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# Schools and IT modernization:
# The latest trends in K-12 education

How school districts are modernizing their digital infrastructures.

In recent years, many school districts have been on a journey to deliver personalized, student-focused learning. The quality of the student experience is their most important concern, and they have become extremely resourceful at using technology to meet diverse learning needs and preferences. The ongoing pandemic has prompted districts to become even more flexible and creative in facilitating effective learning while also keeping students and teachers safe.

No matter whether learning and teaching take place virtually, onsite or both, it takes the right digital infrastructure to enable continuous access to educational resources, collaborative learning tools and communications. Many school districts are therefore already in the process of modernizing and restructuring their infrastructures to make this possible. Digital security and data management have become top priorities along with the student experience. Many K–12 technology managers know from their own experience that outdated infrastructure can compromise educational outcomes, result in poor system performance, complicate resource management, incur a high management workload and weaken security.

Dell Technologies is committed to helping K–12 districts achieve transformation through education and technology expertise, solutions and services. In this ebook, we use findings from both internal and analyst research to give you an overview of how K–12 school districts are thinking about and modernizing their infrastructures.

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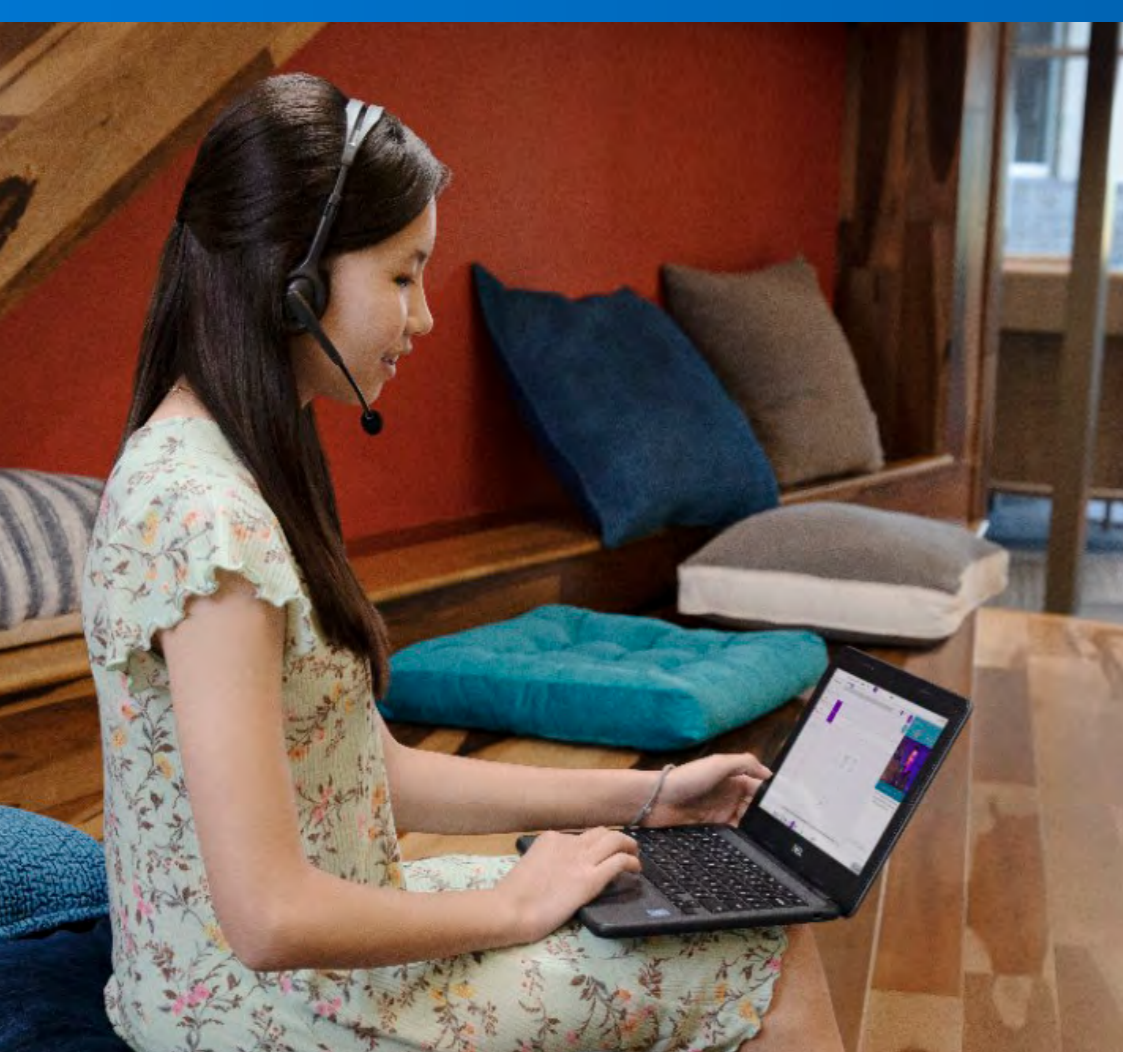
## URGENCY TO ENABLE ANYTIME, ANYWHERE LEARNING AND TEACHING

The global pandemic has required K–12 districts to rapidly equip their students, teachers and staff with the right devices and a powerful infrastructure to ensure anytime, anywhere access to tools and resources.

Many districts are not envisioning a return to times past. Rather, they are viewing their current challenges as an opportunity to accelerate the shift to blended learning. Most likely, they will continue to extend learning off-site, even after the pandemic subsides. Mobile and remote learning, teaching, and district operations—facilitated by technology—are here to stay. For school districts and their technology managers, updating and managing the infrastructures and the devices used by pupils, teachers and administrators may require an unprecedented degree of agility and nimbleness.

When resources and budgets are spread thin, but technology requirements in K–12 districts are more challenging and complex than ever, solutions and guidance from an experienced partner with deep roots in education are invaluable. Dell Technologies offers a wide spectrum of infrastructure technologies and services that can be of advantage to school districts—both during the pandemic and in the future. These include solutions to enable virtual desktop initiatives, endpoint security, cloud environments and software-defined wide area networks. School districts can also rely on Dell Technologies to provide consulting, deployment and support services that simplify and accelerate such tasks as preparing infrastructures for remote learning and teaching or ensuring that technology users, applications, data and systems are secure.

35% of school districts say that implementing platform capabilities for remote learning is one of the top-three desired outcomes of modernizing IT infrastructure.[1]

More than half of K–12 districts are likely to spend more on infrastructure because of the pandemic.[2]

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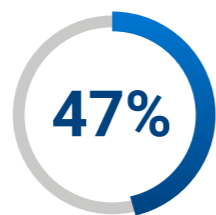# SECURITY IS TOP OF MIND IN INFRASTRUCTURE MODERNIZATION

Educational and technology stakeholders in K–12 school districts understand that the security of data applications and systems is a critical consideration in modernizing their infrastructure.

**59%**
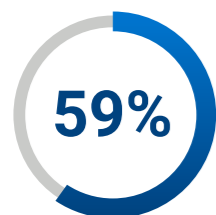
59% prioritize enhanced security features in future infrastructure purchases.[1]

**76%**
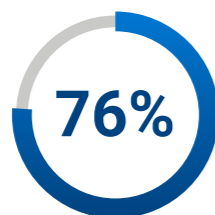
76% say that security is very important in purchasing digital infrastructure.[1]

**47%**

47% indicate that security and data protection are the strongest drivers for modernizing IT infrastructure.[1]

**30%**

30% have already experienced that improved digital security is one of the top-three benefits of infrastructure modernization.[1]

**41%**
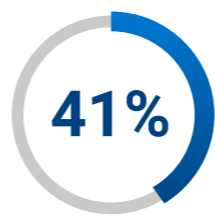
41% back up their data only monthly or less frequently, which means many school districts have significant gaps in cybersecurity.[1]

Some risks to K–12 school district systems are increasing during the pandemic. According to a warning from the FBI,[3] ransomware gangs and other malfeasants have in recent years exploited vulnerabilities in Remote Desktop Protocol (RDP) technology to breach corporate networks and deploy ransomware. As school districts adopt remote learning, many of them set up new RDP accounts on their internal systems, augmenting their vulnerability.
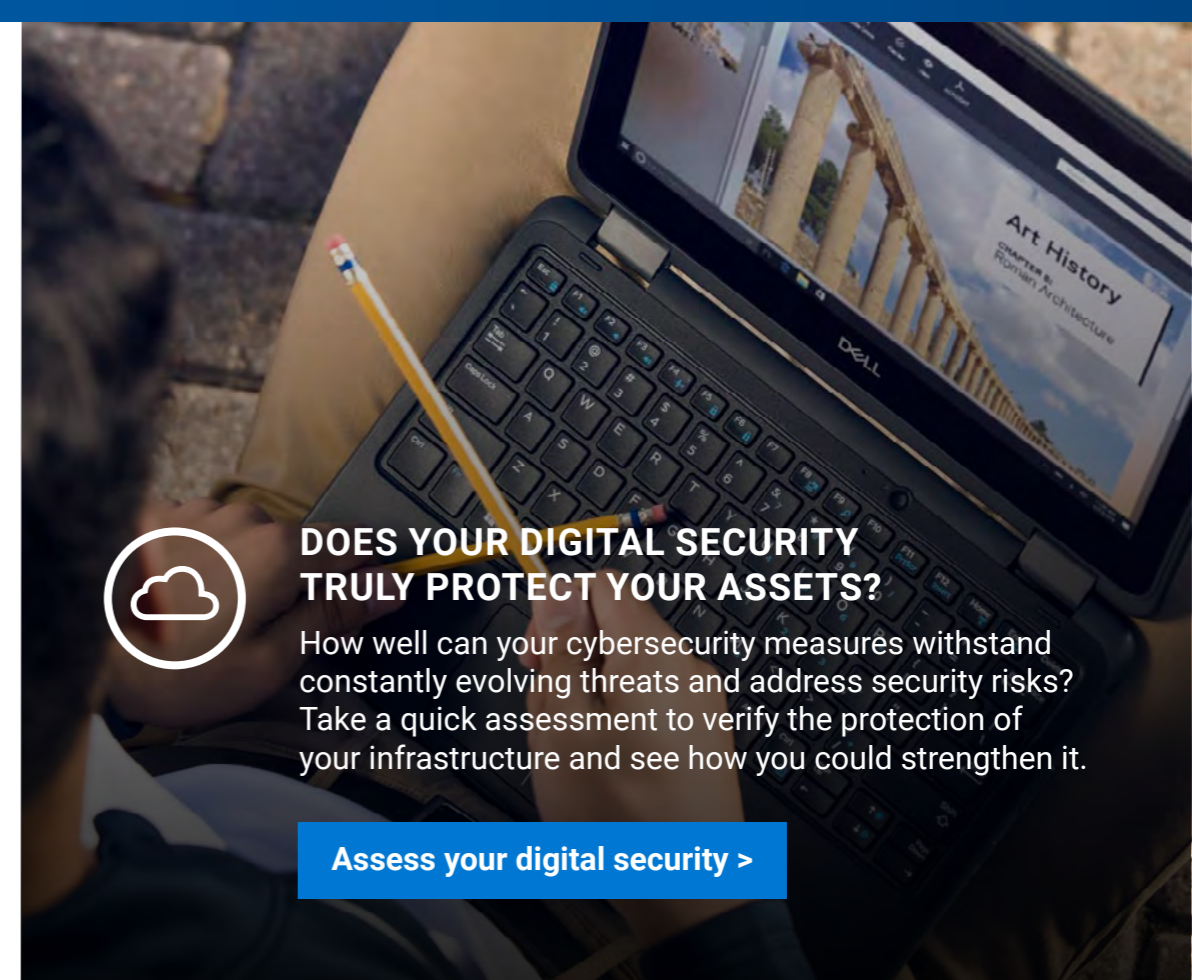
## DOES YOUR DIGITAL SECURITY TRULY PROTECT YOUR ASSETS?

How well can your cybersecurity measures withstand constantly evolving threats and address security risks? Take a quick assessment to verify the protection of your infrastructure and see how you could strengthen it.

**Assess your digital security >**

## K–12 SCHOOL DISTRICTS PRIORITIZE MALWARE PROTECTION

Most popular types of security measures in school districts today:[4]

**77%**
Anti-malware and security software

**70%**
Real-time monitoring and some kind of predictive cybersecurity

**39%**
Networkwide collaborative security
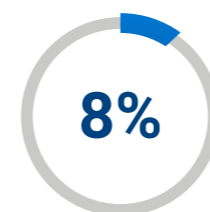
## OVERCOMING LEGACY SERVER LIMITATIONS

Servers remain the computing workhorses in many districts, but they are often products that are near or past their natural lifespan. This is one area where modernization in many school districts lags, and it can impact application performance and security and result in disruptive, unscheduled downtimes.

**8%** — Only 8% of school districts refresh their servers every 1 to 2 years.[4]
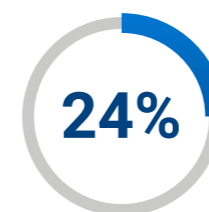
**24%** — 24% refresh their servers every 6 to 8 years.[4]
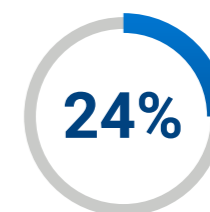
**24%** — 24% refresh or replace them even less often.[4]

Dell Technologies recommends refreshing servers every three years to keep application and system performance at best levels. Our research[5] finds that most servers don't age well:

**14%** is the degree of average annual server performance erosion.

**40%** of the original level of performance is all that servers can achieve by year 5.

**20%** increase in unplanned downtime results from the lower performance and higher failure rates of aging servers.

### MANY GOOD REASONS FOR REFRESHING SERVERS

Forrester Consulting interviewed IT decision-makers to see what value they saw in refreshing servers and infrastructures.[6] The most important benefits of regular server refreshes include:

- Greater systems reliability
- Improved application performance
- Enhanced user experience
- Reductions in downtime and outages
- Stronger security

## EVOLVING ROLE OF DATA STORAGE

On-premises storage remains a key building block of the K–12 infrastructure, even while some workloads are moving to the cloud. Technology managers in many school districts are also exploring cloud-enabled data storage and protection solutions.

**67%**
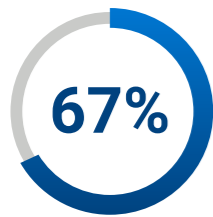
67% use SAN or block storage.[1]

**44%**
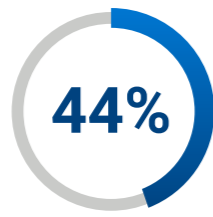
44% of storage users use RAID configurations.[1]

**154TB**

is the average data-storage capacity in a school district.[1]

**28GB/student**

is the average storage capacity allocated by school districts.[1]

### CENTRAL DATA CENTER STORAGE IS THE PREVALENT MODEL

Where school districts store data:[2]

**70% CENTRAL DATA CENTER**

**30% LOCALLY**

## ADOPTING SOFTWARE-DEFINED STORAGE

Similar to commercial enterprises, K–12 school districts are facing the limitations of legacy storage technologies. More traditional storage typically lacks the flexibility, performance, responsiveness, scalability and capacity to support complex, data-intense applications accessed by many users across multiple campuses. Administrating it can be an overwhelming task for busy, often thinly staffed IT teams in school districts.

Software-defined storage (SDS) combines all on-premises and cloud-based storage resources into a single pool that can be managed, scaled and fine-tuned through a software application. Dell Technologies offers several SDS solutions that can benefit school districts:

Simplify storage management to be more efficient and controlled, and less time-consuming, using centralized software tools.

Enable IT to meet school districts' changing requirements and scale storage as students and teachers create more multimedia content and use more immersive learning applications.

Give students and teachers secure storage access from any location, so learning and collaborative projects can take place without any obstacles.

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## TRANSFORMATIVE INNOVATION IN K–12 EDUCATION

Henrico County Public Schools in Virginia had ambitious goals for enabling deep learning by students and helping teachers chart their own path toward instructional innovation. The school district worked with Dell Technologies to refine its technology strategy and rebuild its infrastructure. Important changes included a new HCI with Dell EMC VxRail, storage solutions from Dell Technologies, and Dell Chromebooks and Latitude laptops for pupils and teachers.

Students at Henrico County Public Schools get more out of school with student-directed learning, and teachers have found ways to use technology creatively. The school district virtualized 99 percent of its workloads, simplifying IT administration and giving IT managers time back to support educational initiatives.

**Read the full case study >**

# LEVERAGING THE POWER OF VIRTUALIZATION AND HYPERCONVERGED INFRASTRACTURE

Even with strained budgets and resources, K–12 school districts pursue transformative innovation of their infrastructures. Many of them have adopted virtualization or hyperconverged infrastructure (HCI) because of the advantages of increased computing power, administrative ease and resource efficiency.

## HCI IS A FREQUENT CHOICE FOR CRITICAL WORKLOADS
Top applications for HCI:[4]

| Student information systems | Financial systems | Network management | File and print services | Productivity suites |
|---|---|---|---|---|

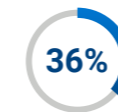## VIRTUALIZATION IS A POPULAR K–12 TECHNOLOGY STRATEGY
How school districts implement virtualization and HCI:

**42%**    41% are already using virtualization.[2]

**61%**    61% of servers and storage are currently virtualized in school districts.[4]

**36%**    36% of school districts use VMware for virtualization.[4]

**12%**    12% of districts are using HCI.[4]

**11** virtual machines on average are used per server.[4]

**700:1** is the average ratio of students to virtual machines.[4]

# EMBRACING CLOUD TECHNOLOGIES

Many K–12 decision-makers see that migrating at least some of their applications and infrastructure to the cloud can help them enable continuous access to learning and teaching resources.

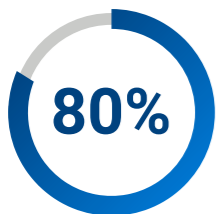One-third of K–12 districts are considering cloud strategies.[2]

More than half are considering taking applications to the cloud during the next two years.[4]
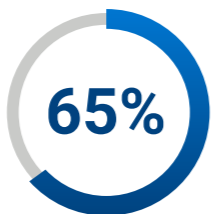
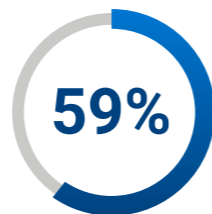36% say that cloud solutions and services are the strongest driver for IT infrastructure modernization.[1]

## TOP-THREE APPLICATIONS FOR MOVING ENTIRELY OR PARTLY INTO THE CLOUD OVER THE NEXT TWO YEARS:[1]

**80%** Data analytics

**65%** File and print services

**59%** Network management

## PROLIFERATION OF USE CASES FOR EDUCATIONAL DATA ANALYTICS

K–12 school districts are already making extensive use of data analytics,[7] often using cloud-based resources, to benefit learners and teachers in many different ways, including:

- Improve attendance and graduation rates.
- Make assignments more meaningful and relevant to students.
- Direct attention to potential cyberbullying and other risk situations, enabling earlier remediation.
- Adjust curricula for better learning results.
- Take advantage of adaptive learning to refine instruction and improve student outcomes.
- Enable students to personalize their learning and make more targeted use of digital tools in blended learning.
- Improve teacher training and professional development.

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## ACCESSING EDUCATIONAL TECHNOLOGY EXPERTISE

The majority of K–12 school districts rely on external expertise and support services when they get ready to plan infrastructure updates. Dell Technologies, well regarded in this area, provides tailored support for school districts of all sizes through K–12 strategists with extensive backgrounds in implementing learning technology.

**78%**
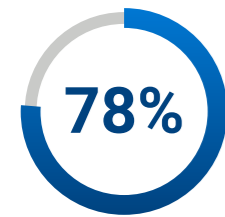
78% always or sometimes use outside consulting or services in refreshing IT infrastructures.[1]

**96%**
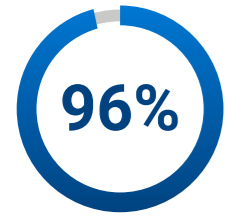
96% said Dell Technologies is "very credible" in providing K–12 IT solutions.[1]

## NEXT STEPS

It's good news for K–12 educators and technology managers that current developments encourage and accelerate many of the transformations that were already well underway in many school districts. Dell Technologies K–12 experts can help you create a student-focused learning environment with an optimal alignment of the digital infrastructure and the educational devices and tools used by students and teachers. We will be happy to discuss your goals and challenges and share what we've learned in our work with K–12 districts. We can work with you to plan your district's technology strategy and choose and deploy solutions that can help you reach your goals for delivering education.

**View resources for K–12 educators**

1. Dell Technologies survey report, "EDU Modernize Research"
2. Dell Technologies, "Accelerating IT Change in K-12". https://www.delltechnologies.com/resources/en-us/asset/industry-reports/solutions/modern-inf-sw-k12-ebook.pdf
3. K–12 Cybersecurity Resource Center, "FBI Warns Schools on Ransomware, RDP Vulnerabilities". https://k12cybersecure.com/blog/fbi-warns-schools-on-ransomware-rdp-vulnerabilities/
4. Dell Technologies 2019 survey report, "IT Infrastructure in Education."
5. Dell Technologies, "5 Reasons Why It's Time to Upgrade Your Servers". https://www.delltechnologies.com/en-us/campaigns/dell-emc/checklist-server-upgrade.htm
6. Forrester Consulting Thought Leadership Spotlight, "Faster Server Refresh Cycles Boost Innovation And Security For Midmarket Businesses". https://www.dellemc.com/fi-fi/collaterals/unauth/analyst-reports/solutions/forrester-faster-server-refresh-cycles-boost-innovation-and-security-for-midmarket-business.pdf
7. EdTech, "Improving Schools Through Data". https://edtechmagazine.com/k12/data-analytics/analytics-programs

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