



EDUCATION

CARROLLTON CITY SCHOOL DISTRICT

Sun™ technology — an important educational tool in Georgia schools

HIGHLIGHTS

Company

Carrollton City, Georgia School District
Progressive school district committed to applying and integrating instructional technology across curriculums and grade levels.

Industry/Market

Education

Products/Services

- Sun Ray™ 1 appliances
- Sun Enterprise™ 420R servers
- Sun Enterprise 450 server
- Sun Enterprise 220R server
- Netra™ st D130 storage
- Solaris™ Operating Environment

Key Results

- Complete access to needed applications and the Web through an easy-to-use desktop solution with low administrative costs
- High reliability resulting in minimal disruption of curriculum plans
- Scalability that has convinced administrators that Sun provides plenty of room for growth
- Freedom from administering PCs means teachers can concentrate on students, not computers

Just 45 miles from Atlanta, the Carrollton City schools are part of a progressive district strongly committed to providing quality education. Instructional technology — the use of technology to provide or enhance education — has long been a key part of their program. Today, Carrollton teachers employ instructional technology across the entire curriculum and across all grade levels as they seek to prepare students for an increasingly sophisticated and demanding world.

The district has recognized that the Internet and World Wide Web provide a wealth of educational opportunities for its students. The Web is ideal for student and teacher research, and also provides access to tools and applications which can be integrated into classroom learning experiences or used for supplemental activities. The Internet also facilitates fast and easy communication across the country and around the world, enabling students to communicate in ways unimaginable just a few years ago. Finally, Web-based applications provide students with a common interface, expanding the opportunities for instruction from the school directly into their homes.

Dr. O.P. Cooper, Assistant Superintendent for Technology in the Carrollton City School District, sums up their philosophy, "Instructional technology is vitally important to us in Carrollton City schools, has been in the past, and we know it's going to be increasingly important in future years." Looking ahead, Cooper expands on his continuing commitment, "We're always looking for new things that will enhance what our students do in the classroom. We believe it's very important in the coming years to move our computing to a Web-based environment."

Distributed PCs Cause Support Concerns

The Carrollton City school district includes three schools, all located on one 250-acre campus. A fibre-optic network connects the schools and enables communication among the more than 1,200 PCs in classrooms, library media centers, and computer labs.

The PCs, scattered across the large campus, are a great resource, but raise many support concerns. Like many school districts, Carrollton City has limited resources for technical support. Routine tasks such as installing or upgrading computers and software require administrators to physically visit each system, taking up valuable time of the technical specialists and limiting their effectiveness.

Dr. Cooper feels fortunate that his support resources in terms of personnel are superior to many K-12 schools, where teachers are often needed to perform administrative tasks on classroom PCs. As Cooper explains, "It's very important for us to remove the classroom teacher as much as possible from the day-to-day administration of a network or maintaining PCs. We want the teacher to concentrate on helping the students to be better with math and reading and social studies and science. If they're worrying about the PCs,





it's taking away from their effectiveness in the classroom."

For Carrollton City, having computers that are easy to use helps teachers integrate the technology into their curriculum. Having computers that are easy to administer enables their technical specialists to accomplish far more for the teachers and students.

Reliability is also an issue for the school environment.

Mission-critical applications are typically associated with large corporations and applications such as on-line banking. But, to a teacher, the classroom is also a mission-critical environment. Debra Muse, third grade teacher, Carrollton Elementary School explains, "I absolutely need reliable technology in the classroom — it has to be available when I need it. The Sun Ray™ appliances meet this need by being reliable and easy to use.

resources we would have to provide to make it work like we wanted, it wasn't going to be cost-effective." He adds, "We just weren't that comfortable with the big server farm that was needed given the scalability and reliability issues with NT."

Enter Sun Ray™ Appliances

Proven performance and reliability prompted Carrollton City schools to turn to Sun for their next generation desktop solution. Cooper explains, "In Carrollton City schools, we've used Sun products for a number of years to run our Web server, mail server, DNS, and Internet applications, and we've been very pleased with the reliability and the stability of those products." He adds, "We like the Sun platform because the throughput is very strong and the machines are extremely reliable."

Sun Ray appliances were the answer for the Carrollton City school district. With the Sun Ray system, all applications run on central servers, with the desktop appliance used only for input and output. Sun's innovative Hot Desk technology enables users to instantly access their own personal desktop and work in progress from any appliance in the workgroup. Smart cards, similar in size to a credit card, provide secure access to the system and enable easy mobility. Users can withdraw their smart card to stop mid-sentence in an application, and then continue where they left off by re-inserting the smart card into any appliance in the workgroup. Users can easily and securely share desktops — nothing is stored locally, so there is no danger of corrupting another's files. And, Sun Ray appliances are fanless, providing a noise-free addition to any setting.

Carrollton City Schools' Sun Ray Deployment

The Carrollton City school district has deployed 420 Sun Ray appliances in their elementary school and Junior High classrooms and media centers. At each of these locations, they have three Sun Enterprise™ 420R servers in a failover configuration each with dual Gigabit cards (one for Sun Ray appliances and one for the public network). Each server is fully loaded, and includes three Netra™ st D130 storage device for additional swap space.

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Dr. O.P. Cooper
 Assistant Superintendent
 for Technology
 Carrollton City School
 District

My students and I love the Sun Ray appliances; we use them daily during our center time. Students rotate between centers, spending at least 20 minutes per class doing Web-based activities on the Sun Ray."

Low-Cost Desktops Seen as the Answer

Carrollton City schools needed a solution that would address their support concerns, keep total cost of ownership under control, and grow with them. They began considering alternatives to fat-client PCs to address these issues and enable them to move toward their vision of a Web-based environment.

Cooper explained their thinking, "We were faced with a situation where we had a lot of legacy equipment. We were trying to decide whether to continue using it or invest in new equipment. At that point, we looked very strongly at a Windows thin client solution. When we looked at the costs and the

Teachers and students currently use Sun Ray 1 appliances to access Netscape™ Navigator™ Web browser and StarOffice™ productivity applications. Smart cards provide secure access to the systems and enable easy mobility between any Sun Ray appliance on their campus. “The Sun Ray environment is very helpful in terms of classroom management. Using the smart cards and Hot Desking, students get right to work, moving quickly to the appropriate web site or program without the hassle of network logins. Moving between classrooms and the media center is very useful as the students are able to pick up exactly where they left off. This saves time, makes the students more efficient, and allows them to accomplish more. I love that component of the Sun Ray appliances.” says Trent North, Assistant Principal, Carrollton Elementary School.

In the elementary school, smart cards are still kept in the classrooms. In the Junior High, the smart cards are also used as their Photo ID and have a bar code printed on it that is used for lunch services and library checkout. The smart card technology has also helped with printing. When the child inserts his or her card into a Sun Ray appliance, the system automatically directs print requests to the nearest printer.

Configured for Performance and Growth

There are two Sun Ray server farms, one at each school. These farms are comprised of three Sun Enterprise 420R servers each with: two internal 9 GB drives; 4 GB of RAM; 4 processors; and 3 external 18 GB drives (Netra™ st D130). All system partitions (except the 21 GB of swap space) are mirrored using Solstice™ DiskSuite™. Each Sun Ray server farm uses a gigabit network for connection to the campus network. They also use a QFE card and an additional gigabit card for connecting to the various Sun Ray networks.

Each Sun Ray server farm is part of a three server failover group, utilizing the Sun Ray server software failover feature. So, if one of the servers fails, each user whose session was on that server is re-authenticated on another server in the failover group, and is presented with a new session and a new login prompt.

Carrollton City School District also uses a Sun Enterprise 450 server as a file server and NIS

server for the farms. All user accounts and home directories are stored on Solstice DiskSuite mirrored stripes on the Sun Enterprise 450 server. Carrollton is using a Sun Enterprise 220R server for the filter and proxy server.

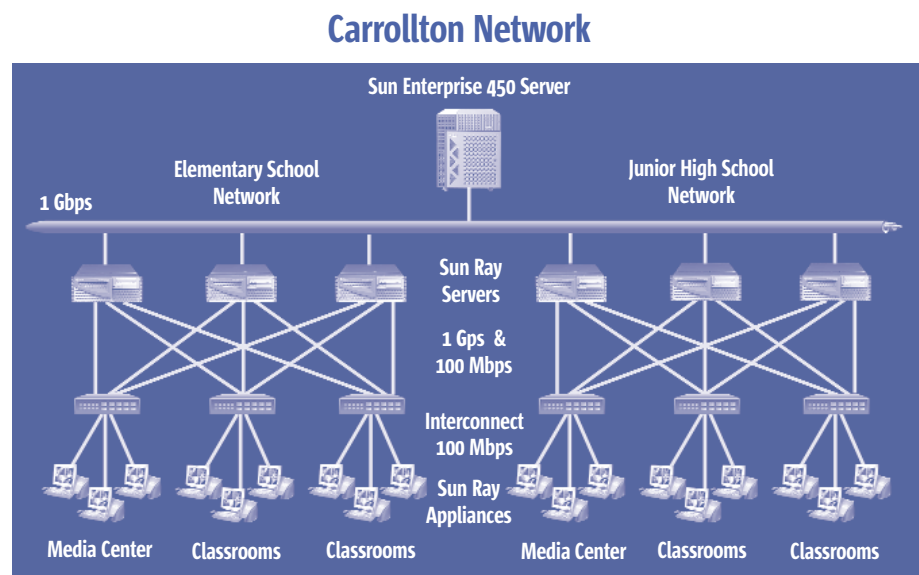
The Sun Ray servers connect to a SMC Gigabit switch that then fans to 3COM 3300-series Ethernet switches for their private interconnect. The 3COM 24-port switches supply 100 Mbit Ethernet bandwidth to each Sun Ray appliance, enabling sufficient bandwidth for user applications. The servers are also connected to the campus-wide network, providing communication with other systems in the district and the Internet.

CPU, memory, and network bandwidth were all considered when determining the Sun Ray configuration, and these resources were gen-

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erously sized to help ensure performance and provide ample room for growth. Each concurrent student user typically requires approximately two to five Mbit of bandwidth and between 20 and 40 MB of memory on the server. Even assuming the worst case, with all

Trent North
Assistant Principal
Carrollton Elementary School



appliances concurrently accessing the server, both network bandwidth and memory resources are more than adequate.

Scalability Provides Room to Grow

Sun's proven scalability was an important factor, increasing Carrollton City schools' confidence as they implemented their new solution and began migrating additional users to the system. Cooper describes Sun's reputation, "Sun servers are known for their scalability. We can scale the server as needed to handle the additional users as they come on-line. With Sun servers, we know that they will grow with us over time."

Total Cost of Ownership Savings

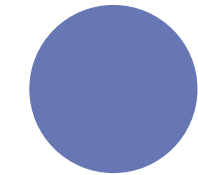
The total cost of ownership associated with Sun Ray appliances should prove far lower than that of conventional PC desktops. Most support costs are eliminated entirely because the Sun Ray 1 appliance, which comes with a five-year warranty, requires zero administration and no upgrades. If an appliance fails, a replacement unit is simply plugged in. All configuration and software updates are performed on a centralized server, simplifying administration and eliminating the need to physically visit each desktop for upgrades and maintenance.

Sun Delivers on Carrollton's Vision

Sun Ray appliances provide Carrollton City schools with a lower-cost, easy-to-use desktop solution that enables them to implement their vision of a Web-based environment for learning. Sun's reliability helps to ensure that students and teachers can work where and when they need to, and the combined scalability and flexibility of Sun servers and Sun Ray architecture provide a system that can grow along with their needs.

John Butler, Technology Coordinator, Carrollton Junior High School sums it up, "Our students and teachers have embraced the Sun Ray appliances, moving easily from our legacy PC environment. As an administrator, I like the flexibility of the smart cards. We use them for the Sun Rays, as a photo I.D., cafeteria system I.D., and for media center circulation." Everyone involved with the Sun Ray appliances at Carrollton City elementary school — administrators, technical specialists, students and teachers — is pleased with the results.

Because the desktop appliance is easy to use, requires zero administration, comes with a five year warranty, and never needs to be upgraded, school administrators look forward to reduced support costs and a lower total cost of ownership. Technical specialists appreciate the simplified administration and easy installation, with new units simply removed from the box, plugged into the network and powered on. Students enjoy the smart cards and Hot Desk technology, enabling them to pause their work on one desktop appliance and then continue later on another in the workgroup with no interruption and no problems saving and transporting their work. And thanks to the reliability and ease of use, teachers can concentrate on what they do best — working with students, not worrying about computers.



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