DeSoto County Chooses Siemon & Cyber Technology Security for 21st Century School District

Lendon Balch - DeSoto's Director of Technology Delivery, Milton Kuykendall - Superintendent of Education for the DeSoto County, Derwood Brewer - owner of Cyber Technologies, and Towner Lowles of Siemon Milton Kuykendall, the Superintendent of Education for the DeSoto County, Mississippi has a very clear vision for his school system. "This will be the best school system in the country," he states plainly. It is a bold statement, but something in his demeanor makes everyone in the room believe it will happen. Back behind his desk just hours after learning that his leg was broken, he speaks passionately about the exponential growth of DeSoto County. "7.5 families move to DeSoto every day, over 1800 new student per year," Kuykendall states, "And, the biggest reason is the school system this team has built - the teachers, staff and administrators have made something special here." The numbers reinforce that something special is happening. Out of 26 schools in the county, 16 have received a superior rating according to the No Child Left Behind act, and 7 others are considered exemplary. In a state consistently rated towards the bottom of most educational lists, DeSoto County is beating the odds.

A major part of the school system's progress is tied to technology. "We are building a 21st century school district," Kuykendall explains, "We are combining curriculum and technology. We're getting them to mesh seamlessly."

This ongoing program to present technology as a critical learning tool is sweeping. DeSoto provides an impressive list of computer and network based education applications.

- Video Classrooms
- Voice over IP
- Streaming Digital Curriculum,
- Web Based Applications
- Email
- Student and faculty Internet Access
- Environmental controls
- Closed Circuit Television
- Lab Applications
- Cafeteria POS
- Office Administrative Applications
- Library Management
- Intrusion Prevention Systems

While these applications provide DeSoto students and faculty outstanding and comprehensive access to e-learning resources, they add considerable strain on network infrastructure. Ensuring that the network is capable of handling increased performance requirements belongs to Lendon Balch, DeSoto's Director of Technology Delivery. From the earliest planning stages, Balch and Robert Earl Phillips, DeSoto's Director of Physical Plant, closely examined their physical infrastructure needs, focusing on the cabling system.

Their initial research and analysis narrowed the available options. DeSoto could continue to install category 5e UTP, as it had in its previous school networks, or they could move to a 10Gb/s solution.

To Balch, the decision was clear, "I have been to seminars discussing everything from video to backup storage devices," he explained, "They all discuss 10Gb/s as if it were already the approved standard." With the 10GBASE-T standard nearing ratification, Balch had little difficulty showing other decision makers that 10Gb/s was real. But, convincing people that an elementary school needs 10Gb/s was another issue. Balch was prepared to answer this one as well; "I have learned over the years to never say things like, 'We'll never need that' or 'I can't see our district ever wanting to do that.'"

This understanding of network advances was supported by DeSoto's own experiences. The District was already replacing category 5 installations that were less than eight years old. While some of these replacements were necessary due to quality issues with product and installation, it was also driven by the category 5 infrastructure's inability to support many of the newer classroom applications involving video and audio. "Our needs are becoming just as demanding as any corporate environment and in many cases we are probably more demanding than most." Balch explained. "To continue with a generation of cabling that we are already replacing in some buildings seemed ridiculous to me."

Balch and Phillips made a strong case, and the DeSoto County School System decided that a 10Gb/s cabling system was the best choice for the county's students. Carefully weighing all available systems, DeSoto selected Siemon's 10G 6A UTP end-to-end copper network cabling system for the horizontal. This category 6A (augmented category 6) solution meets or exceeds all performance requirements dictated by the 10GBASE-T standards, and met all of DeSoto's needs for the data network. Siemon's XGLO 10Gb/s singlemode fiber was chosen for backbone data traffic. "Siemon's performance was everything that we required, and we trusted their reputation for quality," Phillips noted.

With a cabling system selected, DeSoto put forth a competitive bid package. Based upon the preliminary network specifications, they sought a best-value installation provider. It was important that the installer be selected from Siemon's network of Certified Installers. The reason was twofold. One of the important tipping points in the selection of a Siemon solution was their comprehensive 20 year system warranty, which offered industry-best product, performance and installation coverage. Only Siemon Certified Installers can provide installations eligible for the system warranty.

Additionally, the Certified Installer program itself impressed DeSoto. Only installers who attend and pass Siemon's 5-day, ISO 9001 certified installation and network design class can become a CI. These

organizations are heavily screened for stability and required to maintain their certification through continuing education. "We know the value of a professional installation," Balch explained, "Because we know the issues caused by poor installation practices."

Much of DeSoto's network suffered from a combination of poor installation practices, inadequate planning and poor quality of material. "We have patch panels that have developed dead ports; cable that has become brittle; and wall jacks that must be replaced on a regular basis." Balch continues, "The performance of our networks has been degraded in some of our buildings to the point where we have no other choice than to tear it all out and start over." Balch and the rest of the DeSoto team felt strongly that a quality installation was as critical as the product itself. After an exhaustive final selection process, Cyber Technologies of Senatobia, MS was awarded the project on the strength of their best, lowest cost bid. "By the time DeSoto selected Cyber Technologies, they had a strong vision for their network and had chosen their cabling plant," explained Hugh Brewer, President of Cyber Technologies. "We arrived just in time to design and implement the infrastructure."

Working closely with Balch and Phillips, Brewer designed an infrastructure to support the school's immediate and future needs, with an eye towards simple moves, adds and changes as well as centralized control and troubleshooting. The basic design would be repeated for all schools, modified as necessary to accommodate architectural concerns.

The network data backbone consists of 12 strands of 50/125 Siemon XGLO multimode fiber and 6 strands of singlemode. In keeping with DeSoto's future-proofing approach, this 10Gb/s capable backbone is well-suited to support a growing network. Laid out in a star topology, the fiber data backbone is supplemented by two 50-pair category 3 cables to handle all intercom and CCTV equipment as well one RG-11 for CATV.

The horizontal infrastructure features Siemon's 10G 6A UTP cabling system for data. This end-to-end category 6A solution includes Siemon cable, patch panels, patch cords and work area solutions as well as racking and cable management. Although Brewer and DeSoto's Balch and Phillips all believed in the performance benefits of the category 6A UTP solution, the prospect of working with the cable was a bit scary for Brewer. "The diameters on all of the alien crosstalk compliant cables were pretty big and didn't look very easy to deal with," Brewer said.

The increased cable diameters Brewer saw can be traced back to the extraordinary means employed by cable manufacturers to develop alien crosstalk compliant UTP cable. TIA standards allow increased category 6A cable diameters of up to 0.354 in (9mm), compared to category 6 at 0.22 in (5.64mm). While the ability to control alien crosstalk in a familiar UTP construction was a benefit for DeSoto and Cyber Technologies, the increased cable size significantly decreased pathway cable counts and density.

"Luckily, we had time to plan additional pathway space to accommodate the thicker cable," Brewer explained. "And, density at the patch panel was a pleasant surprise." Brewer attributes the unexpected density to the fact that the Siemon panel's increased port spacing, designed to optimize alien crosstalk performance also eliminates the need for rack mounted horizontal cable managers. The Cyber Technologies installers were able to route patch cords directly into vertical managers, saving 2-3 RMS per patch panel.

Brewer was also pleasantly surprised at the ease with which Siemon's category 6A cable could be pulled. "It was some of the easiest cable I've pulled, of any category," Brewer said. "The jacket slid easily even in large bundles and it came off the reel with no memory - no kinks, no bends." Brewer and his team also saw little difference in termination and suggested that the 23 AWG conductors added a benefit over smaller gauge wires. "The thicker conductors were stiffer and took a little more effort to untwist for termination but once they were laid out, they stayed where they were supposed to."

Brewer admits that he and his team had to learn new installation techniques: "All of these category 6A UTP cables may offer good alien crosstalk protection, but you have to be very cautious in your installation. You have to avoid anything that will deform the jacket." Deformation can be a threat to all category 6A UTP cables, which use increased overall diameters to increase cable to cable pair separation for alien crosstalk mitigation. Deforming the jacket decreases these separations and makes the cables susceptible to crosstalk. Some of the techniques Cyber Technologies utilizes to steer clear of this potential issue include avoiding over-cinched tie-wraps, staying within maximum pathway fill ratios and carefully observing bend radius limits.

In addition to the category 6A data channels, the horizontal includes Cat 5e for CCTV and RG-6 for CATV. All horizontal channels are "home run", going directly from the telecom room's horizontal cross-connects to the work area. Brewer felt that this configuration would be the easiest for the school to manage. "We tend to think of a classroom as pretty static. Sure, there may not be as many moves and changes as an office cubicle environment, but evolving education applications will absolutely require flexibility in the cabling plant," Brewer explained. "That flexibility is even more critical in the computer labs. The homerun configuration will make it far easier and less expensive for the school system to manage change on their own."

The potential complexity of the network will make ease of management critical for DeSoto. The initial project includes 7 schools in the county, ranging in size from 100,000 to 350,000 ft2 .
Each classroom is supplied with 4 drops, supporting the teacher workstation, network printer, VoIP phone and video services. Computer lab areas received 36 drops, all supporting workstations and printers. The initial phase of the project totaled over 3000 ports, each ready for 10Gb/s. New schools and retrofits are on the way, and DeSoto's Balch and Phillips plan on sticking with the their plan.

Back in Superintendent Milton Kuykendall's office, one has to be impressed at his commitment to DeSoto County's students. There are not many elected officials that would be so willing to meet public criticism

and cost-cutting pressures with a state of the art network. Kuykendall seems unwilling to take much credit. "Lendon (Balch) and Robert-Earl (Phillips) did their homework and told me that this cabling would support all of our technology initiatives for years to come," he explains. "Not only will it make our students better, it will save us money in the long run. It will still be serving DeSoto when this office has someone else's name on the door and I'm golfing full-time." As he finished, someone joked that with all this effort, he might actually be serious about making DeSoto the best school system in the country. Kuykendall took his broken and heavily braced leg down from his desk, leaned over and said, "What makes you think I wasn't serious before?"