MR Hospitality Design Guide (CVD)

This guide is intended for systems design engineers who are responsible for designing, implementing, and operating wireless networks within hospitality.

Solution overview

Meraki MR access points offer best in class performance and guest experience flexibility. Meraki MR products cover the entire guest experience from the moment they enter the lobby to when they are winding down in their room. Guests expect a "home like" experience with high performance internet access to remain connected to social media and their favorite TV shows. The Meraki architecture is extremely flexible, allowing interactions driven by both partners and customers alike without the need of complex hardware on-site. This flexibility provides a solid foundation for a brand customized experience and user engagement.

Key Benefits

- Hotel staff can use mobile devices to connect to reservation and property management software anywhere on the premises increasing productivity and customer service.

- Wireless VoIP service can ensure staff are connected with front desk resulting in faster response times.

- Wireless PoS (Point of Sale) enable food and drink sales anywhere on the property.

- Free and/or billed packaged internet service for guests in room and around the property.

- Guests remain connected to their favorite services like HD streaming video, social media, and work resources.

- Meraki BLE with mobile application integration enables next generation engagements like keyless check in and secure wifi for loyalty members

Network Segmentation

There are at least two main use cases for a hospitality network. **House Access** which hosts Point of Sale, room automation, and property management system (PMS) solutions which likely require both wired and wireless access. **Guest Access** which hosts either complimentary or paid internet access for guests or conventions.

Switching

Both house and guest access would be served by the switching layer of the network. Depending on the scale of the network, multiple layers of switching may be deployed (Core, Distribution, Access). In smaller networks Core/Distribution may be collapsed into a single layer. Based on the expected device counts, VLANs and subnet will need to be selected for both the House and Guest Access.

Wireless SSIDs

A Service Set Identifier (SSID) defines wireless network access. Typically hospitality environments configure two SSIDs: one for Guest Access and one for House Access. These SSIDs would typically be mapped to one or more VLANs created on the switch fabric intended for each service.

Wireless Network Security/Access

Security mechanisms are needed in a converged network where a single network is the foundation for Guest and House Access.

Secure 802.1x

It is common to deploy 802.1x security for a House Access network for both access control and encryption. Network Access Control like Cisco ISE can instruct the MR access points to grant elevated or customized access to services on the wired network. A VLAN or group policy can be applied to a specific device based on user and device. Use cases that can be satisfied with a single the 802.1x SSID utilizing a NAC:

- PCI secured Point of Sale
- Concierge and Guest Services connectivity
- Mobile property management system devices like tablets
- Automatic secure guest via Hotspot 2.0 profile installed by Custom Brand App

Splash page

Guests expect to easily connect to the guest SSID from their device. The most widely used connection mechanism to connect is a requirement to enter some information to get internet access. Deployments may configure the Meraki Dashboard with a SSID that has "Open" association requirements (no password prompt) but then redirects users to a splash page. Below are a couple additional splash experiences that can be delivered to users.

Access Codes

Access codes are an easy to use method that some hotels choose. Access codes ensure only authorized guests have access to the wireless network. A technology partner can create a splash page and provide a easy way for the property owner to change and manage access codes. Below is a example access code splash page provided by eleven wifi.
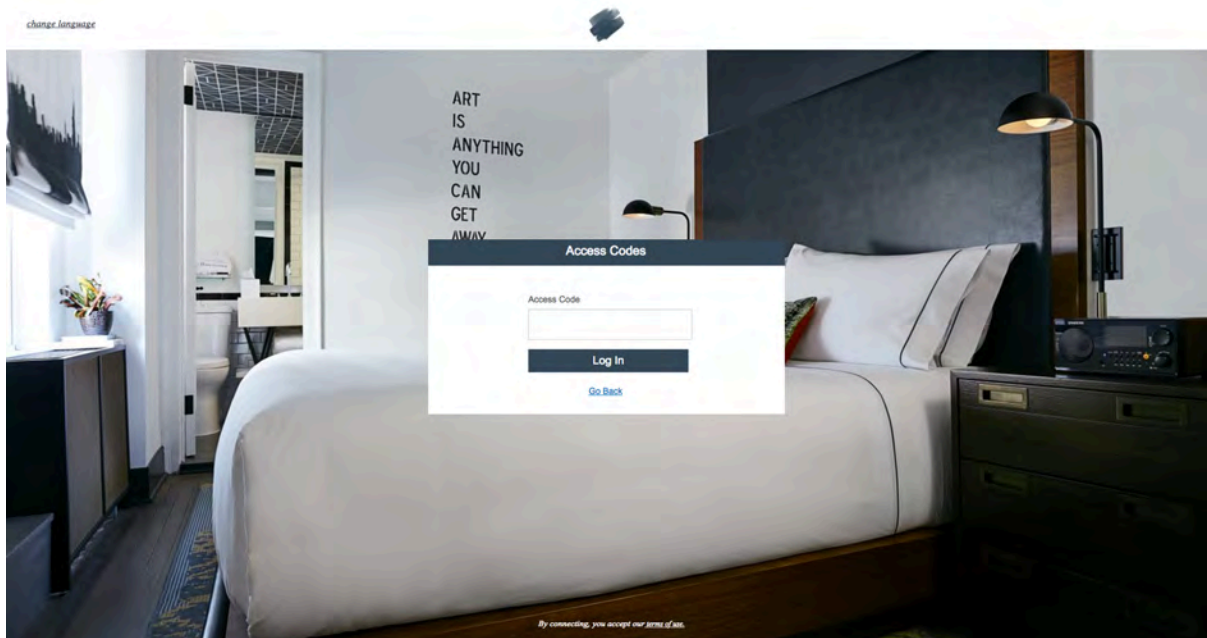

Billing and PMS integration

More advanced integration which includes a billing option or authentication with the property management software can offer a more

customized experience and turn guest wifi into a revenue generation tool. A partner can develop a customized splash page that fits with the hotel brand and integrate into the Property management system. Integration with the PMS system not only allows guests to be authenticated but also any billing transactions can occur directly into the guest folio.

Eleven wifi provided an example of a splash page that offers a billing and PMS authentication.
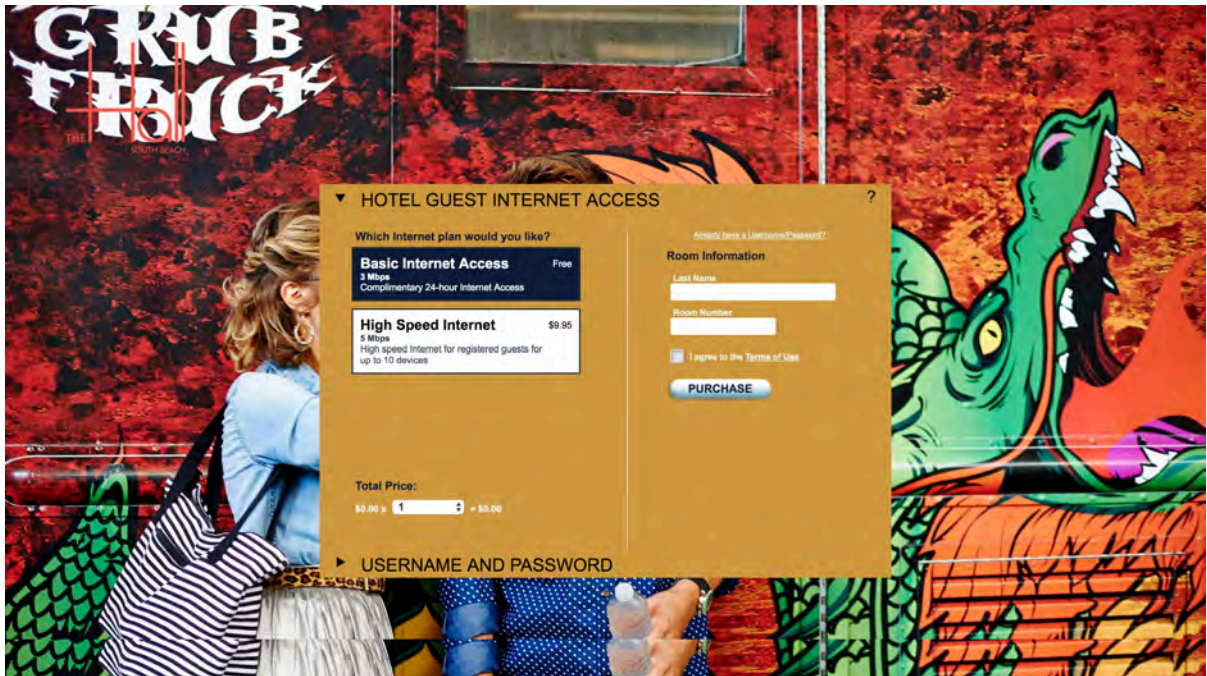
Many partner developers may offer this solution as a service to hospitality customers hosted on their cloud. Larger hospitality customers may choose to host the splash page on an existing production web server in order to ensure easier content management. Technology partners and customers alike can integrate into the Meraki platform, more info below.
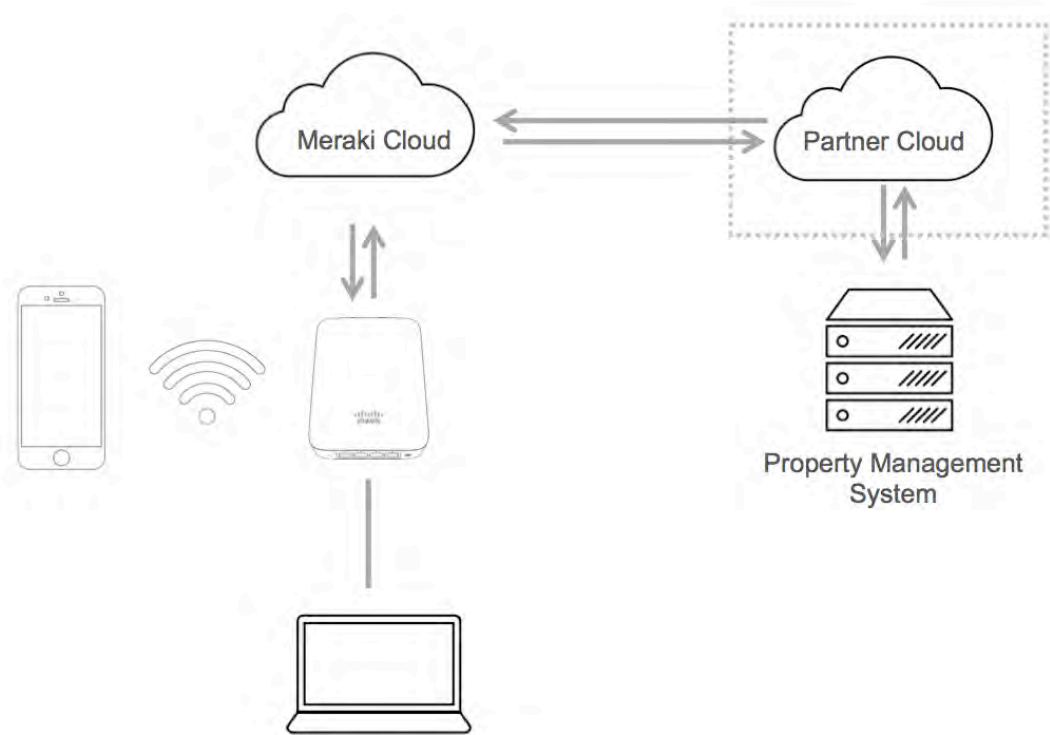
Secured Guest

Some deployments are offering secured guest access. Loyalty members typically have the brand's app installed on their mobile device. The mobile device can be configured via the app with network access profile. The profile can be configured with a unique certificate for authentication and Hotspot 2.0 details allowing the brand to have a unique 802.1x SSID name but still allow secure guest. The NAC system, upon each connection, validates the device certificate and instructs the MR access points to grant that user with an elevated experience of guest access and prevent access to sensitive network services like the PMS.

Because there is no need for a splash page, loyalty members will seamlessly be connected to the wireless network improving the check in experience.

Technology Partners

Cisco Meraki has strong partnerships with technology vendors that integrate into a number of Property Management Systems and Point of Sale systems. These technology partners may even offer the network as a service to property owners. For more information on the established partners see our Meraki Developers portal.

Wired Network Security

When deploying Meraki MR access points into each guest room, the same technologies and experiences can be extended to wired clients. Wireless configuration like splash pages and House Access can also be granted to the wired devices connecting to a MR access point. The AP port profile article describes the configuration of how to enable different access per port on the Access Point.

Wired Services

Mission critical services like IPTV and VoIP are joining the portfolio of services that hotels are offering on the IP network. These new services require the same SLAs from an availability perspective as the traditional PMS systems running on the IP network. The main difference is that these new services require higher capacity and thoughtful QoS.

IPTV

IPTV solutions use multicast as a transport mechanism to deliver content to set top boxes in each room. Multicast allows the content server to stream content to a single destination IP address, reducing system overhead. MR30Hs use a IGMP to monitor and route multicast traffic to connect clients requesting services. A set top box or IPTV enabled device may send an IGMP request to join the stream which will then open the flow through the MR30H. This technology ensures that there is low overhead sent to wired or wireless clients on the MR30H.

VoIP

Voice over IP solutions deliver real time audio and video services to devices within the hotel room. Over time many phone systems have moved away from digital PBXs in favor of VoIP for lower total cost of ownership. The MR30H features a 802.3af PoE out which can power a VoIP phone in the room. QoS and traffic shaping tools on the Meraki Dashboard ensure that the VoIP services have low latency and high reliability.

Wireless RF Design

The wireless network is the foundation to both the Guest Access and mobile House services like access to the PMS. There are a number of different scenarios within a hotel or resort. This section will provide some recommendations/best practices for AP placement and considerations for each use case.

> ⓘ Each and every environment is unique, consulting with a Cisco certified partner is highly recommended.

Overview

The following sections outline different considerations and strategies for each use case within a resort/hotel. The table below is an overview of MR models that are appropriate for each location:

| Location	Model
In-Room Wireless	MR30H
Hallways and low capacity areas	MR42
Lobbies and Gathering areas	MR52/53
Conference facilities	MR52/53 & MR84 (When antennas are needed)
Outdoor grounds where people congregate	MR84
Outdoor grounds for coverage	MR72

Guest rooms

In Room - Best Performance / Recommended

The best wired and wireless experience will be achieved by deploying Access Points directly into the guest rooms. The in room design allows for each and every guest room to have the highest signal strength and performance in their room. Designing with APs in the rooms also typically saves on

cabling cost as it only requires only a single new or existing Ethernet run to the desk area of each guest room. The MR30H can provide both wireless and wired network access over a single Ethernet run into the room.

> ⓘ Typically transmit power is automatically set lower and higher minimum bitrate is configured to reduce co-channel contention between rooms. It is best practice to use Auto Channel and Auto Transmit power in these environments. Meraki MR access points feature a 3rd dedicated scanning radio which will help optimize the RF performance of each AP. Commonly these environments use a minimum bitrate of 18Mbps or 24Mbs.

> ⓘ Be sure to include infrastructure based MRs in the hallways for seamless roaming.
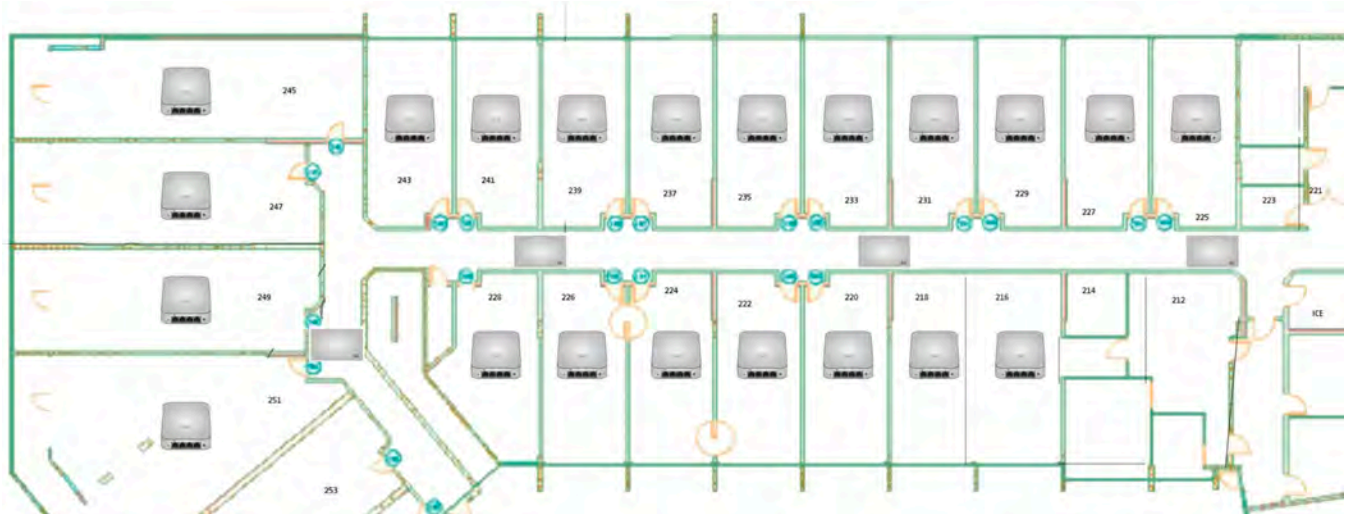

In Room and Hallway Split (Zigzag) - Moderate Performance / Recommended

Split design provides a cost-effective solution and an alternative to in room design where wired connectivity is not needed in every room. Installing an AP to provide coverage for 3 rooms provides the necessary wireless performance to support most use cases. Coverage and performance for this type of design will vary greatly based on building material and a site survey can ensure uniform coverage. It is recommended to use MR42/52/53 for this design strategy as they can support latest devices and the added transmit chain can provide extended coverage in certain locations if needed.

> ⓘ Typically transmit power is automatically set to medium and moderate bitrate is configured to reduce co-channel contention between APs. It is best practice to use Auto Channel and Auto Transmit power in these environments. Meraki MR access points feature a 3rd dedicated scanning radio which will help optimize the RF performance of each AP. Commonly these environments use a minimum bitrate of 12Mbps or 18Mbs.

> ⓘ Be sure to include infrastructure based MRs in the hallways for seamless roaming.
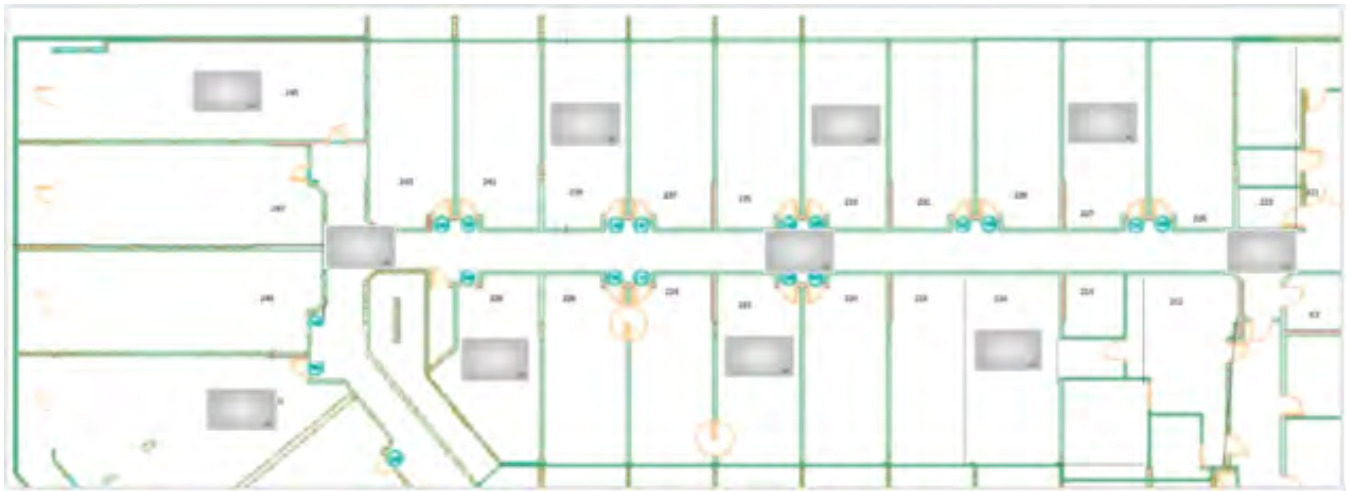
In Hallway - Economical / Not recommended for highest performance

Hallway designs provide basic connectivity to all guest rooms and are coverage based designs rather than performance based. 1 AP in the hallway may serve several neighboring rooms. These designs typically have to overcome challenges related to building material like cinder block walls and other obstructions like pipes and mirrors to support bathrooms. It is recommended to use MR52/53 for this design strategy as the additional transmit chains help extend the coverage.

> ⓘ Typically a high power like 100% power is configured for radios and a minimum bitrate configuration is set to the lowest in order to penetrate into the guest rooms. It is best practice to use Auto Channel and set Power manually. Commonly these environment will use a minimum bitrate of 1Mbps.

> ⓘ APs tend to be very close together in the hallway to ensure RF penetrates into each room.
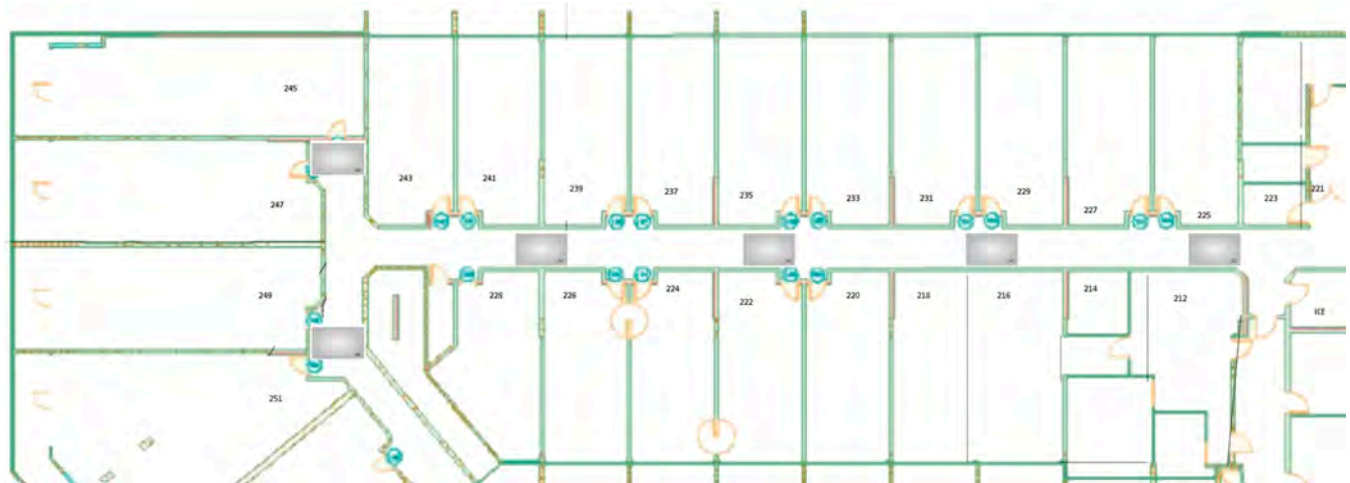
Lobby / Halls / Common areas

Many guests congregate in the lobby, halls, and common areas. Selecting high performance access points is recommended for these areas as they are designed for higher capacity and elevated levels of environmental noise. If there are high ceilings (greater than 30ft) it is recommended to find locations

closer to the users. Aesthetics are important in these environments, include the interior design team in RF design discussion. Placing APs in line of sight to the users will always have the best performance.

ⓘ APs with external antennas may be required if placement of a integrated antenna AP is not optimal for the designed coverage area.

Conference Rooms

Conference rooms can handle anywhere from 10 to 200 people. Many cases these environments have lower ceilings which is optimal for high performance access points with integrated antenna. Stagger APs in the room to help evenly distribute the user density of clients over the area. Especially true in conference rooms, each user is going to have multiple devices. Plan for at least 3 devices per user when planning for capacity.

Event Venues / Convention Centers

Event venues usually handle up to tens of thousands of users. In these environments ceilings are often very high and the fixtures on the floor move around. It is best practice to position and mount the APs as close to the users as possible. In the case where this is not possible, it is common to mount a high performance access point near the ceiling and use a very focused external antenna. The MR84 paired with the Cisco stadium antenna is ideal for these environments as it focuses the RF energy to a small section of the open space and aids in receiving signals from the clients. Co-channel contention may also become a problem when using alternative antennas in these environments.

ⓘ These are the most challenging RF environments and a cisco partner should aid in this design. It is recommend that only the MR84 to be used when mounting on high ceilings if the MR53 is not able to be mounted near the users in these environments.

Outdoor

It is common to cover outdoor areas like valet, pools, recreation areas with wireless especially if the property management software may be used in these areas on mobile devices for point of sale. For highest performance it is recommended to run Ethernet cables to each AP which ensures that it has a dedicated wired back haul. Mesh may be used for hard to reach areas however will not offer the highest performance. See the mesh deployment guide for more detail on mesh considerations.

ⓘ Typically it is best to select sector antennas for APs mounted on walls to focus energy our into the space and away from internal rooms. Depending on client density, a single AP with omni antennas may be mounted on a pole to cover in all directions. Alternatively multiple APs may be mounted on one pole with sector antennas to break up the coverage area into smaller zones and reduce the probability of hidden nodes.

Plan for Voice Roaming

Many carriers are moving to VoWifi for their users, if voice is not on the House Administration network expect that guests will use Voice over the Guest Wifi. Plan for at least 2x 5Ghz APs at -67dBm or higher within every spot of the coverage area. To ensure gap-free roaming, a moving phone must be able to hear each roamed-to AP at least 5 seconds before it needs to roam to it. Make sure to plan the RF environment with an active survey to provide proper overlap at -67dBm.