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Challenges IT Organizations Face in Supporting Educational Facilities and How To Address Them

Tech Brief

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Networks supporting educational facilities face evolving demands as well as present opportunities. In recent years (particularly due to the COVID-19 pandemic), technology in the education sector has advanced to provide new learning methods to both students and teachers, while IT organizations have struggled to support them.

This doesn't come as a surprise. After all, the educational sector has its own set of unique challenges, and these definitely impact the network and those supporting it. Network managers face strict budgets, new eLearning tools, a widely distributed environment, increasing demand for wireless connectivity, and security intrusions from both inside and outside the facility - not to mention the massive shift from paper to digital for almost everything students do.

These are the challenges network operations staff face while school is in session. However, during times of unexpected crisis, such as the COVID-19 pandemic, on-site utilization of networks and IT systems slows to a halt. When students are in class, network operations face problems with congested links, loaded servers, and noisy Wi-Fi – but now there is an opportunity. Low-utilization periods are excellent times for benchmarking performance, throughput testing, and discovering and resolving latent issues lurking in the system. Problems can be mitigated without the competing student traffic which can make them harder to find. And in fact, NOW is the time to re-assess the network infrastructures, prior to students returning to on-site learning.

But how can network engineers and technicians maximize times when school is out? What tools and methods can help them resolve problems ahead of time, while staying on top of new issues throughout the year?

Let's look at the top five challenges facing network operations in the educational sector and some best practices to resolve them – or prevent them in the first place.

TOP FIVE CHALLENGES IN THE EDUCATIONAL SECTOR

1. Distributed Network, Many Remote Sites to Support

Educational organizations, by the very nature of what they do, may be the most distributed of all sectors. Some districts support over 1,000 schools and satellite facilities. Keeping the network safe, secure, and current is not easy, especially when budgets restrict the number of network engineers and technicians on staff.

When a problem strikes that affects one or more sites, having the right combination of visibility, expertise, and remote assistance is crucial to resolving it quickly. Most issues cannot wait until an experienced engineer is available for troubleshooting to begin.

2. Keeping the Wi-Fi Network Secure
Cybersecurity is a challenge for organizations of any size in today's climate. One factor that is especially unique to the educational sector is protecting the network from internal breaches. It is not uncommon for network engineers to detect rogue access points that could allow students to access internal systems and bypass internet access policies.

3. High Wi-Fi Density
Student materials have largely shifted from paper to digital. Rather than carry a book for each class, now students connect one, two, or even three devices to the school network to access course guides and submit homework. The demand for high quality connectivity doesn't stop in the classroom. Throughout the day students drift from hallways to cafeterias, libraries to gymnasiums, expecting the same level of service everywhere.

This thirst for Wi-Fi has taxed the expertise of local network technicians, who don't have the RF skills necessary to build solid coverage with low interference and high throughput. In far too many locations, they simply add more AP's and hope for the best, but then inadvertently cause more performance degradation due to increased co-channel interference.

4. Wide Technology Base, Limited Staff Experience
Network engineers and technicians have a difficult job. In some industries, IT budgets allow for enough personnel to allow each to specialize in a different aspect of the environment – be it network, data center, Wi-Fi, or security. However, in education this luxury rarely exists. Most IT staff are tasked with supporting a wide variety of roles, which makes it difficult to be an expert at any one of them.

In addition to this, the distributed nature of educational environments makes it difficult to provide each technician with the tools and training they need to quickly isolate and mitigate problems.

5. Documentation of Devices, Wi-Fi coverage, PoE and Connection Validation
Things change at a rapid pace in education. Keeping up to date documentation of network devices, connectivity maps, Wi-Fi coverage, and cabling testing/validation is beyond a challenge. As more pressing issues arise day to day, documentation is often put to the side – until a major problem hits and it is needed the most.

How can these challenges be met with present staff, all while staying on top of technologies and trends to come? It's all about having network visibility that won't break the bank, is simple to use, is easy to cross-train, automates the documentation process, and enables collaboration between experts and less experienced technicians. Thankfully, the education sector has an ally.

EtherScope® nXG network discovery feature makes it simple to find what is connected to the wired and wireless environments

NETALLY - MEETING THE IT CHALLENGES FACED IN EDUCATIONAL FACILITIES

1. Distributed Network, Many Remote Sites to Support

When users experience a problem at a remote site, network engineers need to quickly determine if the issue is at the client end, on the network between, or something in the server environment. The EtherScope nXG is designed with local network discovery and path analysis to determine what devices are connected at the remote office.From any location, engineers can remotely generate tests back to the server environment to measure the network roundtrip time, server connectivity, and application response time. If the network seems to lag, throughput tests and path analysis can spotlight network weak spots and help to focus troubleshooting in the right place. These tools are also useful for stress testing the network and validating connections when school is not in session.

Local technicians can also run automated tests with the LinkRunner G2 and AirCheck, which can upload results to the Link-Live Cloud service for analysis and escalation to centralized network engineers. These tools make it easier for teams in distributed environments to collaborate on troubleshooting efforts and solve problems faster.

2. Keeping the Network Secure

Engineers need to stay on top of what is connected to the network and where – on both wired and wireless. Automated network discovery is essential to know if any new or unexpected devices are lurking in the shadows, especially any new devices identified with a MAC ID of “Linksys”, “Netgear” or “TP-LINK”. The EtherScope nXG network discovery feature makes it simple to find what is connected to the wired and wireless environments and document them to Link-Live. Engineers can also install third party security tools on the Android OS for port scans and other cybersecurity tests, which can help them lock the network down when class is not in session.

In the local environment, network technicians can use the device discovery feature of the AirCheck to monitor wireless devices that advertise connectivity and hunt down any rogue AP’s.

3. High density in Wi-Fi

Robust, high performance, high density wireless networks are difficult to implement without the ability to “see” the environment. Beyond the basic challenges of connecting thousands of devices in a somewhat confined space, network engineers need to ensure that channel interference and RF noise are kept to a minimum.

Site surveys are simpler to run and interpret when contending client traffic is low. Engineers can take advantage of times when school is out to analyze the environment and ensure that the architecture is well designed for high-quality Wi-Fi. AirMapper, available on the EtherScope nXG and AirCheck G2, helps network engineers to visualize signal and noise

measurements across a floorplan, enabling them to find blind spots and interference points. AP configurations can be adjusted and noise sources located to ensure that the Wi-Fi environment is able to meet student demand.

4. Wide Technology Base, Limited Staff Experience

With engineers and technicians facing new technologies nearly every day, it is a challenge to help them stay current, effective, and equipped to stay ahead of the curve. They need tools that are simple to use and interpret, while giving the detail needed to really find and resolve the root problem, no matter if it is on the wire or wireless network, in the data center or on the edge.

LinkRunner G2 and AirCheck are designed with these specific technicians in mind. One-click autotests allow them to validate DNS, DHCP, LLDP/CDP, switch connectivity, service ping, TCP connectivity, throughput testing and application response. The results are sent to LinkLive where engineers in any location can assist in interpreting them when necessary.

5. Documentation of Devices, Wi-Fi coverage, PoE and Connection Validation

No doubt about it, documentation is very hard to maintain and prioritize, especially in environments as dynamic as educational facilities. With this challenge in mind, all NetAlly tools are designed to upload test results to a complementary cloud-based environment called Link-Live. Here, IT organizations can maintain a one-stop spot for automated network documentation such as: connectivity tests, device discovery, network mapping, Wi-Fi heatmaps, packet captures, signal coverage maps, channel tests, throughput tests and much more.

CONCLUSION

Networks in educational facilities are a challenge to build, maintain, expand and monitor. Engineers and field technicians of all experience levels can stay ahead of the game with the right tools, equipping them to spot and resolve network problems quickly. Armed with the right methods, they can take advantage of times when the hallways are empty to stress test the network and resolve issues before students come back to class. This will enable teachers to fully utilize the technology of today while training and preparing the workforce of tomorrow.