Arkansas Public School Computer Network (APSCN) Broadband Upgrade

Category:	Information Communications Technology Innovations
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Executive Summary

In 2014, Arkansas's Office of the Governor and the Arkansas Department of Education partnered with a national non-profit, EducationSuperHighway, to study the landscape of the state's K-12 school districts and develop a plan to connect them to high-speed broadband in order to meet federal internet access targets of 100 kbps/student.

While 58 percent of districts were already achieving the target, EducationSuperHighway found that 95 percent of the broadband available in Arkansas's K-12 schools was the result of districts purchasing fiber-based direct internet access (DIA) on their own from providers.

In 2015, shortly after his inauguration, Governor Asa Hutchinson directed the Department of Information Systems (DIS) and the Department of Education to bring high speed broadband connectivity to every school in Arkansas by improving the Arkansas Public School Computer Network (APSCN) to a highly secure, all fiber network built to provide the state's students and teachers with the connectivity speed needed for digital learning today and into the future.

Prior to the broadband transformation, APSCN was delivering 5 kbps/user with much of the bandwidth over antiquated copper.

The new all fiber APSCN doubled the federally recommended minimum speed of 100 kbps/student to provide 200 kbps/user of high speed broadband connectivity to 293 K-12 sites across the state within the Department of Education's existing budget. This project reduced the monthly vendor cost for connectivity from $76.70 per meg on the old K-12 network to $3.70 per meg, and it catapulted Arkansas from the bottom of the K12 connectivity rankings to become one of six states in the nation to achieve 100 percent broadband connectivity.

Arkansas teachers now have the capability to deliver a technology rich educational experience to their students in schools of all sizes regardless of geographic location.

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Concept

Two options arose for improving the state's network: 1) direct internet procured independently by each district from providers; or 2) improvements to the statewide aggregated network. Based on recommendations from EducationSuperHighway, Governor Hutchinson directed DIS and ADE to build a statewide aggregated network.

This concept maximized Arkansas' funding eligibility under the federal government's E-rate program so that money from Arkansans stayed in Arkansas.

The concept of a statewide aggregated network was deemed to be the best and fastest way to connect 100 percent of the state's K-12 school districts to high speed broadband.

The aggregated design accomplished the following:
- Purchase low cost WAN circuits connecting districts to state aggregation hubs
- Leverage the state's buying power to purchase high-volume internet at low rates

The qualitative advantages of the aggregated concept were:
- Scalability. A scalable network not only ensured a more affordable option as bandwidth increases, a scalable network allows costs to increase marginally as bandwidth demand increases over time and scales more efficiently compared to DIA.

- Security. The cybersecurity team at DIS integrated multiple layers of protective barriers on the network to help prevent students from accessing inappropriate content. Strong cybersecurity defenses are also in place to safeguard the sensitive student, personnel and financial data maintained and managed by each district.

- Efficiency. A statewide aggregated network is scalable as the need for greater bandwidth increases to better handle a growing amount of work. This design concept can provide up to 1 Mbps/user with no hardware replacements.

- Customer Service. DIS monitors network connections 24 hours a day. In many cases, network support can troubleshoot an issue before a customer is aware of the problem. A dedicated K-12 network operations center adds tremendous value because it resolves issues and it serves as a single point of contact for districts.

The aggregated design of APSCN allowed telecommunications providers of all sizes to bid for a segment of the project. A total of 22 telecommunications providers, ranging

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from small locally owned companies to companies with a global reach, successfully bid for a portion of the project.

One of the critical success factors was providers waiving construction and installation costs for the build out of the fiber infrastructure.

Significance

Leveraging the state's buying power drastically reduced the vendor cost for internet data from $76.70 per megabit to $3.70, enabling ADE to maximize its existing budget to provide 200 kbps per second per user of state-funded bandwidth at no cost to school districts. What that ultimately means is if the state-funded bandwidth of 200 kbps per user meets a district's connectivity needs, it pays nothing for internet.

School districts were previously paying vendors for additional internet at an average cost of $11.28 per meg on the old network based on 100 kbps per user.

APSCN not only meets national standards for internet infrastructure capabilities, it doubles them.

Digital learning has the power to transform education, but it requires connectivity to high-speed internet which Arkansas has now achieved.

Impact

Digital learning tools are transforming K-12. Governor Hutchinson, ADE and DIS all recognized that a robust high speed broadband infrastructure was needed for students to use these tools.

The expanded bandwidth of 200 kbps/user delivered by APSCN opened doors to a new world of learning through remote collaboration with other students, videoconferencing, and real-time video exploration of distant areas across the globe.

The increased speed enabled teachers to deliver a technology rich educational experience to the over 479K students enrolled in the K-12 system, in schools of all sizes, regardless of geographic location.

This project catapulted Arkansas from the bottom of the K-12 connectivity rankings to become one of six states in the nation to achieve 100 percent broadband connectivity.

Ultimately, the need for technology doesn't stop at the end of the school day. Bringing high-speed Internet into public schools could generate greater demand for it from residential and business customers of local providers. This could broaden the scope of learning opportunities, create a better-educated workforce, bring more jobs to the state, and help Arkansas retain its best and brightest talent.

As a result of its work on the APSCN broadband upgrade, DIS was named the winner of the 2017 Governor's Digital Transformation Award at the inaugural Arkansas Digital Government Transformation Awards.

In presenting the award to DIS, Arkansas Secretary of State Mark Martin said,

"The work you have done has saved the state millions of dollars, eliminated countless sheets of paper, and multiplied the capacity of our workforce—all while providing better and faster service to citizens."

"We're here tonight to honor the work that you all have done in moving our state forward to bring the best possible service to our citizens and make the best possible use of their valuable tax dollars."

APSCN also received a StateScoop 50 Award for Innovation of the Year and Arkansas Governor Asa Hutchinson was designated a national leader for making K12 connectivity a priority of his administration.

This same concept is being applied to conduct a high speed upgrade to the non K-12 portion of the state network serving other state agencies and public entities in Arkansas.