billings Public Schools district. Ultimately, the success of that initial test site resulted in a district-wide rollout plan at the elementary school level.

A Flawless Solution that Reduces Technology Costs

As a publicly funded school district, the Billings Public Schools technology department must work within budget limitations as defined by the funds available through the public bond and federal rebate

The Challenge

Update failing copper networks with a flawless solution that would support 16,000 students and staff across 22 elementary school campuses, some housed in historical buildings

Solution

- Replace failing copper wiring with DZS FiberLAN cabling to ensure long-term, reliable network growth as the population grows
- Deploy DZS zNID 2624Pand 2608T indoor GPON ONTs in each classroom to support the various video, data and other Internet services

Benefits

- GPON helped save approximately $3 million dollars on the update of the broadband network by using GPON.
- Efficiencies realized by minimizing new hires and reduced troubleshooting trips to schools
- Long-term value of the implementation ensured that the IT department could upgrade systems across all of the elementary school campuses in a shorter amount of time, not just a select few campuses here and there as dollars were available
- An infrastructure that will support growth opportunities in the future
- Reliable, always-on access to the Internet. Ensuring fewer disruptions for the teachers and more time spent educating students

programs. Tasked with the goal of updating the technology platforms across all 22 elementary schools in the district, Bybee realized he had to identify a solution that was both cost effective and long term.

"Part of our proposal included competitive bids on implementing copper versus FiberLAN GPON, and we saw significant savings with the GPON solution," said Bybee.

Initial estimates to deploy a traditional category 6 copper-based solution came in at $205,000, for a single school site, McKinley Elementary School. In stark contrast, the GPON installation using DZS access equipment cost approximately $65,000, for a savings of $140,000. Using that cost basis as an estimate, Billings Public Schools saved approximately 3 million dollars in total by upgrading all its school sites with a fiber-based LAN system. "It's impossible to ignore such significant cost savings," Bybee said.

"Thanks to the DZS solution, we should have the funds to implement upgraded Internet platforms across our entire roster of 22 elementary schools."

The Billings Public Schools deployment is based on DZS GPON platform, with DZS zNID 2624P and 2608T indoor GPON Optical Network Terminals (ONT) at the foundation of the implementation. These four-port and eight-port ONTs have unique configurations that support the various video, data and other Internet services the Billings Public Schools population requires.

The DZS solution provided substantial cost savings to Billings. Traditional copper-based implementations can result in significant re-wiring efforts that typically require not only expensive copper wiring, but also the participation of a general contractor to repair walls and install telecommunications closets to house the large-scale equipment. In contrast, DZS GPON implementation includes materials that cost less and require less square footage.

DZS zNID 2624P and 2608T GPON ONTs are unobtrusive and smaller — about the size of a notebook — than traditional telecommunications equipment. The Billings implementation included installing ONTs in classrooms and administrative offices, and require just a single telecommunications closet per school site.

By eliminating the need for additional telecommunications closet across each site, Billings realized further savings, ranging from $5,000-$15,000 per closet, depending upon the school site. This savings translated into available dollars to be spent across the entire district at the elementary school level.

In addition to the significant cost savings realized with the GPON implementation, district IT staff discovered that deployment time was dramatically reduced. The IT team's past experience indicated that copper-based installations could take months. In comparison, Brucker and his team were able to install the GPON system at a single school site in about three weeks.

Generally speaking, the team required two weeks to lay the fiber and an additional two to three days to install the ONTs on-site, and then remotely program the ONTs. As their proficiency increased, the team was able to overlap deployments, enabling the team to install DZS GPON solution at four school sites over a two-month time period.

From a long-term perspective, the fiber used in the Billings implementation has a 25-year warranty, which means that between the installing contractor and DZS, the fiber is covered. Compare that to copper-based solutions, which typically require updating every five to seven years as manufacturers update or phase out the technology, and further cost efficiencies are realized.

This "future proofing" allows DZS GPON fiber solutions to be easily integrated into future developments in technology and data transmission, allowing Billings to continue to offer its students and staff leading-edge solutions.

The flexibility of DZS GPON solution enables teachers to be more self- sufficient in the classroom. Live jacks were installed in multiple locations in each classroom. This allows teachers, who frequently reconfigure their classrooms during the year, to simply pick up and move their ONT and their desk to another area in the classroom without having to call in a technician for assistance.

"Our goal is to maximize technology so we can provide an environment for our students to learn and develop their technology skills," Bybee said. "With DZS affordable solutions, we will continue to offer those high standards across our district."

DZS zNID 2624P Optical Network Terminal (ONT) is unobtrusive and smaller than traditional telecommunications equipment.

An Optical Network Terminal (ONT) provides Internet services to all of the devices on the librarian's desk.

"One of the biggest compliments we can give DZS GPON solution is that since the rollout, teachers haven't complained about the network and the tech support they require has dropped off to almost nothing," Brucker said.

One of the unexpected benefits of installing DZS GPON infrastructure was the realization that the network ran so seamlessly and without interruptions that IT didn't have to be on call as often. The remote programming aspect of DZS ONTs also means that IT staff no longer has to travel across the district to troubleshoot or make updates onsite.

"At one point, we anticipated having to add headcount to our IT team to service our elementary schools' networks," said Brucker. "We were pleased to discover that GPON is so reliable, we don't have to add another network expert, which is a cost savings of nearly $100,000 per year."

As Kris Good pointed out, "GPON is a self-contained, flawless solution. It really is out of sight, out of mind."

Government Dollars for Education

The technology team realized further economic advantages by receiving funds from the Federal Communications Commission (FCC Universal Service Program for Schools and Libraries (E-rate) program. The E-rate program was developed to make telecommunications and information services more affordable for public schools and libraries by offering discounted telecommunications and Internet services to eligible institutions. The E-rate program works in tandem with the efforts of states and local governments to bring advanced, 21st century technologies to public classrooms and libraries.

"The E-rate program allowed us to stretch our bond dollars even further," said Brucker. "But, ultimately, it was the cost savings advantages of DZS GPON technology that will allow us to upgrade all 22 elementary schools within our district by 2017."

As the Billings Public Schools look ahead to further GPON implementations at the middle and high school levels, the IT team will continue to rely on DZS FiberLAN GPON solutions for cost-effective rapid deployments.

"Our goal is to maximize technology so we can provide an environment for our students to learn and develop their technology skills," Bybee said. "With DZS' affordable solutions, we will continue to offer those high standards across our district."

Contact DZS to request a customized assessment identifying how a Passive Optical LAN (POL) can reduce operational investments, increase energy efficiency and reduce storage space for your next project

McKinley Elementary School was the first school in the district to deploy Passive Optical LAN (POL), and is one of the school sites housed in a historical building. This site alone realized a savings of $140,000 when switching from Copper LAN to POL.

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