

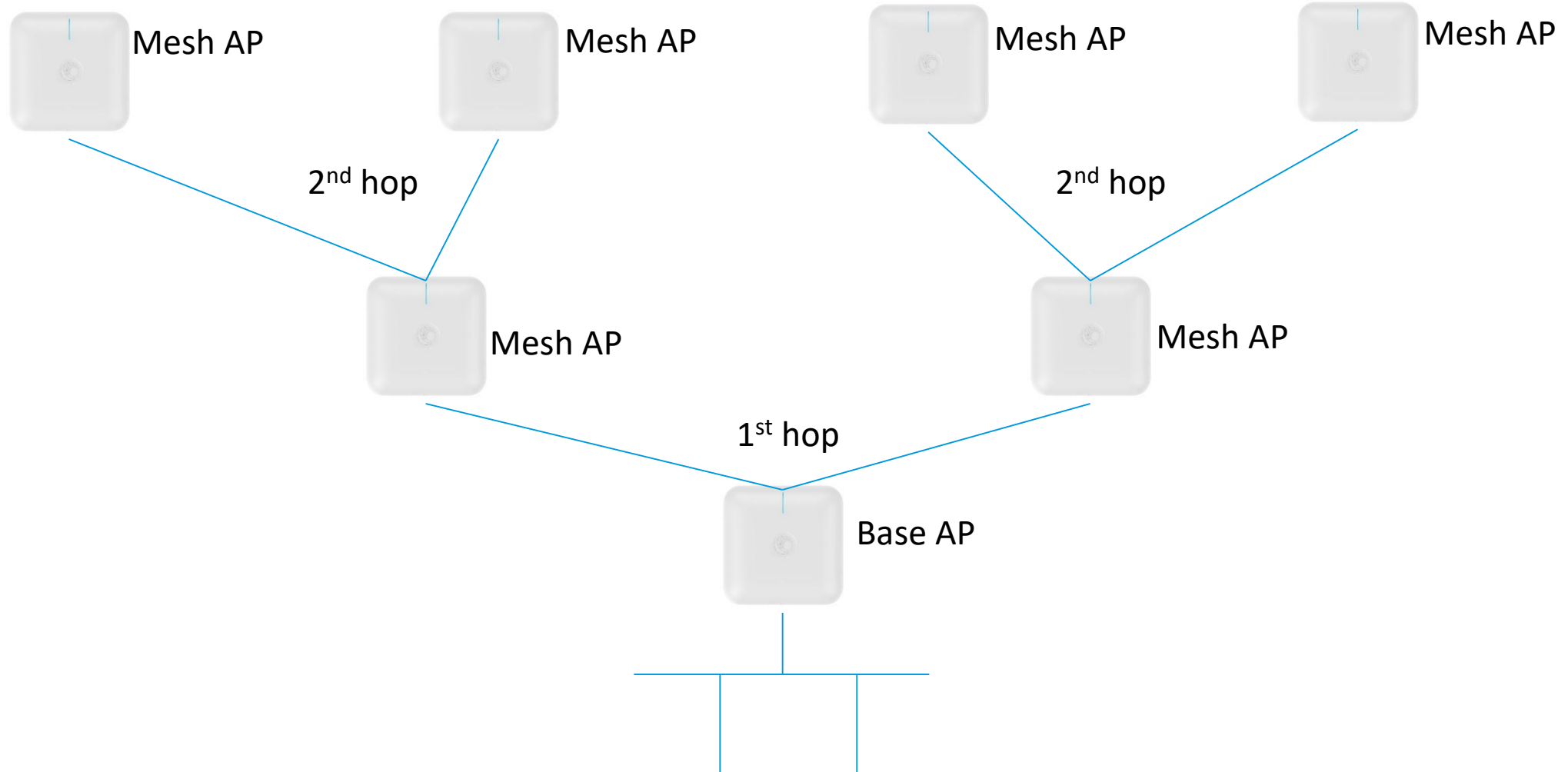
cnPilot

Mesh Configuration

Mesh and cnPilot

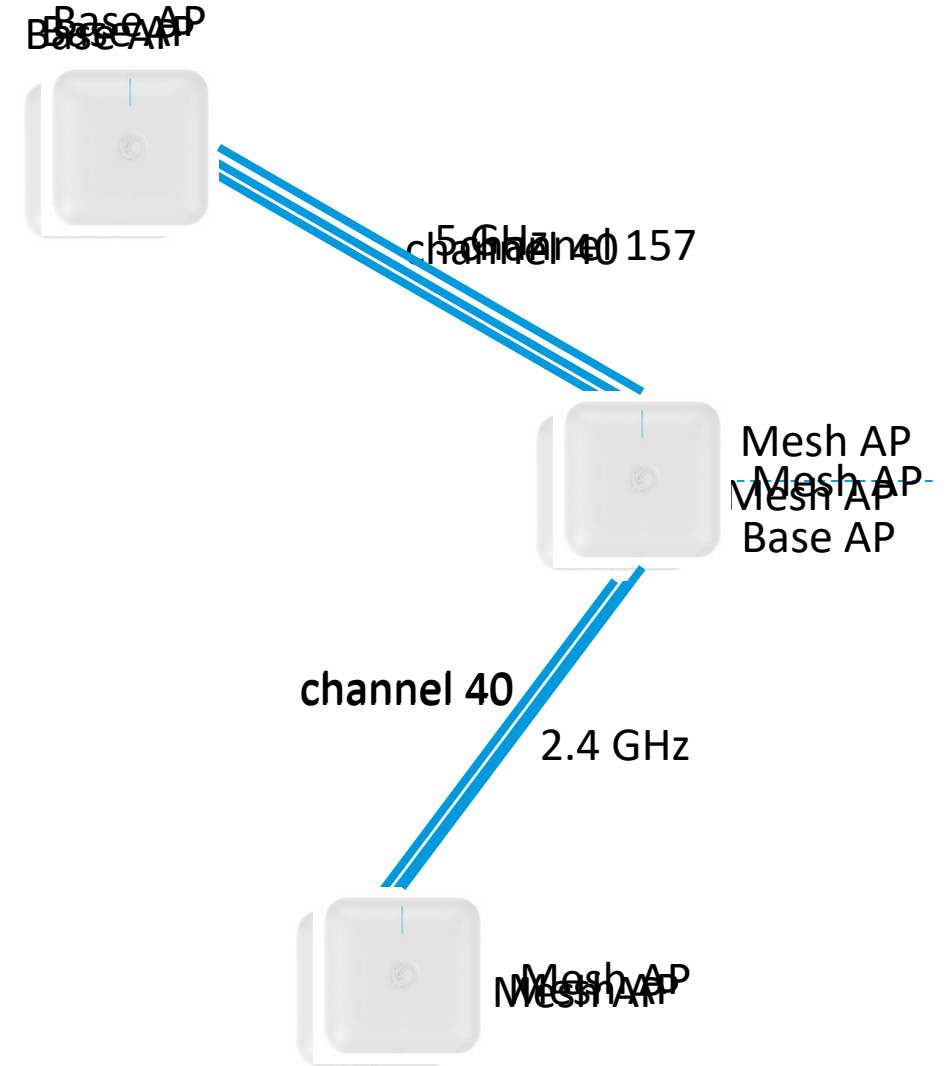
- What is mesh?
- Pros and cons of using mesh
- Where to use mesh, where not to
- Alternatives to mesh
- Configuring mesh on cnMaestro
- Recovery mode
- Monitoring and statistics for mesh
- Best Practices

What is mesh?



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

The screenshot shows the 'Configure / Wlan' page in the cnPilot interface. On the left is a sidebar with navigation options: Dashboard, Monitor, Configure, System, Radio, WLAN (highlighted), Network, Services, and Operations. The main content area has a breadcrumb 'Configure / Wlan' and an 'Add WLAN' button. Below this are tabs for 'Basic', 'Radius Server', 'Guest Access', 'Usage Limits', 'Scheduled Access', 'Access', 'Passpoint', and 'De'. The 'Basic' tab is active, showing a form with the following fields:

- Enable**: A checkbox that is currently unchecked.
- Mesh**: A dropdown menu with a downward arrow.
- SSID**: A text input field.
- VLAN**: A text input field.
- Security**: A dropdown menu with a downward arrow.
- Radios**: A dropdown menu with a downward arrow.

Help text for the fields:

- Mesh**: Mesh Base/Client/Recovery mode
- SSID**: The SSID of this WLAN (upto 32 characters)
- VLAN**: Default VLAN assigned to clients on this WLAN. (1-4094)

- 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

This screenshot shows a modal dialog box overlaid on the 'Basic' tab of the 'Add WLAN' form. The dialog has a title bar with a close button (X) and contains the text 'Please select WLAN ID :'. Below the text is a dropdown menu with the value '1' selected. At the bottom right of the dialog is an 'OK' button.

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.

Edit WLAN

wlan 1 [No SSID]

Basic

Basic

Enable	<input checked="" type="checkbox"/>	
Mesh	Client ▼	Mesh Base/Client/Recovery mode
SSID	Mesh	The SSID of this WLAN (upto 32 characters)
VLAN	1	Default VLAN assigned to clients on this WLAN. (1-4094)
Security	WPA2 Pre-shared Keys ▼	Set authentication and encryption type
Passphrase	WPA2 Pre-shared Security passphrase or key
Radios	5GHz ▼	Define radio types (2.4GHz, 5GHz) on which this WLAN should be supported
Mesh Vlan Tagging	<input checked="" type="checkbox"/>	Enable the vlan tagging over mesh link

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 - ????

Basic

Radius Server

Usage Limits

Access

Delete

Basic

Enable

☒

Mesh

Base

▼

Mesh Base/Client/Recovery mode

SSID

Mesh

The SSID of this WLAN (upto 32 characters)

VLAN

1

Default VLAN assigned to clients on this WLAN. (1-4094)

Security

WPA2 Pre-shared Keys

▼

Set authentication and encryption type

Passphrase

.....

WPA2 Pre-shared Security passphrase or key

Radios

2.4GHz

▼

Define radio types (2.4GHz, 5GHz) on which this WLAN should be supported

Max Clients

127

Default Max Client assigned to this WLAN. (1-255)

Client Isolation

☐

Prevent wireless clients from connecting to each other

Hide SSID

☒

Do not broadcast SSID in beacons

Mesh Vlan Tagging

☒

Enable the vlan tagging over mesh link

Mesh Auto Detect Backhaul

☐

Enable the ethernet link status detection and try to connect over mesh link

Drop Multicast Traffic

☐

Drop the send/receive of multicat traffic

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

WLANs > Recovery_SSID

WLAN Configuration APs

WLAN >

Access Control

Basic Information

Name*: Recovery_SSID

Description:

Basic Settings


SSID

Enable: ☒

Mesh: Recovery Mesh Base/Client/Recovery mode

Save


Monitoring and statistics

APs > E400-AEBD30-Office 

Dashboard Notifications Configuration **Details** Performance Software Update Tools Clients WLANs

Overview Network Info **Mesh Peers** Neighbors

Total Mesh Peers: 1

Band ▾ Search 

Disconnect Clients

<input type="checkbox"/>	Mesh Base	Mesh Client	End Hosts	Host Name	IP Address	Band	SNR	RSSI
<input type="checkbox"/>	00-04-56-AE-91...	00-04-56-AE-EE...	View End Hosts	E400-AEC000	192.168.15.25	5GHz	63	-32

Showing 1 - 1 Total: 1

10 ▾

 < Previous **1** Next >

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

Best practices

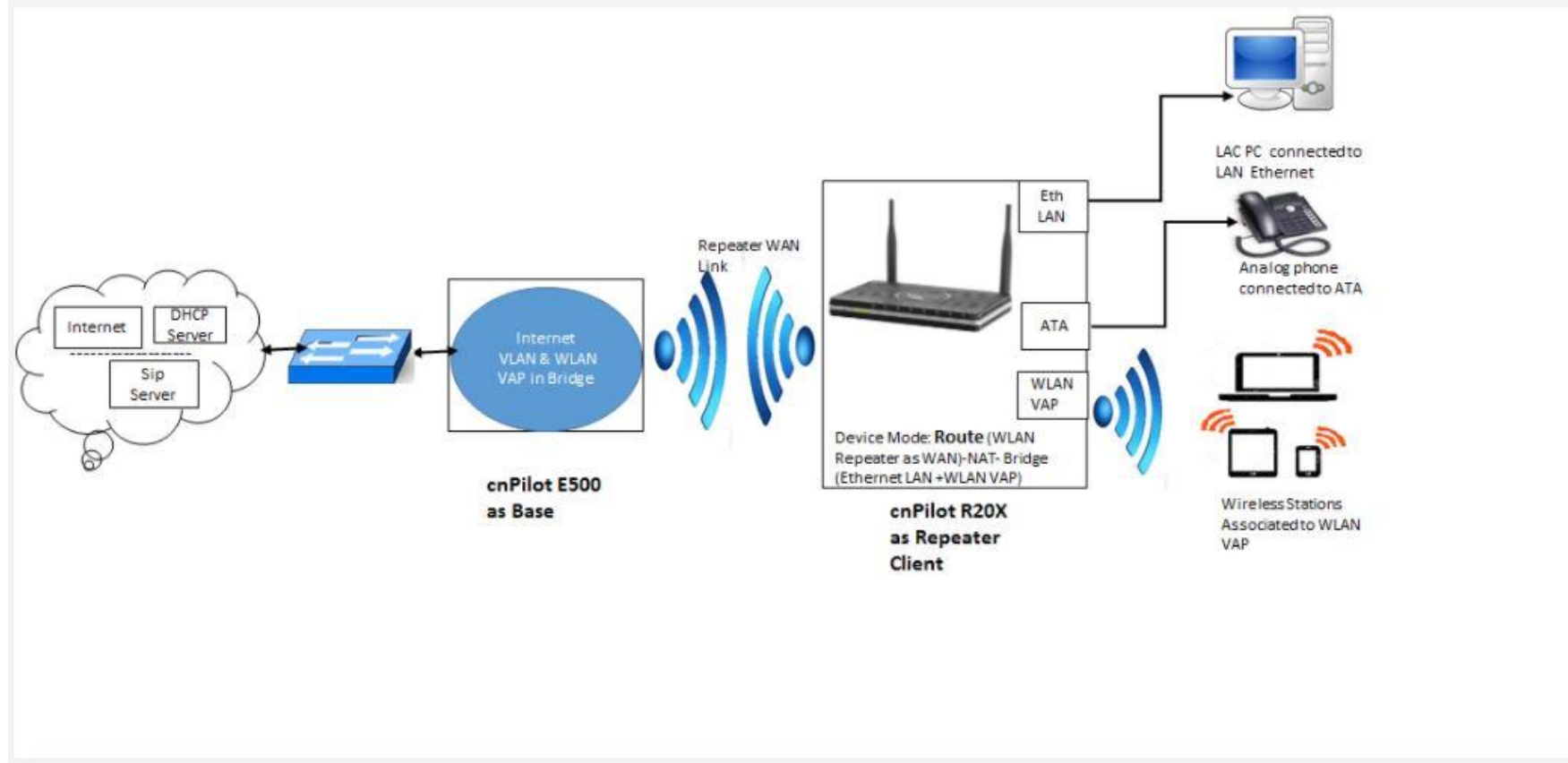
- Consider alternatives to mesh
- Limit mesh to as few hops as possible, 1 or 2 at most
- At least 2 Base APs visible to each Client AP
- Utilize 5 GHz over 2.4 GHz for most deployments
 - The UNII 3 band offers higher power than UNII 1, 2, or 2e
- At least 25 dB SNR for mesh links
- Enable security
- 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

- cnPilot 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!