



Best practices for WiFi in K-12 schools

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Introduction

Educators around the world are actively working to build more engaging and personalized learning environments that give students the opportunity to be independent, self-directed learners and to have choice in how they learn and how they show mastery of that learning.

To enable this new approach, educators are increasing their reliance on technology as an essential learning tool. Technology gives teachers access to an array of actionable data and tools to design personalized experiences that support individual learning styles. It gives students access to the information and resources needed to collaborate, self-direct and produce authentic work.

With technology firmly integrated in the learning process, students develop needed skills to successfully transition into college and/or a career by preparing them to effectively utilize tools, knowledge and information. Technology can also extend student learning well beyond the school day to enable learning any time, any place and at any pace.

As school districts increase technology access for students and staff, whether through school provided devices, bring-your-own-device (BYOD) programs, or a hybrid approach, they must ensure the district wireless LANs (WLANs) can deliver the reliability, performance and security needed to keep learning time productive.

This best-practices guide explores the top 10 considerations when choosing a WLAN to support digital learning initiatives and provides assistance in selecting a WLAN architecture.

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 technology integration in teaching and 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 integration.

How extensively teachers and students will use digital content, tools and internet resources in learning 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 learning.

In meeting one-to-one computing and BYOD initiatives, many schools are putting an access point (AP) in every classroom to ensure sufficient WiFi 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 WiFi 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. Opt for 802.11ac WiFi.

The growing number of devices that can view video and multimedia are increasing the need for additional 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. And as online assessments become a major factor in the learning environment, school districts need to ensure that students taking tests at the same time get a sufficient amount of bandwidth.

Consider upgrading to 802.11ac. It's faster, especially in high-density environments, and provides better range, even for 802.11n clients. That means increased bandwidth for classrooms with high concentrations of mobile devices and multimedia applications.

Controllerless Dell W-Series Instant APs and Dell Mobility Controller-based WLANs deliver high-performance WiFi connectivity that supports the rigorous demands of schools.

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

Additionally, with ARM ClientMatch™ technology, devices are automatically steered to the best AP. This boosts WLAN performance and ensures consistent client performance.

4. Know what applications the network will support.

The learning experience can't be disrupted by an unreliable network. Whether accessing bandwidth-hungry, delay-sensitive video, accessing information and applications on the Internet, or ensuring students have the required bandwidth to complete end of year assessments online, educators depend on reliable network performance to keep learning time productive.

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

With Dell, you can be sure that daily learning activities, such as student collaboration in the cloud, online applications like BrainPop, and critical classroom management applications, such as Hapara and ClassPolicy work well over WiFi. And during the critical times periods when students are taking on-line assessments, IT can ensure adequate network bandwidth is being delivered so that students aren't affected by network delays or disruptions.

Dell provides priority traffic handling, channel load-balancing, band steering, airtime fairness and other Quality of Service (QoS) controls to ensure that WiFi 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.

5. 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 Dell W-Series 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.

6. Choose a WLAN architecture that fits your needs.

Many schools start with standalone, consumer-grade APs for WiFi 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, WiFi 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 802.11ac APs.

With Dell, schools get the best of distributed and centralized WLAN architectures. Dell can help customers deploy a distributed architecture which 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. One dynamically-elected InstantAP 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 minutes.

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 Dell Mobility Controllers.

With Dell, K-12 schools can start with Dell Instant APs 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, Dell Instant APs can be re-imaged as campus APs and migrate to a centralized Mobility Controller architecture.

7. 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.

Dell 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.

Dell also integrates wireless intrusion protection into the mobility infrastructure without requiring separate RF sensors and security appliances. And while eliminating threats and interference, Dell 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, Dell 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 Dell 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. Simple, centralized management.

Budgets are lean in most K-12 districts, and deploying pervasive WiFi to support technology integration in teaching and 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.

Dell Instant APs can be set up in a few minutes by any non-technical person. Just configure one Instant AP over the air using a simple, wizard-driven process. To configure additional Dell Instant APs, simply connect and power them up. The first configured Dell Instant AP automatically configures all other Instant APs.

Dell W-series 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 802.11ac mobile devices.

AirWave provides visibility into everything that affects service quality, such as WiFi 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.

9. Right size the network.

The shift to laptops and tablets is an opportunity to replace physical Ethernet ports with high-performance 802.11ac WiFi coverage.

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

Dell unifies wired and wireless into one cohesive network access infrastructure, helping schools reduce their total cost of ownership by up to 70%. 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, 802.11ac 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 Dell.

10. Take advantage of available E-rate funding

Recent changes to the federal E-rate program are providing opportunities for many schools throughout the country to upgrade their WiFi network. With up to \$1 billion annually in dedicated funding and process changes to speed to release of funds to qualified applicants, upgrading WiFi will be more affordable than ever.

Make sure you track the E-rate program as it evolves and be ready to take advantage of available funding to invest in the district's WiFi infrastructure.

Embrace digital integration with confidence

We are witnessing a profound transformation in the learning environment. As school districts design more engaging and personalized educational experiences, students will have the opportunity to become self-directed learners, demonstrate a mastery of that learning and develop the required skills to successfully transition to college and/or a career.

As administrators expand access to advanced technology for students and staff, they need to ensure that the district WLANs can deliver the reliability, performance and security needed to provide an enhanced educational experience. By applying these best practices, administrators can be confident that the WLAN will be fast, reliable and affordable so that educators can focus on their jobs – teaching our children.

To learn more, visit dellnetworking.com.