aruba
NETWORKS

BLUEPRINT FOR THE NEXT-GENERATION CLASSROOM

INTRODUCTION

With the onset of Common Core, a growing number of schools are adopting technology initiatives to deliver a rich learning experience by engaging students through the devices and applications they thrive on.

Textbooks are being swapped out for e-books that download content in real time. Transition to district-wide online testing is becoming critical. One-to-one and BYOD initiatives are becoming more popular than wired computer labs. Skype and Google Hangouts are fueling new study groups. And virtual field trips are creating new student development opportunities.

As a result, IT must look to the future and build a next-generation infrastructure that supports digital classroom learning and emerging technologies. Following are the critical steps that can help you build a next-generation classroom for Common Core and beyond.

START WITH A ROBUST WI-FI INFRASTRUCTURE

Supporting digital learning, especially in one-to-one environments, means you'll need a Wi-Fi infrastructure that can support the influx of mobile devices along with the bandwidth-hungry applications running on them. There are several things you can do to prepare for this.

Plan to support 3-4 mobile devices per student, teacher devices, wireless printers, and other wireless equipment in the classroom. That means, in a classroom of 30 students, about 100 devices will connect to the network.

Assess classroom application needs by collaborating with teachers to support a rich multimedia curriculum. For example, HD-quality video streaming requires 4 Mbps and interactive learning games require 1 Mbps of bandwidth per user.

Don't let poor access point (AP) performance drag down the entire network. As students roam between APs, their devices can get stuck on an AP instead of associating with a closer one that has a stronger signal.

ARUBA RECOMMENDATION

Migrate to an 802.11ac WLAN with advanced RF management capabilities. Most Aruba K-12 customers are deploying one AP per classroom for a richer Wi-Fi learning experience.

As more users, devices and apps connect, 802.11ac can best handle the increased network traffic. It gives you faster gigabit throughput and greater client density. It even makes 802.11n devices go faster. Learn more about best practices for migrating to 802.11ac.

WLANs with built-in RF management technology can get rid of sticky clients by gathering session performance metrics from devices and using this information to steer them to the best AP and radio. Learn more about Aruba's patented ClientMatch™ technology.

ENSURE A STABLE ACADEMIC TESTING ENVIRONMENT

New student testing systems based on computer adaptive technology such as Smarter Balanced and PARCC required by the new Common Core curriculum have published bandwidth recommendations for testing readiness.

For instance, PARCC recommends 5-50 Kbps bandwidth per user for testing, which adds up to 1.5 Mbps in a classroom of 30 students. However, the Common Core curriculum requirements of a rich digital classroom exceed these test requirements.

The more important considerations for creating a reliable testing-ready Wi-Fi infrastructure are fair wireless access for all students and the ability for IT organizations to easily manage test traffic on the network.

This can be done by ensuring that no test devices get preferential network access and that all students have a similar testing experience. Airtime fairness, an RF management feature that provides equal access for all Wi-Fi clients, must be present in all classroom WLANs.

Most critical is creating a controlled academic assessment environment. The best way to do this is by making sure that test traffic gets priority treatment over other types of traffic on the network.

ARUBA RECOMMENDATION

Deploy a smart WLAN that gives you application-layer visibility and control.

Smart WLANs recognize different types of traffic on a network and let you assign the highest priority to more important testing traffic. This capability is essential to building a solid and reliable testing environment.

In addition to testing, this application-awareness allows you to block the use of inappropriate apps and apply quality-of-service to delay-sensitive video instruction media. See how Aruba AppRF technology works.

EMPOWER TEACHERS

While technology enhances learning, it also creates new challenges for teachers in a digital classroom as students can get easily distracted on their mobile devices.

To meet this challenge, give teachers greater visibility and control over how mobile devices are used in their classrooms. This is the best way to minimize distractions and ensure that students stay on task.

ARUBA RECOMMENDATION

Choose a purpose-built classroom management system from a solution provider who specializes in classroom applications.

Award-winning classroom management systems like LanSchool empower teachers by allowing them to observe and control student device screens, co-browse, block apps and keep everyone focused on learning.

LanSchool uses efficient screen capture and transfer methods. For instance, if the entire teacher's screen is changing, LanSchool only uses about 24 Kbps to transfer that image to the students' screens. This is less than 1% of a 100 MB network.

SUPPORT BYOD WITH CONFIDENCE

Students, teachers, staff and guests connecting to the school network with a variety of personal devices creates a tough challenge for IT. How to you give Wi-Fi access to these devices and keep the network secure with limited IT resources?

Choose a device onboarding solution that best meets your needs. If you're strapped for resources like many K-12 IT organizations, you'll want a solution that automates and simplifies the onboarding process without sacrificing access security.

Once onboarded, enforce differentiated network access based on contextual information like user roles, device types and location. This contextual granularity is vital to securely manage and enforce differentiated policies.

ARUBA RECOMMENDATION

Deploy a network access solution that simplifies device onboarding with self-enrollment and grants network access privileges based on user roles, device types and location.

For onboarding, consider a simple captive portal that displays a web page, similar to a Wi-Fi hot spot. Here, students can simply accept the connection or sign in using their school credentials if you want to map traffic back to an individual user.

802.1X authentication with AES encryption is even more secure. Users can simply enter a user name and password or they can self-enroll by automatically generating and installing device certificates through a web portal with no IT assistance.

Let users onboard their own devices and control access based on contextual data – user roles (students, teachers, staff), device types (laptops, tablets, smartphones) and location (classrooms, common areas, district offices). Learn how Goddard Public Schools onboarded 5,500 students.

LEVERAGE LOW-COST TECHNOLOGIES

Schools everywhere are exploring network-shared devices like Apple TVs as low-cost alternatives to traditional projectors. However, it's important to consider how they can be securely deployed on your network.

Consequently, you'll need to prevent students from hijacking Apple TVs to share inappropriate content or causing disruptions in class. At the same time, teachers must be able to grant access to groups of students who present their projects to the class.

ARUBA RECOMMENDATION

Choose an access management solution that securely enables network-based AV services over the air and allows you to enforce policy-controlled access.

Look for a solution that lets you control which AirPlay and AirPrint devices are visible to teachers, students and staff. This visibility should be based on a user's role, location and what device they're using. See how Fraser Public Schools included Apple TVs in their 21st Century learning environment.

SIMPLIFY NETWORK MANAGEMENT

Despite having limited IT resources, you can keep digital classrooms running by looking beyond traditional network management for a simpler and more cost-effective multivendor solution that meet your district needs.

Opt for an integrated management solution rather than multiple, siloed point-products that solve only one or two management issue. This approach will enable you to better manage IT time and resources.

Also be sure that your solution of choice can manage the application and device experience of users on multivendor networks that extend across geographically dispersed locations – from school campuses to district offices and maintenance yards.

If IT resources are scarce, you should definitely consider a cloud-based management solution. Cloud-based management can reduce the cost and complexity of IT operations by eliminating the need to install and maintain lots of individual management appliances.

ARUBA RECOMMENDATION

Choose a multivendor network management solution for a complex network infrastructure or a cloud-based solution for a simple and cost-effective deployment.

Whichever you choose, be sure that your solution of choice allows you to manage multiple generations of wired and wireless networking equipment from multiple vendors through a single, centralized pane of glass.

Cloud-based management is subscription based with network management services hosted in the public cloud. The great thing about cloud-managed Wi-Fi is that it reduces both capex and opex. Learn how Fairfax County Public Schools centrally manages Wi-Fi at 238 locations.

MOBILIZE THE WIRED NETWORK

The wired networks that used to support teacher and staff devices and a handful of computer labs must be upgraded to meet the dynamic requirements of mobile learning.

To mobilize your wired network, it's important to avoid creating bottlenecks where traffic enters your access switches. For example, 802.11ac supports gigabit Wi-Fi speeds so your access switches should be equipped with 10 gigabit uplinks.

It's also important to anticipate how you'll modernize and support network and IP services as hundreds more mobile devices wirelessly connect at every school. And with wireless outpacing wired, what should you do with all those unused wired ports?

ARUBA RECOMMENDATION

Mobilize your wired infrastructure to support the network and IP services you'll need to handle the onrush of mobile devices.

Wired networks that are designed for mobility apply policies to users and devices based on the same contextual data as wireless. So instead of creating and managing separate access policies for wired and wireless, you'll have one consistent set of policies for both.

802.11ac is designed to support digital learning in classrooms that have high concentrations of mobile devices. Get your wired network ready for 802.11ac by supporting the latest APs on every 802.3at PoE+ port and 10-gigabit uplinks to unleash the full potential of gigabit Wi-Fi.

Rethink VLANs. Consider software-defined flow-based policies that optimize wired and wireless traffic paths without changing your existing network. Also consider how you'll scale DHCP and AAA servers to handle the influx of mobile devices.

Rightsize your wired infrastructure by reducing the number of switch ports in your wiring closet. In doing so, you'll reduce your capex and opex and be in a great position to redirect the savings to digital learning initiatives for the classroom.

CONCLUSION

With the right network infrastructure planning, you can not only be Common Core-Compliant, but also empower teachers and students to leverage the latest technology in devices and applications for a richer learning experience while streamlining IT operations across campus.

Summary of Aruba recommendations for a next-generation classroom:

- Deploy one 802.11ac AP per classroom to address device density and rich applications.
- Prioritize testing traffic on the network for a reliable and controlled test environment.
- Keep students focused on learning with purpose-built classroom management systems.
- Simplify the onboarding process by having users enroll their own mobile devices.
- Grant network access privileges based on user roles, device types and location.
- Strengthen the security Apple TVs in classrooms using policy-based access controls.
- Simplify network management and migrate toward a mobility-centric infrastructure.

Aruba Networks is a leading provider of next-generation network access solutions. For more information about Aruba K-12 solutions, please visit http://cloud.arubanetworks.com/k12.

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