A Networking Roadmap for the Future of Education

EDUCATION IT LEADERS MUST PLAN FOR THE NEAR TERM AND THE LONG TERM.

THE FACE OF EDUCATION CONTINUES TO EVOLVE. Education IT leaders find themselves planning to provide sufficient bandwidth and capacity to support use cases like distance learning and smart campus initiatives. They're working diligently to ensure the foundational network infrastructure is in place to handle not only current demands, but also support future ones.

Education IT leaders are faced with a matrix of factors including the level and quality of internet access across districts, the role of education within the community, and the inevitable "human element." The network technologies that support and enable education are also changing and evolving. There are a handful of new technologies and services like:

- SD-WAN
- Secure network gateways
- Cloud-based learning platforms
- Dedicated internet services
- Managed network services
- 5G

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SD-WAN: A technology like SD-WAN is uniquely suited to support educational networks for both on-campus and hybrid learning, as it provides greater redundancy and resiliency. It also delivers low-latency connectivity to help keep online and remote classrooms connected, especially when operating over a high-speed fiber optic network. This is the most effective combination to achieve low latency and superior bandwidth. SD-WAN also has security features to help protect both the network and data.

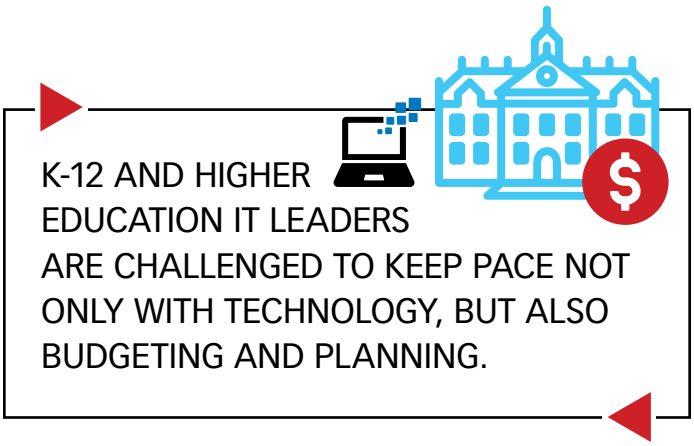
Secure Network Gateways: Operating a secure network gateway is also a fundamental element. Secure network gateways are essentially checkpoints to prevent unauthorized traffic from entering an educational institution's network. They help block malware, viruses, and other malicious traffic. And it's a two-way street, ensuring that users can only access secure and approved websites.

Cloud-based Learning Platforms: The increased availability and use of cloud-based learning platforms has been an expansive shift in educational technology. They convey a variety of benefits for students, teachers, and IT staff. For the students, they simplify collaboration and increase access to resources. And on the faculty and administration side, they are secure, cost-effective, and relatively low-maintenance.

Dedicated Internet Services: Reliable access to the internet is not a guarantee in all areas, but it really needs to be, especially when it comes to supporting education. The Broadband Commission for Sustainable Development has stated in published reports that the challenge is "to help teachers and students use technology … in relevant and authentic ways that actually improve education and foster the knowledge and skills necessary for lifelong learning."

Managed Network Services: By selecting and working with a managed network services provider, especially one focused on education, schools and universities can optimize their spending and gain access to capabilities that might otherwise be out of reach. Educational institutions often have limited IT staff and resources. Managed services providers can handle complex network functions like troubleshooting, integration, and technical support.

Emergence of 5G: There has been much discussion about the promise of 5G, and it is now becoming more widespread. As more 5G networks expand their reach, they will bring increased bandwidth, lower latency, and higher capacity. There are internet of things (IoT) technologies that will support smart campus infrastructures, and 5G will play a critical role facilitating those initiatives.



Enduring Challenges

Nevertheless, school districts and higher education IT leaders face a host of challenges. They have to plan not only for the next year, but the next decade. They must provide the capacity and capability to support educators right now and be ready to expand that support as requirements evolve and grow.

K-12 and higher education IT leaders are challenged to keep pace not only with technology, but also budgeting and planning. New education environments include hybrid learning, immersive learning, and smart campuses. Within these environments, education network decision-makers face three fundamental challenges:

- Security
- Lack of resources, including staffing shortages
- Limited bandwidth

To one degree or another, engaging a managed network services provider can help address these challenges. It boils down to availability and cost. Many schools and universities struggle to find qualified staff, and often face reduced IT budgets. In fact, a recent survey conducted by educational technology community EDUCAUSE found 63% of colleges had dramatically reduced IT budgets for the 2020-2021 academic year.[1]

That could change in the coming academic year, however, at least at a high level. The 2022 U.S. Department of Education budget proposal includes $102.8 billion in new discretionary budget authority, a 41% increase over 2021.

Despite budgetary and technological challenges, schools must continue to support their student populations, teachers, and administrative structures. And challenges around security, lack of resources, and limited bandwidth aren't going away.

Ensuring Adequate Security: Networks in K-12 and higher education have been easy targets for cybercriminals. According to a recent report, 2020 marked a "record-breaking" year for cyberattacks against public schools in the US.

The report, produced by the K-12 Cybersecurity Resource Center and the K12 Security Information Exchange, indicates 408 publicized school cyberattacks in 2020—an 18 percent increase over 2019. Nearly 40 percent of those incidents were data breaches, and approximately 12 percent were ransomware attacks.

Education by its very definition is about providing easy access to information and resources. The delicate balance between access control and ensuring sufficient security is most evident in the education realm.

Security breaches at educational institutions can be particularly troubling, in that student and faculty personally identifiable information is at greatest risk. It is increasingly important for schools to focus on preventive tactics such as:

- Extensive network monitoring and management
- Network segmentation
- Ensuring comprehensive and up-to-date patching
- Secure identity management and access control
- Faculty and staff training

Lack of Resources: Educational institutions across the spectrum are looking to managed services to bolster expertise and capabilities within stringent budgetary constraints. These days, educational institutions can find a current and capable managed network services provider who can provide comprehensive, strategic technology solutions—and support those solutions with IT and operational processes that in turn support evolving educational practices and technology.

Limited Bandwidth: Bandwidth capacity is certainly an enduring issue, especially as students and faculty do more online and with cloud-based services. Deploying scalable SD-WAN networks can certainly help with bandwidth considerations. They can also integrate with existing networks to create a hybrid framework to help continue to realize value from existing network investments.

The Promise of Next-gen Network Technology

To adequately address these challenges, and best prepare not only for the next year, but also the next decade, education IT decision-makers are looking to next-gen technology. And they are ensuring they have sufficient technical expertise to do so, either within their own ranks or by partnering with the right service provider.

As education evolves, emerging next-gen technologies will play a significant role. But how will IT leaders supporting educators best plan for them and ensure they have both the budget and the expertise? Emerging game-changing technologies include:

- Connected campus
- IoT sensors to drive smart campus settings
- Smart utilities and other smart devices
- Expanding access to mobile hotspots
- Virtual reality/immersive learning environments
- Leveraging intelligence to increase security

The emergence of these next-gen technologies is closely related to the expanding use of the cloud and smart services. Connected campus technologies are helping drive greater classroom engagement, fostering increased collaboration, and laying the groundwork for the smart campus. In fact, according to a recent survey conducted by the Center for Digital Education, 86% of education IT leaders believe the connected campus is the campus of the future.[2]

The continued emergence of 5G will help drive these efforts. As 5G becomes available, its increased capacity will help keep students and faculty alike connected. It will help facilitate remote and online learning environments and power immersive education environments like virtual and augmented reality.

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As more educational activities and processes rely on the internet, moving to SD-WAN can help ensure bandwidth capacity without crushing budgets. Educational institutions using SD-WAN can also take advantage of its increased resiliency, efficiency, ease of management, and security.

Security of course remains an enduring concern. The recommended approach to an effective cybersecurity program is fairly straightforward. Fully assess weaknesses and vulnerabilities, as well as strengths, and the evolving nature of cyberthreats. Then establish a program to balance the costs and necessary level of cybersecurity based on an intelligence-driven methodology.

Checklist for the Roadmap

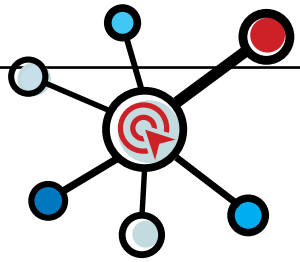
Education IT leaders as well as school district and higher education administrators are focusing on not only the immediate future—the next year—but also the next decade. Their near-term and long-term plans must be to provide scalable, secure connectivity, and engaging educational environments including hybrid learning, immersive learning, and smart campuses for students at all levels.

It's time for education IT leaders to plan for and implement advanced technologies like SD-WAN to help ensure capacity for now and in the future. They should frame their roadmaps for the full life cycle, from architectural design and strategy to integration, implementation, and even retiring components. And involve faculty as well as administrators in the decision-making process.

When it comes to matters that stretch the boundaries of in-house expertise, or the boundaries of the budget, education IT leaders should consider having a managed network services provider assist with network modernization. Here are some potential guidelines to keep in mind:

- How will the provider protect student and institutional data?
- Exactly what services will they provide?
- What are the upfront, ongoing, and potential additional costs?
- What is the support structure?
- What is the exit strategy?

The impact of 5G is another important consideration. When 5G becomes more widespread—from immersive learning experiences and other bandwidth-heavy use cases to IOT solutions like intelligent lighting—education IT leaders will need to help ensure a smooth and secure transition.



EDUCATIONAL PROCESSES ARE EVOLVING, AS IS THE TECHNOLOGY THAT SUPPORTS THEM. IT'S IMPORTANT THAT EDUCATION IT LEADERS TO MAKE PLANS THAT ADDRESS THE PRESENT AS WELL AS THE FUTURE.

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[1] https://er.educause.edu/blogs/2020/10/educause-quickpoll-results-it-budgets-2020-21
[2] https://edtechmagazine.com/higher/article/2018/05/5-ed-tech-trends-redefine-connected-campus