MEETING THE DIGITAL EXPECTATIONS OF YOUR SCHOOL HEAD-ON

In order to support next-generation demands, your higher education institution needs to work with IT industry partners for a data infrastructure reboot that places a premium on the adaptive network.

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FEW ORGANIZATIONS ARE FORCED to stretch their capacity for innovation while still holding to a tight bottom line in the way that colleges and universities do. You feel it. Your institution of higher education faces the challenge of serving the demanding needs of digital learning, big data research and non-stop (student) entertainment while also reliably sustaining 24/7 operations tied to safety and security, communication, housing, transport and climate.

The network infrastructure in your environment has become a lifeblood, designed to support the technology requirements placed on it day by day while also handling anything else that comes along in the next week, month or year — the Internet of Things, bigger data, heightened security, mobile device proliferation, pervasive WiFi, streaming video, cloud computing, the evolution to 5G and more.

To better understand how networks on campuses need to adapt to support new and evolving demands, Campus Technology recently queried information technology, teaching, research and other campus professionals about how they view the current state of their institution's data and communications infrastructure and how well positioned it is for supporting students who expect any time, anywhere access to everything, and fast.

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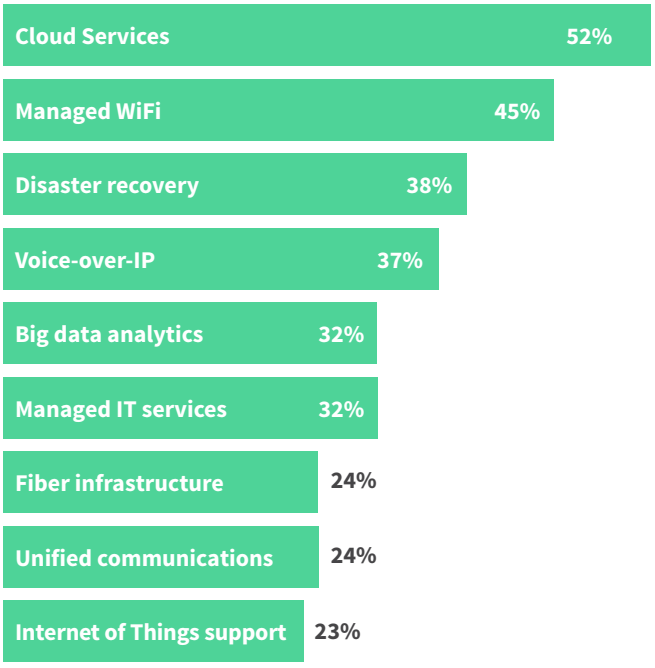
Here's the Plan

To get a feel for what's important to campuses currently, you have only to look at the topics showing up in the strategic plans for networking. The eight most common topics referenced, designated by at least a quarter to a half of all respondents, are these:



Here's the Problem(s)

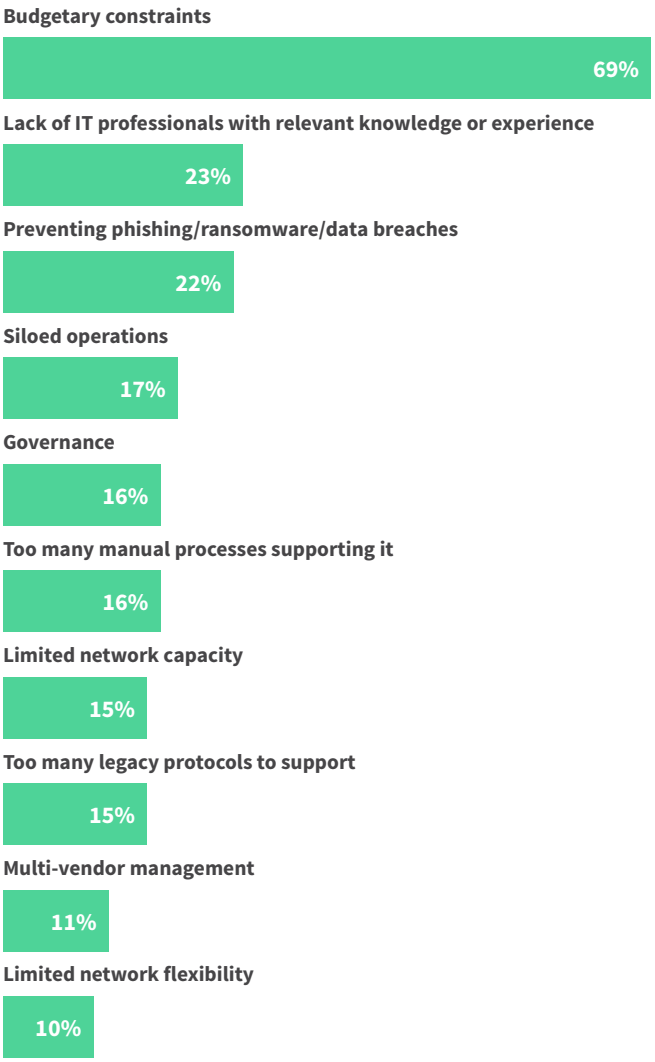
While you might consider most of these technologies as "table stakes" for the typical institution, in reality, they all impose a burden on your IT organization. Today's networks are full of legacy systems and protocols, leaving them unable to rapidly scale or adjust. Setting up, revising and tearing down even the simplest of new services requires painful manual processes.

That isn't the only kind of challenge campus professionals face with their current network infrastructure work. Also on the stack:

- Nearly 70 percent reported that budgetary constraints are their biggest hurdle.
- For the majority of respondents, whether in an IT role (75 percent) or not (62 percent), the funding issue was the most pressing among all of their worries.
- Funding problems were ranked higher at four-year privates (79 percent) than two-year colleges (76 percent) or four-year publics (63 percent).

That funding headache isn't getting any better. Although the majority of survey participants expect their budget for infrastructure to remain the same over the next year, those in two-year colleges are far more likely to see a decrease in their network budgets (44 percent). The percentages were a lot less for four-year publics (12 percent) and private institutions (17 percent).

What are the biggest challenges you face with your current network infrastructure? (responses across all survey participants)



The issues don't stop there. Schools are also facing the same hiring pinch felt by every other organization in the country, even as they continue fending off ever more complex cyber risks.

Simultaneously, demand on the network is continuing its explosive growth. The majority of respondents (71 percent) projected that over the next two years their infrastructure capacity will have to double to keep up with demand. The need appears to be the greatest among four-year private colleges; 82 percent of those respondents stated they could use twice as much capacity in that period as they currently have. A lesser but still significant share (22 percent) reported that they could easily accommodate growth of five times their current capacity. A mere handful of campus professionals said no growth in capacity was needed.

Over the next year, institutions as a whole expect to see the greatest growth in the amount of streaming video and student learning data supported on their networks. Also commanding more capacity in that timeframe: virtual conferencing, training simulations and virtual reality. Far less growth is expected for operational activities: surveillance cameras, voice-over-IP and digital signage.

The Hunt for Infrastructure Excellence

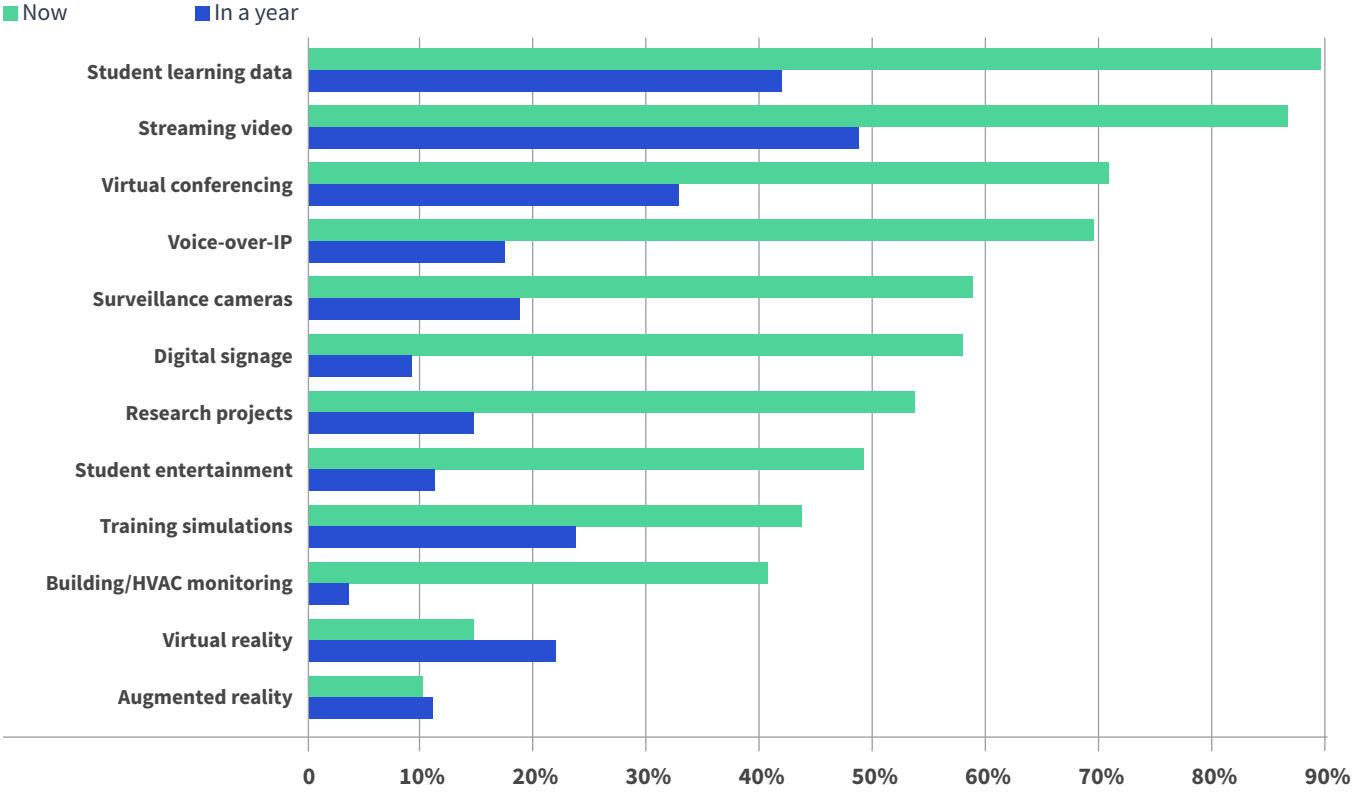
According to respondents in IT roles, colleges and universities still have a distance to go before achieving operational excellence in several key areas that leave them vulnerable to cybersecurity breaches:

- 73 percent haven't ensured that automated changes have been authorized and implemented as intended;
- 62 percent don't monitor virtual security applicant activities;
- 40 percent still don't identify and secure data traffic; and
- 33 percent lack authentication processes to prevent unauthorized users from gaining access to network functions.

Less than a quarter of individuals in IT roles (23 percent) reported that their networks encrypt all data in transit. A comparable share (27 percent) stated that they have only begun work on that.

Most institutions are also behind in forward-looking approaches for simplifying network management:

What kind of traffic is running on your network and where do you anticipate the greatest growth over the next year?



- 68 percent don't use software-defined networking;
- 80 percent don't use network function virtualization; and
- 86 percent don't use open APIs to connect disparate systems.

The use of artificial intelligence or machine learning is finally beginning to show up in network activities. A quarter of people in IT roles said they've just begun dabbling in the use of AI and ML for networking-related work.

Keeping Eyes on the Prize

Every campus leader has a funny bone — some aspect of their jobs where they're highly sensitive to knocking up against unexpected change. Network capacity issues provide an example. While more than seven in 10 people (72 percent) in leadership roles on campus said reporting about network capacity is of great interest, fewer than five in 10 non-managers (48 percent) agreed. Likewise, with broader network trends: Fifty-three percent of managers want reporting on that, while 40 percent of non-managers also think it's important.

When it comes to the network data that campus professionals would like to monitor more effectively, there are big variations between what people in IT roles would put on the list vs. non-IT people. Even though tracking of vulnerabilities is the No. 1 area for both groups, 67 percent of respondents in IT roles placed it at the top of the stack compared to 54 percent of non-IT roles. Equally wide variations exist for reporting related to latency issues, traffic patterns, traffic types and traffic peaks and valleys; in all cases those individuals in IT roles acknowledged that IT could do a better job of monitoring the entire network.

How the Adaptive Network Delivers

Figuring out the right approach for your network doesn't have to be complicated. The concept of the adaptive network can go a long way in addressing many of today's challenges, changing expectations and filling persistent gaps between what campus leaders expect and what IT is capable of delivering. Built on analytics and automation, the adaptive network provides a dynamic, programmable infrastructure that can keep up with an institution's evolving needs.

When formulating your adaptive network strategy, keep these key considerations in mind:

First, **prioritize flexibility**. Oftentimes, the biggest headaches come not from what you see now but from what you can't see yet at all — whether it's meeting the needs of a new research institute, learning initiative or institutional collaboration that didn't exist a month ago. Choosing an adaptive network solution will allow you to accommodate whatever you're going to need in the near-future and the far-future.

Second, **seek operational simplicity**. Don't assume that conventional network automation techniques (such as scripting) are enough. The optimal adaptive network is built on a mighty trio: intelligence (the use of performance data to more accurately predict potential problems and anticipate trends), software control (for handling end-to-end management of network services) and a programmable infrastructure (that can adjust physical and virtual resources as needed to meet the demands of applications running on top of it).

Fourth, **focus on your operating expense** (opex), not just any one-time capital expense (capex) restrictions. Many schools will choose networking equipment based on a lower capex — a decision that will have a big impact on opex, creating an operational nightmare. By future-proofing the university infrastructure, the adaptive network provides the right alternative to legacy rip-and-replace practices.

Finally, **stick to open standards**. Recognize that infrastructure modernization is no longer a one-step process: Even as IT is planning for the next two or three years of bandwidth growth, schools are maxing out that new capacity in just months. Yet, you can't rip out new switches and other network gear with each change in gigabit capacity. Choosing network technologies that rely on open standards not only helps avoid vendor lock-in, but also allows systems to remain more readily customizable, interoperable and modular.

Working toward the adaptive network as you modernize your operations can help you gain the benefits of nimble scaling, quick response and rapid accommodation of new service requests. More important, it will take you a long way in addressing those continually evolving digital expectations on campus and being ready to predict and solve for the next IT challenge your institution faces.

For more information, please visit:

http://www.centurylink.com/public-sector/discover/smart-campus.html

https://www.ciena.com/insights/research-education/

Notes about methodology: *Findings are based on a Campus Technology online survey open for invitation-only response in summer 2018. After filtering for appropriateness of affiliation, job roles and completeness of answers, survey results represent 123 respondents. Roles included: IT management and staff (53%), teaching and research (16%), other institutional leadership (15%) and other institutional staff (15%). Affiliations included two-year public institutions (20%), four-year publics (46%), four-year privates (28%), trade/vocationals (5%) and other (2%). Responses may not total 100% due to rounding.*