

# K-12 Networks for Student Success

## Better Learning Experiences and Enhanced Productivity

Learning environments are constantly changing. Every day, more schools and educational organizations are embracing digital learning by issuing student devices, creating smarter spaces for interactive learning and implementing campus safety initiatives. From immersive learning apps, open education resources (OER) and e-textbooks, to organizational platforms like SIS's, LMS's and cloud-based productivity suites, there's no shortage of tools that can transform the classroom or help with school administration. Both teachers and students rely on digital tools daily to complete assignments and in-class projects. Most learning materials are online, so students and teachers require uninterrupted access anytime, anywhere and on any device.

But creating the right experiences isn't always easy. School network infrastructures are highly complex and need to support many different types of users and devices. Students, teachers, staff, parents, and visitors connect to the school network on site or from home with a variety of personally owned or school-assigned devices. In addition, districts are integrating IoT devices for student safety, lighting, security cameras, and HVAC solutions – all of which become part of the overall building automation. Access control offers efficiencies, savings and yes, also vulnerabilities. According to IDC, more than 150 billion devices across the globe will be connected by 2025, and nearly half of those will be IoT devices. Needless to say, this transformation widens the cyberattack surface and makes a secure network more important than ever.

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“With nearly 114,000 students and over 14,000 employees, we're moving toward several million device connections,” ... “We also need effective tools for managing mobile devices, connections and infrastructure throughout our 87 campuses, plus seven more in the next five years, spread across approximately 238 square miles.”

Frankie Jackson, CTO, Cypress-Fairbanks  
Independent School District

To implement a fully functioning digital learning environment, a school or district must build and maintain the right network foundation. Aruba provides the Edge Services Platform that simplifies network operations, delivering the always-on and secure experience that students and administrators require. Educational organizations can feel confident that the network will enable advanced technology solutions that result in student success and highly productive teachers and administrators.



## SCHOOL CONNECTIVITY MUST BE UNIFIED, ALWAYS-ON, AND AUTOMATED

As in all modern digital environments, the school network cannot go down, and even planned downtime can cause major challenges. When educators can count on the network to perform at an optimal level, it increases their confidence and enables them to focus on student outcomes, not on whether their device connects or not.

### High-Performance Wireless Networks

Aruba's Wi-Fi 6 (802.11.ax) infrastructure is designed to support schools of any size with always-on secure connectivity. Seamless roaming allows network access on the move, while high density capabilities supports both large classrooms, the auditorium and outdoor facilities. Learning management and unified communications systems can be prioritized to deliver latency-sensitive data, voice, and video without delay, loss, or jitter.

Hitless updates and hitless failover ensure that the wireless network can stay current with the latest security updates, tolerate faults, and be available whenever needed. No assessment or online test interruptions, no dropped calls.

The infrastructure leverages industry-leading tools to auto-adapt to changing environments and applications: ClientMatch to optimize roaming performance; AppRF to optimize the performance of critical applications; Adaptive Radio Management to enhance radio performance; and AirSlice to manage bandwidth allocation.

“Complete coverage and connectivity at all of our locations is key”...  
“We have access points in all of our classrooms and covering all of our common areas and we are expanding that coverage to the outside corners of the buildings to support the security measures we have in place with the city and local police.”

Greg Bartay, CTO, Pearland ISD

### A Unified Infrastructure from Edge to Core

Wired and wireless networks work together to deliver a consistent and secure network experience. Aruba designs its own semiconductors so its switches can provide blazing fast and highly granular visibility into the performance of the switching fabric. SmartRate power-over-Ethernet (PoE) allows Wi-Fi 6 access points to operate at >1Gbps over existing cabling, eliminating the need to rip and replace cable plants to obtain multi-gigabit wireless performance.

“With digital curricula and mobile expectations here to stay, our new Aruba network will enable us to support our teachers and students for years to come.”

Michael Uelses, Director of Information Technology,  
Nazareth Area School District

The Aruba AOS-CX operating system features a time-series database that provides deep visibility into data traversing the switching fabric. Intuitive software-defined management tools, built-in analytics, and programmable scripting offer unparalleled insights into network and device activity, fault isolation, and system performance. Upgrades and updates can be easily enabled, reversed, and changed without impacting the network or the people who rely on it.

Redundant Aruba AOS-CX switches operating in Active-Active mode will deliver non-stop operation in the event of a fault. Virtual Switching Extension (VSX) ensures that traffic loads are validated before returning balanced traffic loads to the Active-Active pair. Once the first core switch completes the transfer, the process repeats for the remaining core infrastructure.

The Network Analytics Engine (NAE), included with AOS-CX, provides a built-in framework for monitoring and troubleshooting networks. NAE detects problems in real-time and analyzes trends using the time-series database so IT can predict future performance and security issues.



AOS-CX, coupled with high-performance switches, delivers the throughput, performance, and actionable insights IT administrators need to handle the massive amounts of data now being generated at the network edge in every college and university.

**Automation can help alleviate the high percentage of unplanned network downtime that is caused by human error (Gartner, 2019).**

## PROTECT THE SCHOOL NETWORK WITH ZERO TRUST SECURITY

While K-12 institutions have been investing in cybersecurity, unsettling breach statistics and costly ransomware attacks show more needs to be done to protect people and information. Traditional security solutions create a secure perimeter and detect attacks and malware based on their patterns or signatures. This model is unsuitable for schools where there is no perimeter: students, staff, and teachers move on and off the school site, and need network access everywhere.

Aruba's Zero Trust Security framework dynamically segments network traffic. With policy management, analytics, and automation, the risks of security breaches are minimized while detection and response are enhanced.

### Know What is on the Network

With IoT devices springing up seemingly everywhere, it can be challenging to know what is or should be on the IT network. AI-powered ClearPass Device Insight simplifies device identification and onboarding using machine learning to identify and profile IoT device types so they can be automatically dynamically segmented, remediated, or quarantined.

### Zero Trust Security access

Once devices are identified, ClearPass Policy Manager profiles, authenticates, authorizes, and tightly manages network access using granular, policy-based access controls. Users and devices have restricted access to only those network, IT, and application resources for which they have been approved. ClearPass also ensures that users and devices are compliant with regulations governing student privacy and personally identifiable information.

### Separate student, administrative, and device traffic

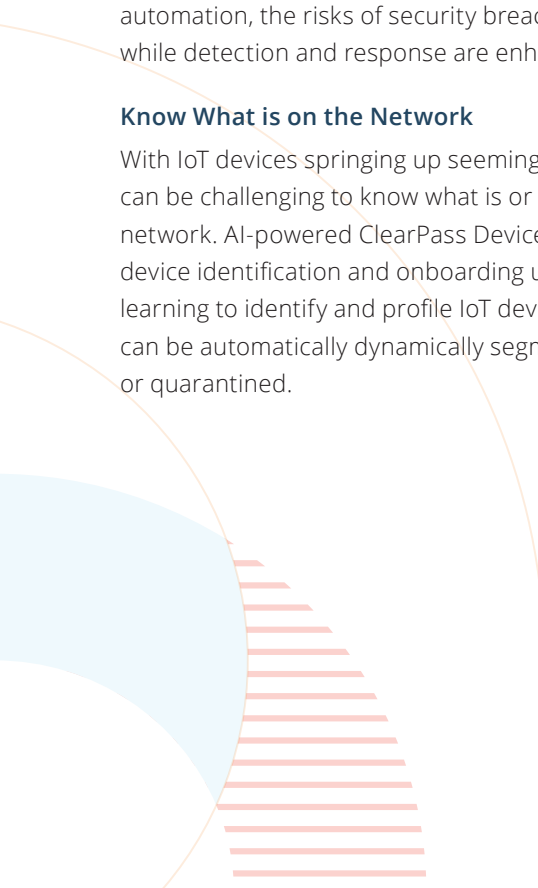
Dynamic segmentation establishes secure tunnels between IT, IoT, and plant operational technology (OT) devices and their associated applications. This perimeter-less zero trust micro-segmentation is applied to wired, wireless and WAN networks, so no matter where users and devices work or roam micro-segmentation will remain in effect. Policies are carried across the network end-to-end, regardless of the location of the user or device or the switch port carrying the traffic, i.e., student learning traffic is isolated from student records, public safety cameras, and administrative traffic.

### ACT QUICKLY WITH INTUITIVE AND AI-POWERED MANAGEMENT TOOLS

Aruba's Edge Services Platform includes assurance and orchestration features to maximize up-time, optimize user experiences, and reduce the time to troubleshoot issues to root cause. Automated network assurance delivers AIOps insights from a single pane of glass, while edge-to-cloud experience monitoring generates automated AI-based alerts that proactively pinpoint critical application and network issues.

### IT OPERATOR EXPERIENCES MATTER:

Often forgotten is the way that IT experiences the network, in light of the constant demands for performance and pressure to deliver. Aruba provides solutions that unify wired, wireless, and WAN operations so that operators can simplify their day-to-day operations and feel confident that they can deliver an always-on and secure network for their school.





### Optimized remote site connectivity, visibility, and management

Aruba's SD-Branch solution leverages SD-WAN capabilities to deliver secure connectivity to individual schools. Offering service level agreement (SLA) monitoring over Internet, MPLS, and cellular WAN links, the solution encompasses WAN, WLAN, wired networks, and security management.

Deployment is a snap and can even be done by non-technical personnel without an IT truck roll. An Aruba mobile app is used to scan barcodes on Aruba devices and configurations are downloaded automatically to Aruba Central cloud-managed gateways. There is no faster or more intuitive way to connect and bring-up schools than Aruba's SD-Branch solution.

### AIOps for optimized performance

Aruba delivers customized recommendations through AI-based machine learning to improve network and application performance based on anonymized comparison with peer environments. If a change could increase performance by 10%, it is recommended to the Network Admin who can then authorize the settings change. Aruba User Experience Insight provides IT a real-time view of the end-user experience and clear action steps to resolve any issues before a service ticket is opened. These powerful tools bring much-needed help to enable already overwhelmed IT staff to take necessary action and stay ahead of issues.

### UNIQUE SOLUTIONS FOR IMPROVED EXPERIENCES AND STUDENT SAFETY

Schools are places of learning and community. The safety of teachers, students, and staff used to be taken for granted, but no longer. Today's natural disasters, civil unrest, and active shooters impact campus safety and are a major concern for first responders. Network infrastructure can help by quantifying the nature of the threat, identifying safe and unsafe areas, and automatically guiding people to safety. While networks can't prevent incidents from occurring, they can lessen the impact of incidents by keeping faculty, students, staff, visitors, and first responders safer.

### Access Points as IoT Platforms

We are accustomed to thinking about Wi-Fi access points in the context of secure wireless network access, and for many years that was their primary function. Not so today. Aruba Wi-Fi 6 access points include radios for wayfinding, geofencing, location tracking, sensor monitoring, door locking, and actuator control. These capabilities transform Aruba access points into secure, multi-purpose communication systems that are both network access on-ramps and full-fledged IoT platforms.

Aruba's location-based services bridge the gap between digital and physical worlds. Using signals generated and received by Aruba access points, our location-ready infrastructure enables turn-by-turn wayfinding navigation of campuses and buildings, proximity-based messaging for guests and students, asset tracking, and location analytics.

Third-party safety devices supported by access points include, among others, mobile panic buttons, gunshot detectors, occupant detection, electronic door locks, and vaping detectors:

- Mobile panic buttons both call for help and identify the location of the individual in distress
- Gunshot detectors identify the type of weapon and muzzle flash rate, so first responders can arrive prepared
- In the event of an incident, the occupant detection system will push a message asking occupants if they're safe and then generate an interactive 3D site model telling first responders where to go first
- Electronic doors locks can be used to secure buildings and remotely provide access to response personnel
- Vaping sensors can be used to enforce no-smoking regulations in bathrooms and other locations

All manner of low-voltage building systems – including comfort, intrusion detection, energy management, access control, personnel and asset tracking, man-down, call button, leak detection, security, and gunshot monitoring – can now reliably and securely communicate over a shared infrastructure. The resulting savings in equipment, installation, and maintenance costs over deploying dedicated control networks is significant.



### Utilizing E-rate funding in support of school upgrades

More than 12,500 school districts, school campuses and public libraries depend on the E-rate program to make telecommunications and information services more affordable as technology has become an integral part of learning. In December 2019, the FCC made some **major changes to the E-rate program for FY2020 and beyond**. Aruba's E-rate-eligible networking solutions deliver the enterprise-grade capabilities, reliability, and security needed to promote digital learning opportunities in K-12 schools.

### A PARTNER ON YOUR JOURNEY TO STUDENT SUCCESS

The most dynamic and transformative experiences happen at the edge. Aruba's mission is to harness and secure data at the edge, and, in partnership with our customers, to enable the most meaningful education digitalization initiatives. Start the journey by contacting your local Aruba salesperson or reseller today.

“ We are definitely realizing value from modernizing our wired and Wi-Fi infrastructure. We credit Aruba with being an exceptional partner in making it happen. ”

Emily Elam, Supervisor of Technology,  
Decatur City Schools