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Introduction

Computer-based learning is far more engaging to today’s tech-savvy students than outdated textbooks. As a result, digital learning is gathering momentum in schools across the world.

For example, in the United States, K-12 school districts from Maine to Texas to California are finding new ways to incorporate digital learning into the curriculum. That momentum will be accelerated by the federal government’s push for K-12 schools to use digital textbooks by 2017.

School districts may explore one-to-one computing initiatives, where the school provides laptops or tablets to students, or they may go the bring-your-own-device (BYOD) route, where students and staff use their personal laptops and tablets in the classroom to support their digital learning plans.

Whether one-to-one or BYOD, digital learning is resulting in an infusion of tablets, laptops and other mobile devices to support an interactive curriculum. And that places new pressures on school wireless LANs (WLANs).

This best-practices guide explores the top 10 things you should consider when choosing a WLAN to support your digital learning initiatives and provides you with assistance in selecting a WLAN architecture that best meets your needs.

The Top 10 List

1. **Create a five-year plan for the network.**
   Wireless is the preferred method of connecting most devices today and it’s the only way to connect tablets.

   Start with your school’s strategic plan for digital learning, and understand how that will impact the requirements for connectivity in the school. Consider not only your district’s commitment to technology in education, but also your government’s commitment to digital learning.

   How extensively teachers and students will use digital curricula impacts the number of tablets, laptops, smartphones and other mobile devices that will be needed. And that decision will impact the size and scope of the wireless and wired network to provide reliable, enterprise-quality connectivity. Consider your requirements over the next five years.

2. **Identify wireless coverage requirements.**
   Robust connectivity is required to support schools filled with students and teachers using tablets and laptops during class.

   In meeting one-to-one computing and BYOD initiatives, many schools are putting an access point (AP) in every classroom to ensure sufficient Wi-Fi capacity. If you expect to have 30 or more concurrently operating mobile devices in a classroom, you may want to consider this strategy.

   In addition, many schools deploy wireless in common areas, such as libraries, auditoriums and lunchrooms. There’s often demand for Wi-Fi outdoors, including campus quads, parking lots, sports fields and stadiums.
Consider a vendor that provides a WLAN solution for both indoor and outdoor use. Having a consistent architecture for both indoor and outdoor coverage should deliver a better user experience and simplify management.

3 Go with 802.11n Wi-Fi.

Tablets are ideal for viewing video and multimedia, which voraciously consume bandwidth. In addition to connecting growing legions of tablets and laptops, schools may want to connect interactive whiteboards, projectors, student response systems, and video surveillance cameras to the WLAN.

Consider upgrading to 802.11n. It’s faster and it supports more users. 802.11n technology delivers up to 300 Mbps of link speed for Wi-Fi radios, compared to 54 Mbps with legacy 802.11a/b/g. That means increased bandwidth for classrooms with high concentrations of mobile devices and multimedia applications.

802.11n is also more reliable because it uses multiple antennas to transmit and receive signals, while the old 802.11a/b/g uses only one antenna to transmit and one antenna to receive.

Controllerless Aruba Instant APs and Aruba Mobility Controller-based WLANs deliver high-performance Wi-Fi connectivity that supports the rigorous demands of schools.

Aruba Adaptive Radio Management™ (ARM) technology optimizes Wi-Fi client performance and mitigates RF interference, which results in unparalleled performance. With ARM™, each Aruba AP gets the optimal channel and transmit-power for its RF environment. And that results in greater capacity and a better user experience.

4 Know what applications the network will support.

Teachers depend on the reliable operation of multimedia applications for instruction, and the learning experience can’t be disrupted by an unreliable network or video delays. At the same time, bandwidth-hungry, delay-sensitive video should not cause the performance of other applications to suffer.

Look for a WLAN solution that is application-aware and can provide special handling for traffic based on the specific application and device.

With Aruba, you can be sure that interactive learning applications like Safari Montage and LanSchool classroom management, as well as videoconferencing applications like FaceTime, work well over Wi-Fi.

Teachers can save time when running applications like LanSchool on an Aruba WLAN, which creates an ultra-reliable classroom management environment. LanSchool keeps the attention level of the students focused by removing distractions and allows teachers to monitor classroom activity.

Aruba provides priority traffic handling, channel load-balancing, band steering, airtime fairness and other Quality of Service (QoS) controls to ensure that Wi-Fi bandwidth is fairly distributed to all mobile devices. That means voice and video get the priority they need, without impacting other vital administrative and productivity applications.
Plan for guest access and BYOD.

Allowing students and teachers to securely connect to the school network using their personal mobile devices doesn’t have to be a huge pain point for IT. High schools are quickly embracing BYOD in part because students are among the biggest consumers of the smart devices. Teachers and administrators also use their own devices to access Internet-based educational content and reference materials.

Start by defining a BYOD policy that outlines groups of users that need network access, including students, teachers, administrative staff, classified employees, guests, substitute teachers, guest lecturers, and parents.

You should also define access policies per device type. For instance, will you allow students and teachers to access educational applications from their personal smartphones and tablets if they have not been registered them? You may also want to differentiate access to content and applications according to groups of users.

The Aruba ClearPass Access Management System™ makes it easy for IT to manage personal and IT-issued mobile devices that securely connect to your WLAN. ClearPass differentiates access by user and device, securely onboards and provisions devices, and ensures that any student-owned device can pass a minimum posture assessment.

With ClearPass, you can ensure that each student, teacher and parent has the right access privileges based on who they are and what device they have, while also giving you a record of who was on your network for compliance requirements.

Choose a WLAN architecture that fits your needs.

Many schools start with standalone, consumer-grade APs for Wi-Fi connectivity, but quickly find that they do not provide the scalability, reliability, manageability and security that’s needed in school environments. Nonetheless, there is no one-size-fits-all WLAN solution – every school and every district will have very unique requirements.

In many K-12 schools districts, enterprise-grade APs that utilize a distributed WLAN architecture can offer the simplest, most efficient and cost-effective WLAN solution. As the name implies, Wi-Fi and security functions are distributed to the individual APs that make up the WLAN.
Conversely, many school districts have complex WLAN requirements and rely on a variety of mobility services to manage security, policies and network performance on a per-user and per-device basis. These schools might be better served by a centralized WLAN architecture that uses controllers with more processing power and 802.11n APs.

With Aruba, schools get the best of distributed and centralized WLAN architectures. Aruba Instant, which employs a distributed architecture, can be installed at a single school site or at multiple locations. It’s a feature-rich, enterprise-grade WLAN that combines affordability and configuration simplicity.

With Aruba Instant, one dynamically-elected AP automatically distributes the network configuration to other Instant APs in the WLAN. Simply power-up one Instant AP, configure it over the air, and plug in the other APs – the entire process takes about five.

School districts that want to create a single cohesive network that unifies wired and wireless access across indoor, outdoor and remote locations should consider deploying an enterprise-grade WLAN using Aruba Mobility Controllers.

With Aruba, K-12 schools can start with Aruba Instant and protect their investment as needs grow. If the number of sites expands or there’s a need to integrate wired, wireless and VPN connectivity into one cohesive network access solution, Aruba Instant APs can be re-imaged as 802.11n campus APs and migrate to a centralized Mobility Controller architecture.

Insist on strong WLAN security.

Security is a major concern for K-12 schools, and threats come from insiders, such as students, as well as outside attackers. As a result, WLANs with role-based access privileges that are tied to a user’s identity offer exceptional protection.

Traditional wired networks only apply access rights to switch ports or VLANs. But mobile users and devices, by definition, do not connect to the network through a fixed port. Now that users are mobile, the network must identify every user and device that connects. The network must apply policies so that the appropriate access is granted.

Aruba supports strong authentication and encryption, and also enforces role-based access controls. An ICSA-certified stateful firewall enforces access policies that specify who may access the network, how and when. The firewall can be integrated with content security appliances and network access control policy engines.

Aruba also integrates wireless intrusion protection into the mobility infrastructure without requiring separate RF sensors and security appliances. And while eliminating threats and interference, Aruba continues to optimize WLAN performance.

In addition to protecting the wireless infrastructure, schools are also responsible for protecting the welfare of students. For example, the Children’s Internet Protection Act (CIPA) requires K-12 schools and libraries in the United States to use Internet filters and implement other measures to protect children from harmful online content.

This is especially challenging when schools issue laptops, notebooks and tablets to students. The school district maintains responsibility for protecting students even when they view Internet content from these devices at home.

To help schools achieve CIPA compliance, Aruba Instant provides integrated web filters as well as malware and botnet protection to every connected device with an OpenDNS service subscription. OpenDNS is the easiest way to protect students, comply with CIPA and continue to receive E-Rate funding.

With Aruba Instant and OpenDNS, administrators can rest assured that their wireless Internet connection is safe and secure. Inappropriate web content, malware and botnets don’t get on the network, regardless of application, protocol, port or device.
8 Leverage AirPlay and AirPrint.

Enabling access to Apple Bonjour services like AirPlay and AirPrint is more crucial than ever in K-12. Bonjour-enabled Apple TVs and wireless printers allow IT to reduce the cost of infrastructure deployment and management.

Applications include teachers being able to easily project to HD televisions in the classroom from their mobile devices or getting access to the closest wireless printer based on their location.

Apple Bonjour is designed for home use and enables service discovery within a single IP subnet. Aruba AirGroup™ overcomes this challenge by making Bonjour services available across multiple IP subnets.

The only technology of its kind to consider a user’s role within an organization – such as a teacher – AirGroup also considers the devices that teacher uses and the teacher’s location before making Apple Bonjour services available.

With Aruba AirGroup, you’ll eliminate the need to configure SSIDs, VLANs, IP subnets and MAC filters when launching Apple Bonjour services, which simplifies deployment and ongoing management.

9 Simple, centralized management.

Budgets are lean in most K-12 districts, and deploying pervasive Wi-Fi to support digital learning cannot add to the IT administrative burden. Schools require a WLAN that’s easy to manage and configure, even across multiple campuses, from a central location.

Aruba Instant can be set up in a few minutes by any non-technical person. Just configure one Aruba Instant AP over the air using a simple, wizard-driven process.

To configure additional Aruba Instant APs, simply connect and power them up. The first configured Aruba Instant AP automatically configures all other Aruba Instant APs.

For large installations across multiple sites, the Aruba Activate™ service significantly reduces deployment time by automating device provisioning, firmware upgrades, and inventory management. With Aruba Activate, Instant APs are factory-shipped to any site and configure themselves when powered up.

For greater efficiency, Aruba AirWave gives IT end-to-end visibility and centralized control to manage mobile users that connect to the network. A multivendor system, AirWave also manages generations of products from leading vendors – from fat APs to thin, from legacy 802.11a/b/g gear to the latest 802.11n mobile devices.

With AirWave, it’s easy to see who is on the network, where users have accessed the network, the mobile devices they’re using, and how much bandwidth each mobile device is consuming.

AirWave provides visibility into everything that affects service quality, such as Wi-Fi coverage, APs, Mobility Controllers and the wired network. It also comes with tools that improve network operations and manage RF security, including user location and mapping, real-time monitoring, proactive alerts and historical reporting.
10 Rightsize the network.

The shift to laptops and tablets is an opportunity to replace physical Ethernet ports with affordable and pervasive 802.11n Wi-Fi coverage.

The reduction in wired Ethernet ports can slash upgrade bills, decrease ongoing operational costs, and lower the carbon footprint. Similarly, voice over Wi-Fi allows schools to obsolete wired phones in classroom and administrative offices along with their associated support costs.

With Aruba, schools can reduce their total cost of ownership by 70%. The California State University System used Aruba to rightsize networks at 23 campuses and saved $30 million by relying more on wireless and less on wired.

Aruba unifies wired and wireless into one cohesive network access infrastructure. Network, security, and management services are unified and controlled locally from the data center. These mobility services are required for every access network on-ramp, including Mobility Access Switches, 802.11n Instant APs, VPN connections and branch office networks.

Equivalent services from a legacy vendor require disparate systems and cost up to three times more than Aruba.

Embrace Digital Learning with Confidence

According to the Georgetown University Center on Workforce and Education, 63 percent of all jobs will require a college degree or above by 2018. And preparing our children to compete in a rapidly changing economy is no small task.

Today’s students are digital natives, and readily immerse themselves in the immediacy and collaboration of digital learning. By applying these best practices, you can be confident that the WLAN for your digital learning initiatives will be fast, reliable and affordable so that educators can focus on their jobs – teaching our children.