Support for Daisy Chaining and PSE in AOS 8.4

Daisy chaining is a useful feature which is supported by a select number of Aruba APs. Adding support for daisy chaining to a low-cost 802.11AC Wave 2 capable platform such as the Aruba AP-303P allows organizations to deploy additional devices such as IP cameras or a second AP to support high density locations without being forced to run additional cables or consume another switch port. At a high level, enabling daisy chaining functionality on the 303P can be divided into two components: at layer 1 we need to get power to the second port and at layer 2 we need to configure it to bridge traffic.

Enabling the Port

Enabling the Eth 1 port of the AP-303P is relatively straightforward. We need to enable the Power Sourcing Equipment (PSE) functionality of the AP.

Configuration via CLI

Create an AP Ethernet Link Profile

Navigate to the desired hierarchical configuration node and enter the following commands:

```
(Drew_MM_01) [Drew] #configure t
Enter Configuration commands, one per line. End with CNTL/Z

(Drew_MM_01) [Drew] (config) #ap enet-link-profile pse
(Drew_MM_01) [Drew] (AP Ethernet Link profile "pse") #
clone                  Copy data from another AP Ethernet Link profile
dot3az                 802.3az (Energy Efficient Ethernet)
dot3bz                 802.3bz
duplex                 Link duplex setting
no                     Delete Command
poe                    Power over Ethernet
                       (RAP-3WNP/RAP-155P/AP-205H/AP-303H/AP-303P only)
speed                   Link speed

(Drew_MM_01) [Drew] (AP Ethernet Link profile "pse") #poe
```

```
(Drew_MM_01) ^[Drew] (AP Ethernet Link profile "pse") #write mem
```

To disable poe:

```
(Drew_MM_01) [Drew] (AP Ethernet Link profile "pse") #no poe
(Drew_MM_01) ^[Drew] (AP Ethernet Link profile "pse") #write mem
```

Apply Ethernet Link Profile to AP Group

1. Navigate the desired node of your **Managed Network** hierarchy and create a new wired port profile:

```
(Drew_MM_01) [Drew] (config) #ap wired-port-profile Dchain
```

2. Tie the ethernet link profile to the wired port profile:

```
(Drew_MM_01) ^[Drew] (AP wired port profile "Dchain") #enet-link-profile pse
```

3. Navigate to the AP-Group containing the AP-303P and add the Dchain Ethernet link profile:

```
(Drew_MM_01) ^[Drew] (AP wired port profile "Dchain") #ap-group TestGroup
```

4. Apply the wired port profile to the PSE interface:

```
(Drew_MM_01) ^[Drew] (AP group "TestGroup") #enet1-port-profile Dchain
(Drew_MM_01) ^[Drew] (AP group "TestGroup") #write memory
```

Verification via CLI

Navigate to the MC where the AP-303Pis terminated and run the following command; we should see something along the lines of the following:

```
(DT_MC_01) [MDC] #show ap debug system-status ap-name 303P | begin "Power Supply"
Power Supply                    : POE-AF
LLDP Power                      : Successfully negotiated at 25.5W
Current Operational State       : PSE enabled, PSE: AF (Overridden by LLDP)
```

Note that the “Power Supply” field may read POE-AF or POE-AT depending on the power source where the AP-303P is connected however the important part is the “Current

Operational State" field reads PSE enable and PSE is AF which would indicated that the 303P is successfully delivering power through its second Ethernet port.

Next we'll check the AP itself. Run the following command:

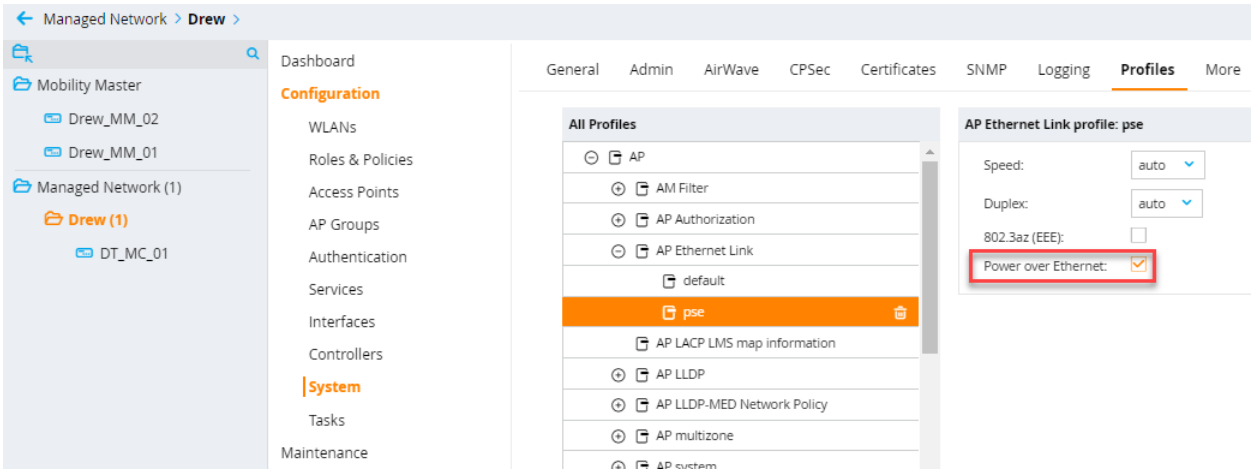
```
(DT_MC_01) [MDC] #show ap debug port status ap-name 303p

AP "303p" Port Status
---------------------
Port  MAC               Type  Forward Mode  Admin    Oper  Speed   Duplex  802.3az   802.3bz  PoE
----  ---               ----  ------------  -----    ----  -----   ------  -------   -------  ---
0     90:4c:81:cf:29:84 GE    N/A           enabled  up    1 Gb/s  full    disabled  N/A      N/A
1     90:4c:81:cf:29:85 GE    bridge        enabled  up    1 Gb/s  full    disabled  N/A      af
```

From the result we can see port 1 is bridging traffic with 802.3af power which is what is expected.

Configuration via GUI

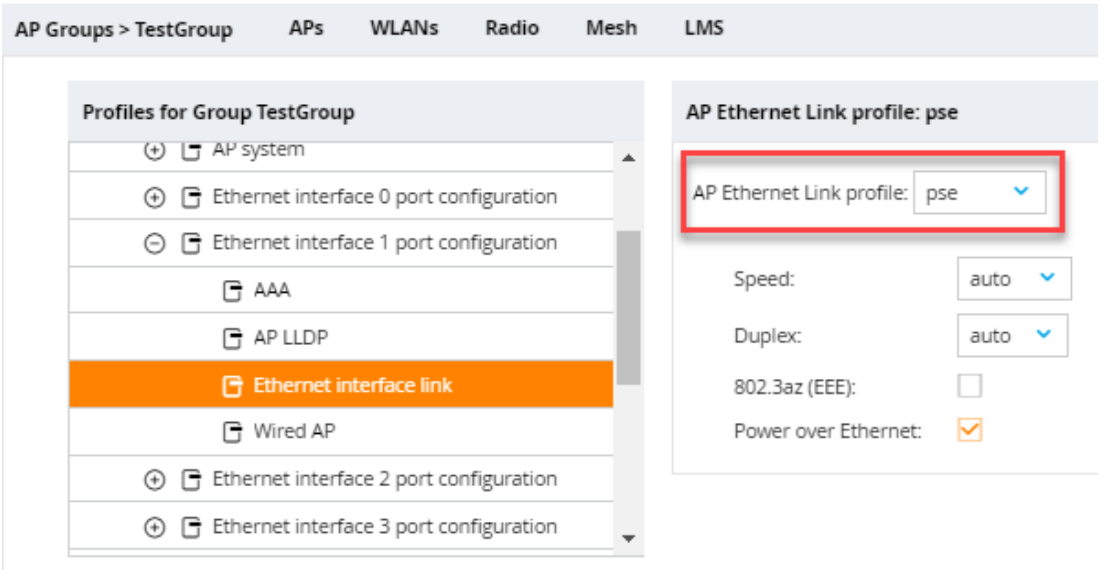
Create an AP Ethernet Link Profile

1. In the GUI navigate to the desired node of the hierarchy then to **Configuration > System > AP > AP Ethernet Link**.
2. Ensure that the **Power over Ethernet** box is checked under the PSE AP Ethernet Link profile. To disable PSE simply uncheck the box. Make sure to click **Submit**, **Pending Changes**, and **Deploy Changes**.



Apply Ethernet Link Profile to AP Group

1. Find the correct node of the **Managed Network** hierarchy, navigate to **Configuration > AP Groups**, and select the group containing the AP-303P.
2. Select **Profiles** in the upper right hand corner of the box that appears
3. Under **Profiles** for Group <name of your AP group> select **AP Ethernet interface 1 port configuration** (select Port 0 instead if the 303P uses it to connect to the switch) select **Ethernet interface link**.
4. Under **AP Ethernet Link profile**: ensure that **pse** is selected.



Configuring Daisy Chaining

Now that the port has power the next step is to configure it to pass traffic with a wired AP profile. Enabling Daisy chaining will allow the AP to bridge all traffic from the second Ethernet port to the uplink port.

Configuration via CLI

Create a Wired AP Profile

1. The first step is to create a wired AP profile which we will name “Dchain”:

```
(Drew_MM_01) [Drew] (config) #ap wired-ap-profile Dchain
(Drew_MM_01) ^[Drew] (Wired AP profile "Dchain") #
broadcast                Forward Broadcast traffic to this tunnel
```

```
clone                   Copy data from another Wired AP profile
forward-mode            Forward mode
no                      Delete Command
switchport              Set the switching mode characteristics
trusted                 Make this a trusted port
wired-ap-enable         Wired AP enable
wired-ap-mode           Wired AP mode
```

2. Enable wired–AP-enable:

```
(Drew_MM_01) ^[Drew] (Wired AP profile "Dchain") #wired-ap-enable
```

3. Select daisy-chain as the wired-ap-mode:

```
(Drew_MM_01) ^[Drew] (Wired AP profile "Dchain") #wired-ap-mode
daisy-chain             Wired ap in daisy-chain mode. In this mode
                        port will work on trusted brdige mode. And
                        port will retain the previous wired port
                        configuration even when controller is not
                        reachable
normal                  Wired ap in normal mode
```

```
(Drew_MM_01) ^[Drew] (Wired AP profile "Dchain") #wired-ap-mode
daisy-chain
Warning: Daisy Chain mode is enabled and Secure Jack will always
work on Bridge Trusted mode!
```

```
(Drew_MM_01) ^[Drew] (Wired AP profile "Dchain") #write memory
```

Apply the Wired AP Profile to AP Group

1. Navigate the desired node of your **Managed Network** hierarchy and select the wired port profile:

```
(Drew_MM_01) [Drew] (config) #ap wired-port-profile Dchain
```

2. Tie the Wired AP profile to the AP wired port profile:

```
(Drew_MM_01) ^[Drew] (AP wired port profile "Dchain") #wired-ap-profile Dchain
```

3. If you have not done it already navigate to the AP-Group containing the AP-303P and add the Dchain Ethernet link profile:

```
(Drew_MM_01) ^[Drew] (AP wired port profile "Dchain") #ap-group TestGroup
```

4. Apply the wired port profile to the PSE interface:

```
(Drew_MM_01) ^[Drew] (AP group "TestGroup") #enet1-port-profile Dchain
(Drew_MM_01) ^[Drew] (AP group "TestGroup") #write memory
```

Verification via CLI

Enter the following show commands from the managed device shell of the device where the 303P is terminated:

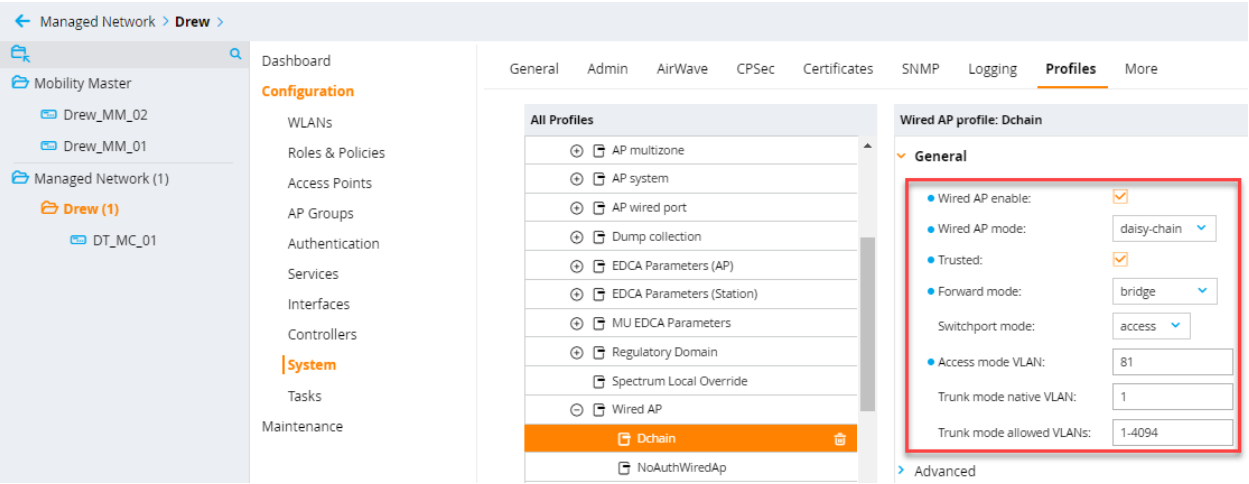
```
(DT_MC_01) [MDC] #show ap wired-ap-profile Dchain
Wired AP profile "Dchain"
-------------------------
Parameter                 Value
---------                 -----
Wired AP enable           Enabled
Wired AP mode             daisy-chain
Trusted                   Trusted
Forward mode              bridge
Switchport mode           access
Access mode VLAN          81
Trunk mode native VLAN    1
Trunk mode allowed VLANs  1-4094
Broadcast                 Broadcast
```

The results of the show command are exactly what we would want to see. Wired AP has been enabled, the mode is daisy-chain, and the profile will configure whatever port it is applied to as trusted.

Configuration via GUI

Create a Wired AP Profile

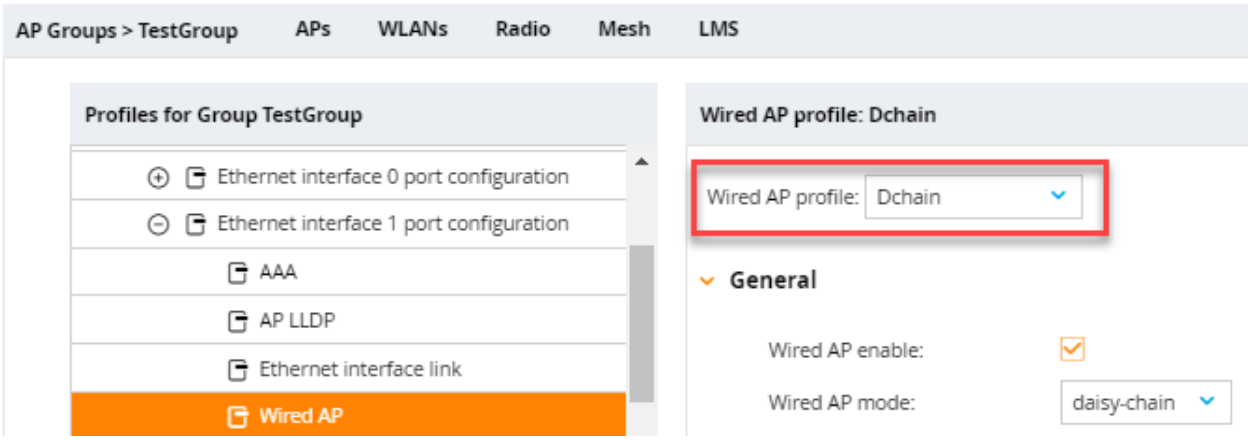
1. Navigate the desired node of your Managed Network hierarchy, then to **Configuration > System > Profiles > AP > Wired AP**
2. Select the plus sign (+) next to Wired AP profile
3. Give the profile a memorable name (recommendation is Dchain or Daisychain)
4. Check the **Wired AP enable** box
5. Under Wired AP mode click the drop down box and select **daisy-chain**
6. Check the **Trusted** box
7. Ensure the VLAN information is compatible with your environment



Apply Wired AP Profile to AP Group

1. Find the correct node of the **Managed Network** hierarchy, navigate to **Configuration > AP Groups**, and select the group containing the 303P.
2. Select **Profiles** in the upper right hand corner of the box that appears.

3. Under Profiles for Group <name of your AP group> select **AP Ethernet interface 1 port configuration** (select port 0 instead if the 303P uses it to connect to the switch) select **Wired AP**.
4. Click the dropdown box next to **Wired AP profile** and select **Dchain** (or whatever else you named the daisy chain Wired AP profile).



Caveats and Limitations

- For purposes of this validation the 303P was connected to a 2930M switch. At the time publication of this document the 303P was not capable of negotiating BT power with the switch, therefore it could only receive AT power and therefore only deliver AF power to the second device, which in this case was an AP-205.
- Additional testing has confirmed the 303P can receive BT power from a PoE injector and in turn deliver 802.3at power to a daisy-chained device from its second Ethernet port.
- Enabling daisy chaining on the second Ethernet of an AP will cause the port to lose firewall capabilities. That port will be considered a trusted bridge port. Wireless operations will continue operating normally.
- If the AP is disconnected from its controller the port configured to daisy chain will remain up and retain its wired port configuration.