BLE Beacons in CiscoWave 2 Access Points

Managing BLE Beacons in Cisco Wave 2 and 802.11ax Access Points

The BLE Management feature supports both sending of beacons and listening to beacons from small battery-powered devices.

BLE beacons support the following profiles:

- iBeacon profile

- Eddystone-URL profile

- Eddystone-UID profile

- viBeacon (contains up to 5 iBeacons internally)

Bluetooth-enabled smartphones that are nearby can pick up the transmission from beacons and communicate with the back-end server to push advertisements or other information. The transmission power range is from –21 dBm to +5 dBm in increments of 3 dB. You can also configure the broadcast frequency in the range of 100 milliseconds to 10000 milliseconds.

The end-to-end solution comprises the following components:

- Cisco Wave 2 or Catalyst 9100 series AP with BLE chip

- Cisco Catalyst 9800 Series Wireless Controller

- On-premise Cisco Connected Mobile Experiences (CMX)

- Cisco Digital Network Architecture (DNA) Spaces

Table 1: Feature Support in AP Models

AP Platform	SKU
Cisco Aironet 1542 Access Point	I

AP Platform	SKU
Cisco Aironet 1810 Access Point	W, T
Cisco Aironet 1815 Access Point	W, T
Cisco Aironet 1800 Access Point	I
Cisco Aironet 4800 Access Point	-

Figure 1: End-to-End BLE Management
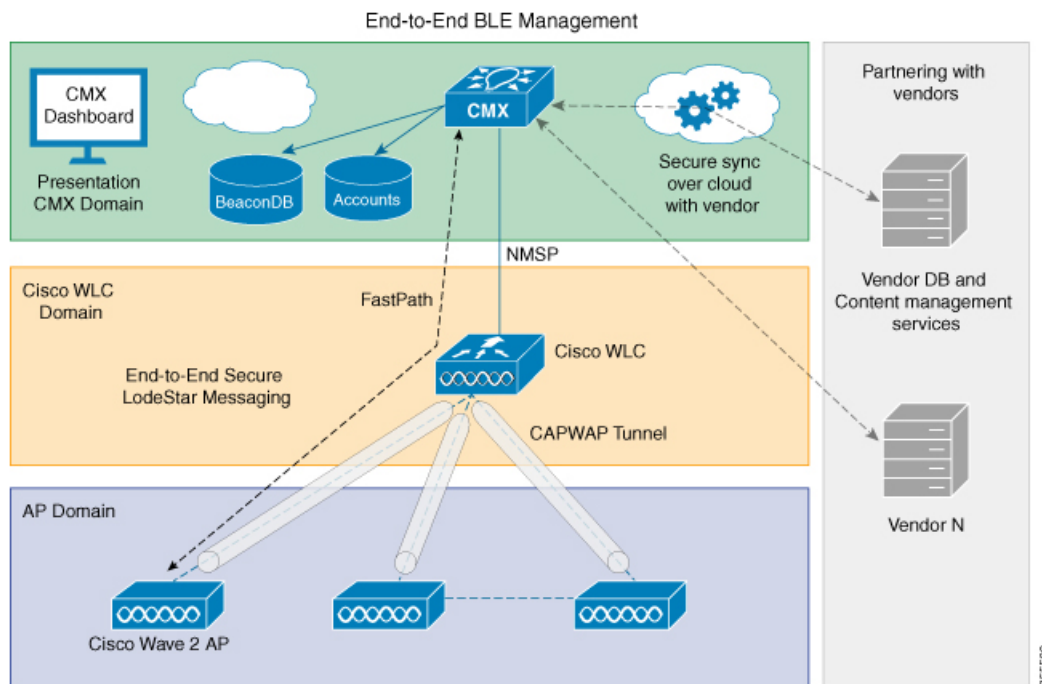
Functional Role

An AP's BLE firmware that is running on an integrated radio can be configured to function as a nonconnectable broadcaster. The beacons are picked up by any other application running on a smartphone, or another Cisco AP, for internal processing. This broadcasting function is mutually exclusive, and no scan operations or other BLE management functions are in operation during this period.

In the Broadcaster role, the AP's BLE beacon supports different profiles. Profiles are different beaconing formats that have been approved by the Bluetooth Special Interest Group. Each profile has its own meaning and these profiles are mutually exclusive, that is, the firmware can only send one format at a time and not a mixed one.

The AP's BLE firmware supports the following beaconing profiles:

- iBeacon: This is Apple's iBeacon broadcast format. In this profile, you can configure the following broadcast data:

    - UUID (16 bytes value, which can uniquely identify an organization)

    - Major number (2 bytes value, which can identify a unique store of the organization)

• Minor number (2 bytes value, which can identify a particular product or section)

Typical use cases are iOS or Android apps that use Major, Minor, or UUID to show local store data to smartphone user, when they walk close to a Cisco Wave 2 or Catalyst AP.

• Eddystone UID: This is one of Google's BLE broadcasting formats, where Namespace and InstanceID are broadcast in the BLE beacon. In this profile, you can configure the following parameters:

• Eddystone Namespace (10 bytes)

• Eddystone InstanceID (6 bytes)

• Eddystone URL: This is another BLE broadcasting format used by Google, in which an AP broadcasts the configured URL for a broadcast data. Any smartphone app such as Android's physical web or the latest Google Chrome plugin can pick up the beacon and render the URL into a web page without the need for users to install any apps. Note that the physical web is yet to be standardized as a plugin to all the smartphone Chrome or web browsers. In this profile, you can configure URL strings, which must start with one of the following prefixes:

• http://www.

• https://www.

• http://

• https://

• viBeacon—Up to five AP beacons can be configured. These beacons are compatible only with Cisco Aironet 3700 Series AP.

All of these profiles can be configured to transmit at a particular Transmit (Tx) power –21 dBm to +5 dBm and advertising interval (100 ms to 10000 ms). This Tx power is common to the iBeacon, Eddystone UID, and Eddystone URL profiles.

Note All of these profiles can be configured on Cisco DNA Spaces.

Monitoring BLE Management

To view the list of joined APs that support the BLE Management feature along with the BLE details for each AP, use the following command:

```
Device# show ap ble summary
AP Name                          Interface           Status      CMX IP
--------------------------------------------------------------------------------
AP4001.7AB2.C39A                 Integrated          Open        10.1.2.3
AP4001.7AB2.C39B                 Integrated          Closed      10.1.2.4
```

Note The BLE Management feature is enabled and APs are displayed only when CMX is registered with the controller, and BLE is enabled on CMX.

To view the list of all the CMXs registered for the BLE Management feature and their global values for BLE, use the following command:

```
Device# show ap ble cmx summary
CMX IP: 10.1.2.3
----------------------
  BLE administrative status: Up
  BLE operational status: Up
  Scanning interval: 12

CMX IP: 10.1.2.4
----------------------
  BLE administrative status: Down
  BLE operational status: Down
   Reason: BLE is administratively down
  Scanning interval: 0

CMX IP: 10.1.2.5
------------------
BLE administrative status: Up
BLE operational status: Down
 Reason: CMX is not subscribed to AP Monitor and RSSI services, or NMSP connection is down
Scanning interval: 10
```

To view the BLE management feature-related global values for a specific CMX along with all the APs associated to that CMX, use the following command:

```
Device# show ap ble cmx detail ip 10.1.2.3
BLE administrative status: Up
BLE operational status: Up
Scanning interval: 10

  AP Name                       Interface         Status
  ---------------------------------------------------------------
  AP4001.7AB2.C39A              Integrated        Open
```

To view the global values for BLE and BLE details for a specific AP, use the following command:

```
Device# show ap name AP4001.7AB2.C39A ble detail

CMX IP: 10.1.2.4
----------------------
  BLE administrative status: Up
  BLE operational status: Up
  Scanning interval: 10

  AP Name                       Interface         Status
  ---------------------------------------------------------------
  AP4001.7AB2.C39B              Integrated        Open
```