



Cisco Hyperlocation

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Finding Feature Information

Your software release may not support all the features documented in this module. For the latest feature information and caveats, see the release notes for your platform and software release. Use Cisco Feature Navigator to find information about platform support and Cisco software image support. To access Cisco Feature Navigator, go to <http://www.cisco.com/go/cfn>. An account on Cisco.com is not required.

Restrictions on Cisco Hyperlocation

- FlexConnect mode is not supported.
- Only IPv4 addresses are supported for the NTP server.
- It is not possible to disable Cisco Hyperlocation on individual APs.

Information About Cisco Hyperlocation

Cisco Hyperlocation is an ultraprecise location solution that allows you to track the location of wireless clients with the accuracy of one meter. This is possible thanks to the Cisco Hyperlocation radio module that is part of Cisco Aironet 3600 and 3700 Series Access Points. This powerful module combines Wi-Fi and Bluetooth Low Energy (BLE) technologies to allow pinpointing beacons, inventory and personal mobile devices.

The Cisco Hyperlocation radio module provides the following:

- WSM radio module functions that are extended to:

- 802.11ac
- Wi-Fi Transmit
- WSM and RRM channel scanning that is extended to 20-MHz, 40-MHz, and 80-MHz channel bandwidth.
- Expanded location functionality:
 - Low latency location optimized channel scanning
 - 32-antenna angle of arrival (AoA)

Cisco Hyperlocation works in conjunction with Cisco Connected Mobile eXperience (CMX). Combining the Cisco Hyperlocation feature on the Cisco Catalyst 3850 or 3650 Series Switch with a CMX device allows to achieve better location accuracy, which can result in delivering more targeted content to users. When you use CMX with Cisco CleanAir frequency scanning, it is simple to locate failed, lost, and even rogue beacons.

Enhancements in Cisco IOS XE Denali 16.3.1 Release

- The Cisco Hyperlocation radio module with Integrated BLE Radio allows to transmit Bluetooth Low Energy (BLE) broadcast messages by using up to 5 BLE transmitters. The Cisco Catalyst 3850/3650 Switch is used to configure the transmission parameters such as interval for the beacons, UUID, and transmission power, per beacon globally for all the access points. Also, the Cisco Catalyst 3850/3650 Switch can configure major, minor, and transmission power value of each access point, thus providing more beacon granularity. This feature works in conjunction with Cisco Hyperlocation radio module and Hyperlocation feature.



Note

Cisco Hyperlocation feature must be enabled on the APs for Hyperlocation BLE to work.

- The Cisco Hyperlocation feature is enhanced such that the location performance via data packets RSSI is reported through Local Mode radios through CPU cycle stealing when Cisco Hyperlocation radio module is not installed on an AP. This enhancement is available on the following APs:
 - Cisco Aironet 700 Series APs
 - Cisco Aironet 1700 Series APs
 - Cisco Aironet 2600 Series APs
 - Cisco Aironet 2700 Series APs
 - Cisco Aironet 3600 Series APs
 - Cisco Aironet 3700 Series APs
- You can configure Cisco Hyperlocation for an AP group. Previously, Cisco Hyperlocation configuration was applicable to all APs globally.

Additional References

For more information about Cisco Hyperlocation, refer to the following documents:

- [Cisco Hyperlocation Solution](#)
- [Cisco CMX 10.2 Configuration Guide to enable Cisco Hyperlocation](#)
- [Cisco CMX 10.2 Release Notes](#)

Configuring Cisco Hyperlocation - Global Configuration (CLI)

Procedure

- **configure terminal**

Example:

```
Device# configure terminal
```

Enters global configuration mode.

- **[no] ap hyperlocation**

Example:

```
Device(config)# [no] ap hyperlocation
```

Enables or disables Hyperlocation on all the APs.

- **[no] ap hyperlocation threshold detection *value-in-dBm***

Example:

```
Device(config)# [no] ap hyperlocation threshold detection -100
```

Sets threshold to filter out packets with low RSSI. The **[no]** form of the command resets the threshold to its default value.

- **[no] ap hyperlocation threshold reset *value-btwn-0-99***

Example:

```
Device(config)# [no] ap hyperlocation threshold reset 8
```

Resets value in scan cycles after trigger. The **[no]** form of the command resets the threshold to its default value.

- **[no] ap hyperlocation threshold trigger *value-btwn-1-100***

Example:

```
Device(config)# [no] ap hyperlocation threshold trigger 10
```

Sets the number of scan cycles before sending a BAR to clients. The **[no]** form of the command resets the threshold to its default value.

- **[no] ap ntp ip *ipv4-address-of-ntp-server***

Example:

```
Device(config)# [no] ap ntp ip 9.0.0.4
```

Sets the IPv4 address of the NTP server, directly reachable by the access points. The **[no]** form of the command resets the NTP value to 0.0.0.0.

- **show ap hyperlocation summary**

Example:

```
Device# show ap hyperlocation summary

Site Name: default-group
Site Description:
Hyperlocation operational status: Up
Reason: N/A
Hyperlocation NTP server currently used: 9.0.0.4
Hyperlocation admin status: Enabled
Hyperlocation detection threshold: -100 dBm
Hyperlocation trigger threshold: 10
Hyperlocation reset threshold: 8
```

Shows the overall configuration values and operational status and parameters for default AP group.

- **show ap hyperlocation detail**

Example:

```
Device# show ap hyperlocation detail

Site Name: default-group
Site Description:
Hyperlocation operational status: Up
Reason: N/A
Hyperlocation NTP server currently used: 9.0.0.4
Hyperlocation admin status: Enabled
Hyperlocation detection threshold: -100 dBm
Hyperlocation trigger threshold: 10
Hyperlocation reset threshold: 8
```

Values for APs in all AP Groups:

AP Name	Radio MAC	Method	Hyperlocation
APf07f.0635.2d40	f07f.0676.3b89	WSM	Enabled
APf4cf.e272.4ed0	f4cf.e223.ba31	Local	Enabled

Shows both overall and per-AP configuration values and operational status. The Method column of the AP rows shows “Local” for APs on Local Mode FastLocate. The values shown for Hyperlocation status and parameters reflect the values for default AP group.

- **set platform software trace wireless switch active R0 hyperlocation {debug | emergency | error | info | noise | notice | verbose | warning}**

Tracing commands that are specific to Cisco Hyperlocation:

- **debug**—Debug messages
- **emergency**—Emergency possible message
- **error**—Error messages
- **info**—Informational messages
- **noise**—Maximum possible message

- **notice**—Notice messages
- **verbose**—Verbose debug messages
- **warning**—Warning messages

Configuring Cisco Hyperlocation for an AP Group (CLI)

Procedure

	Command or Action	Purpose
Step 1	configure terminal Example: Device# configure terminal	Enters global configuration mode.
Step 2	ap group <i>ap-group-name</i> Example: Device (config) # ap group my-ap-group	Creates an access point group.
Step 3	[no] hyperlocation Example: Device (config-apgroup) # [no] hyperlocation	Enables or disables Hyperlocation for the AP group <i>my-ap-group</i> .
Step 4	[no] hyperlocation threshold detection <i>value-in-dBm</i> Example: Device (config-apgroup) # [no] hyperlocation threshold detection -100	Sets threshold to filter out packets with low RSSI. The [no] form of the command resets the threshold to its default value.
Step 5	[no] hyperlocation threshold reset <i>value-btwn-0-99</i> Example: Device (config-apgroup) # [no] hyperlocation threshold reset 8	Resets value in scan cycles after trigger. The [no] form of the command resets the threshold to its default value.
Step 6	[no] hyperlocation threshold trigger <i>value-btwn-1-100</i> Example: Device (config-apgroup) # [no] hyperlocation threshold trigger 10	Sets the number of scan cycles before sending a BAR to clients. The [no] form of the command resets the threshold to its default value.
Step 7	[no] ntp ip <i>ipv4-address-of-ntp-server</i> Example:	Sets the IPv4 address of the NTP server, directly reachable by the APs of an AP group.

	Command or Action	Purpose												
	Device (config-apgroup) # [no] ntp ip 9.0.0.4	The [no] form of the command resets the NTP value to 0.0.0.0.												
Step 8	<p>show ap group <i>ap-group-name</i> hyperlocation summary</p> <p>Example:</p> <p>Device# show ap group my-ap-group hyperlocation summary</p> <p>Site Name: my-ap-group Site Description: This is an AP group Hyperlocation operational status: Up Reason: N/A Hyperlocation NTP server currently used: 9.0.0.4 Hyperlocation admin status: Enabled Hyperlocation detection threshold: -100 dBm Hyperlocation trigger threshold: 11 Hyperlocation reset threshold: 9</p>	Shows the overall configuration values (AP group specific) and operational status and parameters for the AP group <i>my-ap-group</i> .												
Step 9	<p>show ap group <i>ap-group-name</i> hyperlocation detail</p> <p>Example:</p> <p>Device# show ap group my-ap-group hyperlocation detail</p> <p>Site Name: my-ap-group Site Description: This is an AP group Hyperlocation operational status: Up Reason: N/A Hyperlocation NTP server currently used: 9.0.0.4 Hyperlocation admin status: Enabled Hyperlocation detection threshold: -100 dBm Hyperlocation trigger threshold: 11 Hyperlocation reset threshold: 9</p> <p>Values for APs in all AP Groups:</p> <table><thead><tr><th>AP Name</th><th>Radio MAC</th></tr><tr><th>Method</th><th>Hyperlocation</th></tr></thead><tbody><tr><td>APf07f.0635.2d40</td><td>f07f.0676.3b89</td></tr><tr><td>WSM</td><td>Enabled</td></tr><tr><td>APf4cf.e272.4ed0</td><td>f4cf.e223.ba31</td></tr><tr><td>Local</td><td>Enabled</td></tr></tbody></table>	AP Name	Radio MAC	Method	Hyperlocation	APf07f.0635.2d40	f07f.0676.3b89	WSM	Enabled	APf4cf.e272.4ed0	f4cf.e223.ba31	Local	Enabled	Shows both overall (AP group specific) and per-AP configuration values and operational status for the AP group <i>my-ap-group</i> . The APs listed are only those that belong to the AP group.
AP Name	Radio MAC													
Method	Hyperlocation													
APf07f.0635.2d40	f07f.0676.3b89													
WSM	Enabled													
APf4cf.e272.4ed0	f4cf.e223.ba31													
Local	Enabled													
Step 10	<p>show ap groups</p> <p>Example:</p> <p>Device# show ap groups</p> <p>Site Name: my-ap-group</p>	Shows Hyperlocation operational status for each AP group.												

	Command or Action	Purpose
	<pre> Site Description: This is an AP group ... Hyperlocation operational status: Up ... </pre>	

Configuring Hyperlocation BLE Beacon Parameters

To configure hyperlocation BLE beacon parameters, use the procedure given below:

Procedure

-
- Step 1** **configure terminal**
- Example:**
- ```
Controller# configure terminal
```
- Enters the global configuration mode.
- Step 2**     **ap hyperlocation ble-beacon {beacon-id | interval interval-value}**
- Example:**
- ```
Controller(config)# ap hyperlocation ble-beacon 3
```
- Specifies the BLE beacon parameters and enters the BLE configuration mode.
- Step 3** **config-ble { default {enable | txpwr | uuid } | enable | exit | no {enable | txpwr | uuid } | txpwr att-value | uuid uuid-name}**
- Example:**
- ```
Controller(config-ble)# enable
```
- Configures the BLE beacon values.
- Step 4**     **show ap hyperlocation ble-beacon**
- Example:**
- ```
Controller# show ap hyperlocation ble-beacon
```
- ```
BLE Beacon interval (Hertz): 1
```
- | ID | UUID                                 | TX Power(dBm) | Status   |
|----|--------------------------------------|---------------|----------|
| 0  | 00000000-0000-0000-0000-000000000000 | -34           | Disabled |
| 1  | 00000000-0000-0000-0000-000000000000 | 0             | Disabled |
| 2  | 00000000-0000-0000-0000-000000000000 | 0             | Disabled |
| 3  | 00000000-0000-0000-0000-000000000000 | 0             | Disabled |
| 4  | 00000000-0000-0000-0000-000000000000 | 0             | Disabled |
- Shows the list of configured BLE beacons.
-

# Configuring Hyperlocation BLE Beacon Parameters for AP

To configure hyperlocation BLE beacon parameters for an AP, use the procedure given below:

## Procedure

|               | Command or Action                                                                                                                                                                                                                                                                                                       | Purpose                                                    |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|
| <b>Step 1</b> | <b>ap name <i>ap-name</i> hyperlocation ble-beacon <i>beacon-id</i> { <b>major</b> <i>major-value</i>   <b>minor</b> <i>minor-value</i>   <b>txpwr</b> <i>att-value</i> }</b><br><br><b>Example:</b><br>Controller# ap name test-ap hyperlocation ble-beacon 3 major 65535                                              | Configures Hyperlocation and related parameters for an AP. |
| <b>Step 2</b> | <b>show ap name <i>ap-name</i> hyperlocation ble-beacon</b><br><br><b>Example:</b><br>Controller# show ap name test-ap hyperlocation ble-beacon<br><br><pre> ID   Major   Minor   TX Power (dBm) ----- 0    0        0       0 1    0        0       0 2    0        0       0 3    0        0       0           </pre> | Shows the list of configured BLE beacons.                  |