Network Navigation: An IT Director's Guide to School Reopening

While many K-12 discussions focus right now on the form schooling will take in the fall — on campus, from home or a hybrid structure of the two — one group of people needs to stay focused on the invisible aspects of delivering that education. CIOs, CTOs, IT and network directors and others working on the front line of school and district information technology want to make sure that when students return to learning, the network is ready.

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How they accomplish that is a path that is going to be unique for every school system. But there are a few common themes that hit in quick succession:

- Getting devices into students' hands
- Extending network coverage far beyond classrooms and offices
- Providing students, teachers, and staff with secure, easy-on access to the network
- Addressing the digital divide with locally-developed solutions.

Drive-up Education

Neosho School District in Missouri, with 4,700 students, is moving into its seventh year of 1-to-1 devices. That began in grades 9-12 with Chromebooks. A few years later, grades 5-8 were added. On the elementary side, K-2 has had iPads for about six years. Then two years ago grades 3 and 4 were given Chromebooks.

But that ready availability of student devices for classroom use didn't mean the shift to remote learning in the spring was trouble-free. While students in grades 7-12 had take-home devices, that wasn't true for those in K-6. IT set up two drive-through checkout locations and handed out 1,100 Chromebooks over three days, from noon to night. Then it switched to iPads and IT issued 700 of those over a couple of days.

"It was harum-scarum," recalled Technology Director Scott Harris. "We were paranoid because at that point we really didn't know the implications of COVID-19. So, we tried to play it safe. We were very adamant with parents about staying in their cars and just giving us their child's name, grade level and school. And then we checked out a device to them and sent them on their way with a little instruction sheet on how to join the network at home." Then IT set up helpdesk email and phone support, both of which were "used heavily," said Harris.

As a quick-fix for students who lacked internet access, the district handed out mobile hotspots to some families, promoted deals being offered by the major service providers and publicized area hotspots where people could park and get online access from their cars.

Neosho toyed with the idea of parking its fleet of WiFi-enabled school buses in strategic areas but gave up on that idea because "honestly, Neosho is hilly," Harris allowed, and "hills don't work well for WiFi."

"Better to provide outdoor access points at its campuses," said Neosho Network Administrator C.J. Wickstrom, to "allow folks who don't have a network connection at home to roll past the school, be able to log in, submit work, download the next round of work and carry on their merry way all while staying socially distant from everybody else."

The district tested the use of outdoor wireless using Aruba access points at a new elementary school. More recently, it received a set of outdoor APs from the company to pilot in other locations. After Superintendent Jim Cummins heard about the project, he allocated additional funding in the budget to make sure every campus could offer the same capability.

Community Service and Safety

The idea of "drive-up education" is a topic of interest to many of the school IT staff that Wanda Williams speaks with in Tennessee, where she serves as an Aruba territory manager for state and local government and education. "A lot of districts are putting outdoor wireless in every one of their schools, community centers and even at the police department," places, she observed, where families can show up "and get access knowing they're in a safe place."

Chris Illingworth, an Aruba

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account manager in Eastern Missouri, is hearing the same, and not just for the sake of the students. "Schools are lighting up their parking lots to facilitate access to the internet for remote learning and also for parents who are out of work and looking for jobs — almost as a community service."

The key, Illingworth advised, is the use of access points designed for outdoor use, sensors to deliver continuous monitoring and testing of the wide area network and switches optimized for mobile usage with power-over-Ethernet. The advantage of this set-up is that it can be integrated into the existing school network to expand coverage or set-up to run independently as a standalone network.

Palo Alto Unified in California, a district with about 12,000 students, also amped up its existing outdoor coverage by adding additional outdoor wireless access points from Aruba to increase density. The district had covered a lot of its outdoor spaces already. "However, we didn't intend to have a lot of people using those," said Chief Technology Officer Derek Moore. The addition of more APs "allowed more people to use the outdoor WiFi."

What If You Don't Have a Car?

That isn't to suggest that parking lot WiFi will work everywhere. When J Pulliam, Aruba territory manager in the Pacific Northwest, reached out to the schools in his region, asking how he could help, the initial surge was getting teachers secure access to network resources. From there, it quickly moved to, "OK, let's move onto the digital divide and how we serve the under-served communities."

Simply providing outdoor access wasn't sufficient for a place like Seattle, "where it rains a good 200 days a year and you're not going to hang out outside," he pointed out. "And if you're poor enough that you don't have internet, you may not have a car. Or if you do have a car, it's probably with mom or dad so they can get to work."

Crossing the digital divide in those scenarios calls for deeper thinking, Pulliam contended. One school district he has been working with believes it can identify a few major apartment complexes where the bulk of their under-served students live. Pulliam further proposed that if those apartment complexes can be isolated, "we could potentially build an overlay network in partnership with the city and the apartment complex owner, with infrastructure owned by the district and installed in the apartment complex."

As with many things "well-intended," there are complicating factors, Pulliam asserted. "If I'm going to convince a private party to let me install hardware, there's going to have to be something in it for them — such as a tax break." That is a topic Pulliam is willing to broach, orchestrating meetings with city and school leadership, because he recognizes that there are politics inherent in such approaches. "It's a big lift," he acknowledged, especially when budget cuts for everybody are likely.

Pulliam's advice: "Engage with partners you're not actively doing business with just to get other perspectives." His thinking: You don't always know, going in, where the best answers will come from.

"Ultra-Simple" Network Access

The network worries that Todd Croupe, Aruba systems engineer, is hearing from schools can be distilled into two: "First is security. Second is providing a consistent look and feel as if users were actually on campus accessing their resources, whether they sign on through wired, wireless or VPN. Bottom line, they want "something simple.'"

Consistency and simplicity were on the table about three years ago when Palo Alto Unified did a wireless upgrade, for which

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the district chose an Aruba infrastructure. That included implementation of ClearPass, the secure access control component of the Aruba network management suite; and AirWave, the company's wired and wireless network management application.

When that was done, Palo Alto Unified IT crew kicked off a campaign under the leadership of CTO Moore, who said, "We don't care where you are; we care *who* you are. As long as you identify yourself on the network, you will be assigned the right services to use our network."

When somebody comes to the network — whether staffer, student or parent — he or she is presented with the login page. "Everybody connects the same," said Moore. The person uses his or her own username and password, and on the back end, ClearPass "puts them in the correct network, hits the firewall rules, does all those good things on the back end."

Automated Account Creation

The pursuit of consistency and simplicity go back even further for Palo Alto Unified. Account automation for students and staff has been in place for about five and a half years, said Moore. As soon as students' registration is complete in the student information system, a nightly process runs that creates new accounts, gives them access to what they need and puts them in the right groups. A similar process exists for staff. The day after a person is entered as an official employee in the HR system, his or her account is created, and he or she is given access to the right applications.

About a year ago the district automated the account creation process for parents too, giving them parent rights to the SIS and

5 Ways to Accelerate Response

1 **MAKE OPERATIONS INVISIBLE.** Palo Alto Unified's CTO Derek Moore said he spends a lot of time figuring out how to make the "operational pieces as transparent as possible so they don't get in the way of learning." That's why the district invested in network account automation. "We spend a lot of time in schools dealing with the process of getting students registered for school, getting them assigned to classes, and making sure they have the materials they need," he explained. "I group all of that into the overarching umbrella of, how easy can you make it so that when a student or staff member is starting at a school, they have what they need on day one?" Only then, he added, can you "get to that point where you have some really good conversations about how the use of specific tools can improve learning for kids."

2 **CALL FOR HELP.** Neosho's Scott Harris and C.J. Wickstrom strongly encouraged reaching out to other school IT people. "We gladly answer any phone call from any school district asking for help, because they would do the same for us," said Harris. Wickstrom, who worked in corporate environments before joining the district, was surprised by the level of openness he found among school IT people. "If you're not sure about something, it is worth picking up the phone and calling the next district down the road and talking to them about how they're doing things."

3 **QUICK AND CHEAP IS HARDLY EVER BEST.** Better to invest in enterprise-grade equipment, such as remote access points, that can provide "secure access from home to the school or district data center," suggests Aruba's J Pulliam. The individual just plugs it into power at home and the RAP will broadcast the school's Wi-Fi SSID — providing the same experience off-campus. The use of a RAP also provides a more agile and compliant approach. Teachers, staff, and students connect to the same school network, and the connection can maintain CIPA compliance, and adhere to other governmental requirements.

4 **USE REPORTING TO SELL THE NEED FOR THE UPGRADE.** School leaders hardly ever care about the nuts and bolts, advised Aruba's Todd Croupe. Take the granular data generated in tools such as Aruba Central or Aruba ESP, he said, to illustrate the bigger impacts of changes on the district: "Our student access has quadrupled. We need a better way to do this..." That kind of reporting can provide "the runway" for the IT crew to have conversations with decision makers about tool and platform changes that can "make everybody's lives easier."

5 **SIZE DECIDES SOLUTION.** The needs vary dramatically between large and small school districts, according to Aruba's Chris Illingworth. In both settings — and for those in between — "it's really about giving them the biggest bang for their buck." But in nearly all cases, one of the first conversations K-12 IT teams are having these days touch on internet access. "There are a lot of people displaced from a work standpoint; there are a lot of students and their parents who are still trying to figure out how to move forward. Outdoor APs serve that need well."

the learning management system, among other applications.

Over the past year, Moore noted, IT has tied all of those processes into a single sign-on. "There's a log-on portal where all three of those groups start," he explained. "They log in with their credentials, and from there they can click on the different application buttons and get into everything that they need to from us." They only see what they're supposed to see.

Aruba's Pulliam recommended that schools and districts find an efficient way to "validate the credentials [of users] and authenticate them before we let them hit resources." That applies whether they're inside the school building, at home or sitting in the parking lot.

As he pointed out, "we want to make sure that just any device that hits that network doesn't have access to secure content. We need to know who it is that's on the network and prevent them from going where we don't want them to go and authorize them to go where we do want them to go."

Hassle-free VPN

The California district saw virtual private network usage quadruple when everybody started working from home, Moore noted, rising from 10 simultaneous users to 40. Those may not be big numbers, he admitted, but that's largely because the district is already web- and cloud-based. Even as usage numbers for applications went "through the roof," most of the burden was borne by the networks being used by individuals working and studying from home.

When a previous pandemic (H1N1) struck, Aruba introduced RAP, a remote access point that can be issued to an employee, put on the network at home and pointed directly to a specific SSID to place them on the district wireless network securely and without the hassles and hurdles of getting through the network access control mechanisms. As Williams suggested "It's a very nice and modern way to bring your network access ID to an individual, enabling that person to work from home and be more secure."

Fish-Tank-Caliber Security

Now, Palo Alto Unified is refreshing its wired network — using Aruba equipment as well — with two aims: survivability and accommodation of new types of end points, cameras, building access controls and HVAC sensors.

The ever-present concern for Moore: "How well will our network keep running and how do we continue to improve the reliability and security of the infrastructure to provide services to people in the event that we have failures or natural disasters or whatever that may be?"

That's where Aruba Edge Services Platform (ESP) comes into play, which, according to Aruba systems engineer Croupe, "maintains what our secret sauce has been from day one — role-based access." Aruba ESP doesn't stop there. It also oversees access to devices, including endpoints that belong to the Internet of Things. As Croupe explained, "If I'm a thermometer on a fish tank, I'm only supposed to go visit the thermometer application. If I try to visit a student information system, a red flag is drawn." Aruba ESP makes sure "you are who you say you are, you do what you're supposed to do, following the appropriate timeframes and capabilities."

The jump to Aruba ESP isn't a great leap, he added. "A majority of our existing customers already have the baseline to migrate towards the Aruba ESP architecture. Maybe they need to add cloud management; maybe they need to add a component here or there; but a lot of them have a majority of those components already, which are the starting point. What we do is augment those baseline components with the features within

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the cloud. That's where Aruba ESP comes to fruition."

Then there's this problem: When somebody calls IT for help, it is because he or she assumes it is their fault. Yet the real source of trouble may have nothing to do with IT whatsoever. "It could be the application itself or a site that doesn't even have power," said Croupe.

With Aruba Central, the IT administrator can manage the whole network from a single location: "what networks are out there, what users are utilizing it, what IoT devices are doing, as well as what roles are assigned, so that IT people don't have to plug in sniffers everywhere." They can use the tools within Aruba Central to diagnose issues proactively within the network "even though they don't have an Aruba logo on them." That capability lets IT respond quickly, Croupe asserted: "'Hey, you've got power out on this intrusion detection system.' 'Hey, this application's experiencing issues…"

Making Jobs "a Whole Lot Easier"

Missouri's Neosho district is also in transition. While it is running Aruba throughout for wireless and another company's products for its wired infrastructure, both the wired and wireless networks are undergoing updates, and Aruba will provide the fabric for both. As a result of new gear — both switches and firewall — single-gigabit bandwidth will grow to a data capacity of 10 gigabit and the district will step up from 802.11ac to WiFi 6 (otherwise known as 802.11ax).

Neosho network admin Wickstrom is hoping for greater flexibility with the redesign. "The [current] wired segments of the network are robust but fairly inflexible. We want to make that a lot more flexible, reduce the number of virtual LANs we're using and design a much simpler network that offers high availability," he said. He also wants to shepherd the deployment of Aruba Central, Aruba ESP and Aruba ClearPass "to manage everything." As he observed, the combination of "the new line of Aruba switches being released, the use of machine learning and the addition of ClearPass will make everyone's job a whole lot easier and changes on the network much, much faster."

Why the devotion to Aruba? Wickstrom pointed to his experience with the opening of the new elementary school in the district. IT had less than two weeks to implement a network in the new site. Aruba sent in its area engineer, who sat with Wickstrom for two solid days, from nine in the morning until midnight, laying out the network architecture. Yes, there was a sale involved. But for Wickstrom, there was more than that. "It was a trial by fire. But that engineer was wonderful. I could not sing his praises high enough for what he and his team and his superiors did for the school district in helping us out."

Counting on IT

When the iPad was introduced to the world, it had no Ethernet connection, and that single decision "completely changed the world. Everybody suddenly got why wireless was so important," said Steve Vitamanti, Aruba territory manager in Southern California. Something similar is happening right now, he said. "Non-technical people are getting the critical value that IT provides in helping their schools provide the best education available to their students. They suddenly understand why it's important to be able to move quickly and have flexibility."

While nobody really knows what will come next, schools are counting on IT to navigate safe passage through the technology challenges as they surface. Fortunately, IT doesn't have to face the journey alone, and the tools and services to be network-ready are here.

Aruba Central
Provides a cloud-based control center for managing the entire wired and wireless network, giving visibility into network health, application performance and user experience issues.

Aruba ClearPass
Provides role-based access control for security enforcement across the wired and wireless network.

Aruba Edge Services Platform (ESP)
Uses machine learning to analyze traffic traversing the entire network and act on it in real time, to resolve problems, protect against advanced threats, monitor and manage devices and deploy services where they're needed.

Aruba Outdoor Access Points
Are designed for rapid provisioning in school settings for temporary use or to bolster the current density of outside wireless coverage.

Aruba Remote Access Points (RAP)
Plug into any existing internet connection, including mobile internet to provide remote access to the network, with built-in privacy and security. The RAP is provisioned statically with the ultimate domain controller's IP address.

To learn more about Aruba K-12 solutions, visit www.arubanetworks.com/k12