

## Canāree AQM for Aruba Wireless Solutions

***What's that hanging off your AP - it's a Canāree Air Quality Monitor!***

*Solution Deployment Guide – Version 1.5.3 Updated 1/4/22*



Figure 1: Canāree connected to USB Port on Aruba

### **Overview**

Piera's Canāree line of Air Quality Monitors (AQMs) have been designed specifically and certified to interoperate with Aruba Access Points (APs) beginning with the 8.8 release of Mobility Controller or Instant AP (IAP) from Aruba/HPE and is validated with subsequent and newer releases by both companies.

With this release of 8.8 - Aruba became certified as a Microsoft Azure IoT Connectivity solution, enabling the AP or controller to securely provision and send/receive data to Azure's IoT Hub for Piera sensors connected to Aruba APs via the USB Port and for our AQMs to be mass-deployed and provisioned simply using Azure's Device Provisioning Service (DPS)

This guide covers planning your design, configuration and validation of the solution as well as troubleshooting guide and interoperability matrix. For more information contact us at [support@pierasystems.com](mailto:support@pierasystems.com)



Figure 2: There's a bird on this Aruba AP and its name is Canāree

### **Ideal Placement of AQMs**

When planning the deployment of AQM in a building the ideal location for monitoring has a lot in common with AP Locations. Ceiling mounted APs above users about 10' height with a line of sight to users is a common deployment scenario for typical office buildings, especially with ceiling grid as shown in the picture above. With each AP covering 600-1000sq in for high density Wifi designs.

This placement of APs is often perfect for monitoring air quality through a building. With millions of APs already deployed in these locations our solution takes advantage of the USB-C Port on many Aruba APs to both power the Canāree AQMs and report data to the cloud. This eliminates the need to deploy additional power/network cables to add AQM in your environment greatly simplifying the deployment process which is an important consideration in large buildings.

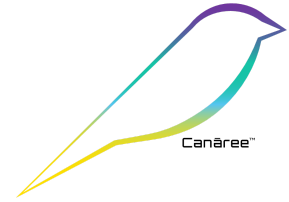
## **USB Mounting Options**

All Aruba 300 and 500 Series APs and many other models have USB Ports that can be used for Canāree AQM. Ceiling Mounted APs orient the USB Connector in the ideal direction for Canāree AQMs. However some Aruba APs such as 303-Series may require a USB 90° Adapter to orient the Canāree in a more compact design.

Various USB Adapters and Extension Cables can be used with Canāree on Aruba APs to change the orientation or extend the reach of the Canāree up to 10' from the Aruba APs USB Port.



Figure X: A 90° USB Adapter is preferred on the Aruba 303 Model seen above.



## **Canaree Configuration for Aruba**

This solution supports both Canaree A-Series USB AQMs and Canaree IoT AQMs with the same USB connector. In both cases the Aruba AP is used to power the device as well as transport data from the USB Port to Piera's SenseiAQ Cloud running Azure IoT.

When deploying Canaree on an Aruba AP the configuration must be modified, to optimize message length and intervals.

The following values are set on Canaree CLI using a Terminal Program such as Putty or HyperTerm to restore factory defaults, enable low data mode (ldm), set the update interval to 60 seconds (interval) and optionally disable the Wifi radio (I-Series devices only) when connected directly to the Aruba AP.

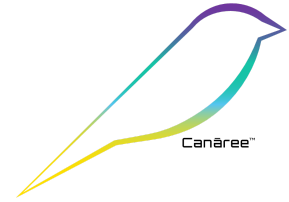
Recommended Commands for all Canaree devices on Aruba

```
$Wfactory=  
$Wldm=1  
$Winterval=60
```

Optional Command to disable Wifi Radio on Canaree I-Series devices:

```
$WAPRadio=0
```

Note: The AP-Radio is enabled by default on Canaree I-Series for standalone Wifi connectivity; however when connecting directly to an Aruba AP (at such a short distance) it is recommended to disable the Canaree's Wifi Radio to avoid interference unless you are using a USB Extension cable to move the Canaree at least 3 feet away from the AP.



## Aruba Configuration

ArubaOS 8.8 for Mobility Controller, VMC, IAP or Aruba Central is required to for communication with Piera sensors. The following changes are required on Mobility Controller or IAP to allow forwarding of serial data from the Piera Sensor sensor data to the Azure-IoTHub.

For testing we provide a demo Symmetric Key below; however for production you should request a specific key from [support@pierasystems.com](mailto:support@pierasystems.com) to secure your deployment.

Be sure the date/time and DNS is properly configured on your Aruba devices, using NTP is recommended to keep the time accurate which is critical for authenticating to the Azure IoT Hub.

Replace the **default** AP-group name with the AP-Group used in your environment for these APs.

```
iot transportProfile piera
  endpointType Azure-IoTHub
  payloadContent serial-data
  bleDataForwarding
  azure-dps-id-scope 0ne00284EE8
  azure-dps-auth-type group-enrollment symmetric-key
2c401c13316b83dbdda30ba45f6745df66c803ef63b10256b3340f3af71b6609925e0f5da361a38d67f970
1a766abfb9b1ba97f3111bf0a0b4335c1c5424c8d4ec3f08ecbf718cee480d85a57abdfb192aa34adbbc4
6a76e17f8f3dac4dc33e4a52e1b5c5aa1efb
!
iot useTransportProfile piera
!
write memory
```

Apply the IoT-Transport Profile to your default (or other) AP-Group

Note: Ensure when you type in the symmetric-key there are no line or spaces in the output if you copy/paste from this document.

## **Aruba Validation**

With a Canāree AQM connected to one or more APs and the above IoT transport profile configured, the device will attempt to register to the Azure cloud and begin to send data. This can be seen using the following troubleshooting commands on the Aruba MC/IAP.

- show clock (to validate time/date is set correctly)
- show version (to validate your version)
- ping google.com (to test DNS is working)
- show ap debug ble-config (shows USB Port status active IoT Transport )
- show ap debug ble-relay iot-profile (shows DPS and Azure Registration Status)
- show ap debug ble-relay azure-iot-hub-log (Show IoT Connection log file)
- show ap debug ble-daemon (shows full log for IoT Messages sent/received )
- show ap debug usb-device-mgmt log (shows full log for USB devices identified on AP)

Always check the Clock and ensure the time is accurate, using NTP Is recommended to avoid issues.

**Piera-Aruba505# show clock**

Current Time :2022-01-20 13:22:07

Use the following to validate your Version of Aruba OS running. Minimum supported version is 8.8.0.0

**Piera-Aruba505# show version**

Aruba Operating System Software.

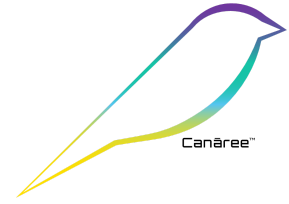
ArubaOS (MODEL: 505), Version 8.9.0.0

Website: <http://www.arubanetworks.com>

(c) Copyright 2021 Hewlett Packard Enterprise Development LP.

Compiled on 2021-08-16 at 09:59:14 PDT (build 81161) by jenkins





Validate DNS Is working properly on your MC/IAP Device, DNS Is required to register to Azure IoT Hub.

```
Piera-Aruba505# ping google.com
```

```
PING 142.250.189.206 (142.250.189.206): 56 data bytes
64 bytes from 142.250.189.206: icmp_seq=0 ttl=107 time=35.9 ms
64 bytes from 142.250.189.206: icmp_seq=1 ttl=107 time=35.6 ms
```

The following command validates the Piera USB Device was loaded successfully.

```
Piera-Aruba505# show ap debug usb-device-mgmt log | inc piera
```

```
2022-01-04 16:02:55.5840 5039 DEBUG Plugin 'piera' was loaded successfully
```

The following command validates a specific AP is seeing the Piera Sensor on its USB Port and also reports the Serial Device ID (used for Azure DPS Registrations)

```
(ArubaMC-VA) #show ap debug ble-config ap-name Test315 | include PIERA
```

```
Radio Information PIERA USB External
```

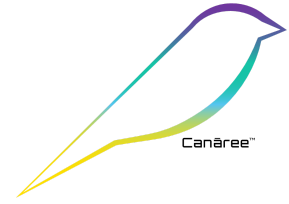
```
Serial Device Id PIERA_USB:97f0f0bbf18db89fa9e8ad07bd4de670
```

The following command validates the Azure-IoT Connection has been successfully established, for registering and reporting of sensor data. Note the first connect and last update times shown

```
Piera-Aruba505# show ap debug ble-relay iot-profile
```

```
-----Profile[aruba-demo]-----
serverType           : Azure IoTHub
deviceClassFilter     : Serial Data
reportingInterval     : 600 second
authentication-mode   : none
rssiReporting        : Average
environmentType       : office
bleDataForwarding     : TRUE
azure-dps-id-scope    : 0ne00284EE8
```

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```
azure-dps-group-key          : *****
Server Connection State
-----
TransportContext             : Ready
Last Data Update           : 2022-01-20 13:12:15
Last Send Time            : 2022-01-20 13:12:15
TransType                    : Azure AMQP Over Websocket
Transport count              : 1
-----
-----Azure Transport[sensei.azure-devices.net]-----
Transport url              : sensei.azure-devices.net
Transport created            : Yes
Device count                 : 1
-----
Device MAC                   : b8:3a:5a:c0:18:da
Device id                    : B83A5AC018DA
Device created               : Yes
Status                     : Connect success
Direct Method Status        : Idle
```

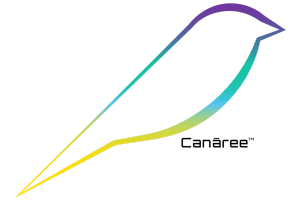
The following command shows the full log for Aruba's connectivity to Azure IoT Hub, including details about the device provisioning process, ID-Scope and Group key used to register.

**(ArubaMC-VA) #show ble\_relay azure-iothub-log**

```
2022-01-04 16:03:39 Azure connect: Azure iothub init...
2022-01-04 16:03:39 Azure connect: Azure iothub init done
2022-01-04 16:03:39 Azure connect: az_iot_connecting(161) Start azure
iothub connecting thread.
2022-01-04 16:03:39 Azure connect: New connecting, iothub url
sensei.azure-devices.net, register id B83A5AC018DA, key *****
2022-01-04 16:03:39 az_iothub_creat_client_hash_entry(146): Created AP
mac<b8:3a:5a:c0:18:da>, id <B83A5AC018DA>.
2022-01-04 16:03:39 Azure connect: az_iothub_create_device(230) creating
client B83A5AC018DA
2022-01-04 16:03:39 Azure send: az_iot_sending_msg(235) Start azure iothub
sending thread.
2022-01-04 16:03:39 Azure connect: az_iot_connecting(202) Create device
```

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```
2022-01-04 16:03:40 Azure connect: Update azure connection status to
daemon
```

```
2022-01-20 12:46:43 parse_apb_heartbeat:1272 fw return status is
BEACON_SUCCESS(0)
```

## Map View Examples

A Map View is ideal for monitoring AQM on larger buildings, and often a similar Floorplan is used to monitor Wireless network itself. Piera provides example code for Google Maps integration, which allows you to overlay a JPG floor plan, or use real Google Maps to place your AQMs on a custom map for easy viewing.



Figure X: 3D Map View of Air Quality using Google Maps feature



Figure X: Typical 2D Floor Plan Map with Air Quality Monitoring

Example Code is available at our GitHub Site on <https://github.com/PieraSystems/map-test>

A live Demo MAP can be viewed online at <https://sensei.pierasystems.com/map/index.html>

## **Canāree Specifications**

<b>Technical Data</b>	
USB-Serial Driver	Silicon Labs CP2102 UART Bridge
Wireless LAN Support (Canāree I-Series only)	802.11n 2.4 GHz using WPA2/PSK/AES (Client)
Power Consumption	100mA @ 5.5v (Continuous Operation) A-Series 120mA @ 5.5v (Continuous Operation) I-Series
Total Airflow	0.1 LPM
USB Connector Type	Type A - USB 2.0, (max 10' cable extension)
Physical Dimensions	9cm x 7cm x 2cm (3.54" x 2.76" x 0.79")
Weight *	50g (1.76 oz)
Software Supported	SenseiAQ (Windows / MacOS) Application
Cloud Reporting Support	Microsoft Azure IoT Hub*
Power Saving and Cleaning Mode	Supported
Storage Temperature Range	-40°C to +80°C

Table 3. Absolute minimum and maximum ratings

\*1 Year subscription included with purchase of device. Extended subscriptions available with maintenance contract.

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