



## Chase Collegiate School and Siemon Build a World-Class, Invisible Network

*Chase Collegiate School has a progressive philosophy on technology in education: if it is implemented well, it will disappear.*

This is not to suggest that Chase, a K-12 private day school in Waterbury, CT is eliminating technology. Nothing could be further from the truth. Their goal is to implement technology not as a separate area of the curriculum, but a seamless component of the entire learning process and experience. Like blackboards and pencils - always there, always supporting the students and staff, but never really noticed.



Considering the very impressive list of IT applications and services running at Chase, creating a network that can deliver it all smoothly and unobtrusively from the background is a challenge.

Scott Temple, the Director of Technology at Chase is instrumental in driving the school's philosophy on technology as well as managing the vanishing act.

"Bringing the right technology into the school experience creates so many opportunities," Temple explained. "With all of the network-based programs, services and products available, you are only limited by your imagination and the capabilities of your network." According to Temple, imagination was not an issue. "The Chase staff is a forward-looking team - regularly bringing innovative concepts to the table. Always looking for a way to improve the way they teach." The network, however, often limited the technology behind the ideas.

"Whenever we struggled to implement a new IT capability, the physical infrastructure was the limiting factor," Temple recalled. "This was particularly true of the cabling plant." In many cases, the cabling simply did not have sufficient throughput to handle new applications. So, when Chase broke ground on a new classroom building and began a major renovation on another, Temple saw an opportunity to install a cabling plant with sufficient performance to support the school well into the future.

Seeking "peace of mind for 20 years" in an easily managed, flexible cabling infrastructure, Temple and his team specified a twisted pair copper cabling system capable of at least 10Gb/s performance. Working closely with The Siemon Company, a global network cabling manufacturer based in CT, Chase explored category 6A systems in both shielded and unshielded configurations before selecting a fully-shielded category 7A system.

Offering bandwidth of 1000MHz, Siemon's category 7A TERA solution more than met Chase's current performance requirements and supporting speeds in excess of 10Gb/s, and offered additional headroom for future advancements. Category 7A utilizes fully shielded cable, known as S/FTP. In S/FTP cable, each individual pair is wrapped with a foil shield and then all four pairs are encased in an overall shield. The individually shielded pairs virtually eliminate crosstalk between pairs within the same cable and, in combination with the overall shield, provide superior noise immunity versus unshielded cable. Noise, from both within the cable and from other cables can negatively impact network performance, especially at higher transmission speeds such as 10Gb/s.

The performance headroom of the TERA cabling plant, along with an upgrade of the switching infrastructure, had an immediate impact at Chase. "The hardware had always been our main focus," noted Temple. "With such a solid,

long-term infrastructure in place, we could put all our focus on the applications that directly impact the students' education."

That focus is evident just about everywhere on campus. But, just as planned, you have to be looking for it.

In the classrooms of the newly constructed Upper School building, network services are delivered in a number of ways. All rooms are supplied with physical network connectivity in the form of category 7A outlets, supporting the VoIP system, data connections and video. It was in this classroom connectivity that another unique TERA benefit was leveraged. In addition to enabling high speed data transfer, the combination of fully-shielded cable and the TERA interface also provided a unique means to support less bandwidth-intensive applications. Through "cable sharing", up to four applications can be supported over a single category 7A cable and TERA outlet. The standards-accepted practice of cable-sharing is made possible by the connector's four quadrant design, which allows easy access to individual channel pairs via hybrid patch cords combining 1-pair, 2-pair and 4-pair non RJ style TERA plugs terminated to appropriately wired RJ-45 or RJ 11 Ethernet plugs.

In a Chase classroom, a single TERA outlet could be supporting a VoIP phone and a 100Mb/s data connection, four individual high definition video feeds or any number of combinations. This flexibility is key to the technology approach - when a network service is needed, the capacity is there and easily put to use.

Chase's use of video is an excellent example of this. Throughout the school, mobile multimedia carts are available. Consisting of a PC and wide-screen monitor, these carts can be plugged into any outlet to instantly deliver streaming video to the classroom from any of the school's subscription-based online libraries. In those situations there's no fumbling with DVD's or setting up projectors, just smooth delivery of content - technology quietly doing its job.

Even more impressive are the school's interactive Smart Boards. A cross between a blackboard and a touch-screen PDA, these boards project the instructor's PC screen on a large wall mount display. Rather than lecturing from a desktop workstation, teachers can access network services by touching the board, displaying web-based content, video and other learning tools for the students. According to Temple, the boards very effectively engage students by making them a part of an interactive lesson. "The kids want to be hands-on," he said. "They're excited to get up there and use them. That visual interactivity and sense of contribution pulls them in like few other technologies I have seen." But like most of the technology at Chase, the smart boards' effect would be diminished if the network lacked the performance to support them smoothly. "The throughput of the cabling is critical for the Smart Boards. We're already delivering some bandwidth-intensive capabilities through them, and this is only going to grow in the future" explained Temple.

The throughput of the cabling plant is also a key to the school's robust wireless infrastructure. A network of Cisco enterprise 802.11n wireless access points (WAPs) provides campus-wide coverage in speeds up to 320Mbps, from classrooms to public areas to the sports fields. With each WAP hard-wired to the category 7A infrastructure, there is performance headroom to seamlessly support Chase's extensive wireless program today and still leave capacity for future expansion.

At many organizations, Chase's level of wireless capacity might be considered overkill, but like much of the school's network, it is doing more than meets the eye. In addition to supporting the school's own IT hardware, Temple and his team must contend with increasingly sophisticated student-owned equipment. Rather than viewing it as a problem, Chase embraces it, providing network access to wifi-enabled student laptops, PDAs and mobile devices. Through wifi connections, students can access network services like e-mail, internet and school document libraries. In fact, this full-access connectivity enables a whole new approach to student engagement.

Each Chase student has their own secure network portal where they can receive and complete assignments, view grades, get announcements and more. These portals also include student blogs, where they can record their own news and updates. They can even upload videos from their mobile devices or from the school's fleet of "flip-phone" video recorders, a capability that underscores the need for superior network throughput. The portals are also accessible off-campus, allowing students to leverage school resources from home and providing parents 24-hour visibility into their child's progress and school-day experiences. Dave Medeiros, whose child attends Chase,

praised the ability to monitor and share day-to-day student progress and experience: "I feel more connected to her education. I see how and what she's doing from a classroom standpoint in real-time and can help reinforce what she's learning. Better yet, I see the fun stuff in her blog." Beyond the positive effect the portals provide on the educational process, the efficient communication between school administration, teachers, students and parents has generated a cost savings and positive environmental impact, considerably reducing mailing costs and paper usage.

For all of the technology being leveraged at Chase, it is the way in which it is deployed that is most notable. Nowhere on campus does technology seem out of place or implemented outside of the core educational mission. It is a support structure that delivers services to enhance, not replace traditional student-focused methods. This is what makes its reliability so critical - provided that the network delivers services smoothly, it is barely even noticed. According to Temple, that was always the goal. "Students don't come to Chase because we have a great IT network; they come for a great education. Technology just gives us more ways to deliver great education."

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