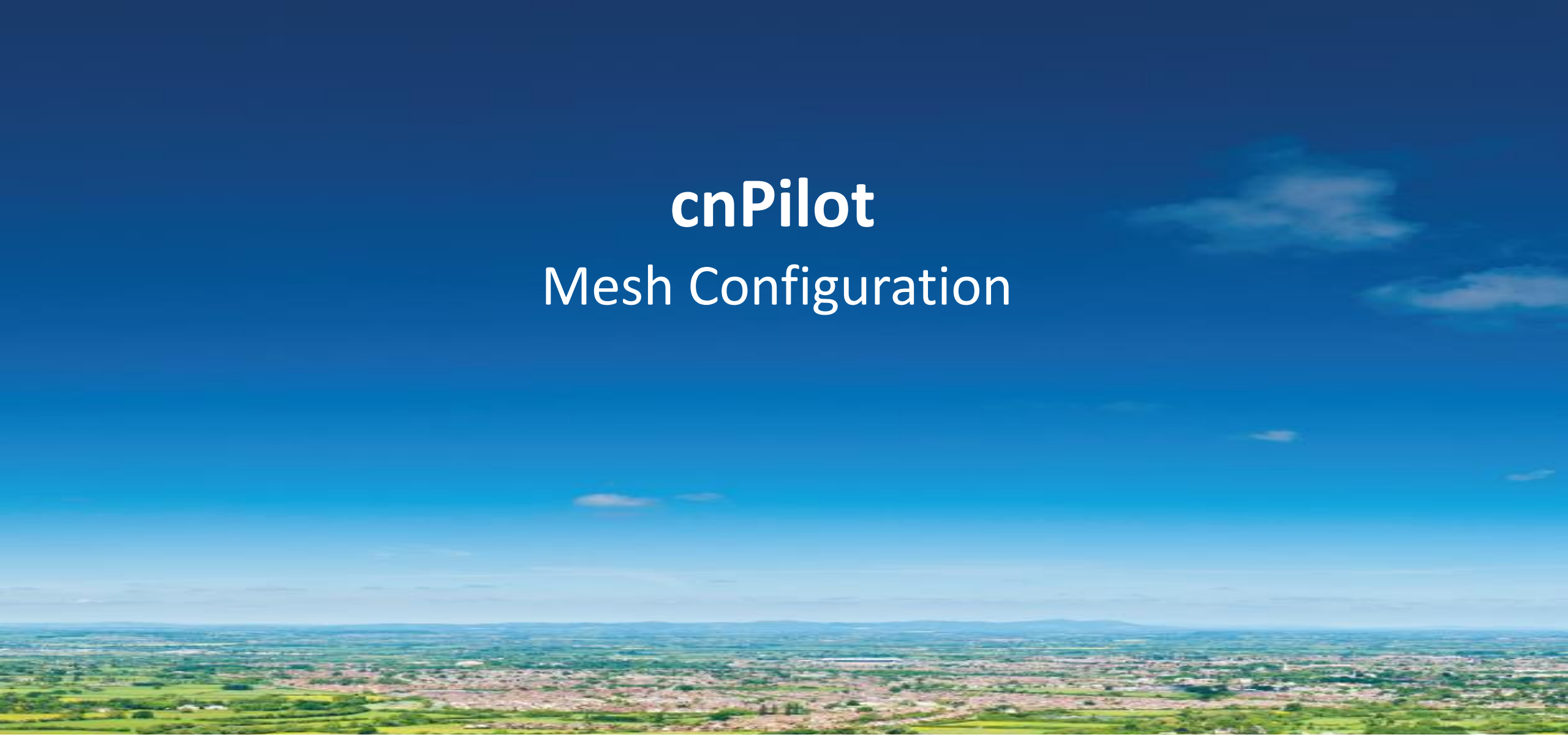
# cnPilot

## Mesh Configuration



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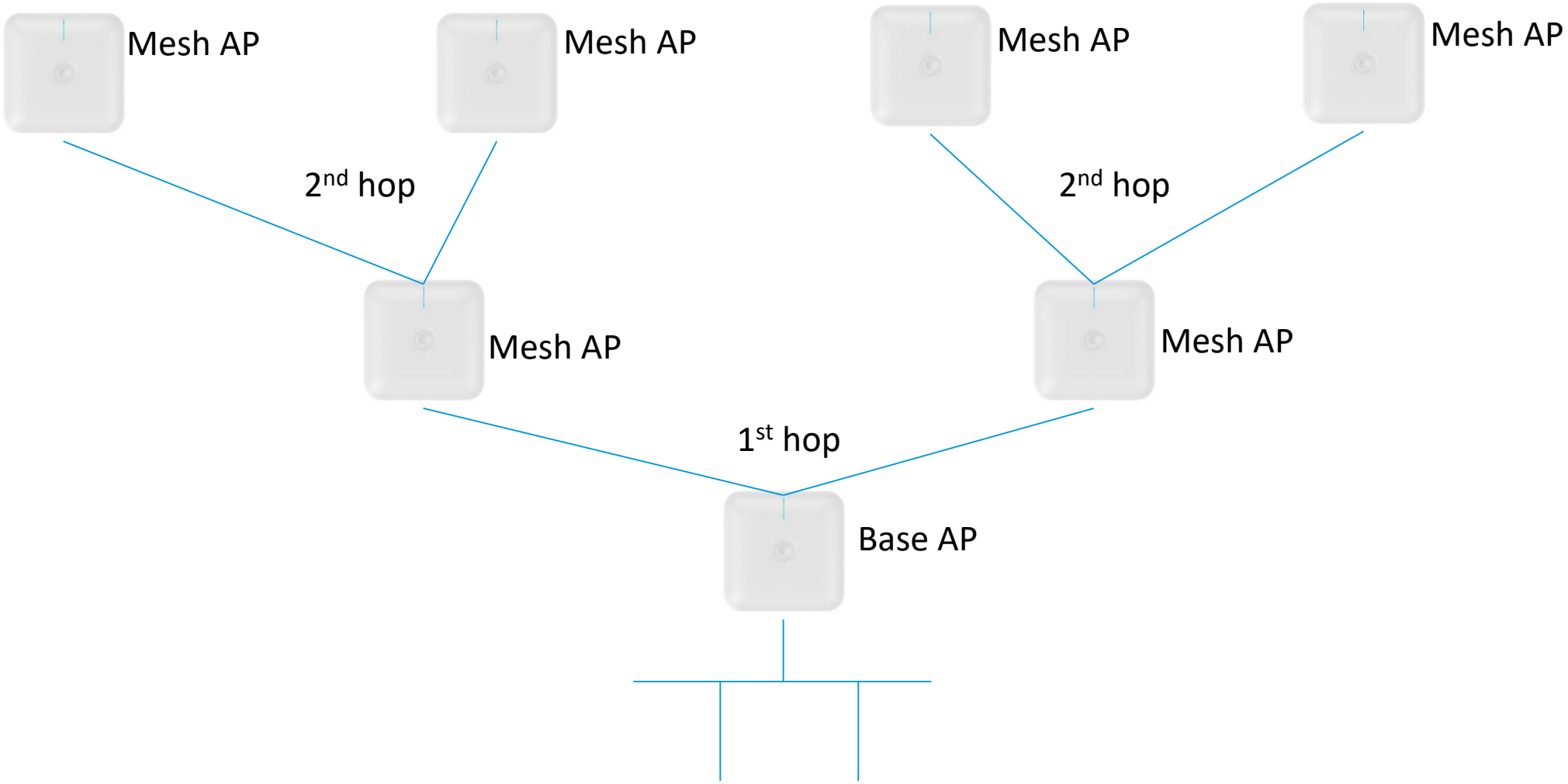
Connect the Unconnected

# Mesh and cnPilot

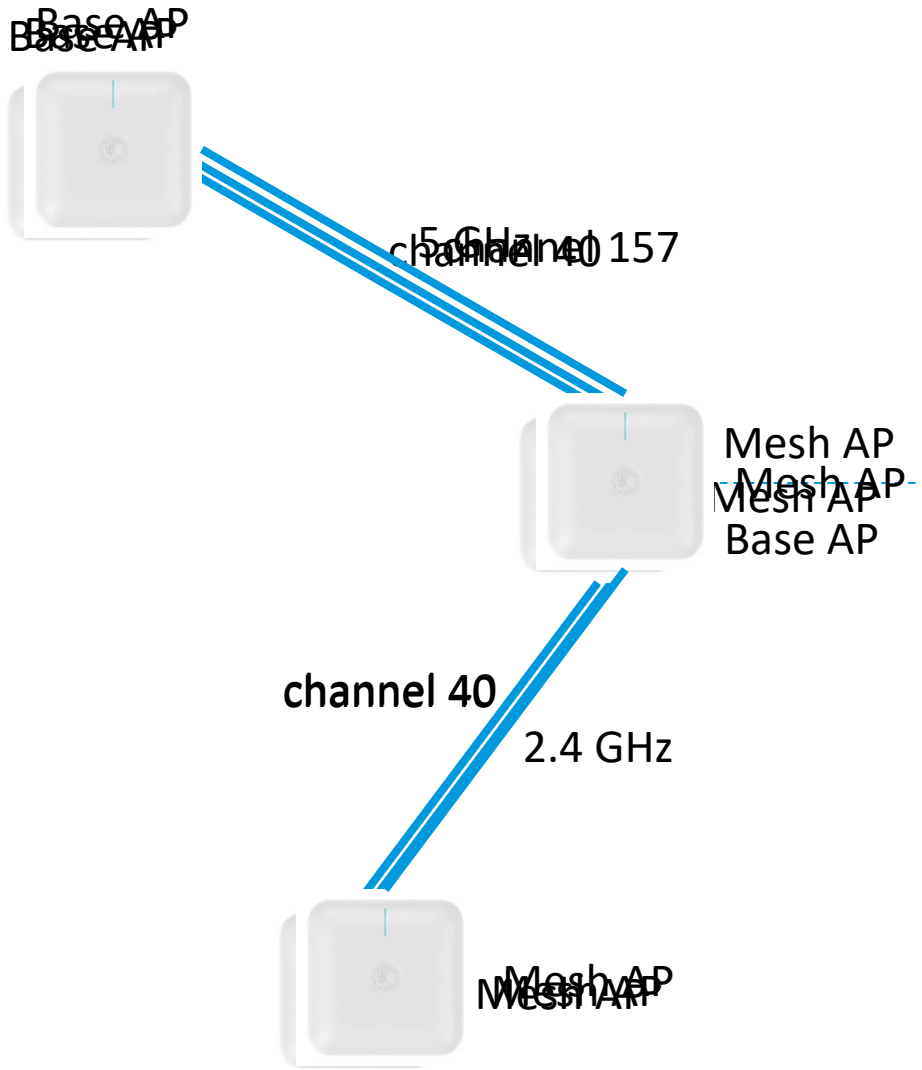
- What is mesh?
- Pros and cons of using mesh
- Where to use mesh, where not to
- Alternatives to mesh
- Configuring mesh on cnMaestro
- Recovery mode
- Monitoring and statistics for mesh
- Best Practices

# What is mesh?


Mesh AP
Mesh AP
Mesh AP
Mesh AP
2nd hop
2nd hop
Mesh AP
Mesh AP
1st hop
Base AP

# Types of WiFi mesh

- WDS
- 802.11s
- Proprietary
- Single frequency
- Dual frequency
- Multiple Radios in 5 GHz band



# Pros and cons of using mesh

- Pros
  - Quick deployment
  - Lower cost deployment
  - Mesh can provide a backup for failed Ethernet
- Cons
  - Still need power connection
  - Loss of capacity
  - Lower total throughput possible
  - Co-channel interference
  - Complexity and stability

# Where to use mesh, where not to

- Coverage vs capacity
  - Mesh will always reduce capacity, but can provide more coverage if it is the only way to add APs
- Ability to provide backhaul
  - Weigh the cost of providing a backhaul (Ethernet or otherwise) against the cost of capacity loss,  throughput loss, added complexity, and reduced stability
- Outdoor deployments
  - Outdoor deployments are often the most difficult to deploy without mesh or an alternative to traditional Ethernet connections
- Latency and jitter sensitive applications
  - Applications such as VoIP and video are problematic over mesh

# Alternatives to mesh

- Ethernet to each AP
  - Obvious
- Fiber
  - Will require power to the AP as well
- Wireless
  - Point to Point
  - Point to Multipoint
    - ePMP and 450 series are an excellent alternative to using mesh

# cnPilot Mesh Configuration

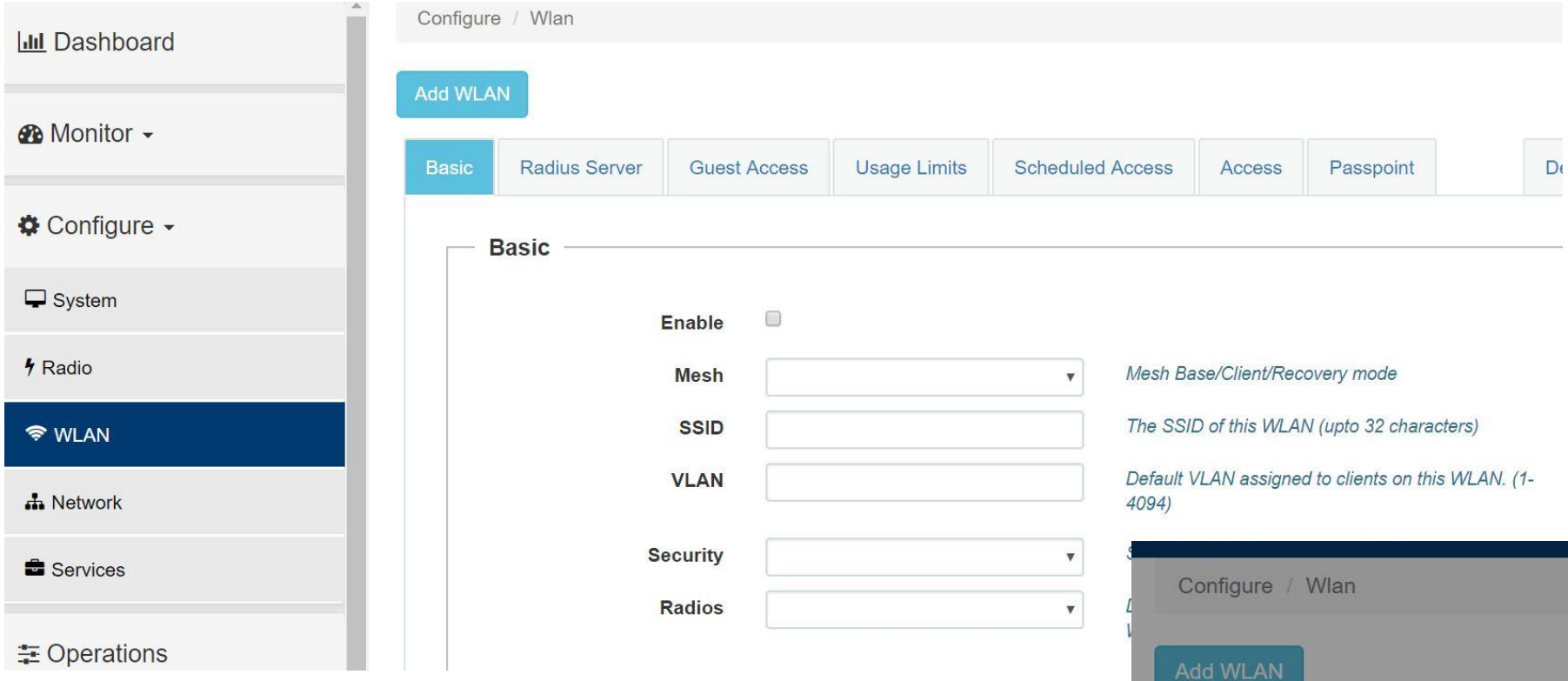
We will use the next several slides as a lab to show both mesh configuration and to actually configure mesh in the class.

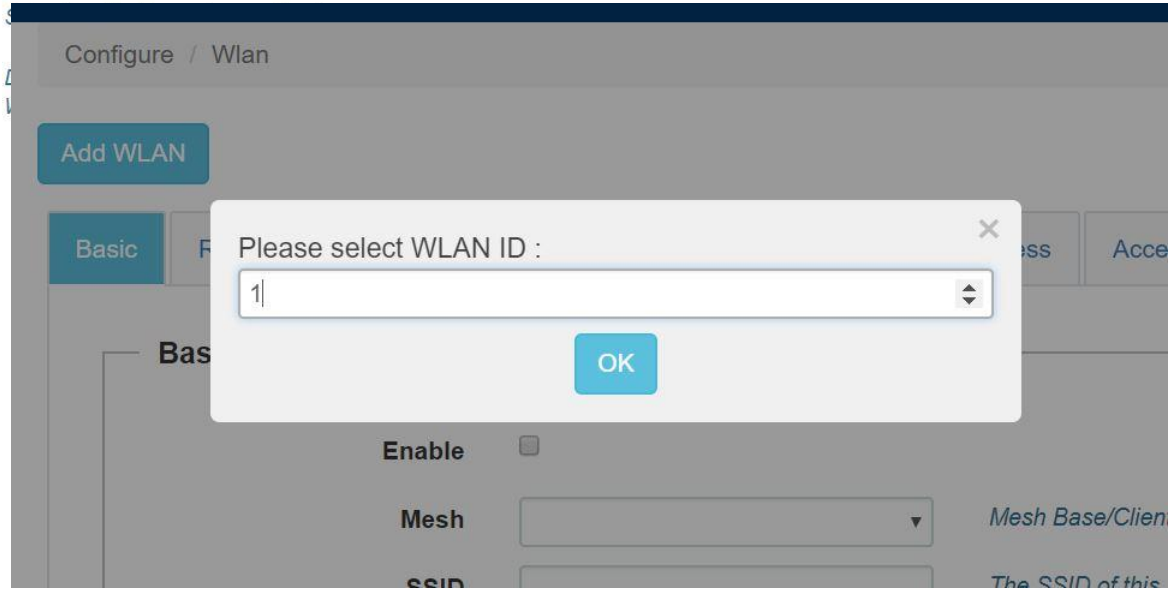
Configuration can be done via cnMaestro or via the cnPilot GUI.  We will use the cnPilot GUI for the lab.

# cnPilot – Configuring mesh

- Configuration can be done either through the cnPilot GUI or via cnMaestro
- If you configure via cnMaestro, follow these steps ***in order***
  - 1. Configure AP groups
    - One group for Base APs. Do not push configuration out to APs yet.
    - One group for Client APs.
  - 2. Connect Client APs via Ethernet and push out AP group configuration to them
    - No Base APs should be configured for mesh yet.
  - 3. Disconnect Client APs and move to their permanent locations
  - 4. Place Base APs in permanent location and push configuration to them

# cnPilot Mesh Configuration - Client




- From the Configure/WLAN menu, Add a new WLAN
- For a client, the mesh WLAN must be WLAN 1
- No more than 5 clients can connect to a single base

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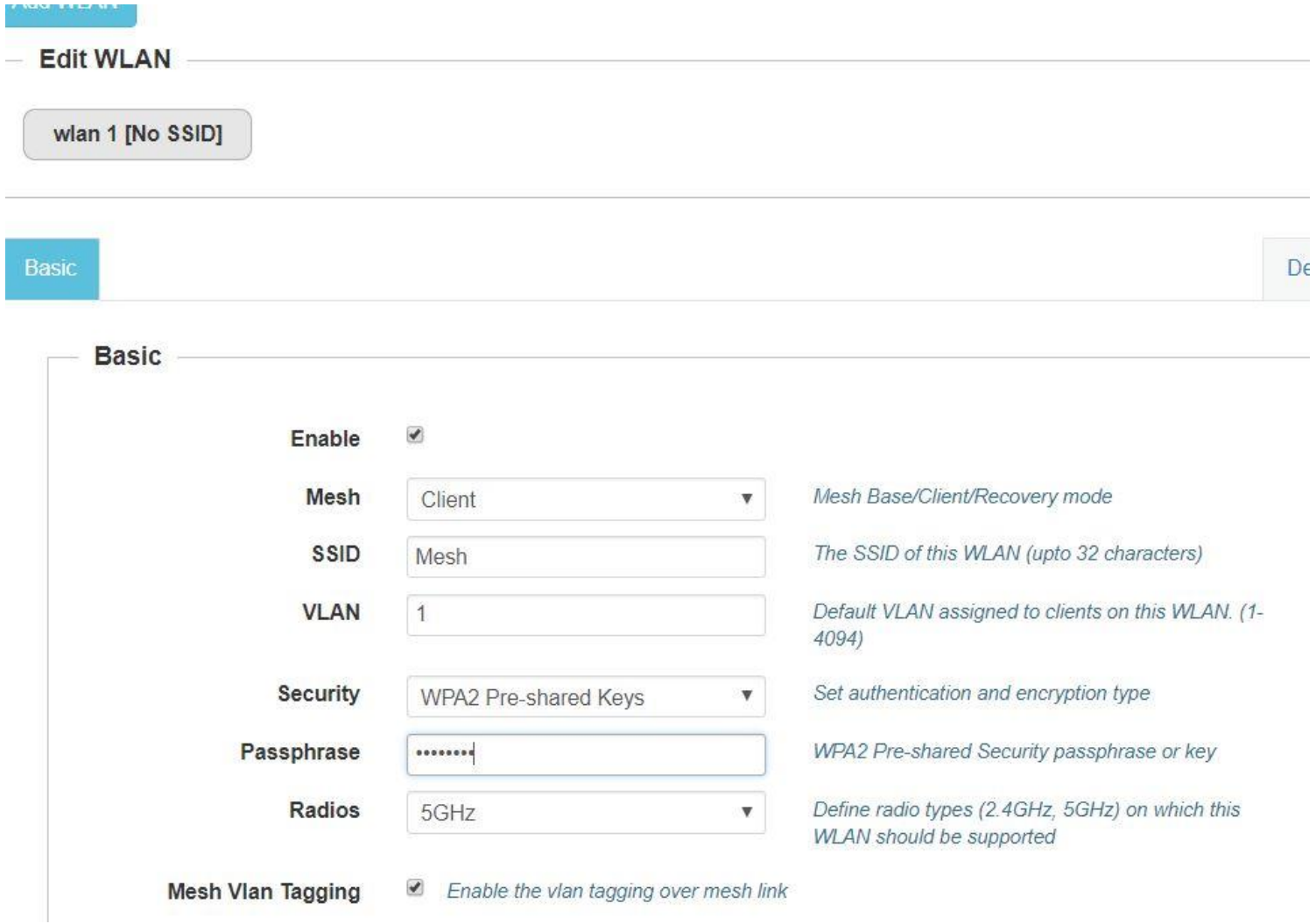
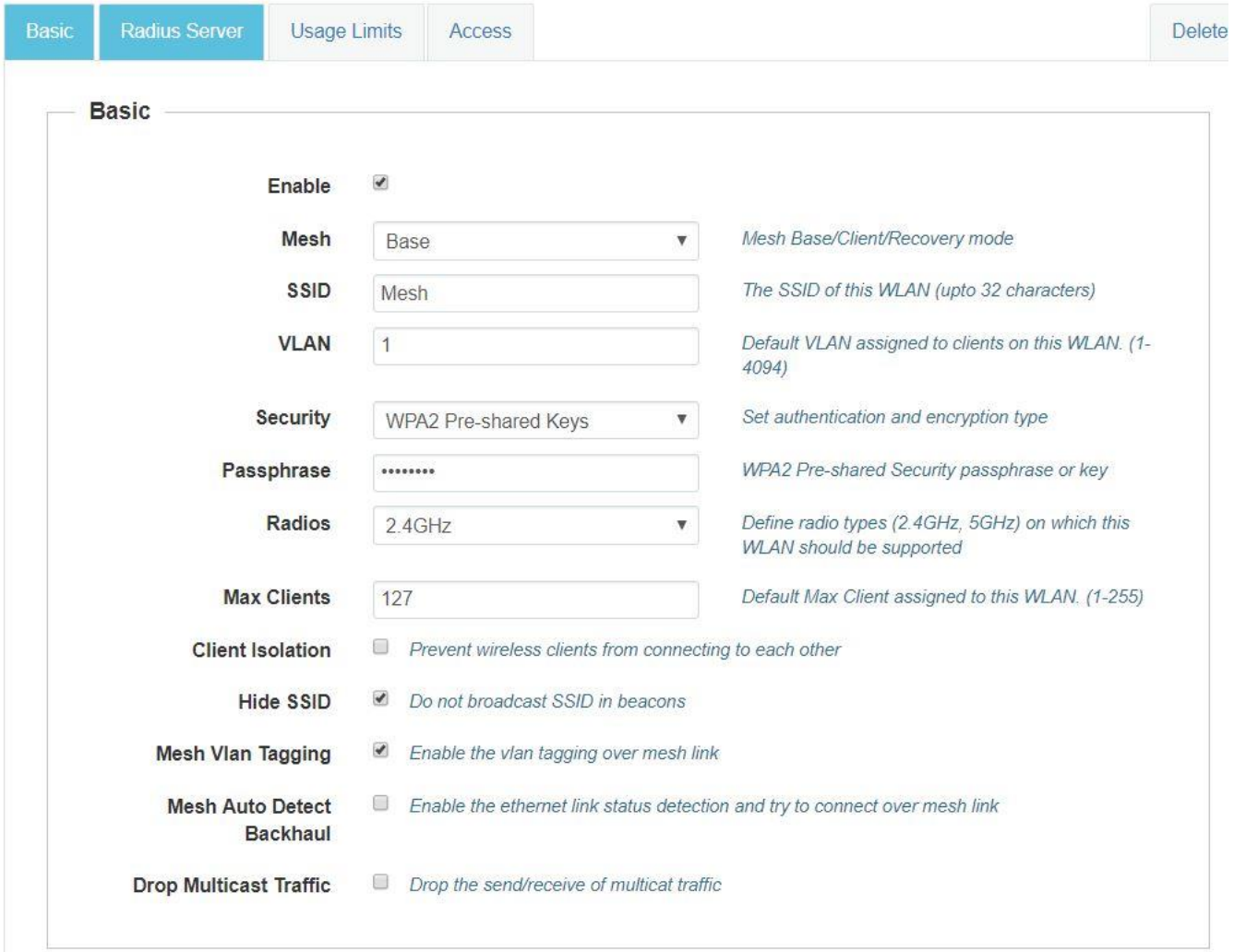
# cnPilot Mesh Configuration - Client

- Select Enable
- Select Client for Mesh type
- Enter SSID name
- Enter default VLAN
- Choose Security type
  - It is recommended to not choose Open for a mesh SSID
  - This must match the configuration that will be used on the base
- Choose radio (either 2.4 GHz or 5 GHz)
- Except in special circumstances, leave the Mesh VLAN Tagging option as enabled.



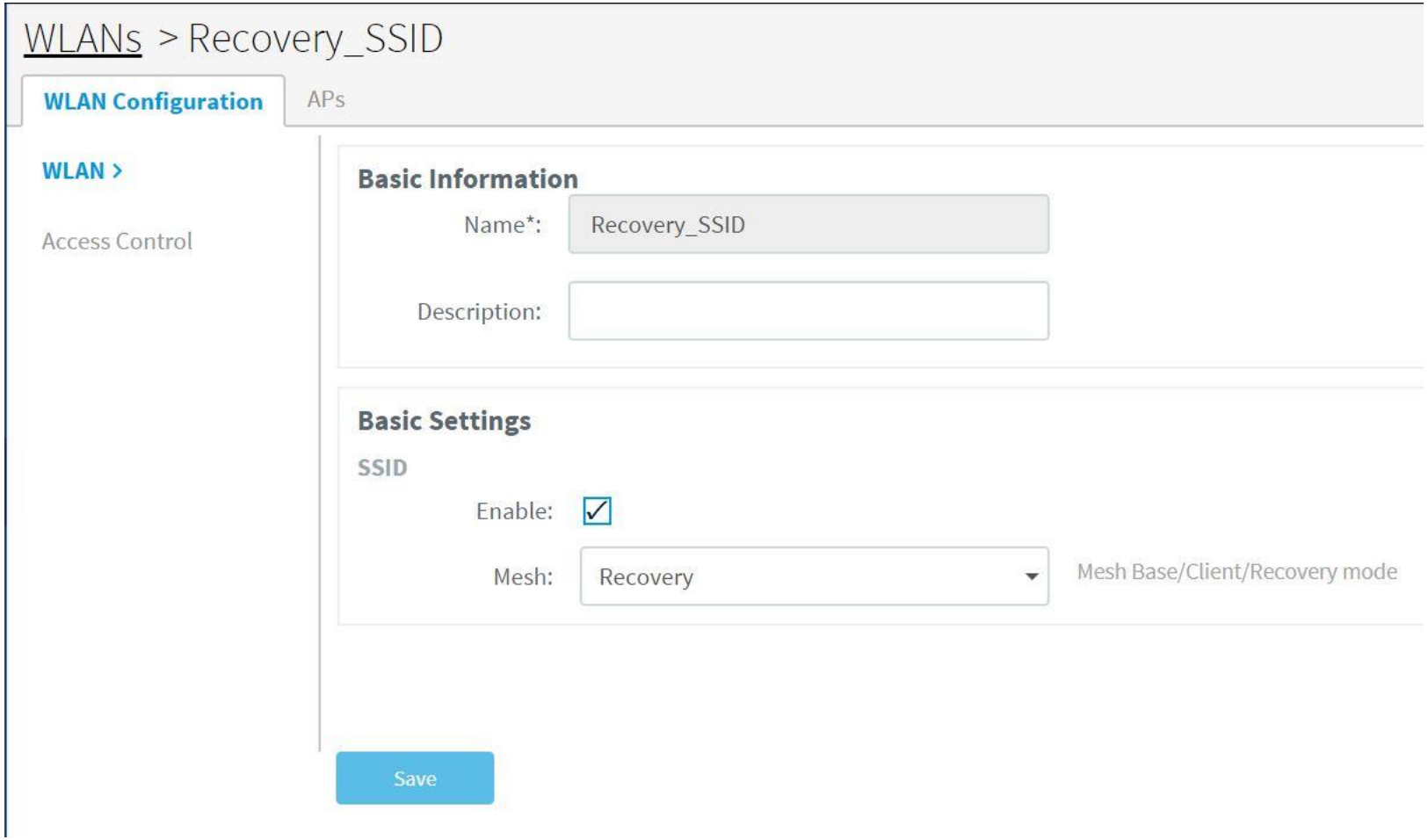
# cnPilot Mesh Configuration - Base

- Enable the WLAN
- Select Base for Mesh type
- Select the correct VLAN
- Choose Security type
  - It is not recommended to choose Open.
- Choose Radio
- Max clients is actually irrelevant as long as it is at least 5
  - The max number of client mesh APs that will be accepted by a base AP is 5
- Hide the SSID
- In most cases, you will want to enable Mesh VLAN tagging
- Mesh Auto Detect Backhaul - ????

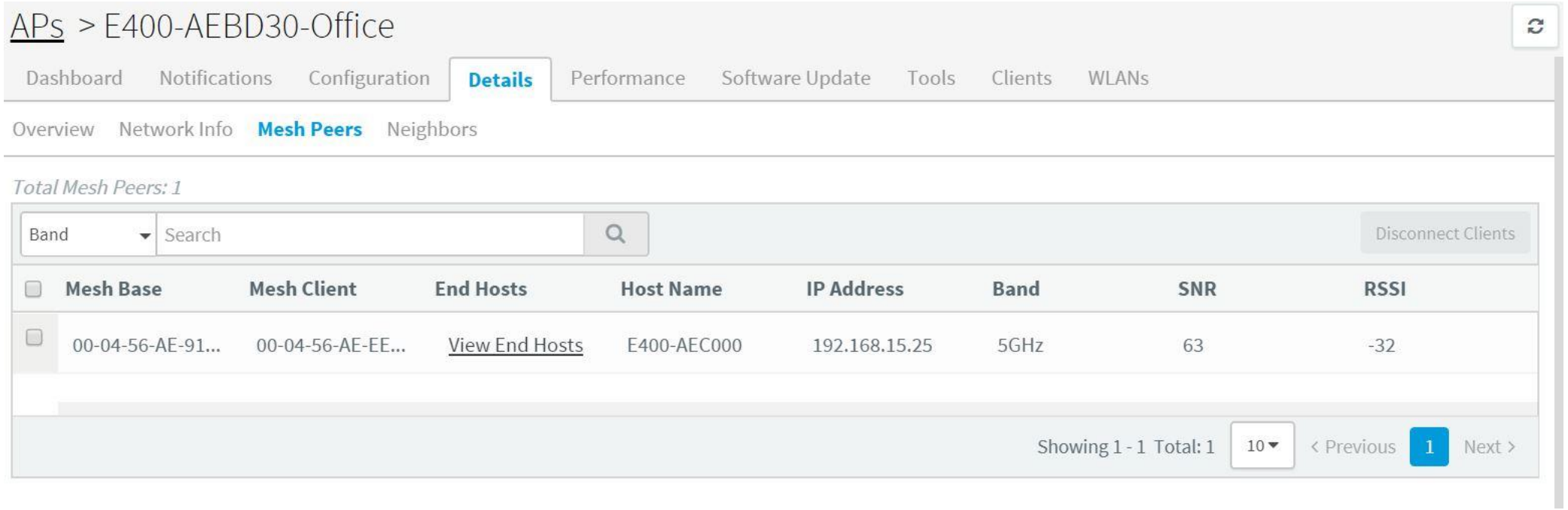


# Recovery Profile

- Recovery serves 2 purposes
  - Recover mis-configured mesh AP
  - Connect out of the box APs
- To Configure, add a new WLAN
  - Provide a name (for management purposes only)
  - Enable
  - Define as Mesh - Recovery



# Monitoring and statistics




- View Mesh Connection Information Under APs/Details/Mesh Peers
- SNR and RSSI are Key Indicators to the Health of a Mesh Link

# Best practices

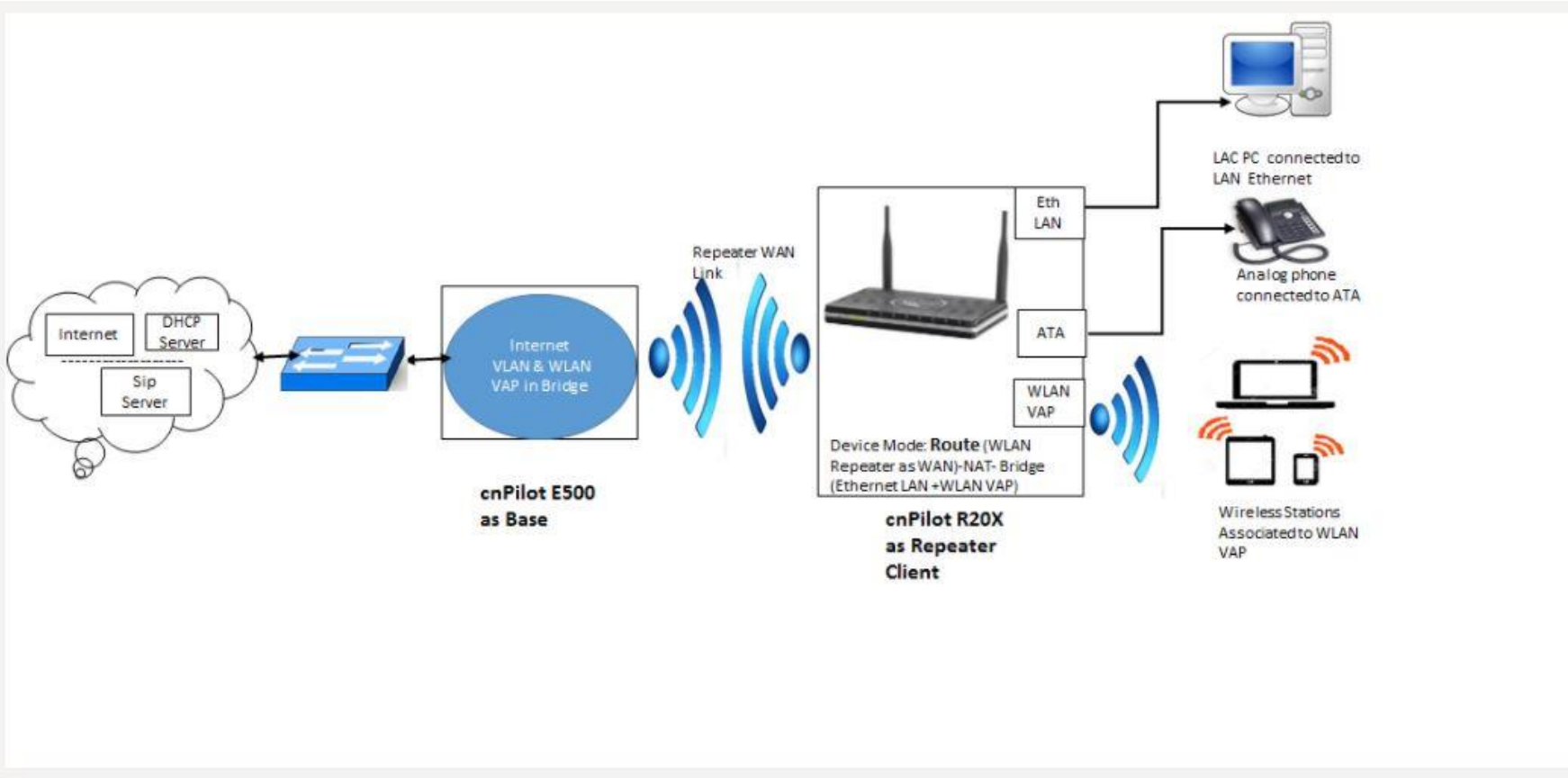
- Consider alternatives to mesh
- Limit mesh to as few hops as possible, 1 or 2 at most
- At least 2 Base APs visible to each Client AP
- Utilize 5 GHz over 2.4 GHz for most deployments
  - The UNII 3 band offers higher power than UNII 1, 2, or 2e
- At least 25 dB SNR for mesh links
- Enable security
- Do not broadcast SSID
- Disable Auto RF on Base AP
- 20 MHz channels may offer better SNR and more ability for a clear channel

# Connecting to 3rd party APs

- It is possible to mesh between cnPilot E Series and R Series
  - See the following slide(s) for details
- WDS allows for connectivity to 3rd party APs
  - If a cnPilot E-series AP is the Client Mesh AP, configure as already described
  - If cnPilot E-series AP is the Base Mesh AP, the 3rd party AP must be configured for WDS in order to connect via mesh and still pass client traffic.

# cnPilot R-Series as a Range Extender for WiFi

- cnPiot R-Series can act as a range extender to an E Series AP
- E-Series
  - Configure a normal (non-mesh specific) SSID to be used for the link
  - Either Open or WPA2-PSK are supported for this configuration
  - Disable Proxy ARP
  - Disable Unicast DHCP
- R Series
  - Configure for NAT or Bridge mode




# Thank you!