

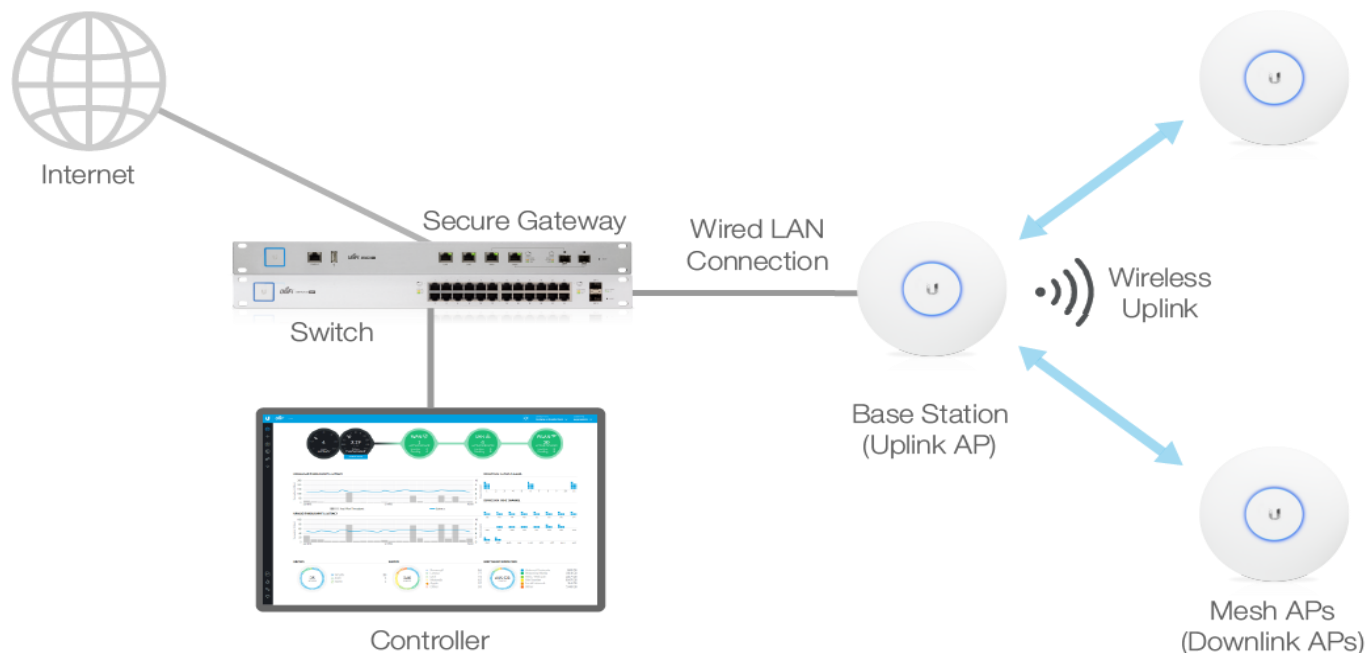
UniFi- Feature Guide: Wireless Uplink

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Overview

UniFi introduced Wireless Uplink to help make wireless deployments more flexible and convenient for network administrators. Wireless Uplink allows an access point with a wired data connection to act as a Base Station (Uplink AP) for up to four other access points on 5GHz- which can extend Wi-Fi coverage to inaccessible areas, as well as pull down any configuration and settings changes from the controller via the upstream AP.



Example of Wireless Uplink Topology with UAP-AC-PRO

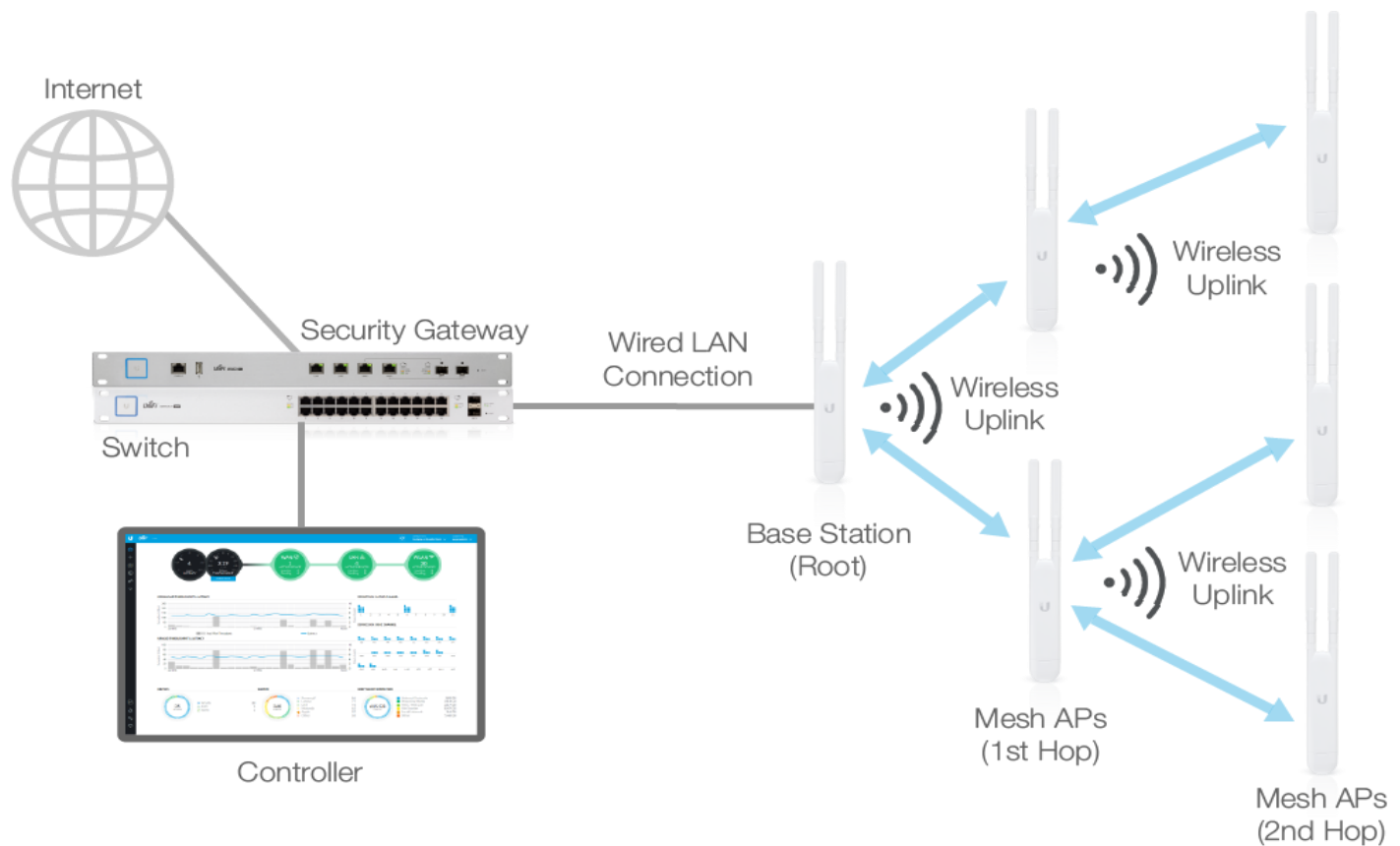
The UniFi Mesh access points (UAP-AC-M, UAP-AC-M-PRO) offer additional functionality with wireless uplink- enabling wirelessly downlinked APs to also act as an uplink to other access points.

To understand how Wireless Uplink can be used, it's important to know the terms used in UniFi/this article:

Base Station (Uplink AP): Access point with a wired data connection that is configured to relay data to and from Mesh APs (Downlink AP).

Mesh APs (Downlink AP): Access point without wired data connection, that functions as a normal wired AP would by sending/receiving client data wirelessly to/from the base station, or an intermediate AP by use of the Wireless Uplink feature (the second option is only supported with UniFi Mesh product line as intermediate AP).

Multi-hop Wireless Uplink (Only supported by UniFi Mesh products): A deployment that uses a base station but has more than one level of Wireless Uplink with intermediate APs relaying data to and from the base station. When using multiple levels of APs, the uplink tiers can be referred to by root (Base Station), first hop, second hop, etc. See example below:



Example of Multi-hop Mesh Topology with UAP-AC-M

How it Works

Once enabled, Wireless Uplink allows access points without a wired data connection to communicate with pre-configured wired access points on a network. This offers a number of benefits:

- Factory default or unadopted devices can once powered up via POE, connect to an AP in range and make itself available for adoption within the UniFi controller.
- These devices can be adopted and configured in the controller via the Wireless Uplink connection.
- Once configured, these devices can broadcast SSIDs and relay network traffic to and from the network through the uplinked AP.
- (UAP-AC-M & UAP-AC-M-PRO Only) Additional devices without wired data connection can be booted up and installed via Wireless Uplink by communicating with the first hop UAP-AC-M or UAP-AC-M-PRO.

Note: With each additional AP communicating with a single AP via Wireless Uplink, wireless speeds on the Uplink AP and downlink APs will be lessened to some degree. When extending network coverage to remote areas, this is typically of little consequence as accessibility is the primary function of the Wireless Uplink configuration. Still, when using many devices via Wireless Uplink consider the limitations on network speed.

Requirements

In order to use Wireless Uplink you will need:

- Setting: “Connectivity Uplink Monitor and Wireless Uplink” enabled.
- At least one wired access point that supports Wireless Uplink (see compatibility matrices below.)
- Power source for non-data wired AP i.e. PoE injector.
- (Recommended) Most current stable firmware.

See the following compatibility matrices for information on supported devices:

UniFi Access Points - Wireless Uplink Compatibility Matrix

Model	Supports Wireless Uplink	Supports Multi-hop Wireless Uplink
UAP-AC-HD	✓	
UAP-AC-PRO	✓	
UAP-AC-LR	✓	
UAP-AC-LITE	✓	
UAP-AC-IW	✓	
UAP-AC-EDU	✓	
UAP-AC-M	✓	✓
UAP-AC-M-PRO	✓	✓

Legacy UniFi Access Points - Wireless Uplink Compatibility Matrix

Model	Supports Wireless Uplink	Supports Multi-hop Wireless Uplink
UAP	✓	
UAP-LR	✓	

UAP-PRO	✓
UAP-AC	
UAP-AC-Outdoor	
UAP-Outdoor	✓
UAP-Outdoor+	✓
UAP-Outdoor5	✓
UAP-IW	✓

Note: Single-band non-AC devices only support Wireless Uplink on 2.4GHz band.

How-to/Instructions

To enable Wireless Uplink:

- Open your UniFi Controller
- Go to Settings > Site
- Verify “Connectivity Uplink Monitor & Wireless Uplink” is enabled. If not, check the box, then click Apply Changes.

The screenshot shows the UniFi 5.4.8 settings interface. The top navigation bar includes the UniFi logo, version 5.4.8, a refresh icon, 'CURRENT SITE: Default', and 'USERNAME: admin'. The left sidebar contains a 'SETTINGS' menu with options: Site (selected), Wireless Networks, Hotspot 2.0 (BETA), Networks, Routing & Firewall (BETA), Guest Control, Profiles, Admins, User Groups, DPI, Controller, Cloud Access, and Maintenance. The main content area is titled 'Site' and is divided into two sections: 'SITE CONFIGURATION' and 'SERVICES'.
SITE CONFIGURATION:
- Site Name: Default
- Country: United States
- Timezone: (UTC-08:00) Pacific Time (US & Canada)
SERVICES:
- Advanced Features: Enable advanced features
- Automatic Upgrades: Automatically upgrade firmware
- LED: Enable status LED
- Alerts: Enable alert emails
- Speed Test (BETA): Enable periodic speed test every 20 minutes (USG)
- Port Remapping (BETA): Configure VOIP port as WAN2 on UniFi Security Gateway 3P (USG)
- Uplink Connectivity Monitor: Enable connectivity monitor and wireless uplink
- SNMP: Enable SNMPv1 Community String: public
- Remote Logging: Enable remote syslog server
- Device Authentication: Username: Simon, Password: [masked]
At the bottom, there are three buttons: 'APPLY CHANGES' (green), 'RESET', and 'EXPORT SITE' (grey).

To adopt devices via Wireless Uplink:

- Power up the access point that will be communicating with Base Station/root AP via Wireless Uplink and ensure it is within range of the Base Station/root AP. You will need a source of PoE to power the device without a wired data connection.
- After device boots up, it will appear within the Devices page of your controller, with the status Pending Adoption (Wireless).

DEVICE NAME	IP ADDRESS	STATUS	MODEL	VERSION	UPTIME	ACTIONS
UniFi Switch - Upstairs	192.168.2.227	CONNECTED	UniFi Switch 8 POE-150W	3.7.32.5963	11d 3h 14m 23s	LOCATE, RESTART, UPGRADE
80:2aa8:02:05:45	192.168.2.139	CONNECTED	UniFi AP-AC-Mesh-Pro	3.7.34.5997	19m 35s	LOCATE, RESTART
80:2aa8:d9:8a:25		PENDING ADOPTION (WIRELESS)	UniFi AP-AC-Mesh			ADOPT

- Click Adopt to adopt the device.
- *Once adoption has begun, the Base Station will provision, then again show as connected.* After this, the Mesh AP device status will change with each step of the process:
 - Adopting
 - Provisioning
 - And when finished, Online (Wireless).
- After device boots up, it will appear within the Devices page of your controller, with the status *Pending Adoption (Wireless)*.

DEVICE NAME	IP ADDRESS	STATUS	MODEL	VERSION	ACTIONS
UniFi Switch - Upstairs	192.168.2.227	CONNECTED	UniFi Switch 8 POE-150W	3.7.32.5963	LOCATE, RESTART, UPGRADE
80:2aa8:02:05:45	192.168.2.139	PROVISIONING	UniFi AP-AC-Mesh-Pro	3.7.34.5997	
80:2aa8:d9:8a:25		ADOPTING	UniFi AP-AC-Mesh		ADOPT

This process will take longer than a wired adoption- should take roughly 2-3 minutes to show up as adopted within your controller. Once adoption has finished your device can be managed within the controller in the same way as a wired AP.

Configure/Modify Existing Wireless Uplink Connections

Occasionally, administrators may want to change the way in which their Wireless Uplink devices are communicating, for instance, changing one AP to use a different uplink. This can all be easily done through the UniFi Controller. To do this:

- Open your UniFi Controller.
- Click on the Device in the Uplink Setup that you'd like to configure.
- Click on the Configuration Tab in the Device Pane.
- Select "Wireless Uplinks"
- *Once in this menu you can choose a different device to act as the Uplink. To do so, Select the desired AP to act as uplink, and click the link icon.*

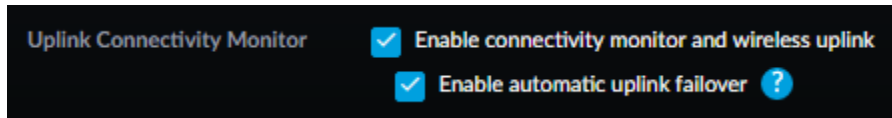
To remove the existing uplink:

- Click the trash icon next to the link you'd like to remove.
- The device will then reprovision and will no longer use the selected AP as uplink.

Enable Automatic Failover

In order to allow APs to stay connected in case an AP from your Wireless Uplink topology goes offline, the UniFi controller has a feature to help ensure devices/APs stay functional. This feature is called Automatic Failover. To enable it:

- Go to Site > Settings
- Under Uplink Connectivity Monitor & Wireless Uplink, click the box "Enable Automatic Uplink Failover"



Devices will need to reprovision frequently while setting up your Wireless Uplink topology, so to avoid devices rolling over to the next available AP and throwing off your designed topology, it is recommended to disable this feature until you've got your mesh network fully configured.

Using Map/Topology Views

The Map and Topology views are very helpful ways to manage your Wireless Uplink configuration as they help visualize the deployment. Carefully labeling devices and placing them in the appropriate location on your map can help save a lot of time when managing a Wireless Uplink deployment.

UniFi 5.4.5

Wireless Uplink Test Utah USERNAME: andrew.pleper

TOPOLOGY LINK LABELS SHOW CLIENTS

```

    graph LR
      USW[USW-14-150W (Andrew's office)] --- BS[BaseStation-PRO]
      BS --- M4[Mesh 4 - East Warehouse]
      M4 --- M1[Mesh 1 - Between (2 and 3)]
      M1 --- M3[Mesh 3 - N. End of Warehouse]
      M1 --- M2[Mesh 2 - South Warehouse]
  
```

USW-14-150W (Andrew's office) BaseStation-PRO Mesh 4 - East Warehouse Mesh 1 - Between (2 and 3) Mesh 3 - N. End of Warehouse Mesh 2 - South Warehouse

PROPERTIES

Mesh 3 - N. End of Warehouse CONNECTED (WIRELESS)

Details Users Guests Configuration

GENERAL

RADIOS

WLANS

NETWORK

BAND STEERING

AIRTIME FAIRNESS

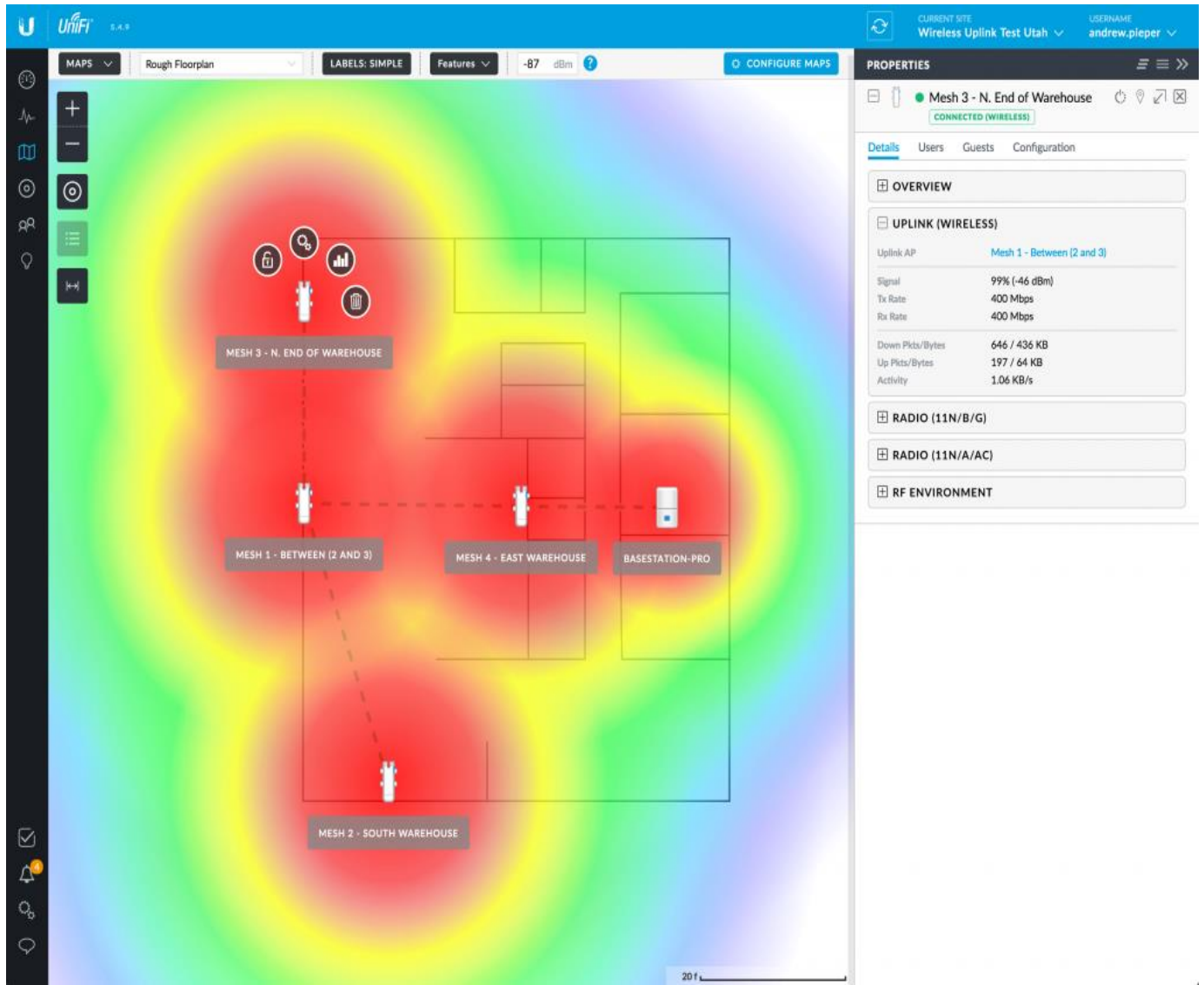
WIRELESS UPLINKS

AP	CHANNEL	SIGNAL ↓	ACTIONS
Mesh 4 - East Warehouse	161	92% (-53 dBm)	↻
Mesh 2 - South Warehouse	161	87% (-55 dBm)	↻
BaseStation-PRO	161	84% (-56 dBm)	↻

Showing 1-3 of 3 records.

MANAGE DEVICE

DEBUG TERMINAL



To access these views:

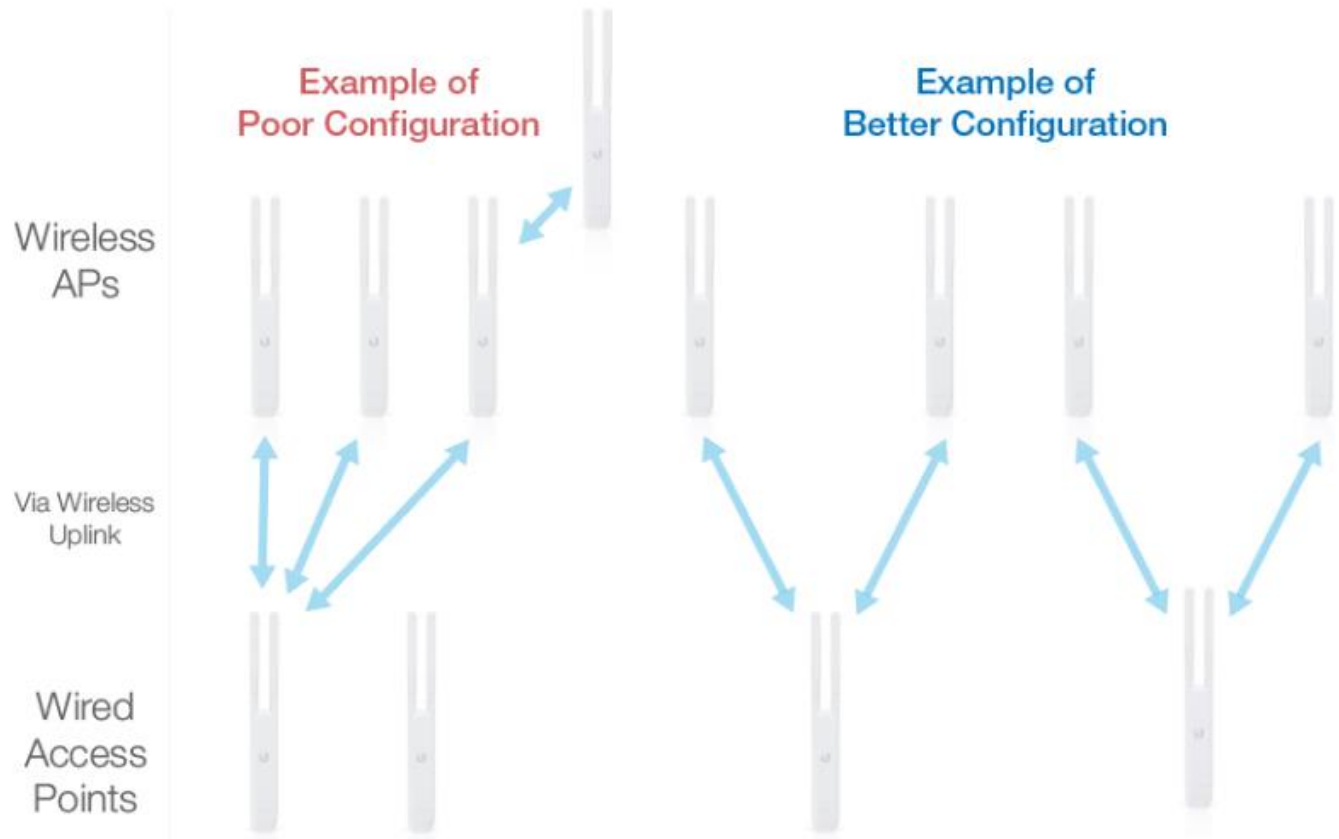
- Open your UniFi Controller
- Click the Map Icon on the left toolbar
- Select either Maps or Topology from the dropdown menu in top left of display.

Once in this view you can manage devices by clicking on the device and clicking the configuration icon.

Best Practices

Wireless Uplink is most helpful in extending network access to less accessible physical locations within the network. When LAN connectivity is not viable in a particular location/setting, Wireless Uplink can help take your network wherever it is needed. The Mesh product line can be particularly helpful in extending network with multi-hop functionality and an outdoor-suitable enclosure.

Also, to ensure that network speeds are optimized with Wireless Uplink, we recommend when designing a network to balance Wireless Uplink load from wired APs as to not create unnecessary delays on any devices connected via the overused AP. See example below:



Note the example on the left has not balanced the load between the two UAP-AC-MESH and is unnecessarily burdening the one AP, when the other could also be used as a Wireless Uplink AP, as has been done on the better example on the right. Also, the first example on the left added an unnecessary level of Wireless Uplink- while the example on the right eliminated this.

Unless your network needs to use wireless Uplink or benefits from the use of this feature, we recommend you disable the Connectivity Uplink Monitor & Wireless Uplink setting. To do so, in your UniFi Controller:

- Click Settings icon.
- Go to Site Settings.

- Under "Uplink Connectivity Monitor", uncheck the box next to "Enable connectivity monitor and wireless uplink".

Uplink Connectivity Monitor

Enable connectivity monitor and wireless uplink

Disabling this setting can offer some improved speed and is often suggested when network speeds with UniFi are less than ideal.