Apartment Wi-Fi:

Technical Decision Guide

Considerations for designing a network to suit your property's needs.

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Making decisions about the design up front and having clear requirements can significantly simplify the process long term when creating a Request for Proposals (RFP). This guide will outline some of these decisions and compare your options so you can craft an RFP that aligns with your goals.

The Model

What is Apartment Wi-Fi?

Modeled after how Wi-Fi is delivered in most hotels today, Free Apartment Wi-Fi programs can connect 6.5 million unconnected people in four million households to reliable high-speed home internet by installing property-wide networks in affordable multifamily housing.
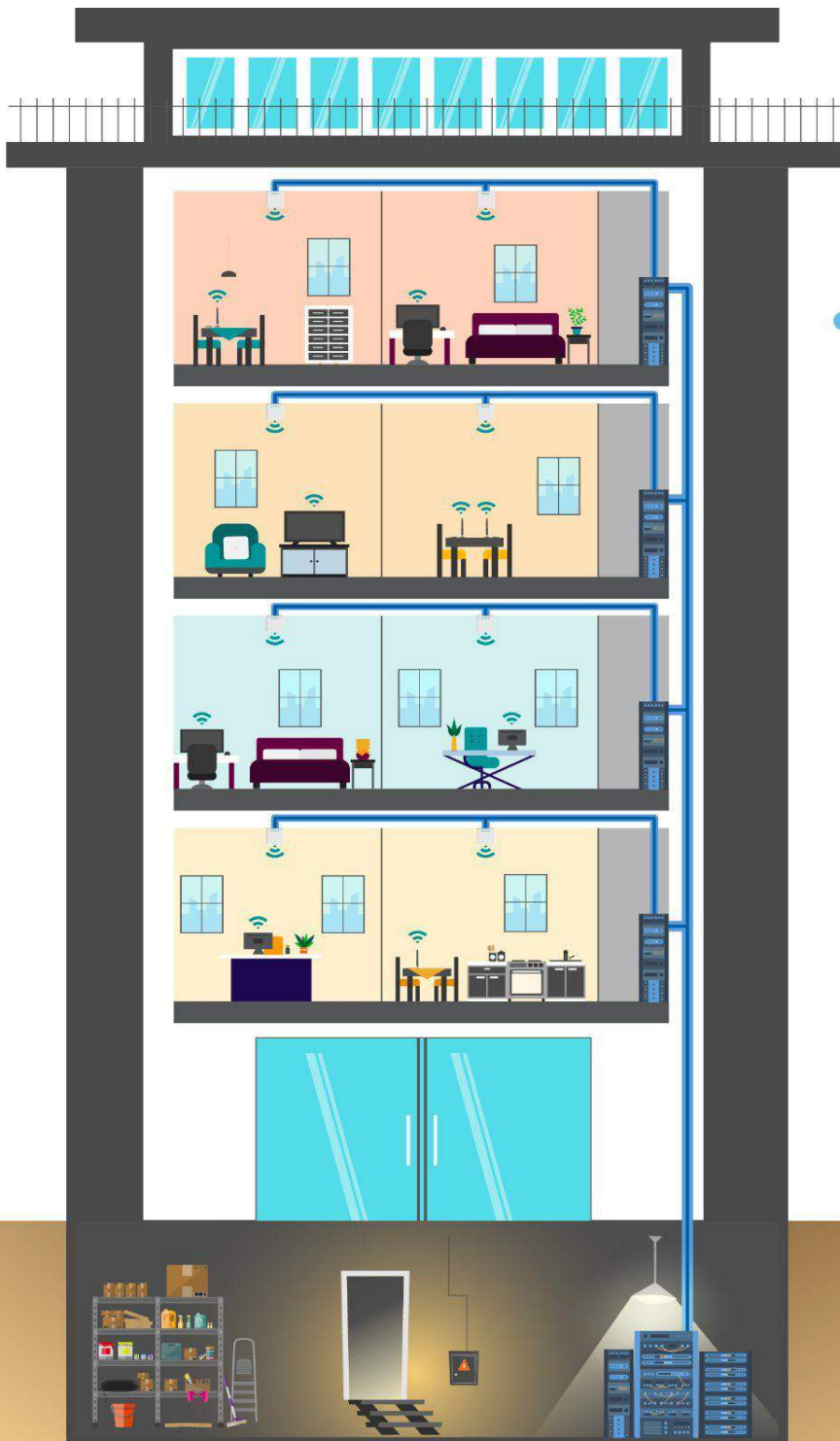
Internet Connection
A high-speed fiber internet connection is delivered into the building.

Server Rooms
Networking equipment is installed in small server rooms on each floor to distribute the internet connection throughout the property.

Structured Cabling
Wiring is installed in the walls of the building to connect the server rooms and wireless access points to the internet.

Wireless Access Points
Wireless Access Points are placed around the property to distribute Wi-Fi signals to residents.

Support
An integral part of any installation is the ongoing support and maintenance of the network by professionals.

The Process

Now that you have established an understanding of the model, this guide will take you through the essential steps, from determining bandwidth needs to selecting in-building cabling and outdoor connectivity methods. It will also cover strategic placement of wireless access points, network management for secure resident connections, and strategies to ensure all residents have the necessary digital literacy skills.

As a property owner or manager, you should follow these steps to collect relevant information to provide to prospective vendors. With these considerations and resources, you can craft an RFP that aligns with your community's needs and provides reliable, accessible internet service for all residents. This will also facilitate a proposal that does not require change orders.

Before beginning the implementation process, get familiar with project roles and the requirements of a site survey.

Roles Glossary

PROPERTY OWNER
- Secure Managed Service Provider to install and support Apartment Wi-Fi implementation.
- Serve as the **ultimate decision maker** and decide what is best for their residents and business.

MANAGED SERVICE PROVIDER (MSP)
- Create and implement the **technical network design**.
- Serve as the **primary contractor**, responsible for managing the subcontractors.
- May provide post-installation **support and maintenance**.

INTERNET SERVICE PROVIDER (ISP)
- Delive**r high-speed business-class internet** to the building.
- The MSP assists in vendor selection and can manage this relationship if the property owner desires.

STRUCTURED CABLING PROVIDER (or Low Voltage Provider)
- Completes **physical installation of the wiring** in the building.
- Typically, the MSP is responsible for selecting and managing this provider.

Site Survey

Conducting a thorough site survey before making technical decisions about your network is essential. Below is a sample of the information necessary to make sound technical decisions.

BUILDING DETAILS	EXISTING INFRASTRUCTURE	UNIQUE CHALLENGES
☐ Addresses ☐ Contact Information ☐ Number of Buildings ☐ Number of Floors ☐ Construction Year(s) ☐ Number and Size of Units ☐ Blueprints and Building Plans	☐ Existing Internet Service Providers ☐ Wiring in the Units 　　☐ Phone Lines 　　☐ Cable TV 　　☐ Ethernet 　　☐ Fiber	☐ Existing server rooms/comms rooms ☐ Existing cable conduits ☐ Building materials ☐ Other technology onsite ☐ Plans for Renovation ☐

EducationSuperHighway has created a Site Survey Guide and Checklist to assist in conducting a detailed and thorough process.

Plan Type & Bandwidth

What type of connection and how much bandwidth does my building need?

A business-class fiber internet connection is recommended for an Apartment Wi-Fi solution.

Business-class internet connections provide Service Level Agreements (SLAs) that guarantee uptime, latency, and resolution time. In contrast, **residential internet connections share bandwidth with many residents without guaranteeing service.**
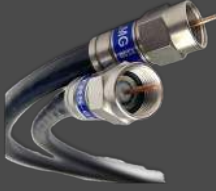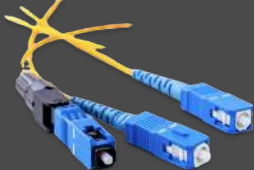
This connection is shared between all residents, taking advantage of the fact that not all residents are online simultaneously. Bandwidth caps can be used to prevent residents from monopolizing the connection.

TOTAL RESIDENTIAL UNITS	RECOMMENDED SYMMETRICAL INTERNET BANDWIDTH
125	1 Gbps
250	2 Gbps
625	5 Gbps
1250	10 Gbps

This recommendation was calculated using information and data from the FCC Broadband Speed Guide

This is in line with real-world deployments we have seen with our industry research. In general, bandwidth usage increases and bandwidth prices decrease over time.

In-Building Cabling

What cabling is best for my property?

See the chart provided for a detailed comparison of cabling technologies to aid in your selection.

	Ethernet Installing New Industry Standard Networking Over Twisted Pair Cables	**Coaxial Cable** Reusing Existing Cable For Networking With G.hn Technology	**Phone Lines** Reusing Existing Phone Lines For Networking With G.hn Technology	**Fiber to the Unit** Installing A New Fiber Passive Optical Network (PON)
Bandwidth	**VERY GOOD** Currently allows up to 10 Gbps speeds over 300 feet on Cat6a cabling.	**GOOD** Currently allows for up to 2.5 Gbps speeds over 1,500 feet.	**FAIR** Currently allows 1 Gbps speeds over 450 to 750 feet.	**EXCELLENT** Essentially unlimited bandwidth. Currently supports speeds of up to 10 Gbps over multiple miles.
Affordability	**VERY GOOD** Standard technology is supported by most vendors, which helps keep prices low.	**EXCELLENT** Reusing existing building wiring saves time and money.	**EXCELLENT** Reusing existing building wiring saves time and money.	**POOR** More expensive to purchase and install than other options.
Lifetime	**EXCELLENT** Can last through multiple generations of network upgrades.	**FAIR** The industry is moving away from Coaxial Cable to Fiber and Ethernet.	**FAIR** The industry is moving away from Phone Lines to Fiber and Ethernet.	**EXCELLENT** Can last through multiple generations of network upgrades.
Ease of Installation	**GOOD** If installations are needed, they add cost and disruption to residents. Twisted Pair Cabling is cheaper to install than Fiber.	**VERY GOOD** Very common in existing buildings. If in good condition, minimal changes to the property are needed.	**VERY GOOD** Very common in existing buildings. If in good condition, minimal changes to the property are needed.	**POOR** If installations are needed, they add cost and disruption to residents. Fiber is more expensive to install than Ethernet.

TAKEAWAYS

- Ethernet is the best option for new installations. It offers high performance, a long lifespan, and vast industry adoption.

- Reusing existing coaxial cables and phone lines for networking can save costs. Although this niche technology offers lower performance, it may be a good fit for older buildings that lack existing cabling pathways.
- Fiber is fast, reliable, and has a long lifespan, but it can be more difficult and expensive to install and requires niche equipment. Fiber is often only a good fit in new construction.

Outdoor Cabling

If buildings are close to one another, how can I connect their networks?

A single high-speed internet connection can serve multiple nearby properties, making it a cost-effective solution by sharing resources.
- Fiber is fast, reliable, and long-lasting, but installation can be more difficult and expensive.
- Wireless can be installed quickly and inexpensively but has lower performance and a few things to consider.

	Fiber A high-performance solution with a long l 	**Fixed Wireles**s Quick and easy installation, no cabling required between buildings
Bandwidth	**EXCELLENT** Essentially, unlimited bandwidth potential currently supports more than 100 Gbps.	**GOOD** Typically, less than 10 Gbps of throughput.
Affordability	**FAIR** More expensive.	**VERY GOOD** Less expensive.
Lifetime	**EXCELLENT** Fiber can last through multiple generations of network upgrades.	**FAIR** Fixed wireless equipment must be replaced during every upgrade cycle.
Ease of Installation	**FAIR** Difficult to install. Requires installing trenching or pulling aerial cables between buildings.	**VERY GOOD** Easier to Install. No cables are needed between buildings. Only requires mounting on the roof of the building and wiring to a server room.
Reliability	**EXCELLENT** Generally, only a physical cut of the fiber will cause problems once installed.	**FAIR** Wireless signals are subject to interference from weather effects such as rain, lightning, and radio interference.

Wireless Access Point (WAP) Placement

Where is the best place to install access points?

Every building is different, and its characteristics must be considered when making this decision.
- In apartment buildings with smaller units, hallway installations are quick and easy.
- In apartment buildings with larger units, wireless signals may only cover some rooms within the units from the hallways. In this case, access points may be needed in some or all units.
- Knowing the building construction materials (and having blueprints) is essential. Engineers can use software to model Wi-Fi signal strength with this information, allowing optimal network design pre-installation.

	In-Hallway Model	In-Unit Model
	Best for properties with smaller units	Best for properties with larger units
Service Quality	**VERY GOOD** Walls between the access points and the residents can degrade wireless signal strength.	**EXCELLENT** Wireless signal strength is very strong within each unit.
Affordability	**VERY GOOD** Fewer access points, cabling, and labor required, reducing costs.	**GOOD** More access points, cabling and labor are required, increasing costs.
Ease of Installation	**VERY GOOD** Access points are in common areas; no need to enter private units.	**FAIR** Access points are placed in private residences, which can be challenging.

Security & Connectivity Methods

What's the best way for your residents to connect?

When designing a Wi-Fi network, finding the right balance between security and ease of use is important. A shared password can be effective in shared spaces like common areas, providing easy access for everyone. However, this approach isn't ideal for individual apartments, where privacy and security are essential. A more secure option, like a captive portal, can offer better protection for these private areas. While this method enhances security, it can be more cumbersome for users to connect, requiring an additional step to access the network. The goal is to weigh these options carefully to create a network that meets everyone's needs.

RECOMMENDED
Unique passwords per household are easy to use and offer strong protection.

	Shared Password Easy to implement and connect, but less secure.	**Unique Passwords** Easy to connect with strong security.	**Captive Portal** Strong security, but more burdensome to connect.
Security & Privacy	**POOR** All residents are on the same network.	**VERY GOOD** Each unit has a private network.	**VERY GOOD** Each unit has a private network.
Ease of Implementation	**EXCELLENT** No complex technical requirements, widely supported by all vendors. Common in communal areas like community rooms and for guest access.	**VERY GOOD** More complex technical requirements.	**GOOD** Most complex technical requirements.
Ease of Use	**EXCELLENT** All residents enter the same password to connect.	**EXCELLENT** Residents have their own accounts, allowing separate billing and usage statistics gathering.	**GOOD** Residents have their own accounts. It is not easily supported by all devices, such as printers and smart TVs.

Network Management & Support

Who will manage the network once it is complete?

A critical piece of any network is ongoing support and maintenance, which includes:
- **Proactive monitoring** to ensure everything is working as expected.
- **Alerting** if equipment fails or if connectivity is poor.
- **Software upgrades** to ensure the best performance.
- Maintaining **security policy** to keep hackers out.
- Guaranteed uptime with **Service Level Agreements (SLAs)**.

	MSP MANAGES	BUILDING OWNER MANAGES
Cost	Ongoing costs for internet connectivity *and* monthly fees for management or network support	Ongoing costs for internet connectivity only.
Ideal for	Companies *without* dedicated IT staff	Companies *with* dedicated IT staff

CONSIDERATIONS
- Does your company have the staff to provide ongoing maintenance and network support?
- If not, will you hire IT staff or contract an MSP?

Adoption & Digital Literacy Training

How will you encourage residents to use the new network?

It is essential to encourage resident adoption and provide digital literacy support to ensure the successful implementation of your new Apartment Wi-Fi network. Here are effective strategies to inspire adoption your residents to utilize the network:

1. **Planning is key**
   - Incorporate Network Adoption strategies into a comprehensive implementation strategy from the beginning.

2. **Community Engagement**
   - Organize community workshops to educate residents about the new network.
   - Distribute informational flyers and conduct door-to-door outreach to raise awareness.

3. **Neighborhood Liaisons**
   - Train and support neighborhood liaisons to promote the network.
   - Offer digital literacy training and support through these liaisons or community partners.

4. **Digital Literacy Programs**
   - Align with local training programs to help residents get connected.
   - Provide guidance on using computers, signing onto the network, and navigating the Internet comfortably.

CONSIDERATIONS
- Will your organization conduct resident outreach, or should it consider hiring or partnering with a local group?
- Will your organization provide digital literacy training, including using the new network?
- Does your organization have relationships with any digital equity groups?
- Consider establishing relationships with local digital equity organizations specializing in outreach. These partnerships can enhance resident engagement and effectively support digital literacy efforts.