Global Navigation Satellite System Support on PIMs

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Table 1: Feature History

Feature	Release Information	Description
Global Navigation Satellite System Support on PIMs	Cisco IOS XE Catalyst SD-WAN Release 17.15.1a Cisco Catalyst SD-WAN Manager Release 20.15.1	This feature allows you to configure and manage the Global Navigation Satellite System (GNSS) PIM module on Cisco IOS XE Catalyst SD-WAN devices using Cisco SD-WAN Manager.

Information About GNSS on PIMs

Specific Cisco IOS XE Catalyst SD-WAN devices support pluggable interface modules (PIMs) that offer satellite navigation services from satellite networks such as GPS, GLONASS, Galileo, and BeiDou. These satellite networks, collectively knows as Global Navigation Satellite System (GNSS), deliver geolocation services and precise time synchronization to Cisco IOS XE Catalyst SD-WAN devices and their connected devices.

Using Cisco SD-WAN Manager, you can configure a Cisco IOS XE Catalyst SD-WAN device equipped with a PIM module that supports GNSS.

Benefits of GNSS

- Time Synchronization

  Cisco IOS XE Catalyst SD-WAN devices equipped with GNSS receivers can directly synchronize to the time provided by GNSS, ensuring accurate timekeeping even without connectivity to time servers, and enabling all connected devices to maintain synchronized time.

- Precise Geolocation

  GNSS provides precise geolocation data.

Supported Devices for GNSS on PIMs

- Cisco Catalyst IR1101 Rugged Series Routers
- Cisco Catalyst IR1800 Rugged Series Routers

Configure GNSS on PIMs Using a CLI Template

For information about using CLI templates, see CLI Add-On Feature Templates and CLI Templates.

Note By default, the CLI Profile and CLI **show sdwan bfd sessions** templates execute commands in global configuration mode.

On a Cisco IOS XE Catalyst SD-WAN device, configure the slot number of the cellular interface and specify a GNSS constellation:

```
controller cellular slot_number
 lte gps constellation {beidou | galileo | glonass | gps | gnss}
```

Here's a complete configuration example for setting up a GNSS constellation with **gps** selected as the GNSS constellation.

```
controller cellular 0/1/0
 lte gps constellation gps
```

Verify GNSS on PIMs

Use the **show cellular** command with **gps detail** to retrieve detailed information about GNSS constellations. The output shows the GNSS details such as feature status, mode, constellation configuration, GPS port selection, current GPS status, location coordinates, timestamp, and details of individual satellites such as GPS, GLONASS, Galileo, and BeiDou.

The following is a sample output from the **show cellular** command using the **gps detail** keyword:

```
Device# show cellular 0/3/0 gps detail
GPS Feature = enabled
GPS Mode Configured = standalone
Current Constellation Configured = gnss
GPS Port Selected = Dedicated GPS port
GPS Status = GPS coordinates acquired
Last Location Fix Error = Offline [0x0]
Latitude = 37 Deg 25 Min 6.0448 Sec North
Longitude = 121 Deg 55 Min 9.6295 Sec West
Timestamp (GMT) = Fri Jul 12 16:11:30 2024

Fix type = 2D, Height = 20m
HDOP = 0.7, GPS Mode Used = standalone

Satellite Info
----------------
GPS:
Satellite #5, elevation 60, azimuth 108, SNR 31 *
Satellite #11, elevation 24, azimuth 50, SNR 34 *
Satellite #12, elevation 40, azimuth 163, SNR 33 *
Satellite #15, elevation 1, azimuth 151, SNR 19 *
Satellite #18, elevation 30, azimuth 248, SNR 33 *
Satellite #20, elevation 46, azimuth 59, SNR 36 *
Satellite #25, elevation 64, azimuth 206, SNR 35 *
Satellite #26, elevation 6, azimuth 320, SNR 27 *
Satellite #28, elevation 13, azimuth 274, SNR 33 *
Satellite #29, elevation 59, azimuth 327, SNR 37 *
Satellite #31, elevation 8, azimuth 305, SNR 27 *
Satellite #46, elevation 0, azimuth 0, SNR 34 **
Glonass:
Satellite #74, elevation 35, azimuth 312, SNR 34 *
Satellite #82, elevation 21, azimuth 52, SNR 35 *
Satellite #73, elevation 52, azimuth 248, SNR 41 *
Satellite #80, elevation 20, azimuth 187, SNR 34 *
Satellite #84, elevation 30, azimuth 278, SNR 22
Satellite #83, elevation 51, azimuth 9, SNR 27 *
Satellite #67, elevation 24, azimuth 61, SNR 36 *
Satellite #66, elevation 2, azimuth 16, SNR 0
Satellite #68, elevation 21, azimuth 115, SNR 0
Galileo:
Satellite #13, elevation 33, azimuth 247, SNR 38 *
Satellite #15, elevation 75, azimuth 330, SNR 39 *
Satellite #27, elevation 68, azimuth 271, SNR 37 *
Satellite #3, elevation 2, azimuth 118, SNR 0
Satellite #5, elevation 4, azimuth 71, SNR 0 *
Satellite #21, elevation 21, azimuth 316, SNR 0
Satellite #30, elevation 42, azimuth 164, SNR 0
Beidou:
Satellite #6, elevation 3, azimuth 322, SNR 30
Satellite #12, elevation 15, azimuth 274, SNR 30 *
Satellite #19, elevation 33, azimuth 108, SNR 0
Satellite #20, elevation 21, azimuth 54, SNR 0 *
Satellite #22, elevation 14, azimuth 161, SNR 0
Satellite #24, elevation 28, azimuth 295, SNR 0
Satellite #26, elevation 37, azimuth 232, SNR 0 *
Satellite #29, elevation 25, azimuth 73, SNR 0 *
```