## Table of Contents

Revision History

| DATE | VERSION | EDITOR | CHANGES |
|------|---------|--------|---------|
| 22 Sep 2024 | 0.1 | Ariya Parsamanesh | Initial creation |
| | | | |
| | | | |

# 1 Multi Cluster Wi-Fi Mesh and Ethernet Bridging with AOS10 APs

This is the continuation of Wi-Fi Mesh with AOS10 APs technote in which we'll build on the previous solution and demonstrate Ethernet bridging across the wireless mesh network. Then I'll configure and test multiple wireless mesh clusters.

Just a recap that an AP with an active Ethernet link is a Mesh Portal and acts like a gateway between wireless mesh and the main wired LAN. The AP that connects to Mesh portal using its Wi-Fi radio is called Mesh Point. Then the mesh point provides wireless/wired services to its clients.

Here is the lab set-up to demonstrate multiple mesh cluster using 6GHz band with Ethernet bridging.



## 1.1    Things you need

- Aruba AOS10 10.6.x.x or later (I am using 10.7.0.0)
- 3x APs (I am using AP-605H and AP-615)
- A Layer three switch and some Wi-Fi and wired clients

## 1.2    Assumptions

The technote "Wi-Fi Mesh with AOS10 APs" was read and the topology was configured accordingly. This means that

- All the APs shown above are configured and MeshCluster 89 is operational
- MeshPoint AP is using mesh cluster to transport the traffic from client on Test-PSK WLAN.

## 1.3    Ethernet Bridging Configuration

This feature is used to use the Ethernet port of the Mesh Point IAP as a downlink, so you can connect a wired device either on the same VLAN as that of the IAP or on any other VLAN through 802.1Q VLAN trunking.

Before we make any changes this is the status of the Ethernet port profiles of the MeshPoint AP.

```
MeshPoint:09:0c# sh wired-port-settings

Wired Port Profiles
-------------------
Name                            VLAN Mode  Allowed VLANs  Native VLAN   Admin Status  Role
Speed   Duplex  POE   In Use  Authentication Method  STP  Trusted
----                            ---------  -------------  -----------   ------------  ----
-----   ------  ---   ------  --------------------   ---  -------
wired-SetMeUp                   Access     all                          guest         Up
wired-SetMeUp                   auto    auto    No    Yes    None                          No    No
default_wired_port_profile     Trunk      all                          ap-ip-vlan(1)  Up
default_wired_port_profile     auto    full    No    Yes    None                          No    No
Port Profile Assignments
------------------------
Port   Profile Name
----   ------------
0      default_wired_port_profile
1      wired-SetMeUp
2      wired-SetMeUp
3      wired-SetMeUp
4      wired-SetMeUp
USB    wired-SetMeUp

MeshPoint:09:0c#
```
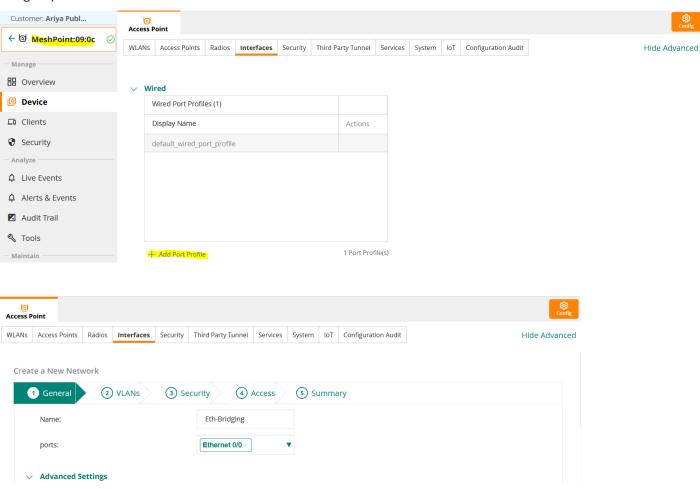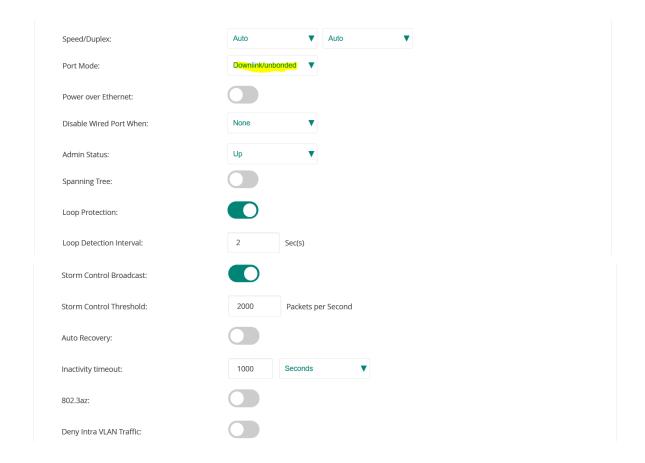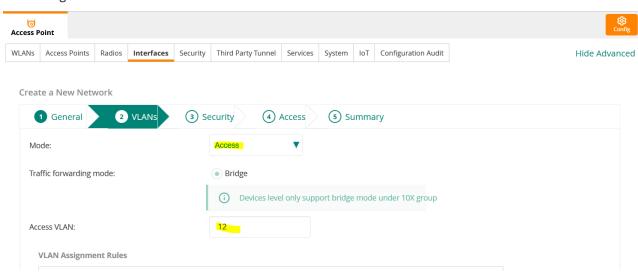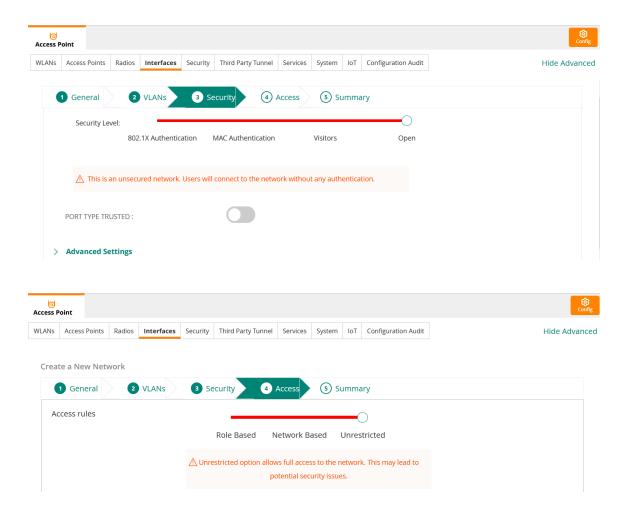
Since our MeshPoint is AP-615 that has single Ethernet port we need to configure it at the device level and not at the group level.

| | | |
|---|---|---|
| Speed/Duplex: | Auto ▼ | Auto ▼ |
| Port Mode: | Downlink/unbonded ▼ | |
| Power over Ethernet: | ◯ | |
| Disable Wired Port When: | None ▼ | |
| Admin Status: | Up ▼ | |
| Spanning Tree: | ◯ | |
| Loop Protection: | ⬤ | |
| Loop Detection Interval: | 2 | Sec(s) |
| Storm Control Broadcast: | ⬤ | |
| Storm Control Threshold: | 2000 | Packets per Second |
| Auto Recovery: | ◯ | |
| Inactivity timeout: | 1000 | Seconds ▼ |
| 802.3az: | ◯ | |
| Deny Intra VLAN Traffic: | ◯ | |

We'll assign the VLAN 12 for the Access mode



**Access Point**      ⚙ Config

WLANs | Access Points | Radios | **Interfaces** | Security | Third Party Tunnel | Services | System | IoT | Configuration Audit     Hide Advanced

**Create a New Network**

1 General ▸ 2 VLANs ▸ 3 Security ▸ 4 Access ▸ 5 Summary

| | |
|---|---|
| Mode: | Access ▼ |
| Traffic forwarding mode: | ◉ Bridge |
| | ⓘ Devices level only support bridge mode under 10X group |
| Access VLAN: | 12 |

**VLAN Assignment Rules**

And once it is saved it is listed as shown below.



If you re-call this is the Mesh-Point and enabling Eth0 bridging is by setting it to downlink. We can check that with this CLI command.

```
MeshPoint:09:0c# sh wired-port-settings

Wired Port Profiles
-------------------
Name                         VLAN Mode  Allowed VLANs  Native VLAN    Admin Status   Role
Speed  Duplex  POE  In Use  Authentication Method  STP  Trusted
----                         ---------  -------------  -----------    ------------   ----
-----  ------  ---  ------  --------------------  ---  -------
wired-SetMeUp                Access     all                          guest          Up
wired-SetMeUp                auto   auto    No   Yes   None                          No    No
default_wired_port_profile   Trunk      all                          ap-ip-vlan(1)  Up
default_wired_port_profile   auto   full    No   No    None                          No    No
Eth-Bridging                 Access     all                          12             Up             Eth-
Bridging                     auto   auto    No   Yes   None                          No    No
Port Profile Assignments
```

```
------------------------
Port   Profile Name
----   ------------
0      Eth-Bridging
1      wired-SetMeUp
2      wired-SetMeUp
3      wired-SetMeUp
4      wired-SetMeUp
USB    wired-SetMeUp

MeshPoint:09:0c#
```

You should then reboot the AP for this change to take effect. Note that if an AP is set to Ethernet 0 bridging, it always acts as a mesh point.  When an AP is configured with Eth0 bridging and then rebooted, the E0 bridging will become AP environment setting.


## 1.4    Wired Client Testing

Now that we have configured and rebooted the AP for ethernet bridging we'll connect the wired client to this Eth0 interface of the Mesh point AP.

Here we see the E0 port is up.

```
MeshPoint:09:0c# sh port status

Port Status
-----------
Port   Type   Admin-State   Oper-State   STP-State   Dot3az   Loop-Protect   Storm-Control
Loop-Detection-TX   Loop-Detection-RX
----   ----   ----------   ----------   ---------   ------   -----------   -------------
-----------------   -----------------
bond0  2.5GE  up            up           N/A         Disable  ON             ON
1530                0
eth1   USB    up            down         N/A         Disable  OFF            OFF
0                   0
MeshPoint:09:0c#
```
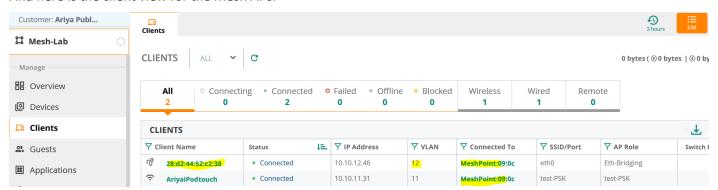
Next, we'll check to see if the client is listed in the client table and has a correct IP address on VLAN 12. Since we have made the port untrusted, we can see the wired clients with this command.

```
MeshPoint:09:0c# sh clients wired

Wired Client List
-----------------
Name   IP Address   MAC Address        OS    Network   Access Point      Role
IPv6 Address   Speed (mbps)
----   ---------   ----------         --    -------   -----------       ----         ---
---------  ------------
       10.10.12.46  28:d2:44:52:c2:38  NOFP  bond0     MeshPoint:09:0c   Eth-Bridging  --
-
Info timestamp       :2156

MeshPoint:09:0c#
```

The MAC address of the wired client is 28:D2:44:52:C2:38

Now you can check the bridging table with this command and should see the MAC address of the device that is connected to the Eth0 port.

```
MeshPoint:09:0c# show datapath bridge
Datapath Bridge Devices
----------------------------
Flags: F - source-filter, T - trusted, Q - tagged, I - IP
       S - split-tunnel, B - bridge, M - mesh, P - PPPoE, W - WAN
       C - content-filter, O - corp-access, h - to HAP, f - to FAP
       h - dhcp-redirect b - blocked by STP, p - PAN

Dev  Name                     VLANs  PVID  ACLs          MTU   FramesRx  FramesTx  Flags
---  ---------------------    -----  ----  -------------  ----  --------  --------  --------
4    bond0                    1      12    160/0/0     0  1500     63422    164473  FB
14   br0                      0      1     105/0/0     0  1300    215104         0  FIB
16   mesh0                    4095   1       0/0/0     0  1500    166791     65629  FTQBM
25   aruba002                 1      1     152/0/0     0  1500         0         1  B
26   aruba102                 1      1     152/0/0     0  1500         0         1  B
27   aruba003                 1      11    154/0/0     0  1500         0         0  B


Datapath Bridge Table Entries
----------------------------
Flags: P - Permanent, D - Deny, R - Route, M - Mobile, X - Xsec, A - Auth, N - No-Aging
AP Flags: X - Awaiting 1X reply, B - Block all non-1X traffic, F - Force bridge role, G - Gateway

      MAC           VLAN  Assigned VLAN  Destination  Flags  AP Flags  Bridge Role ACL
-----------------   ----  -------------  -----------  -----  --------  ----------------
F0:1A:A0:2A:5E:B5   1     1              dev16                          0
48:B4:C3:C1:09:0C   3333  3333           local        P                0
28:D2:44:52:C2:38   12    12             dev4                           0
48:B4:C3:C1:09:0C   1     1              local        P                0
94:60:D5:DA:5A:20   1     1              dev16               G          0
94:60:D5:DA:5A:20   11    11             dev16                          0
94:60:D5:DA:5A:20   13    13             dev16                          0
94:60:D5:DA:5A:20   12    12             dev16               G          0
94:60:D5:DA:5A:20   22    22             dev16                          0
F0:1A:A0:2A:5D:6B   1     1              dev16                          0
94:60:D5:DA:5A:20   51    51             dev16                          0
94:60:D5:DA:5A:20   50    50             dev16                          0
94:60:D5:DA:5A:20   55    55             dev16                          0
94:60:D5:DA:5A:20   54    54             dev16                          0
94:60:D5:DA:5A:20   53    53             dev16                          0
94:60:D5:DA:5A:20   52    52             dev16                          0

MeshPoint:09:0c#
```

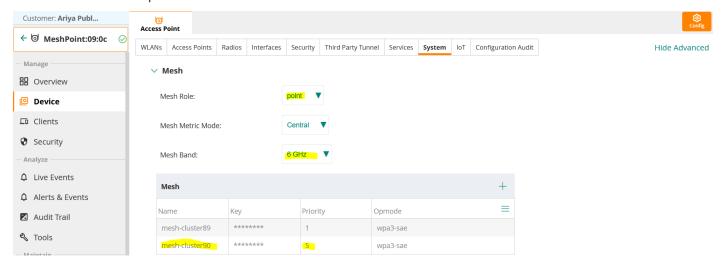And here is the client view for the Mesh APs.



And as you can see, we have both wired and wireless clients on the same mesh Point AP.
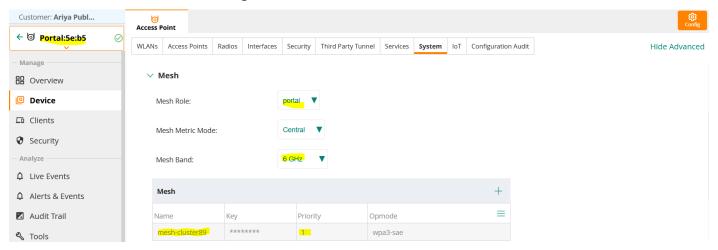
## 1.5    Mesh Cluster Configuration

Here we'll configure our second mesh cluster to provide backup to the first mesh cluster. Note that all the mesh configurations are done at device level.
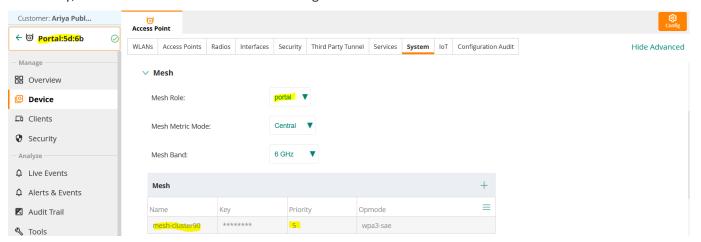
Starting with Mesh Point AP and followed by Mesh Portal APs. Here the Mesh Point AP will have both the Mesh clusters with different priorities.



Next is the Mesh Portal AP that is configured for mesh-cluster89



And finally, the second Mesh Portal AP that is configured for mesh-cluster90



Once you have made the mesh configuration and rebooted the three APs, the Mesh Point AP will boot up and form a mesh link with Portal:5e:b5 because mesh-cluster89 has priority 1.

First look at the mesh neighbours and note the different mesh cluster IDs one for each of the clusters.

```
MeshPoint:09:0c# sh ap mesh neighbours

Neighbor list
```

```
-------------
Radio  MAC                 AP Name      Portal  Channel  Band  Age  Hops  Cost
Relation                   Flags  RSSI  Rate Tx/Rx  A-Req  A-Resp  A-Fail  HT-Details
Cluster ID
-----  ---                 -------      ------  -------  ----  ---  ----  ----  -------
----------         -----  ----  ----------  -----  ------  ------  ----------     ------
----
1     50:e4:e0:14:17:81  Portal:5e:b5  Yes     69S       6GHz  0    0     1.00  P
7m:49s                    ELK    40    544/1814    4      3       1       HE-160MHz-2ss
e1baf29f4ca4ed35645e0a937d9c9c7
1     50:e4:e0:14:0e:41  Portal:5d:6b  Yes     5S        6GHz  108  0     0.00  N
1m:50s                    ELK    76    -           0      0       0       HE-160MHz-2ss
71157c0b8ba97fe589aec5c4a2b514e

Total count: 2, Children: 0
Relation: P = Parent; C = Child; N = Neighbor; B = Denylisted-neighbor
Flags: R = Recovery-mode; S = Sub-threshold link; D = Reselection backoff; F = Auth-
failure; H = High Throughput; V = Very High Throughput, E= High efficient, L = Legacy
allowed
       K = Connected; U = Upgrading; G = Descendant-upgrading; Z = Config pending; Y =
Assoc-resp/Auth pending
       a = SAE Accepted; b = SAE Denylisted-neighbour; e = SAE Enabled; u = portal-
unreachable; o = opensystem; m = Mobility Enabled

MeshPoint:09:0c#
```

Here we see that based on our mesh cluster priority mesh link to MeshPoint:09:0c is established.

```
MeshPoint:09:0c# sh ap mesh link

Neighbor list
-------------
Radio  MAC                 AP Name      Portal  Channel  Band  Age  Hops  Cost
Relation                   Flags  RSSI  Rate Tx/Rx  A-Req  A-Resp  A-Fail  HT-Details
Cluster ID
-----  ---                 -------      ------  -------  ----  ---  ----  ----  -------
----------         -----  ----  ----------  -----  ------  ------  ----------     ------
----
1     50:e4:e0:14:17:81  Portal:5e:b5  Yes     69S       6GHz  0    0     1.00  P
8m:23s                    ELK    40    544/1921    4      3       1       HE-160MHz-2ss
e1baf29f4ca4ed35645e0a937d9c9c7

Total count: 1, Children: 0
Relation: P = Parent; C = Child; N = Neighbor; B = Denylisted-neighbor
Flags: R = Recovery-mode; S = Sub-threshold link; D = Reselection backoff; F = Auth-
failure; H = High Throughput; V = Very High Throughput, E= High efficient, L = Legacy
allowed
       K = Connected; U = Upgrading; G = Descendant-upgrading; Z = Config pending; Y =
Assoc-resp/Auth pending
       a = SAE Accepted; b = SAE Denylisted-neighbour; e = SAE Enabled; u = portal-
unreachable; o = opensystem; m = Mobility Enabled

MeshPoint:09:0c#
```

The important thing here is that we now have good predictivity and control for choosing Mesh Points that need to connect to specific Mesh portals.

## 1.6 Mesh Clusters Failover Testing

Now that we have configured two mesh clusters with different priorities, we can start testing them.

This is what has been configured on Mesh Portal AP.

| Mesh Cluster | Priority | Mesh Portal AP |
|---|---|---|
| MeshCluster-89 | 1 | Portal:5e:b5 |
| MeshCluster-90 | 5 | Portal:5d:6b |

As pointed out in the previous section, the Mesh Point will form a mesh link with Portal:5e:b5 as it has the lower priority number.

```
MeshPoint:09:0c# sh ap mesh debug status

State: CONNECTED(1), since: 16m:57s, recovery: FALSE
Topology algo:central, svc topo empty.
Country-code: 33 ("AU"), Outdoor: FALSE
Active Cluster: <e1baf29f4ca4ed35645e0a937d9c9c7>, encrypted: TRUE, opmode: 0x20000, priority:1
All Available Clusters(2):
 Cluster: <e1baf29f4ca4ed35645e0a937d9c9c7>, encrypted: TRUE, opmode: 0x20000, priority: 1
 Cluster: <71157c0b8ba97fe589aec5c4a2b514e>, encrypted: TRUE, opmode: 0x20000, priority: 5
Working RF Band: 2, RF Split 5G Range: 0

SM State: CONNECTED, Descendant Upgrading: FALSE, Portal Reachability: TRUE
Topology Adjust Scan: False, Scan Times: 3, Scan Interval: 1000s,
Portal ID: 50:e4:e0:14:17:81, Loop Protect Seq NO: 4078, Hop Count: 1, Path Cost: 1, Portal MTU:
1578,
Metric Reselection State: Idle, Optimize Scan Tick: 660, Reselection Tick: 953, Switch Interval:
0, Switch Tick: 1015,
SAPD Pending: FALSE, Received Config: TRUE, Thermal Protect: FALSE, Reboot Me: FALSE, Shutting
Down: FALSE,
SAPD Radio Off Tick: 0, CLI IP address Tick:0 FIPS Change Tick: 0, LMS change Tick: 0, LMS IP:
0.0.0.0,
Mesh Ctrl Socket: 15, Hostapd Recreate Pending: FALSE, Hostapd PID: 10245, Hostapd Sent Config:
TRUE, Hostapd Sync Count: 0,
Supplicant Initted: 1,
Mesh Radios Status:
 Radio 1, Running Opmode: 0x20000, Phy Down: FALSE, Band: 3, Current Channel: 69/0,

  Total 24 channels: 1,5,9,13,17,21,25,29,33,37,41,45,49,53,57,61,65,69,73,77,81,85,89,93,
  Scan Active: FALSE, Scan Started 660 Ticks, Scanned 24 channels, Curring Scanning Channel 1,
  Schedule Renegotiate: 0, Renegotiate: 0, Authenticate Pending: 0, Assoc Pending: 0, Assoc Tick:
1192, WPA Auth Pending 0,
  Marginal Uplink: FALSE, Hop Count: 1, Past Cost CH: 103, Path Cost: 1, Children Num: 0, Node
Cost: 0, Subtree Weight: 0,
  Commit Pending: 0, Mesh_P VAP Up: TRUE, SAPD Radio Off Tick: 0, Point Radar Tick: 0, Radar
Channel: 0,
  Supplicant EAPOL Socket: 16, VAP Added: 1, VAP Name: aruba100, MAC c0:00:00:00:00:00, BSSID
50:e4:e0:14:17:81, SSID e1baf29f4ca4ed35645e0a937d9c9c7, KEY MGMT 4
Mesh Configurations:
  Max children: 8, Max Hop Count: 2, Heartbeat Threshold: 10, Roaming: FALSE/RSSI-limit 0, Prefer
Uplink Radio: No prefer uplink radio, Remote Mesh MPV: 0
  Metric Algorithm: Distribute Tree RSSI, Reselection Mode: Startup Subthreshold, Optimize Scan
Interval: 3600(s), Link Threshold: 16, Max RSSI: 42, RSSI Delta: 2, Penalty: 10, Offset: 0
  HT Enabled: 1, VHT Enabled: 1, HE Enabled: 1, 40M: 1, 80M: 1, 160M: 1
  Mesh Access List Type: Deny, Hostname list(0):

MeshPoint:09:0c#
```

Here we are checking the meshd logs.

```
MeshPoint:09:0c# sh ap mesh debug meshd-log 0

[8902]2024-09-12 11:41:28.552 the str is /proc/sys/dev/wifi1/uchannel, 69 0 5 3
[8902]2024-09-12 11:41:29.559 meshd_scan_complete_all: selected potential parent  50:e4:e0:14:17:81 in
profile 0 on ch 69(offs=5), hop_count 0
[8902]2024-09-12 11:41:29.559 meshd_scan_complete_all: Using Active profile e1baf29f4ca4ed35645e0a937d9c9c7,
opmode 0x20000
[8902]2024-09-12 11:41:29.559 meshd_scan_complete_all: candidates:1, profiles:2, recovery:FALSE, num_scans 3,
disconnected-time: 3(secs)

<Lines removed>
```

```
[8902]2024-09-12 11:41:29.567 meshd_read_wlan_packet:4052 Received external Auth start event(14)
[8902]2024-09-12 11:41:29.567 meshd_supplicant_trigger_ext_auth. to start external SAE Auth to
50:e4:e0:14:17:81
[8902]2024-09-12 11:41:29.585 meshd_supp_tx_mlme: Meshd start to send MLME fc:176, type:0, stype:11, seq:1
[8902]2024-09-12 11:41:29.585 meshd_supp_tx_mlme: sent 128 bytes
[8902]2024-09-12 11:41:29.603 Received SAE Auth frame. alg:3, seq:1, status code:126 from 50:e4:e0:14:17:81,
len 128
[8902]2024-09-12 11:41:29.624 meshd_supp_tx_mlme: Meshd start to send MLME fc:176, type:0, stype:11, seq:2
[8902]2024-09-12 11:41:29.625 meshd_supp_tx_mlme: sent 64 bytes
[8902]2024-09-12 11:41:29.627 Received SAE Auth frame. alg:3, seq:2, status code:0 from 50:e4:e0:14:17:81,
len 64
[8902]2024-09-12 11:41:29.628 meshd_supp_handle_ext_auth_status: SAE Auth Success, to send assoc requst to
50:e4:e0:14:17:81
[8902]2024-09-12 11:41:29.629 meshd_read_wlan_packet:4161 Received mesh vap 1/0 up(8)
[8902]2024-09-12 11:41:29.630 meshd_read_wlan_packet: Rcvd Local mgmt frame body, stype:0
[8902]2024-09-12 11:41:29.630  Got RSN IE valid:1, key_mgmt:100, capa:e8
[8902]2024-09-12 11:41:29.632 Received Assoc response from 50:e4:e0:14:17:81
[8902]2024-09-12 11:41:29.632 meshd_read_wlan_packet: assoc response received from 50:e4:e0:14:17:81 with
rssi 0, var_len:190,len:220

[8902]2024-09-12 11:41:29.632 meshd_handle_assoc_resp: received assoc_resp from 50:e4:e0:14:17:81 with status
0/SUCCESS

<Lines removed>

MeshPoint:09:0c#
```

The mesh link is established with  Portal:5e:b5 .

```
MeshPoint:09:0c# sh ap mesh link

Neighbor list
-------------
Radio  MAC              AP Name      Portal  Channel  Band  Age  Hops  Cost  Relation
Flags  RSSI  Rate Tx/Rx A-Req A-Resp A-Fail  HT-Details   C                          luster ID
-----  ---   ---------- ----- ------ ------ -------- ---- --- ---- ---- ---------------- ----
-  ----  ---------- ----- ------ ------ ----------  -                     ---------
1      50:e4:e0:14:17:81 Portal:5e:b5 Yes    5S       6GHz 0    0    1.00  P 7m:51s          ELK
18     68/17    1     1      0      HE-160MHz-2ss  e
1baf29f4ca4ed35645e0a937d9c9c7

Total count: 1, Children: 0
Relation: P = Parent; C = Child; N = Neighbor; B = Denylisted-neighbor
Flags: R = Recovery-mode; S = Sub-threshold link; D = Reselection backoff; F = Auth-failure; H = High
Throughput; V = Very High Throughput, E= High efficient, L = Legacy                    allowed
       K = Connected; U = Upgrading; G = Descendant-upgrading; Z = Config pending; Y = Assoc-resp/Auth
pending
       a = SAE Accepted; b = SAE Denylisted-neighbour; e = SAE Enabled; u = portal-unreachable; o =
opensystem; m = Mobility Enabled
MeshPoint:09:0c#
```

Now when we have powered off the Portal:5e:b5 AP and we see that our Mesh Point AP has established a mesh link
with the backup mesh cluster.

```
MeshPoint:09:0c# sh ap mesh link

Neighbor list
-------------
Radio  MAC              AP Name      Portal  Channel  Band  Age  Hops  Cost  Relation
Flags  RSSI  Rate Tx/Rx A-Req A-Resp A-Fail  HT-Details   Cluster ID
-----  ---   ---------- ----- ------ ------ -------- ---- --- ---- ---- -----------------
-----  ----  ---------- ----- ------ ------ ----------  ----------
1      50:e4:e0:14:0e:41 Portal:5d:6b Yes    5S       6GHz 0    0    1.00  P 10m:31s
ELK    54    2268/2401  1     1      0      HE-160MHz-2ss  71157c0b8ba97fe589aec5c4a2b514e

Total count: 1, Children: 0
Relation: P = Parent; C = Child; N = Neighbor; B = Denylisted-neighbor
Flags: R = Recovery-mode; S = Sub-threshold link; D = Reselection backoff; F = Auth-failure; H =
High Throughput; V = Very High Throughput, E= High efficient, L = Legacy allowed
       K = Connected; U = Upgrading; G = Descendant-upgrading; Z = Config pending; Y = Assoc-
resp/Auth pending
       a = SAE Accepted; b = SAE Denylisted-neighbour; e = SAE Enabled; u = portal-unreachable;
o = opensystem; m = Mobility Enabled

MeshPoint:09:0c#
```

You can also check the meshd-log to see the switch over.

```
MeshPoint:09:0c# sh ap mesh debug meshd-log 0

[8902]2024-09-12 12:47:46.762 meshd_hostapd_ready:5718 syncing up with hostapd
[8902]2024-09-12 12:47:46.762 725,send_hostapd_configs, Sending cmd to hostapd:CONFIG  /- - -
RHRDWvPl23Wv/F91uxUS3LPZgvXlPhd *** ***- - -

[8902]2024-09-12 12:47:46.764 meshd_hostapd_ready:5720 set meshd_hostapd_ready_flag TRUE
[8902]2024-09-12 12:47:46.764 meshd_scan_complete_all: Switching active profile to
71157c0b8ba97fe589aec5c4a2b514e, opmode 0x20000
[8902]2024-09-12 12:47:46.764 meshd_program_active_profile: set meshc VAP ssid to
71157c0b8ba97fe589aec5c4a2b514e
[8902]2024-09-12 12:47:46.766 meshd_program_active_profile: Adding supplicant iface phy=1
[8902]2024-09-12 12:47:46.786 aruba100: deleting key mac=00:00:00:00:00:00 key_id=0
[8902]2024-09-12 12:47:46.786 aruba100: deleting key mac=00:00:00:00:00:00 key_id=1
[8902]2024-09-12 12:47:46.786 aruba100: deleting key mac=00:00:00:00:00:00 key_id=2
[8902]2024-09-12 12:47:46.786 aruba100: deleting key mac=00:00:00:00:00:00 key_id=3

<Lines removed>

MeshPoint:09:0c#
```

Next, we'll power up the Portal:5e:b5 AP again.  Note that the mesh-point AP will not automatically change the current mesh link back to Portal:5e:b5 AP.  There is no pre-emption for mesh links, so it will remain on the existing mesh link until the RSSI value falls below the configured threshold.

## 1.7    Mesh Statistics

There are a few interesting show commands.

"Show ap mesh cluster active" provide the active mesh clusters.

```
MeshPoint:09:0c# show ap mesh cluster active

Mesh Cluster name: e1baf29f4ca4ed35645e0a937d9c9c7
-------------------------------------------------
Name            AP Type  Mesh Role  IP Address  Portal AP    Parent AP    RSSI  Last Update
Uplink Age  Children Num  Children List
----            -------  ---------  ----------  ---------    ---------    ----  -----------
----------  -----------  -------------
MeshPoint:09:0c  AP-615  Point      10.10.10.32  Portal:5e:b5  Portal:5e:b5  39    20s
13m:1s      0             -

Total APs: 1
(N): 11N Enabled. (AC): 11AC Enabled. (AD): 11AD Enabled. (AX): 11AX Enabled. For Portals 'Uplink
Age' equals uptime.

MeshPoint:09:0c#
```

From the above output you can get the IP addresses of the mesh points and portals and then execute the stats command. Here is the command that was ran from the mesh-point AP.

```
MeshPoint:09:0c# sh ap mesh cluster stats 10.10.10.32

Radio ID : 0
Mesh link on radio : No

Radio ID : 1
Mesh link on radio : Yes
Mesh link band : 6G
Children Num : 0
Children List : -
Metrics stats:
-------------
Timestamp  RSSI  Channel Utilization (%)  Goodput [Tx] (bps)  Goodput [Rx] (bps)  Throughput [Tx] (bps)
Throughput [Rx] (bps)
---------  ----  ----------------------  ------------------  ------------------  --------------------  ----
----------------
11:18:44   37    2                        26283568            1223473684          3850                  4091
```

```
11:17:14   40   3                    21260822        1256996441        2804              3885
11:15:43   38   3                    19386689        1310078740        2531              3660
11:14:12   39   2                    24537291        787666666         3744              3742
11:12:42   36   2                    19769217        1295462686        2585              3819
11:11:10   40   2                    19811628        1223333333        3471              4521
11:09:39   39   3                    42288248        1262782608        10280             5750
11:08:08   43   2                    0               0                 0                 0

Radio ID : 2
Mesh link on radio : No

MeshPoint:09:0c#
```