LEADING EDUCATION INNOVATION

Network Design
NETWORK: BUILD OR BUY?

Overview

School systems are faced with the challenges of designing, supporting, and maintaining networks that meet the current and future demands of students and teachers, plus administrative and operational support for schools. Technology leaders must continuously plan for increased network traffic and the ability to support a wide range of new technologies, including Internet of Things (IoT) devices such as vaping sensors, cameras, mobile devices, augmented and virtual reality, and much more.

To continue to be flexible and adapt quickly to changing demands on the network, it is important to seriously consider whether to build one's own network infrastructure within the school system or buy network services from a service provider. There is no one right answer to the question of whether to build or buy. Rather, it is important to complete a thorough build or buy analysis and consider the following benefits and disadvantages of each approach.

Build

Building and maintaining one's own network infrastructure to support your school system allows a higher degree of direct control over the design and management of the network services. Additionally, building and managing the network on site can result in a network designed specifically to meet the needs of the school district.

While it can be tempting to choose to build and manage a network based on the degree of direct control and ownership that approach allows, there are also some significant challenges and disadvantages. First, building and owning the network requires a commitment to maintaining the network up-to-date and protecting it from intrusion. This can be a challenge from a budget perspective, especially if budget pressures result in being unable to upgrade and replace critical equipment on schedule. Second, it can be difficult to find and hire staff with the necessary skills, training, and experience to support, manage, and secure the network. This challenge is common in a tight labor market where there is a lot of competition for these employees.
Questions to ask when considering building and managing the network infrastructure:

1. What is the funding mechanism for maintaining and replacing network hardware?
2. Will purchasing and implementing your own network infrastructure limit your ability to expand and adjust your network services to meet the needs of the district?
3. What are the risks to your ongoing funding for maintaining and replacing equipment?
4. Network operations require 24 x 7 support, do you have adequate staffing to be able to support the network?
5. Do you have adequate staff to be able to monitor and secure the network?
6. Are trained network administrators available in your work pool? Will you be able to hire replacement staff if your current staff leave?
7. What is the life cycle of the network I am building? How long will I maintain the current build? At what point will the equipment and structure become obsolete?
8. Have I planned adequately for timely future replacement and upgrades?

Buy

Buying network infrastructure management and support through a third party is similar to renting a house. Unlike ownership which places all responsibility for repair and maintenance fully on the owner, purchasing a managed service places the responsibility on the service provider for managing and maintaining the network infrastructure on behalf of the school district. This removes not only the direct 24 x 7 responsibility of network maintenance, but also provides additional staffing support for network services. A managed service provider can likely find and afford more trained network administrators because they are aggregating services across multiple customers. Depending on the service levels in place, the managed service provider may also take on responsibility for network security monitoring and response.

Another advantage of purchasing a managed service, is the ability to scale services up as needed. A managed service provider can generally upgrade network capabilities faster than a district can because they don't have to rely on district capital funding to make the upgrades, they just make the upgrade and adjust the monthly price for the customer.

There are challenges to this approach. Buying a managed service requires a good understanding of contract management and the district needs to be prepared to manage the contract and service level agreements. This approach also puts the district at the mercy of the provider for support and responsiveness. Understanding the terms of the contract is essential to having a successful relationship with a managed service provider.

Questions to ask when considering buying network infrastructure as a managed service:

1. What service level agreements (SLA) does the provider have in place?
2. Does the provider's SLA meet the needs of the district?
3. Can the services be scaled up and down based on need? Are there penalties for doing so?
4. What is the distribution of responsibilities for monitoring the network and resolving performance or security issues?
5. Who controls incident escalation?
6. What metrics will be tracked? How will they be tracked and reported?
7. How will contract updates be handled?
8. How will contract disputes be resolved?

Case Example: School District X Build or Buy

Background: School District X (SDX) is expanding and has projected population growth for the foreseeable future. The district has 30 instructional sites and 4 non-instructional locations. SDX recently passed a 4-year, $36M Tech Levy and a $390M Capital Bond that includes 4 new schools to be built over the next 5 years.

Objective: School District X desires dedicated bandwidth, high performing connections, and increased security.

SDX's infrastructure objective is to build a flexible and expansive fiber optic network, in conjunction with the city, that can easily grow to support the community.

As SDX evaluates their situation and design, they decide to weigh the advantages of both building the network leveraging a dark-fiber installation and managing it themselves, or buying network services through leased lit models. Additional factors that need to be considered:

- Because this is a joint effort with the city, what additional funds are available from other sources to offset costs?
- With a joint solution, any expansion to new areas for construction will be preplanned into their design. How do they make the design adaptable?
- Creating a community wireless network to support student mobile devices, is now possible. What resources will be needed to manage it?
- Additional capacity is key to the design and implementation, to support system growth and redaction; as well as business continuity and disaster recovery.
- When does SDX need to file paperwork for a leased lit or dark fiber network with USAC?
- What percentage of this work can be supported by USAC's ERate program?

SDX expects to use ERate dollars for a majority of their build. Because ERate requires approval, work can only commence after USAC approves their Form 471. Since approval cannot be guaranteed, SDX should consider other options for funding the network.

- Can the school district lease services to other entities?
- Can the school district lease from other entities?
- If the district chooses to build the network, who will support a school district owned fiber network? At what cost?
- Does fiber infrastructure already exist, making a build out by SDX redundant?
- What kinds of permits and special construction costs does SDX need to consider if they build a network?
- In either scenario, build or buy, who is responsible to test, maintain and repair network hardware?

There is no right or wrong answer to the question of build or buy. In the scenario, SDX would need to focus on the analysis of the decision which includes the early stages of planning the project. SDX needs to determine the scope of the work, the viability of staffing either model, and the costs and extraneous expenses that accompany both models.

Summary

There are no right or wrong answers in the decision to build or buy network services. The decision depends on the needs of the district balanced against the pros and cons of each option. It is important to assess the short- and long-term impacts of both options and consider the opportunities and challenges that each approach presents. It is important to clearly define the business requirements of your network, what your district needs to be able to accomplish on that network, and assess the build or buy options to determine which best supports your users and organization.

About CoSN:

CoSN, the national association of school system technology leaders, believes that technology is an essential component of learning today, and is deeply committed to the use and distribution of technology in school systems. However, all technologies must be properly assessed for design and appropriateness in the modern classroom. Educators and companies alike must recognize and uphold their responsibilities to protect the privacy of student data.

Working together, educators and the private sector serve millions of students by providing them with the rich digital learning experiences and access needed to succeed in college, work and life. That

partnership is critical to ensuring that students will have the tools necessary for success in the 21st century.

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