STEP 5
INFRASTRUCTURE
What digital infrastructure is required for implementation of one-to-one?

For a one-to-one technology initiative to be implemented seamlessly and effectively, districts must ensure that key “digital infrastructure” is in place to facilitate the use of digital learning tools. Digital infrastructure includes the three components of a one-to-one initiative outside of the devices themselves: internet connectivity, device security, and an LMS. Without this infrastructure in place, students and teachers will be unable to make full use of their digital learning tools, and a district may also fall out of compliance with federal law.

Internet Connectivity
(both in school and out of school)

In-school broadband and wifi capacity:
While most school districts in the United States likely have at least some capacity for accessing the internet on a wireless network, chances are this will need to be expanded to accommodate the increase in users that will accompany the transition to one-to-one. This will involve working with internet providers to first assess a current level of bandwidth and then likely expand it. Bandwidth is typically measured in megabits per seconds (Mbps), and it is generally recommended that a school wireless network should be running at a minimum of 1 Mbps per student, though some recommendations call for as much as 4.3 Mbps per student. Some internet providers now offer a baseline of 1 gigabits per second (Gbps), which is equivalent to 1,000 Mbps (enough to accommodate between 233 and 1,000 students at once, depending on the recommendation for bandwidth). Importantly, districts should recognize that providing adequate bandwidth is a two-step process: first, districts must ensure a speedy broadband connection (i.e., the internet connection between a school’s modem/router and the outside world). Second, while a faster broadband connection will be obtained by purchasing additional bandwidth from an internet provider, device users will not be able to fully utilize the broadband connection without a strong wifi signal (the internet connection between a school’s modem/router and individual devices). Especially on larger campuses, districts may need to purchase wifi extenders, which essentially act as additional routers that can be placed strategically around a school to ensure a strong connection throughout.

Access to the internet outside of school: With 42% of Mississippi households lacking high-speed internet at home, districts should not assume that students will have reliable internet access outside of school hours. Given the vital importance of internet access to utilizing one-to-one, districts can and should take the lead in ensuring that all students can access the internet. Here are some potential solutions for communities in which at-home internet access is not always available:
• **Individual hotspots:** A hotspot is a small, portable device that creates wireless connectivity by acting as the middleman between a cellular data network and a nearby personal device. Some districts have addressed a lack of at-home internet access by providing unconnected students with hotspots. In Decatur City Schools in Alabama, for instance, Technology Director Emily Elam first took steps to identify which students lacked access to the internet at home, and once these students were identified, she provided hotspots as necessary. (Now may be an excellent time for districts to purchase hotspots, as the E-rate program currently offers reimbursements of 100% for purchases related to home connectivity.)

• **Bus hotspot:** Another method of utilizing hotspots, particularly for districts with a limited supply, involves setting up hotspots on school buses. This has been a strategy employed by school districts throughout the state, where hotspot-equipped school buses have been parked in neighborhoods, church parking lots, local businesses, etc. Students are then allowed to either work in the bus or park nearby. 28

• **Campus space:** A third method is to set up locations on school grounds that students can access after-hours, a strategy utilized by Rankin County School District, among others. This method has been employed by districts around the country as well, in large part because there are no additional costs associated with using the existing wifi network on school grounds. Common spaces for this purpose include cafeterias, multi-purpose rooms, and gymnasiums.

• **Community space:** Another strategy that Rankin County considered was to partner with local businesses or nonprofit organizations who may be willing to share their wifi with students who need a place to work. There also may be existing community spaces with available wifi for this purpose. To explore options in your community, check out this interactive map, courtesy of the Mississippi Library Association, of free wifi hotspots throughout the state.

**Website and application filters:** As with wireless internet, it is likely that most districts already have some form of filters in place. Without web and application filtering, students may be exposed to harmful content, both affecting their safety and productivity, and putting the district at risk of violating CIPA. In addition to blocking inappropriate content (hate speech, violence, porn, nudity, etc.), filters can also be used to block access to social media. After the initial implementation of these filters, technology staff should take care to regularly update these to prevent hackers as well as tech-savvy students who often find a way to circumnavigate these measures.

**Device security system:** As described in Step 4, many districts opt for comprehensive device security systems that allow for multiple services, including filtering; tracking of students’ progress, information, and chat rooms; real time risk assessment for schools to prevent suicide and violence; locking student screens; restricting internet access, etc. Whether the district simply provides filtering or a full security system, these tools must be operational before one-to-one begins.

**Learning Management System**

While a district could theoretically implement a one-to-one initiative without an LMS, it is hugely beneficial when it comes to the organization and efficacy of one-to-one, particularly in regards to virtual learning. (See Step 4 for more about LMSs.) If a district has chosen to employ an LMS, this system should be loaded onto school devices for both teachers and students so that it can be ready to use when one-to-one begins.

Again, districts may find MDE’s Digital Learning Capacity Assessment, included in its Digital Learning District Guidance document, useful for conducting a self-assessment on capacity related to these components.