

GPS Dead Reckoning

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GPS Dead Reckoning

Table 1: Feature History

Feature Name	Release Information	Description
GPS Dead Reckoning	Cisco IOS XE Catalyst SD-WAN Release 17.9.1a Cisco vManage Release 20.9.1	Dead reckoning provides a fallback mode for GPS location services when the GPS receiver cannot detect GPS satellite signals. Dead reckoning calculates the current position by using input from sensors such as accelerometers to measure movement from a previously known position. Dead reckoning is not as accurate as GPS, but provides a fallback method for providing location information.

Information About GPS Dead Reckoning

Dead Reckoning is a global positioning system (GPS) fallback feature that provides users with location information during satellite signal interruption by calculating the current position by using a previously determined position, and advancing that position based upon known or estimated speeds over elapsed time and course. For more information about GPS dead reckoning, including feature limitations, see Configuring GPS in the *Cisco Catalyst IR1800 Rugged Series Router Software Configuration Guide*.

Supported Devices for GPS Dead Reckoning

- Cisco IR1833 router
- Cisco IR1835 router

GPS Dead Reckoning Prerequisites

A GPS field-replaceable unit (FRU) module must be installed.

Use Cases for GPS Dead Reckoning

When a router is installed in a vehicle, such as a municipal services vehicle, the GPS receiver can provide accurate location information for reporting on the vehicle's location, as long as it can receive GPS satellite signals. If the vehicle enters an area that blocks reception of satellite signals, such as a tunnel, the dead reckoning feature continues to provide location information. The location determined by dead reckoning is not as reliable as the location information from functioning GPS.

Enable GPS Dead Reckoning Using a CLI Template

Use the following commands to enable the dead reckoning feature.

```
controller gps-dr
dead-reckoning enable
```

Disable GPS Dead Reckoning Using a CLI Template

Use the following commands to disable the dead reckoning feature.

```
controller gps-dr
no dead-reckoning enable
```

View the GPS Module Details

Use the **show inventory** command to view the GPS module details. Note the module information displayed for the Gps-Dr portion of the output.

```
Router#show inventory
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
INFO: Please use "show license UDI" to get serial number for licensing.
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
NAME: "Chassis", DESCR: "Cisco Catalyst IR1835 Rugged Series Router"
PID: IR1835-K9         , VID: V00  , SN: FHH2416P00W
NAME: "Power Supply Module 0", DESCR: "Cisco IR1800 DC Power Supply"
PID: PWR-12V           , VID:      , SN:
```

```
NAME: "GE-POE Module", DESCR: "POE Module for On Board GE for Cisco IR183X"
PID: IR-183X-POE       , VID:      , SN:
NAME: "module 0", DESCR: "Cisco IR-1835-K9 Built-In NIM controller"
PID: IR-1835-K9        , VID:      , SN:
NAME: "NIM subslot 0/0", DESCR: "Front Panel 1 port Gigabitethernet Module"
PID: IR1835-1x1GE      , VID: V01  , SN:
NAME: "NIM subslot 0/1", DESCR: "IR1835-ES-4"
PID: IR1835-ES-4       , VID: V01  , SN:
NAME: "module F0", DESCR: "Cisco IR1835-K9 Forwarding Processor"
PID: IR1835-K9         , VID:      , SN:
NAME: "Gps-Dr", DESCR: "Dedicated GNSS/GPS/DR module"
PID: IRM-GNSS          , VID:V03 , SN:FOC243645DJ
```

Verify the Status of GPS Dead Reckoning

On a router, use the commands described in the sections that follow to verify the status of GPS dead reckoning. The status has three possibilities:

- GPS and dead reckoning are enabled and the GPS receiver has received satellite location information.
- GPS and dead reckoning are enabled and the GPS receiver has not received satellite location information, so it falls back on using the dead reckoning method.
- The GPS feature is not enabled.

Dead Reckoning Is Enabled, GPS Receiver Has Received Satellite Location Information

When the GPS receiver has received satellite location information, the **show platform hardware gps status** command indicates that GPS coordinates have been acquired.

```
Router#show platform hardware gps status
GPS Feature =  enabled
GPS Status =  GPS coordinates acquired
```

The **show platform hardware gps mode** command indicates that dead reckoning (DR) is not in use.

```
Router#show platform hardware gps mode
GPS Feature =  enabled
DR in use for location fix: No
```

Use the **show platform hardware gps detail** command to show the location information received by satellite. Note that the output includes "GPS Mode Used = GPS standalone" to indicate that GPS has received satellite information.

```
Router#show platform hardware gps detail
GPS Feature =  enabled
GPS Status =  GPS coordinates acquired
Latitude =  37 Deg 25 Min 4.7460 Sec North
Longitude =  121 Deg 55 Min 11.1840 Sec West
Timestamp (GMT) =  Tue Nov 24 03:03:55 2020
Fix type index =  0, Height =  40 m
HDOP =  4.1, GPS Mode Used =  GPS standalone
Satellite Info
----------------
Satellite #30, elevation 72, azimuth 43, SNR 0
Satellite #28, elevation 68, azimuth 277, SNR 0
Satellite #7, elevation 49, azimuth 89, SNR 0
Satellite #13, elevation 37, azimuth 312, SNR 0
Satellite #17, elevation 26, azimuth 185, SNR 25
Satellite #8, elevation 21, azimuth 43, SNR 0
```

```
Satellite #9, elevation 15, azimuth 160, SNR 17
Satellite #5, elevation 11, azimuth 260, SNR 26
Satellite #21, elevation 10, azimuth 77, SNR 0
Satellite #19, elevation 7, azimuth 194, SNR 24
Satellite #1, elevation 7, azimuth 103, SNR 0
Satellite #15, elevation 6, azimuth 322, SNR 0
```

Dead Reckoning Is Enabled, GPS Receiver Has Not Received Satellite Location Information

The **show platform hardware gps mode** command indicates that dead reckoning (DR) is in use.

```
Router#show platform hardware gps mode
GPS Feature =  enabled
DR in use for location fix: Yes
```

Use the **show platform hardware gps detail** command to show the location information. Note that the output includes "GPS Mode Used = DR based GPS" to indicate that the dead reckoning method is being used for location information. The output also provides the most recent satellite location information available.

```
Router#show platform hardware gps detail
GPS Feature =  enabled
GPS Status =  GPS coordinates acquired
Latitude =  37 Deg 25 Min 4.7460 Sec North
Longitude =  121 Deg 55 Min 11.1840 Sec West
Timestamp (GMT) =  Tue Nov 24 03:03:55 2020
Fix type index =  0, Height =  40 m
HDOP =  4.1, GPS Mode Used =  DR based GPS

Satellite Info
----------------
Satellite #30, elevation 72, azimuth 43, SNR 0
Satellite #28, elevation 68, azimuth 277, SNR 0
Satellite #7, elevation 49, azimuth 89, SNR 0
Satellite #13, elevation 37, azimuth 312, SNR 0
Satellite #17, elevation 26, azimuth 185, SNR 12
Satellite #8, elevation 21, azimuth 43, SNR 0
Satellite #9, elevation 15, azimuth 160, SNR 14
Satellite #5, elevation 11, azimuth 260, SNR 10
Satellite #21, elevation 10, azimuth 77, SNR 0
Satellite #19, elevation 7, azimuth 194, SNR 8
Satellite #1, elevation 7, azimuth 103, SNR 0
Satellite #15, elevation 6, azimuth 322, SNR 0
```

GPS Is Not Enabled

The following show commands indicate that the GPS feature is disabled.

```
Router#show platform hardware gps mode
GPS Feature =  disabled

Router#show platform hardware gps status
GPS Feature =  disabled
GPS Status =  GPS mode not enabled

Router#show platform hardware gps detail
GPS Feature =  disabled
GPS Status =  GPS mode not enabled
```