Configuring RFC 5580 Location Attributes

Feature History for RFC 5580 Location Attributes

This table provides release and related information for the feature explained in this module.

This feature is also available in all the releases subsequent to the one in which they are introduced in, unless noted otherwise.

Table 1: Feature History for RFC 5580 Location Attributes

Release	Feature	Feature Information
Cisco IOS XE Cupertino 17.9.1	Support for RFC 5580 Location Attributes in the Controller	This feature uses the RFC 5580 location attributes to convey location-related information for authentication and accounting exchanges. The controller supports the following RFC 5580-related attributes: • Location-Information • Location-Data CIVIC Profile: Country • Location-Data CIVIC Profile: CAtype 1 (State) • Location-Data CIVIC Profile: CAtype 3 (City) • Location-Data CIVIC Profile: CAtype 23 (Venue Name) • Location-Data CIVIC Profile: CAtype 24 (Zip Code) • Location-Data GEO Profile (Longitude, Latitude, and Altitude) • Operator Name

Information About RFC 5580 Location Attributes

The RFC 5580 location attributes convey location-related information for authentication and accounting exchanges.

The location information is useful in several scenarios. Wireless networks are deployed in public places, such as shopping malls, airports, hotels, and coffee shops by a diverse set of operators, such as wireless internet service providers (WISPs), cellular network operators, and fixed broadband networks. In all these scenarios, the network may need to know the user location to enable location-aware authorization, billing, or services.

To preserve user privacy, the location information must be protected against unauthorized access and distribution.

The RFC 5580 defines two types of location:

- **User location**: This location is more specific to users.

Note The user location is configured in AP.

- **NAS location**: This is the common location to host all the users. For instance, suppose you configure user location at AP1, other users connecting to AP1 will also have the same user location. Now other users coming from AP2 will have a different user location. Thus, if AP1 and AP2 are connected to the controller, and you configure a NAS location, then users from AP1 and AP2 are connected to the same NAS location.

Note The NAS location is configured in AAA.

You can define certain profiles in each location. Profile refers to the attributes used to define the location. Each location has two profiles, namely, Civic and Geo.

The following are the location profiles:

- **Civic Profile**: In this profile, the location is described in terms of attributes such as Country, State, City, Area, and Postal Code.
- **Geo Profile**: In this profile, the location is described in terms of attributes such as Latitude, Longitude, and Altitude.

For users with both user location and NAS location, you can set their location in both Civic and Geo profile formats. Such users have the following locations:

- Civic User location
- Civic NAS location
- Geo User location
- Geo NAS location

Each location information, for instance, the civic user location, is sent using the following attributes:

- Location-Information
- Location-Data

The controller supports the following RFC 5580-related attributes:

- Location-Information
- Location-Data CIVIC Profile: Country
- Location-Data CIVIC Profile: CAtype 1 (State)
- Location-Data CIVIC Profile: CAtype 3 (City)
- Location-Data CIVIC Profile: CAtype 23 (Venue Name)
- Location-Data CIVIC Profile: CAtype 24 (Zip Code)
- Location-Data GEO Profile (Longitude, Latitude, and Altitude)
- Operator Name

Thus, a user can have four locations and one operator name.

To transfer location information, the Out-of-Band Agreement (Flow 1) delivery method mentioned in RFC 5580 is supported.

This is applicable only if the feature is enabled and location information is configured.

Restriction for Configuring RFC 5580 Location Attributes

This feature is supported only for 802.1X users.

Configuring Location Delivery Based on Out-of-Band Agreement (CLI)

Procedure

	Command or Action	Purpose
Step 1	**configure terminal** **Example:** `Device# configure terminal`	Enters global configuration mode.
Step 2	**radius-server attribute wireless location delivery out-of-band** **Example:** `Device(config)# radius-server attribute wireless location delivery out-of-band`	Configures RFC 5580 Out-of-Band location support.
Step 3	**end** **Example:** `Device(config)# end`	Returns to privileged EXEC mode.

Creating Location Attributes

Configuring a Civic Profile (CLI)

Procedure

	Command or Action	Purpose
Step 1	**configure terminal** **Example:** `Device# configure terminal`	Enters global configuration mode.
Step 2	**location civic-location identifier** *civic_identifier* **Example:** `Device(config)# location civic-location identifier USER_C_1`	Configures the civic profile for User location. Here, *civic_identifier* refers to the civic location identifier string. It can take up to 215 characters. You can enter a total of 250 bytes to configure civic address attributes. Cisco reserves 50 bytes

	Command or Action	Purpose
		for internal information. Therefore, the remaining 200 bytes can be used for user-configured civic location. **Note** You can configure the following types of civic attributes and add them to the RADIUS requests: • Country • City • State • Postal Code • Name
Step 3	**country** *country_ID* **Example:** `Device(config-civic)# country IN`	Sets the country ID. **Note** Only two-letter ISO 3166 country codes are accepted.
Step 4	**city** *city_name* **Example:** `Device(config-civic)# city Bangalore`	Sets the city name.
Step 5	**state** *state_name* **Example:** `Device(config-civic)# state Karnataka`	Sets the state name.
Step 6	**postal-code** *postal_code* **Example:** `Device(config-civic)# postal-code 562016`	Sets the postal code.
Step 7	**name** *residence_name* **Example:** `Device(config-civic)# name Nivas`	Sets the residence name.
Step 8	**end** **Example:** `Device(config-civic)# end`	Returns to privileged EXEC mode.

Configuring a Geo Profile (CLI)

Procedure

	Command or Action	Purpose
Step 1	**configure terminal** **Example:** `Device# configure terminal`	Enters global configuration mode.
Step 2	**location geo-location identifier** *geo_identifier* **Example:** `Device(config)# location geo-location identifier USER_G_1`	Configures a Geo profile for user location. Here, *geo_identifier* refers to the geographic location identifier string. It can take up to 215 characters.
Step 3	**latitude** *latitude_in_degrees* **resolution** [*resolution_value*] **Example:** `Device(config-geo)# latitude "34 12 15"`	Sets the latitude information. The optional parameters are documented within square brackets. While configuring the latitude, you can specify the resolution, in meters. If you do not specify any resolution, a default value of 10 meters is used.
Step 4	**longitude** *longitude_in_degrees* **resolution** *resolution_value* **Example:** `Device(config-geo)# longitude "111 59 44"`	Sets the longitude information. The optional parameters are documented within square brackets. While configuring the longitude, you can specify the resolution, in meters. If you do not specify any resolution, a default value of 10 meters is used.
Step 5	**altitude** *altitude_value* {**feet resolution** *resolution_value* | **floor** | **meters resolution** *resolution_value*} **Example:** `Device(config-geo)# altitude 10 meters resolution 10`	Configures the altitude for the geographic location. The optional parameters are documented within square brackets. • *altitude_value*: Refers to the altitude, in feet, floors, or meters. • *resolution_value*: Refers to the resolution, in feet or meters. **Note** Both the altitude and the altitude resolution must be in the same unit.
Step 6	**resolution** *resolution_value* **Example:** `Device(config-geo)# resolution 30`	Specifies a single common resolution for latitude and longitude.

	Command or Action	Purpose
Step 7	**end** **Example:** `Device(config-geo)# end`	Returns to privileged EXEC mode.

Configuring an Operator Name (CLI)

Procedure

	Command or Action	Purpose
Step 1	**configure terminal** **Example:** `Device# configure terminal`	Enters global configuration mode.
Step 2	**location operator identifier** *identifier_name* **Example:** `Device(config)# location operator identifier USER_O_1`	Configures an operator name for the user location. Here, *identifier_name* supports strings up to 215 characters in length.
Step 3	**name** *operator-name* **Example:** `Device(config-operator)# name ACT`	Configures the location operator name. Here, *operator-name* supports strings up to 248 characters in length.
Step 4	**namespace-id** {**E212** | **ICC** | **REALM** | **TADIG**} **Example:** `Device(config-operator)# namespace-id ICC`	Configures the namespace for a location. The following are the namespace options: • **E212**: Refers to the Mobile Country Code (MCC) and Mobile Network Code (MNC). • **ICC**: Refers to the International Telecommunication Union Carrier Codes (ICC). • **REALM**: Refers to any registered domain name. • **TADIG**: Refers to the Transferred Account Data Interchange Group (TADIG) code.

	Command or Action	Purpose
		Note • If you have not configured any namespace, **REALM** is used as the default value. • The operator name can be associated with both NAS-Location and USER-Location. When an operator name is configured at both the locations, the operator name that is configured in USER-Location takes precedence.
Step 5	**end** **Example:** `Device(config-operator)# end`	Returns to privileged EXEC mode.

Associating Location Attributes with User Location (CLI)

Procedure

	Command or Action	Purpose
Step 1	**configure terminal** **Example:** `Device# configure terminal`	Enters global configuration mode.
Step 2	**ap location name** *location_name* **Example:** `Device(config)# ap location name OFFICE`	Configures a location name for an AP.
Step 3	**ap-eth-mac** *AP_Ethernet_MAC* **Example:** `Device(config-ap-location)# ap-eth-mac 0a0b.0cf0.0001`	Adds the AP to the location. Here, *AP_Ethernet_MAC* refers to the AP Ethernet MAC address.
Step 4	**location civic-location-id** *identifier_name* **Example:** `Device(config-ap-location)# location civic-location-id USER_C_1`	Associates the civic location attribute with the user location.
Step 5	**location geo-location-id** *identifier_name* **Example:**	Associates the geographic location attribute with the user location.

	Command or Action	Purpose
	`Device(config-ap-location)# location geo-location-id USER_G_1`	
Step 6	**location operator-id** *identifier_name* **Example:** `Device(config-ap-location)# location operator-id USER_O_1`	Associates the operator location attribute with the user location.
Step 7	**end** **Example:** `Device(config-ap-location)# end`	Returns to privileged EXEC mode.

Associating Location Attributes with the NAS Location (CLI)

Procedure

	Command or Action	Purpose
Step 1	**configure terminal** **Example:** `Device# configure terminal`	Enters global configuration mode.
Step 2	**radius-server attribute wireless location civic-location-id** *identifier_name* **Example:** `Device(config)# radius-server attribute wireless location civic-location-id NAS_C_1`	Associates the civic location attribute with the NAS location. Here, *identifier_name* supports strings up to 215 characters in length.
Step 3	**radius-server attribute wireless location geo-location-id** *identifier_name* **Example:** `Device(config)# radius-server attribute wireless location geo-location-id NAS_G_1`	Associates the geographic location attribute with the NAS location. Here, *identifier_name* supports strings up to 215 characters in length. Enter a valid or existing identifier name.
Step 4	**radius-server attribute wireless location operator-id** *identifier_name* **Example:** `Device(config)# radius-server attribute wireless location operator-id NAS_0_1`	Associates the operator location attribute with the NAS location.
Step 5	**end** **Example:** `Device(config)# end`	Returns to privileged EXEC mode.

Verifying RFC 5580 Location Attribute Configuration

To verify the location attributes associated with a given location, use the following command:

```
Device# show ap location details AAA_location
Location Name.....................: AAA_location
Location description..............:
Policy tag........................: default-policy-tag
Site tag..........................: default-site-tag
RF tag............................: default-rf-tag
AAA Location Status ..............: Enabled
Civic Location Identifier : NAS_C_1
Geo Location Identifier   : NAS_G_1
Operator Name Identifier  : NAS_O_1

Configured list of APs
38ed.18ca.5a20
```

To verify the Cisco AP location, use the following command:

```
Device# show ap name AP38ED.18CA.5A20 config general
Cisco AP Name   : AP38ED.18CA.5A20
================================================

Cisco AP Identifier                             : 38ed.18cb.cf00
Country Code                                    : Multiple Countries :
Regulatory Domain Allowed by Country            : 802.11bg:   802.11a:   802.11 6GHz:
AP Country Code                                 : US  -
AP Regulatory Domain
  802.11bg                                      : -A
  802.11a                                       : -A
MAC Address                                     : 38ed.18ca.5a20
IP Address Configuration                        : Static IP assigned
IP Address                                      : 9.4.172.111
IP Netmask                                      : 255.255.255.0
Gateway IP Address                              : 9.4.172.1
Fallback IP Address Being Used                  :
Domain                                          :
Name Server                                     :
CAPWAP Path MTU                                 : 1485
Capwap Active Window Size                       : 1
Telnet State                                    : Disabled
CPU Type                                        :  ARMv7 Processor rev 0 (v7l)
Memory Type                                     : DDR3
Memory Size                                     : 995328 KB
SSH State                                       : Disabled
Cisco AP Location                               : AAA_location
-
-
-
```

To verify the location attributes associated with a given MAC address, use the following command:

```
Device# show wireless client mac 0080.5222.545c detail

Client MAC Address : 0080.5222.545c
Client MAC Type : Universally Administered Address
Client DUID: NA
Client IPv4 Address :
AP MAC Address : 38ed.18cb.cf00
AP Name: AP38ED.18CA.5A20
AP slot : 1
Client State : Associated
```

```
Policy Profile : default-policy-profile
Flex Profile : N/A
…
Civic Location Identifier : NAS_C_1
Geo Location Identifier   : NAS_G_1
Operator Name Identifier  : NAS_O_1
```

Note You will be able to view this output only if the RFC 5580 feature is enabled.

To verify the Civic location details, use the following command:

```
Device# show location civic-location identifier TEST1
Civic location information
--------------------------
Identifier              : TEST1
Name                    : home
City                    : Morges
State                   : Vaud
Postal code             : 1110
Country                 : CH
```

To verify the Geo location details, use the following command:

```
Device# show location geo-location identifier TEST4
Geo location information
------------------------
Identifier  : TEST4
Latitude    : 46.5112700
Longitude   : 6.4985400
Altitude    : 380 meters           Resolution : 10
Resolution  : 100
```

To verify the Operator location details, use the following command:

```
Device# show location operator-location identifier myoperator
Operator location information
-----------------------
Operator Identifier     : myoperator
Operator Name           : myoperator
Operator Namespace      : REALM
------------------------
```