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Overview

According to FCC data, 22% of locations in Montana are classified as unserved by broadband. Montana ranks among the highest state in the U.S. for unserved and underserved households. As noted in the Montana Digital Opportunity Plan (DOP), "CAIs (Community Anchor Institutions) represent a wide variety of public and private institutions across the state that can serve as a gateway to universal broadband access. CAIs, like libraries and community centers, often serve as hubs for individuals to access free high-speed internet, as they are usually equipped with faster speeds than are available elsewhere in communities." A survey of libraries indicates that in 24% of Montana communities, the public library is the only location offering free public wi-fi. Given the importance of libraries in providing broadband access, DOP goals and strategies include:

Digital Opportunity Plan Goal: **Broadband availability and affordability**: Ensure all Montana residents have access to affordable internet in their homes, schools, libraries, and businesses, irrespective of their income level."

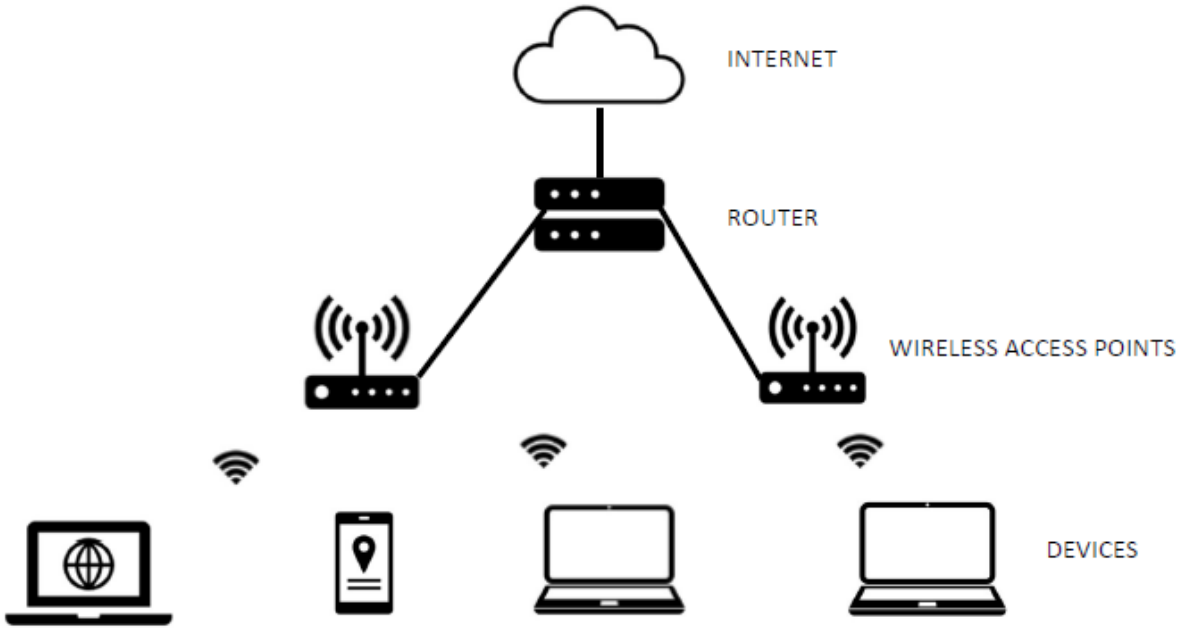
Digital Opportunity Plan Strategy/Objectives

- Invest in community anchor institutions: Ensure reliable high-speed access at CAIs or identify opportunities in non-traditional CAIs

- Community Anchor Institutions - Increase the availability of and affordability of access to, fixed and wireless broadband technology.

Wi-Fi Basics

A wi-fi network relies on radio waves to transmit data between devices and allows users to access the Internet. A wireless network is made up of multiple components. Routers connect the network to the Internet and direct traffic to wireless access points via network cables. Wireless access points transmit and receive wireless signals to multiple devices that are within range to connect to the network.



Best Practices

Design Considerations - Deploying a wi-fi network requires forethought and design. This will increase the reliability and performance of the network. A good design will help libraries budget adequate funds for wireless technology and can save money by not overspending on unnecessary network infrastructure.

- Coverage- Map out the coverage area (inside and outside) and estimate square footage. Identify physical restrictions such as walls that could block the wi-fi range as well as appliances/devices that may interfere with the signal. If access points cover two floors, survey each story in the building. Note high ceilings that may affect wi-fi range and be an obstacle to running cables. Also identify high use areas that should be in close range to an access point. Depending on the coverage area mapping, determine the best locations for placing access points.

- Outdoor coverage – Determine if wi-fi service will extend to outdoor areas such as plazas, library grounds, parking lots. Outdoor antennae may be required to provide service to these areas. Map coverage area and range and develop separate plan for outdoor spaces.

- Installation – Position access points in the most central part of the coverage area. Plan for some coverage overlaps.

- Capacity – Estimate the number of users (staff plus patrons) that will log-in to the wi-fi at peak hours of operation. The bandwidth and internal wiring should be adequate to serve this number of users without experiencing a drop in the quality of service.

- Settings – Configure channels. (i.e. channel for staff vs. guest log-in) Test devices throughout the coverage area to ensure there are no gaps in coverage. Run speed test on devices.

- Security **–** It is important to secure the wi-fi network to prevent unauthorized use, protect sensitive information and prevent malware attacks. Separate the internal library staff network from an open public access network.

- Privacy – Establish privacy policies to protect library information as well personal information of network users. Disclose privacy policies including any information that is gathered from users, how long it is stored and how it is used.

- Passwords – Passwords offer another layer of security by establishing some level of encryption. It also makes it more difficult for unauthorized users to connect to the wi-fi which can lead to security risks and misuse of the network.

- Encryption – Encryption protocols encrypt data that is transmitted over the network to make it difficult for hackers to intercept information. This is done as part of configuring the router.

- Firewalls – Most operating systems have built-in firewall software that helps prevents cyberattacks. It is advisable to upgrade firewall software on a regular basis. Larger networks may invest in hardware devices with additional software to protect multiple devices.

Use Policies

- Terms of Service – It is advisable to have a "splash" or "landing" page when guest first log-in that list the terms of service and requires the guest to "Accept the Terms" before they can use the wi-fi. Requiring users to accept an Internet use policy warns users about inappropriate Internet behavior and provides some liability protection for libraries if patrons engage in unlawful activity.

- Hours-of-Operation – Determine hours of operations for the wi-fi system. Some libraries leave systems on after hours to provide wi-fi access outside of building as a service to patrons who otherwise do not have Internet access.

- Track Usage – Tracking wi-fi usage provides information for network design as well as benchmarks for measuring public use of library services. Requiring users to log-in with a password or to accept "terms of service" on the landing page after connecting allows libraries to track usage. Compile data on a monthly basis (or more frequently). Some routers may be unable to log a full year's worth of activity. Google analytics is another tool for web page user statistics.

Other

Technical Support **-** Even if the library has an IT staff person/department, it may be necessary to contract with a professional wi-fi installer to design and install the system. Once the system is installed, have a plan for trouble-shooting and technical support to deal with system failures.

Wi-Fi Outages – It is helpful to have a plan to deal with outages that may disrupt wi-fi services. A back-up generator to keep the network running during power outages could provide a valuable public service during emergencies. Additionally, an Internet Service Provider (ISP) may also experience an outage that would disrupt library wi-fi services. Subscribing to a secondary provider for minimal services may be an option. A cellular hot-spot, even if only for use by staff during outages, is a low-cost way to have back-up service.

Case Studies

In 2024, the Montana State Library conducted a survey of public libraries to identify common practices for libraries providing wi-fi. Some key findings among the 32 respondents included:

- 69% of libraries require a password to log-in to the wi-fi network.
- 90% of libraries offer wi-fi outside of the library buildings.
- 38% of libraries have installed equipment to extend the reach of the wi-fi beyond the library.
- 88% of libraries report that wi-fi is available 24 hours a day.
- 28% of libraries require users agree to an Internet use policy before they can use wi-fi.

The specific case studies of Montana libraries are described below may provide tips on offering public wi-fi in libraries of different sizes.

Sidney/Richland County Library

- **Coverage –** The public wi-fi is available throughout the interior of the building. Wireless access points are distributed so there are no dead spots. Additionally, coverage includes outside the building within approximately a 20-foot radius of the library as long as users have the password to log-in. There may be interest in extending the wi-fi to cover a larger area outside of the building but this may require additional equipment.

- **Security/Usage Policies –** There are separate passwords for the public wi-fi and staff wi-fi. Patrons that access public wi-fi must accept "terms of use" policies when they log-in. There have been no instance of hacking or cyberattacks.

- **Installation/Tech Support –** The county IT Department installed wi-fi equipment and sub-contracted with a local business to do the internal wiring. Cost for equipment and installation was part of county budget. The library has adequate bandwidth capacity from the local ISP to accommodate the number of users on the wi-fi system. The county IT Department provides technical support. The library has a back-up power source that can provide power for about 20-minutes in case of a power outage.

Resources

Montana Digital Opportunity Plan
https://connectmt.mt.gov

Digital Equity
https://broadbandusa.ntia.doc.gov/resources/grant-programs

Prepared by