



About Charlotte County Public Schools

Charlotte County Public Schools is a 20-campus K-12 district in a rural area of southwest Florida with over 18,000 students and 2,000 teachers that uses the latest Web-based applications and streaming media in its instructional content.

Organization

Charlotte County Public Schools
Port Charlotte, FL
www.ccps.k12.fl.us

Challenge

Provide more students access to more Web and streaming video applications, while protecting students and resources and not having to increase the capacity of the WAN or Internet connection. Solution Charlotte County Public Schools deployed Blue Coat SG appliances at its central office and school sites to radically reduce bandwidth consumption, ensure quality streaming media to large numbers of students, speed SSL encrypted traffic and provide overall security and control.

Charlotte County Public Schools: Accelerating Web Applications, Streaming Media, and SSL

Enterprise-Class Demands On a School District Budget

Even though Charlotte County Schools serve a mainly rural area of southwest Florida, its board, administrators, and teachers are committed to offering their 18,000 students all the advantages of a technology-rich education, including access to online instructional materials from Compass Learning Odyssey and streaming educational videos from the United Streaming division of Discovery Communications. But that commitment to leveraging Web technology and streaming media creates some unique challenges for the district's IT staff—like how to provide the WAN performance needed for online learning without burdening taxpayers with recurring expenses for additional bandwidth.

It was extremely important for us to find a solution that would manage the precious bandwidth of our WAN and our Internet connection, accelerate key applications and content and protect both our students and our resources.

*Chris Bress, Chief Information Officer
Charlotte County Public Schools*

Limited Network Options, Lots of Bandwidth-Hungry Applications

Charlotte County Public Schools (CCPS) is not in an urban area, so bandwidth is an issue – they don't have many options. Initially, CCPS had T1s from site to site in a star topology. Subsequently, CCPS upgraded some sites to a wireless WAN infrastructure – to get beyond the limitations of the area's local telecommunications infrastructure. While the upgrade has helped considerably, streaming and other bandwidth-intensive applications can easily saturate each WAN link. Regardless, Internet bandwidth remains constrained.

The application mix within Charlotte County Public Schools includes a wide variety of web applications, heavy use of streaming, Novell-based file services, a few HTTPS applications, and a steady flow of student-discovered applications and content.

Web Applications. The most critical web application to CCPS' primary mission is Compass Learning Odyssey, which is an application containing the Florida State standard curriculum (the Sunshine State Standard) – English, math, social studies, etc. – that students are tested on with the FCAT (the Florida standardized test). Students can use the application from either school or home – according to Chris Bress, CIO of Charlotte County Public Schools, CCPS has an “anytime, anywhere” philosophy regarding learning. Other web-based applications are Internet or ASP-based, like Grollier's On-Line, Thompson Gale, Facts on File, and Electric Library.

Streaming. CCPS subscribes to United Streaming, which is a service that takes Discovery Channel content and makes it available over streaming video. A central 1.5TB server houses some of the United Streaming content at CCPS' headquarters, and is populated via the district's Internet connection. Each classroom makes heavy educational use of this content, and, obviously, given the content and quality of the streams (i.e., high bit rate), a few streams can quickly overwhelm CCPS' Internet and/or WAN bandwidth. Because of bandwidth limitations, only several students at each site could watch United Streaming content.

HTTPS and Other Applications. CCPS has several SSL-encrypted web applications – notably WinOcular as their HR package, and another package (Synergistic Technologies' A3) to manage their individualized education plans for students significantly above or below norms. Because these applications deal with confidential and sensitive information (human resources and student data respectively), CCPS encrypts all user-application communication with SSL. Additionally, CCPS uses Novell as their file server platform, and stores much of their operational student data in a client server-based student information system.

Bandwidth Remains an Issue, Latency Sometimes

Despite bandwidth upgrades, CCPS has struggled to keep critical applications available and performing well on the network. The number of applications has continued to grow, and many of them are bandwidth-intensive applications (e.g., streaming). Perhaps most importantly, students, and their never-ending appetite for bandwidth, made it difficult to deliver applications in a high-performance, prioritized manner. While the wireless network infrastructure and the distances across the county introduced some latency, much of CCPS' latency was caused by congestion. For example, the networking team noticed that after 15 students were using Compass Learning, the pipe was full. As a school district of 18,000 students, CCPS sorely lacked capacity.

Why Blue Coat?

Initially, Charlotte County looked at bandwidth-expanding options, primarily around caching servers. Chris Bress and his staff have tremendous experience with caching, and chose Blue Coat because of the caching robustness (including the refresh algorithms that Blue Coat appliances



use to manage the information in the cache), the integrated compression and byte caching, and the easy-to-integrate content filtering. The SG appliance could effectively cache video locally and dramatically improve the quality and capacity to serve large numbers of students. The SG appliances could also provide visibility, acceleration, and control of SSL-encrypted traffic. Blue Coat's reporting capability was also important to CCPS.

Blue Coat: Serious Bandwidth Gains

CCPS deployed the Blue Coat solution in phases – first starting out using the appliances in a “nested” or cascading web proxy cache deployment. Next, CCPS implemented the Blue Coat SSL proxy capability at the core. Finally, CCPS upgraded their SG appliances to SGOS5 (which contains the MACH5 acceleration technology) at several key locations. Testing confirmed significant benefits – bandwidth gains chief among them.

Right away, Bress noted that Blue Coat SG appliances at least tripled the size of any CCPS pipe. Testing confirmed that and more. One of the interesting things that testing highlighted is the SG appliances' ability to byte cache Novell shares as well as CIFS (Microsoft.) In some cases the byte cache was very efficient (in excess of 100x improvement), however over the long haul it resulted in about a 40x increase. Delivery of United Streaming content, the key streaming media application, saw a peak reduction in bandwidth of 100x.

This summer, CCPS was doing migration work for the ninth grade academy (a magnet school on the far side of Charlotte County), moving roughly 500 students, their classrooms, and their computing infrastructure to a new



location. Performing the desktop imaging over the network, they saw imaging time drop by 50-60% just because of byte caching. Login times for this migration went from 45-60 seconds, to 15 seconds – an improvement of 3x-4x.

Regarding student appetite for bandwidth, CCPS is creating policies for Blue Coat's bandwidth management capabilities to ensure that critical applications have the room they need to run. For example – CCPS describes setting a policy to ensure that Compass Learning Odyssey has 60% of the overall bandwidth available to it (if needed) at any given time. This prevents surges in popularity of acceptable (but non-critical) sites that can easily saturate CCPS' network. CCPS can perform bandwidth management and application control locally at each school as well and in the central district office.

While CCPS doesn't yet have formal numbers, they expect to have data showing significant performance improvements for their Student Information System, their backups, and all of their applications.

SSL Control, Management Reports, IM and P2P – All in The Same Platform

Students are often the most tech-savvy people around – frequently figuring out new holes, exploits, and workarounds well before they can be anticipated by an IT staff. As CCPS implemented web filtering (to comply with US Federal standards), some enterprising students set up anonymizing proxies at home, and then connected to them over SSL – subverting controls by encrypting traffic. Obviously, this enabled students to download and use inappropriate content, but it also has the potential to saturate CCPS' network with unknown encrypted traffic. Once CCPS implemented Blue Coat's SSL proxy capabilities, they could

fully control outbound SSL for both performance and security, shutting down unauthorized encrypted traffic – and fully complying with Federal standards. In addition, important administrative applications that utilize SSL encryption can be given proper priority and acceleration.

Charlotte County Public Schools uses Blue Coat Reporter extensively. It is especially useful to show high-level reports showing usage trends, biggest applications, heaviest user groups, and performance gains. This has been critical, according to Chris Bress, in demonstrating value and the need for any additional (or reduction in) investment to management. "Blue Coat Reporter gives me a real insight to the school district as an organism," noted Bress.

Finally, CCPS is looking at the potential to use the Blue Coat infrastructure in the future to manage (read: block) P2P, IM, and Skype traffic – replacing a legacy signature-based bandwidth management system he has in place today.

Blue Coat At the Head of the Class

Charlotte County Public Schools had infrastructure limitations courtesy of its geography, application mix, and user population. CCPS now uses Blue Coat to optimize and secure bandwidth-intensive applications (even SSL-encrypted traffic), prioritize the applications running on its network, and vastly increase its network capacity. From a business perspective, it enables CCPS to ensure delivery of a wide variety of curricular and other educational applications and content to a bandwidth-hungry populace without breaking the bank. The ability to do all of this with a single application delivery infrastructure has Blue Coat at the head of the class at CCPS.