

A. Project Title

2008 NASCIO Recognition Awards

The District of Columbia Public Schools
Communications Enhancement Project

Information Communications Technology (ICT) Innovations Category

EXECUTIVE SUMMARY

Project Description

The District of Columbia Public Schools (DCPS) Communications Enhancement (CE) project propelled day-to-day operations within the public schools to a new height of effectiveness and positioned the schools to launch applications that will enhance the learning experience of DC students for years to come.

DCPS purchased high-bandwidth fiber-optic data services from Allied Telecom, Inc. (Allied), a local telecommunications carrier. Allied provided these services by leasing services from DC-NET, an innovative high-bandwidth network conceived and operated by the DC Office of the Chief Technology Officer (OCTO). DC-NET's reliability, available bandwidth, and costs made this project feasible. Today, DC-NET serves 101 DCPS sites and 79 other District agencies with dedicated fiber optic cable. DC-NET provides industry level reliability and redundancy utilizing the Synchronous Optical Networking (SONET) protocol and Multi Protocol Label Switching technology.

DC-NET also supports critical government initiatives such as:

- Providing core connectivity to the Unified Communications Center (UCC), the District's call center
- Interconnecting the base stations of the Wireless Accelerated Responder Network, the first municipal 700 MHz broadband wireless network
- Linking District public safety operations to the Metropolitan Police command center and Fire and Emergency Services command center

Business Problem and Solution

DCPS is introducing significant new technology initiatives as Mayor Fenty implements his wide-ranging reform of the schools. The faculty and staff of each school require the use of computer systems to achieve the mission and continue to make progress. Access to these systems must be available when students and educators need them, the network must be responsive to their requests, and network services must be affordable.

Before Allied brought DC-NET to DCPS schools, the schools suffered from unreliable and costly infrastructure. School Internet service was slow and would often fail. DCPS could not implement new technologies or adequately support existing services because there was not enough bandwidth. The incumbent local exchange carrier (LEC) provided only a single facility connection. As a result, a single equipment failure or environmental event caused the service to fail. The schools could not afford the costly higher bandwidth LEC services. At times, the T1 connections were so slow that key applications, such as email, would "time out" and fail because the central servers would lose the connection.

The solution was to switch DCPS services from the LEC to Allied. Allied implemented a network solution provided by DC-NET, a network of fiber optic rings exclusively for government and educational users.

DC-NET's ring topology removes the single point of failure inherent to single facility connection. DC-NET's SONET ring and Gigabit Ethernet MPLS technology together provide the highest level of reliability provided by commercial networks at *every* DCPS location. DCPS schools now receive ten to sixty times the capacity of the original T1 connections while paying the same cost as the original services, or less. **In fact, DCPS will realize more than a \$2M cost savings in infrastructure (circuits) with the switch this fiscal year.**

Significance of the Improvement to the Operations of Government

The immediate impact is that educators and staff more time focused on education. DCPS is now implementing distance learning using multi-cast lectures, interactive simulations, and internet protocol TV.

C. Description of Business Problem and Solution

Allied, via DC-NET, provides reliable, bandwidth rich, cost effective service which improves the day-to-day operations of DC Public Schools and enables technology for next generation approaches to education.

DCPS is charged with providing quality education to District students. To meet this responsibility, the faculty and staff must focus on the identification, packaging, and delivery of high quality instructional material. In this technology driven society, computer systems are required to meet the efficiency levels required in all aspects of life. Education is no exception.

DCPS uses centrally located applications in the daily operation of the central administration and the schools. Access to these applications was traditionally achieved via a network implemented with services provided by the LEC serving the DC area. The design of LEC services did not provide the reliability or cost effective bandwidth required. These limitations affected DCPS operations.

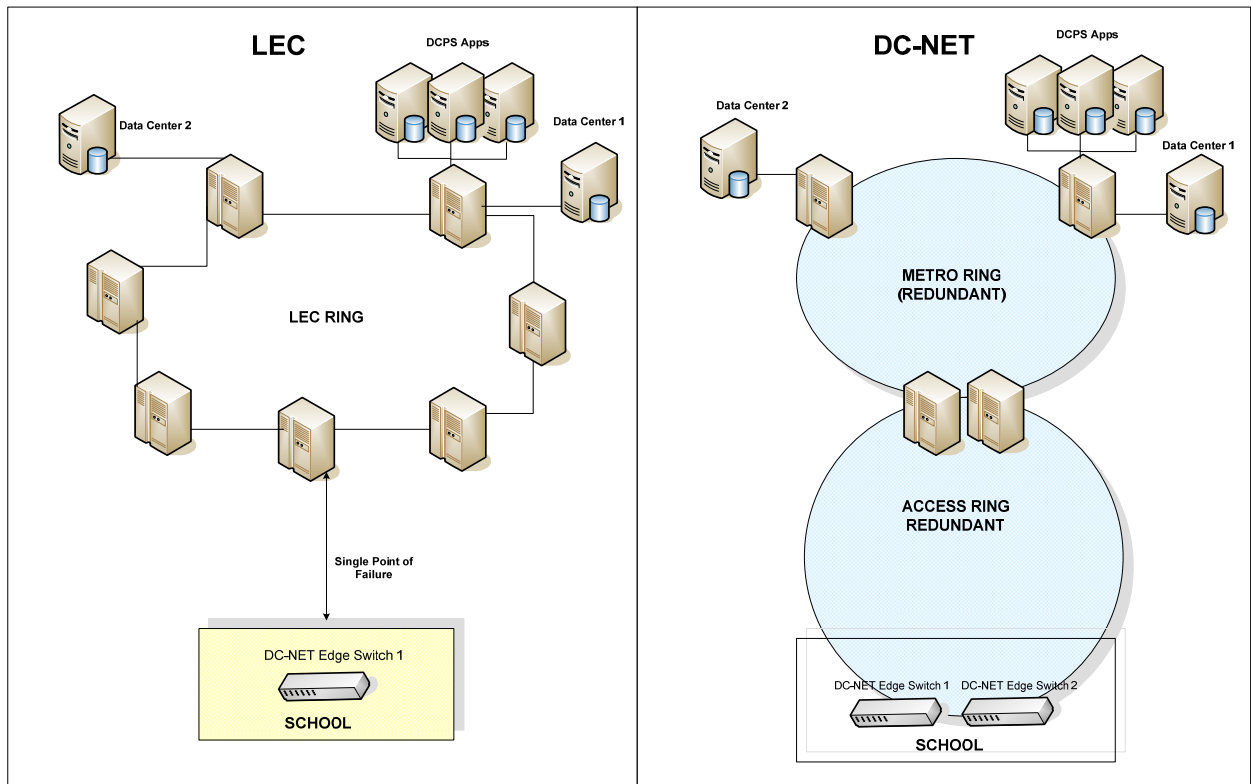


Figure 1 – Typical Network Architectures

Reliability

Figure 1 depicts the architectures of the LEC and DC-NET. The figure LEC only operates a ring between its Central Offices (CO). However, the connection from this LEC CO ring to the school or DCPS administrative building, usually a connection of a few miles, was a single physical path. Any failure of this path resulted in a service interruption to the school.

Instead, DC-NET connects each school directly to a ring. As a result, a failure of one physical connection does not affect service to the school, because the redundant path in the opposite direction around the ring provides uninterrupted service. In addition, there are two switches at each school, so the DC-NET switch is also not a single point of failure.

Cost Effective Bandwidth

Cost of service was a real barrier when DCPS services were provided by the LEC. DCPS could not afford to pay for the bandwidth required to connect schools and administrative locations to critical applications such as:

- DC STARS – Student Records
- Destiny - Text book and library collection database
- Encore - Special Education
- PASS - Procurement

These applications are integral to the efficient operation of the school system. Impaired access resulted in late report cards, inaccurate attendance records, and delayed receipt of goods and services.

Other problems included:

- DCPS had multiple LEC services for network connectivity. This created accountability and billing/tracking complexities.
- For a majority of sites, network speed was limited to 1.5 Mbps.
- Network connectivity outages were quite frequent, especially during bad weather.
- DCPS Enterprise applications were timing out. As a result this hampered such tasks as printing of reports cards and schedules.
- DCPS Transportation had to purchase separate network connections for their Intranet/Internet applications to work properly.
- Slow network connectivity restricted the server architectural design and resulted in some servers being placed in multiple locations rather than the central data center, increasing the cost of operations as well as decreasing reliability.

Now that service is implemented via DC-NET:

- Allied provides one source for all services, eliminating the accountability, billing and tracking issues.
- Network connectivity speeds increased by 16 to 66 times. New bandwidth offerings
 - Elementary Schools = 25 Mbps
 - Junior High / Middle / Education Centers = 50 Mbps
 - Senior High /Administrative Sites = 100 Mbps.
- New fiber connections replaced legacy LEC copper connections.

2008 NASCIO Awards Submission: Information Communications Technology (ICT) Innovations
Washington, District of Columbia Public Schools Communications Enhancement

- Service outages are virtually non-existent.
- No application time outs have been bandwidth related.
- DCPS can leverage new applications/technologies such as VoIP in every school.
- DCPS Transportation eliminated the additional Internet connections.
- Servers can be located per the desired architectural design thus reducing operations and duplication of hardware and software.

DC-NET began operations in August 2004 and currently has more than 23,000 telephone numbers and more than 6 Gbps in aggregate circuit bandwidth. Allied began leasing DC-NET service in February 2006. Since that time approximately 101 of 145 schools have transitioned to Allied services and received the performance and cost benefits. The remaining 44 schools are scheduled to update by July 2008.

D. Significance of the Project to the Improvement of Operation of Government

The DC-NET project encompasses a new approach for governments to ensure uninterrupted communications in times of emergency. Because DC-NET uses dedicated fiber and has its own operational staff, DC-NET continues to operate routinely, while commercial networks have been proven to become congested or unreliable in an emergency when many people try to communicate at once.

Because DC-NET is optimized for educational and government users, its customer service can be more responsive to the requests of those users.

Allied's services to DCPS utilize DC-NET so DCPS enjoys the robustness and cost reductions of the underlying infrastructure already serving the District government.

In removing data communication as an issue for faculty and staff, more time is spent on providing quality education to students in the District.

Improved reliability of the services, centralized monitoring, and maintenance provided by DC-NET resulted in a 50% reduction in technical staff required to support the DCPS network.

Funding is an issue for any government agency, but schools tend to have even bigger challenges in this area. Every dollar saved on communications services and support staff can be applied to other aspects of running the schools.

DC-NET also enables other technology improvements, over and above the services currently offered by Allied, which can further improve operations and reduce costs. For example, Voice over Internet Protocol (VoIP) is being deployed. VoIP provides additional capabilities--for example video communication between teachers in the class room, the principal's office, and even central administration.

D. Public Value of the Project

The DCPS-CE delivers substantial value to the public:

- a) Educators dedicate more time to educating students rather than addressing communication issues.
- b) Reduced cost saves taxpayers' money.
- c) Accountability increases for timely delivery of reports and records (e.g. report cards, attendance tracking).
- d) Increased bandwidth to the schools provides many more options for maintaining and increasing security at the schools.
- e) Advanced technologies can provide parents with accurate and timely reports on their children.

Benefits to service recipients, tax payers, and city agencies

Education is among the highest priorities for every community, and District residents made it clear during the last election that education is their *highest* priority at this time. Education is also at the top of the Mayor's Key Priorities.

Each improvement made in dedication to instruction and the cost of service benefits the community at large. Students experience a positive learning experience. Students are better prepared for the workplace and higher education. And parents take pride in the achievement of students and support the system to maintain improvement.

A tremendous benefit is that DCPS will realize more than two million dollars in cost savings in infrastructure (circuits) with the switch from Verizon to Allied/DC-NET this fiscal year. Additionally, the money saved from reduced cost of communication services and staff reductions is being redirected to fund other areas within DCPS, to ensure that the overall mission of educating District students is achieved.