



FastLocate for Cisco Catalyst Series Access Points

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Information About FastLocate

Current Wi-Fi location technology relies on mobile devices sending received signal strength indication (RSSI) or location information, based on probe request messaging, to access points. This information is sent on most channels by the mobile device and received by neighbor APs on different channels. This helps in location estimation.

Wi-Fi clients are moving towards lesser probing to discover an AP. This helps to conserve battery power. Depending on the client, operating system, driver, battery, current, and client activity, device probing frequency varies anywhere from 10 seconds to 5 minutes. This variation results in inadequate data points to represent real-world movement.

Since data packets are more frequent than probe request packets, they can be aggregated better. FastLocate enables higher location refresh rates by collecting RSSI or location information through data packets received by the APs. Using these data packets, location-based services (LBS) updates are initiated by the network and are available more frequently.

Supported Access Points

Beginning with IOS XE 17.1.1, FastLocate feature is supported on the Cisco Catalyst 9120 Series Access Points.

In IOS XE 17.3.1, the following APs support the FastLocate feature:

- Cisco Catalyst 9130 Series Access Points
- Cisco Catalyst 9120 Series Access Points
- Cisco Aironet 4800 Series Access Points.

- Cisco Aironet 3800 Series Access Points.
- Cisco Aironet 2800 Series Access Points.

In addition, Cisco Aironet 4800 Series Access Points also supports the Angle of Arrival based location calculation (Hyperlocation).

When FastLocate is enabled, the Cisco RF ASIC radios of these APs act as a WSSI module and transform into a monitoring role and off-channel scanning mode. The Cisco RF ASIC radios scan through all the 2.4-GHz channels and 5-GHz channels in a linear fashion, with each channel scanned for 150 milliseconds. This period is called the dwell time.

The Cisco RF ASIC radios of the APs are synchronized with the NTP server. Using FastPath, all data packet RSSI records that are collected during one off-channel dwell is sent in a specific packet format to the Cisco controller, at the end of the dwell time.

FastLocate Network Components

For successful packet RSSI location computation, the following components with necessary functionalities are needed:

- Wireless client
 - Send data, management, and control packets
- Cisco Catalyst 9800 Series Wireless Controller
 - Configure NTP server information and location parameters on AP
 - Forward clients' RSSI related information to CMX/MSE via FastPath/datapath
- Cisco Catalyst 9120 Series AP
 - Location radio in monitor or equivalent role
 - Time synchronized with NTP server
 - Collect RSSI related data sent by clients (both associated and unassociated)
 - Send clients' RSSI data to the Cisco controller through CAPWAP
- Cisco CMX
 - Parse fastpath location data received by WLC
 - Calculate exact physical location of the client and render on GUI using algorithms

Configuring FastLocate (GUI)

Procedure

-
- Step 1** Choose **Configuration > Tags & Profiles > AP Join**.
 - Step 2** On the **AP Join** page, click the **default-ap-profile** AP join profile.
 - Step 3** In the **Edit AP Join Profile** window, click the **AP** tab.
 - Step 4** Under **Hyperlocation**, select the **Enable Hyperlocation** check box.
 - Step 5** Click **Update & Apply to Device**.
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Verifying FastLocate on Cisco Catalyst APs

To verify FastLocate, use the below commands on the AP:

Device# **show ntp**

```
Stratum    Version    Last Received    Delay    Offset    Jitter    NTP server
  1         4          123sec ago      1.169ms -3.262ms  10.050ms   7.7.7.2
```

Device# **show ap fast-path statistics**

```
total packets sent      : 90001
invalid app ID drops    : 0
application              : 0 (HALO)
packets sent (CAPWAP)   : 90001
packets sent (APP HOST INTF) : 0
admin state drops       : 0
no dest IP drops        : 0
```

To view FastLocate admin status details on the AP, use the following command:

Device# **show capwap client rcb**

```
Hyperlocation Admin State : Enabled
MSE Gateway MAC           : 00:50:56:86:0F:9D
WLC Hyperlocation Source Port: 9999
MSE IP Address             : 10.0.0.1
```

To view FastPath-related parameters on the AP like source and destination IP addresses, port numbers, and the gateway MAC address, use the following command:

Device# **show ap fast-path configuration hyperlocation**

```
source IP address       : 10.0.0.2
destination IP address: 10.0.0.1
source port (WLC)       : 9999
destination port (MSE): 2003
gateway MAC             : 00:50:56:86:0F:9D
ewlc hyperlocation MAC: 00:00:00:01:00:01
```

To verify FastLocate on the Cisco Catalyst controller, use the appropriate command given below.

To view the summary of applications that send fastpath or datapath data, use the below command. The hexcode for the HyperLocation and BLE port numbers are displayed.

```
Device# show platform hardware chassis active qfp feature wireless wlclient
cpp-client summary
```

```
Client Type Abbreviations:
RG - REGULAR      BL - BLE
HL - HALO         LI - LWFL INT
Auth State Abbreviations:
UK - UNKNOWN     IP - LEARN IP    IV - INVALID
L3 - L3 AUTH     RN - RUN
Mobility State Abbreviations:
UK - UNKNOWN     IN - INIT
LC - LOCAL       AN - ANCHOR
FR - FOREIGN     MT - MTE
IV - INVALID
EOGRE Abbreviations:
N - NON EOGRE   Y - EOGRE
CPP IF_H      DPIDX      MAC Address VLAN CT MCVL AS MS E WLAN POA
-----
0X31   0XF0000002 0000.0003.0001 122 BL 0 RN LC N NULL 0X32 0XF0000001 0000.0001.0001 122
HL 0 RN LC N NULL
```

To capture statistics of a selected application, use the below command:

```
Device# show platform hardware chassis active qfp feature wireless wlclient
datapath
cpp-if-handle register-code statistics start
```

The hex-value of the register-code is obtained from the **show platform hardware chassis active qfp feature wireless wlclient cpp-client summary** command mentioned earlier.

```
Device# show platform hardware chassis active qfp feature wireless wlclient
datapath cpp-if-handle 0x32 statistics start
```

To display the statistics of the selected application, use the below command:

```
Device# show platform hardware chassis active qfp feature wireless wlclient
datapath
cpp-if-handle register-code statistics
```

The hex-value of the register-code is obtained from the **show platform hardware chassis active qfp feature wireless wlclient cpp-client summary** command mentioned earlier.

```
Device# show platform hardware chassis active qfp feature wireless wlclient
datapath cpp-if-handle 0x32 statistics
      Pkts   Bytes
Rx    232   38850
```