A BALANCING ACT: GROWING NETWORK NEEDS IN K-12 EDUCATION
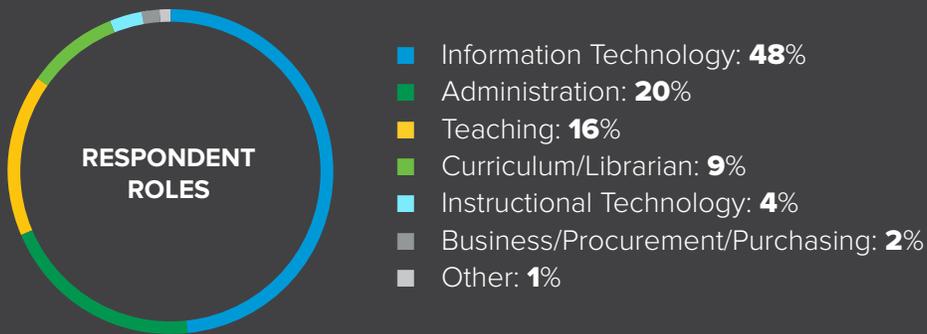
Driven by new technologies in the classroom and the proliferation of mobile devices and digital content,

K-12 schools and districts report their networks are being stretched — a trend that might continue as more schools explore emerging technologies such as smart transit and the Internet of Things (IoT).
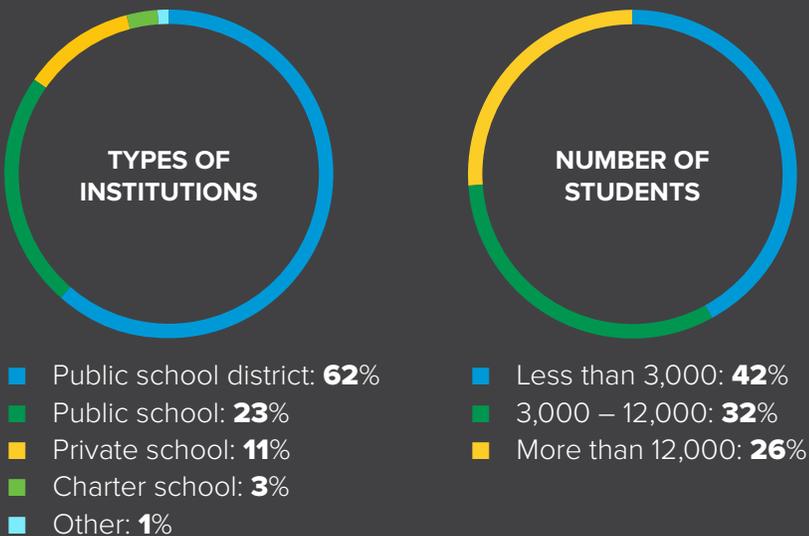
To identify network technology needs and priorities for K-12 education, in October and November 2017 the Center for Digital Education (CDE) surveyed 205 K-12 IT employees and conducted 12 interviews with K-12 network professionals. The results offer a snapshot of how technology is transforming education, and the emerging network technologies that could change it even further.

Respondent Demographics

Respondents were nearly evenly split between IT roles (48 percent) and a broad range of other roles, including administration, teaching, curriculum/librarian, and business and procurement.

RESPONDENT ROLES

- Information Technology: **48**%
- Administration: **20**%
- Teaching: **16**%
- Curriculum/Librarian: **9**%
- Instructional Technology: **4**%
- Business/Procurement/Purchasing: **2**%
- Other: **1**%

Many respondents (62 percent) work for public K-12 school districts, with 23 percent from individual public schools and smaller proportions representing private and charter schools (11 and 3 percent, respectively). Respondents were split among different-sized districts, with 42 percent from districts with fewer than 3,000 students, 32 percent from districts ranging from 3,000-12,000 students and 26 percent from districts with more than 12,000 students.

TYPES OF INSTITUTIONS

- Public school district: **62**%
- Public school: **23**%
- Private school: **11**%
- Charter school: **3**%
- Other: **1**%

NUMBER OF STUDENTS

- Less than 3,000: **42**%
- 3,000 – 12,000: **32**%
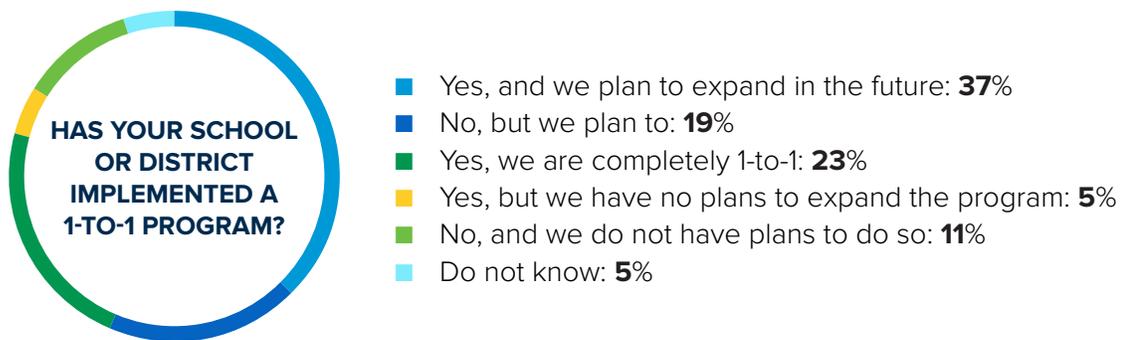- More than 12,000: **26**%

New Learning Models, More Technology in K-12

Personalized learning, including online courses and remote learning options, are commonplace. Nearly seven in 10 respondents (69 percent) say their K-12 schools and districts offer individualized education programs.

DOES YOUR SCHOOL OFFER INDIVIDUALIZED EDUCATION PROGRAMS WITH ONLINE COURSES OR REMOTE LEARNING OPTIONS?

- Yes: **69**%
- No: **24**%
- Do not know: **7**%

More than half of respondents (56 percent) also plan to implement or expand 1-to-1 programs, which provide a laptop or mobile device to each student in a classroom. Another 23 percent have fully implemented 1-to-1 programs, bringing the total respondents with existing and planned 1-to-1 approaches to 84 percent.

HAS YOUR SCHOOL OR DISTRICT IMPLEMENTED A 1-TO-1 PROGRAM?

- Yes, and we plan to expand in the future: **37**%
- No, but we plan to: **19**%
- Yes, we are completely 1-to-1: **23**%
- Yes, but we have no plans to expand the program: **5**%
- No, and we do not have plans to do so: **11**%
- Do not know: **5**%

Individuals interviewed by CDE reported several benefits of increased access to online learning materials, including up-to-date information and curriculum, and the opportunity to individualize instruction to meet student needs.

Fueled by these trends, a range of emerging technologies — including in-class mobile devices, cloud storage, online and remote learning options, adaptive curriculum, smart classrooms and data analytics — are entering K-12 schools of all sizes. More than half of respondents reported using all of these technologies, with mobile devices (77 percent) and cloud storage (72 percent) most commonplace.

TECHNOLOGY USE IS PERVASIVE AND DIVERSE

▨ Grey Bar = Planning to Procure

In-class mobile devices — **77**% in use, **14**% planning to procure

Cloud storage — **72**% in use, **18**% planning to procure

Online/remote learning options — **61**% in use, **21**% planning to procure

Adaptive/responsive curriculum — **60**% in use, **23**% planning to procure

Smart classroom — **59**% in use, **19**% planning to procure

Data analytics — **58**% in use, **21**% planning to procure

Cloud-based systems — **58**% in use, **15**% planning to procure

Network Issues Arise

Interviewees reported these new instructional models and technologies are straining their networks. The primary factor? Students accessing online content during class.

Many respondents pointed to a disconnect between the proliferation of new mobile devices and instructional methods and their existing network infrastructure. The growing volume of digital learning content expected to enter classrooms will likely be the next significant challenge, particularly for older infrastructure. Some respondents reported plans to upgrade wireless access to improve in-class connectivity for students attempting to access the network using mobile devices or other 1-to-1 technologies.

Most respondents (70 percent) reported managing their own Wi-Fi, and more than half (54 percent) use managed Wi-Fi solutions, which are supported by the federal E-rate program. Only one-quarter of respondents (24 percent) currently receive E-rate funding for hosted voice, but the complete elimination of funding in 2020 (a yearly 20 percent phasedown of support was adopted in the 2014 E-rate Modernization Order) for hosted voice services will pose a challenge for nearly half (40 percent).

HOW IS YOUR INSTITUTION'S WI-FI STRUCTURED?

- ■ It is maintained and managed internally: **70**%
- ■ It is maintained and managed externally by a government entity: **16**%
- ■ It is maintained and managed externally by a vendor: **11**%
- ■ Do not know: **3**%

DOES YOUR INSTITUTION HAVE A MANAGED WI-FI SOLUTION?

- Yes: **54**%
- No, and we don't plan to procure: **28**%
- No, but we plan to procure: **10**%
- Do not know: **8**%

WERE YOU AWARE THAT E-RATE FUNDING SUPPORTS MANAGED WI-FI?

- Yes: **67**%
- No: **25**%
- Do not know: **8**%

DOES YOUR INSTITUTION RECEIVE E-RATE CATEGORY 2 FUNDING FOR HOSTED VOICE?

- Yes: **25**%
- No: **45**%
- Don't know: **30**%

WILL THE ELIMINATION OF E-RATE FUNDING FOR HOSTED VOICE SERVICES POSE A CHALLENGE FOR YOUR SCHOOL OR DISTRICT?
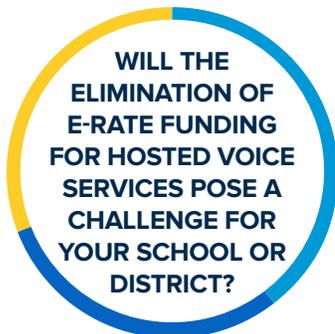
- Yes: **40**%
- No: **30**%
- Don't know: **30**%

More respondents said their networks and information systems were vulnerable to security threats than those who perceive them to be fully protected. Large majorities, however, reported having reliable backup systems (85 percent), internet safety policies as required by the Children's Internet Protection Act (87 percent) and multiple layers of internet filtering.

OF THE FOLLOWING INTERNET FILTERING REQUIREMENTS, WHICH HAS YOUR INSTITUTION IMPLEMENTED TO MAINTAIN CIPA COMPLIANCE?

Filtering is provided locally for all internet-enabled computers on a network basis: **61**%

Filtering is incorporated with the service provided by the internet service provider: **32**%

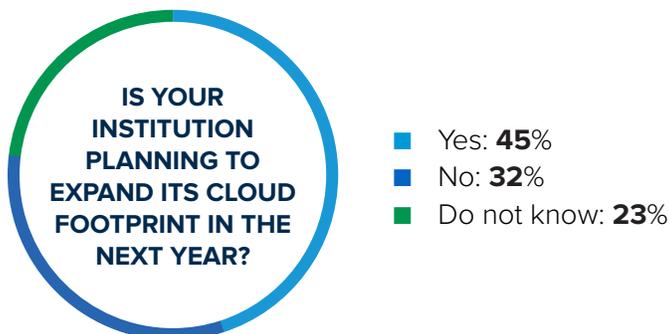Filtering is provided individually on each internet-enabled computer: **30**%

Do not know: **5**%
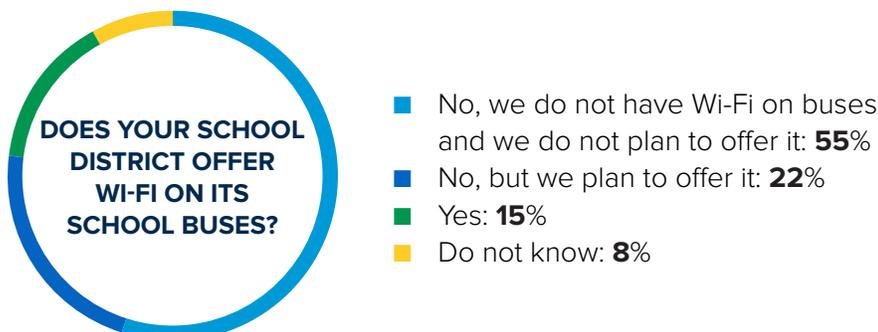
Other: **2**%

What's Next?

The Cloud Expands

Nearly half of respondents (45 percent) plan to expand their cloud footprints, with larger districts more likely to expand their use of cloud technologies. More than half of respondents (58 percent) are moving large systems to the cloud — increased confidence in the security of cloud solutions may be one factor driving this growth.

IS YOUR INSTITUTION PLANNING TO EXPAND ITS CLOUD FOOTPRINT IN THE NEXT YEAR?

- Yes: **45**%
- No: **32**%
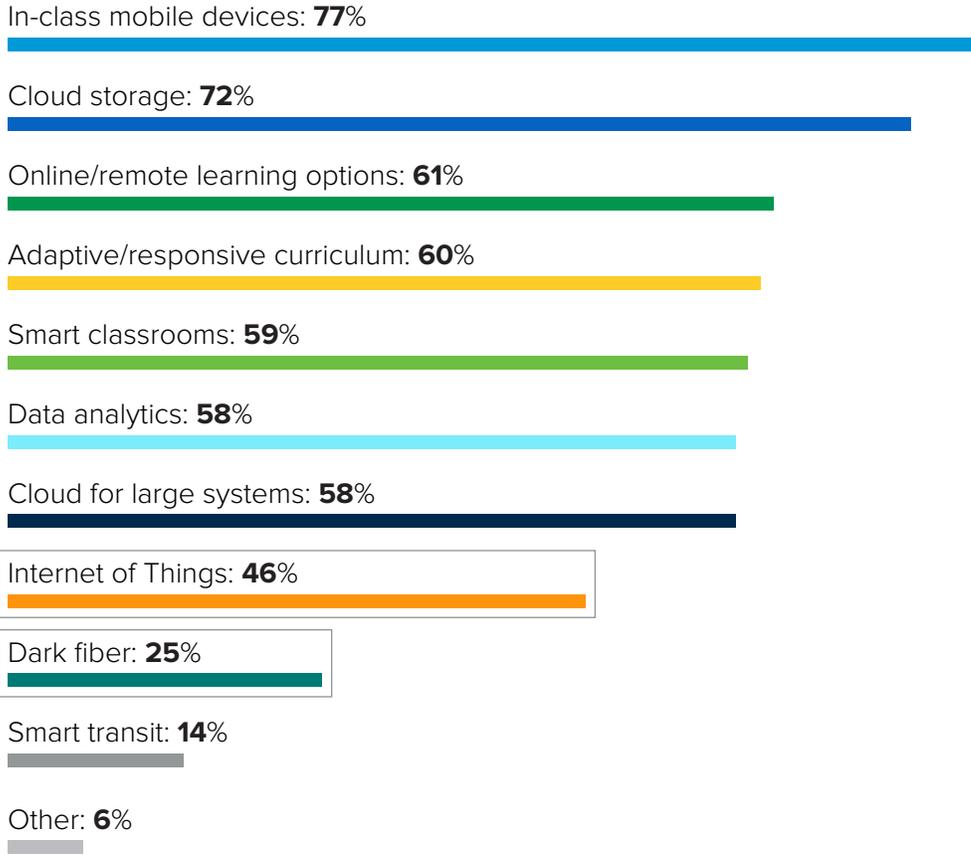- Do not know: **23**%

Get on the Bus

Used for navigation, security and internet access, Wi-Fi connectivity on school buses remains uncommon today — only 15 percent of respondents said their districts have deployed it. However, 22 percent plan to procure smart transit technologies, making it the top choice for future technology plans.

DOES YOUR SCHOOL DISTRICT OFFER WI-FI ON ITS SCHOOL BUSES?

- No, we do not have Wi-Fi on buses and we do not plan to offer it: **55**%
- No, but we plan to offer it: **22**%
- Yes: **15**%
- Do not know: **8**%

IoT and Beyond

Nearly half of respondents (46 percent) also reported their districts have implemented technology to support the proliferation of systems, devices and controllers that comprise IoT.

WHICH TECHNOLOGIES ARE YOU CURRENTLY USING?

In-class mobile devices: **77**%

Cloud storage: **72**%

Online/remote learning options: **61**%

Adaptive/responsive curriculum: **60**%

Smart classrooms: **59**%

Data analytics: **58**%

Cloud for large systems: **58**%

Internet of Things: **46**%

Dark fiber: **25**%

Smart transit: **14**%

Other: **6**%

Other emerging technologies cited by respondents include "dark fiber," private networks operated by the district or a provider that can be offered to other customers. One-quarter of respondents reported that such systems, which can be operated in partnerships with local governments or their partners, are in use in their districts today.

Together with the push for personalized learning, these emerging technologies represent ways K-12 schools and districts can connect not just additional parts of their enterprise, but also potentially underserved areas of their communities. They also represent growing challenges for network infrastructure, including increased demands for bandwidth and more robust security. To navigate this balancing act, K-12 districts and the providers who serve them will have to evaluate technology and the networks that support it together.

Ensure your K-12 networks are equipped to handle digital growth and emerging technologies. Learn more at enterprise.spectrum.com/education.

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