

BANDWIDTH PLANNING 101

A RESOURCE FOR REMOTE AND HYBRID SCHOOL OPERATIONS

The Bandwidth Challenge

With a majority of school systems starting the 2020-21 academic year with either hybrid or remote classrooms, school system IT leaders must be prepared to manage the significant bandwidth requirements necessary for either option. Understanding and estimating bandwidth consumption for teachers and students allows for IT leaders to plan for connectivity challenges and advocate for more comprehensive connectivity solutions.

Where does all the bandwidth go?

All applications used by students and teachers in remote and hybrid environments will utilize bandwidth. Text applications require far less bandwidth than those utilizing graphics, sound, and video. Examples of bandwidth-consuming applications in the hybrid or remote classroom include:

- Learning management systems
- Productivity tools - email, online word processing for documents, online presentation creation
- Student information systems
- Telephony (using softphones, VOIP)
- Video streaming services
- Web conferencing tools
- Web browsers

What are the bandwidth implications of these tools?

The Hybrid Classroom

Take as an example a hybrid model in which the teacher and 50% of the students (15) present in the classroom, while 15 more students attend remotely. Here are some factors to consider when calculating bandwidth needs:

- What applications will be used to deliver instruction? If 50% of the students are remote on any given day, it is likely that web conferencing will be one of the highest bandwidth requirements.
- What home bandwidth levels are required for students to participate in hybrid instruction? Consider that remote student bandwidth access may vary, and that students may have to share their internet connection with family members and working adults. Consider methods for augmenting student bandwidth, such as wireless hotspots.
- Based on the applications being used and the number of students physically present, how much bandwidth will each classroom require? Multiply this bandwidth requirement by the number of classrooms in the facility to determine bandwidth impact on the building network.

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- Will students participating remotely run into quality problems when they reach bandwidth data limits on devices like hotspots? How will you compensate for these limitations? For example, can teachers compress videos to minimize data use?

The Remote Classroom

Remote classrooms assume that all students and the teacher are located remotely. All instruction and support will be provided via the device. Here are some factors to consider when calculating bandwidth needs:

- What applications will be used to deliver instruction? Which ones utilize the most bandwidth?
- What instructional strategies are being used, and can they be modified to reduce student bandwidth needs? An example might be a teacher doing a web presentation but not requiring students to have their cameras on.
- What home bandwidth levels are required for students to participate in remote instruction? Consider that remote student bandwidth access may vary, and that students may have to share their internet connection with family members and working adults. Be aware of the impact of multiple students in a household, or other family members' impact to bandwidth. For example, most home upload speeds are around 6 Mbps and a video conference meeting requires 2-3 Mbps upload speed. Two students plus one parent engaging in video calls simultaneously will quickly overload home access capacity. Consider deploying one hotspot per student rather than one per family.
- Will students participating in remote learning run into quality problems when they reach bandwidth data limits on devices like hot-spots? How will you compensate for these limitations?

Considering the different ways in which teachers and students utilize online applications and the resulting bandwidth needs will help prepare school systems to successfully implement hybrid or remote instruction.

Next steps:

COSN Members may access the [Remote and Hybrid Bandwidth Calculator Version 1.0](#) for additional planning support.