



Cisco Catalyst SD-WAN Rugged Series Router Configuration Guide, Cisco IOS XE Catalyst SD-WAN Release 17.x

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CHAPTER 1

Read Me First



Note To achieve simplification and consistency, the Cisco SD-WAN solution has been rebranded as Cisco Catalyst SD-WAN. In addition, from Cisco IOS XE SD-WAN Release 17.12.1a and Cisco Catalyst SD-WAN Release 20.12.1, the following component changes are applicable: **Cisco vManage to Cisco Catalyst SD-WAN Manager, Cisco vAnalytics to Cisco Catalyst SD-WAN Analytics, Cisco vBond to Cisco Catalyst SD-WAN Validator, Cisco vSmart to Cisco Catalyst SD-WAN Controller, and Cisco Controllers to Cisco Catalyst SD-WAN Control Components.** See the latest Release Notes for a comprehensive list of all the component brand name changes. While we transition to the new names, some inconsistencies might be present in the documentation set because of a phased approach to the user interface updates of the software product.

Related References

- [Cisco Catalyst SD-WAN Control Components Compatibility Matrix and Server Recommendations](#)
- [Cisco Catalyst SD-WAN Device Compatibility](#)

User Documentation

Communications, Services, and Additional Information

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CHAPTER 2

What's New in Cisco IOS XE (SD-WAN) and Cisco Catalyst SD-WAN Releases

Cisco is constantly enhancing the Cisco Catalyst SD-WAN solution with every release and we try and keep the content in line with the latest enhancements. The following links includes release-wise new and modified features that are documented in the Configuration, Command Reference, and Hardware Installation guides. For information on additional features and fixes that were committed to the Cisco Catalyst SD-WAN solution, see the *Resolved and Open Bugs* section in the Release Notes.

[What's New in Cisco IOS XE Catalyst SD-WAN Release 17.x](#)

[What's New in Cisco IOS XE Catalyst SD-WAN Release 16.x](#)

[What's New in Cisco SD-WAN \(vEdge\) Release 20.x](#)

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CHAPTER 3

Ignition Power Management

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- [Supported Devices for Ignition Power Management](#), on page 5
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Ignition Power Management

Table 1: Feature History

Feature Name	Release Information	Description
Ignition Power Management	Cisco IOS XE Catalyst SD-WAN Release 17.9.1a Cisco vManage Release 20.9.1	Ignition power management prevents a router from draining the charge of a vehicle battery in automotive applications.

Information About Ignition Power Management

When a router is installed in a vehicle and is powered by the electrical system of the vehicle, ignition power management prevents the router from draining the charge of the vehicle battery. When the vehicle engine is running, and charging the battery, the router remains operational. When the vehicle ignition is turned off, the router shuts down. You can configure a time interval to delay shutting down the router immediately.

For information about ignition power management, including feature limitations, see [Ignition Power Management Overview](#) in the *Cisco Catalyst IR1800 Rugged Series Router Software Configuration Guide*.

Supported Devices for Ignition Power Management

Cisco IR1835 router

Use Cases for Ignition Power Management

For a fleet of vehicles with Cisco IR1835 routers installed to provide network connectivity to each vehicle, you can configure the routers to sense the ignition status of the vehicle. The routers can start when the vehicle engine is running, and shut down shortly after the vehicle ignition is turned off. This ensures that the routers are operational and providing connectivity when the vehicles are in use, and not using power when the fleet vehicles are not in use.

Enable Ignition Power Management Using a CLI Template

1. Enable ignition power management, which enables the router to detect whether a vehicle ignition is on or off.

```
ignition enable
ignition sense
```



Note To disable ignition power management, configure **no ignition enable** and **no ignition sense**.

2. Configure the battery type as 12 V or 24 V. The default is 12 V.

```
ignition battery-type {12v | 24v}
```

3. (Optional) Configure an off-timer delay, to delay router shutdown after the ignition status changes to off. The range is 120 to 32,400 seconds, and the default is 300 seconds. Note that the device shutdown process begins approximately 100 seconds before the configured off-timer value.

```
ignition off-timer seconds
```

4. (Optional) Configure the undervoltage parameter to trigger system shutdown if the voltage drops below a specific threshold. Configure the volts and millivolts as two separate inputs. The range of volts is 9 to 24, and the range of millivolts is 0 and 999. The default is 9.000 V.

```
ignition undervoltage threshold volts millivolts
```

Here is a complete sample configuration, which configures a battery type of 12 V, an ignition off-timer of 300 seconds, and an undervoltage of 9 V (shown as 9 V and 0 millivolts)

```
ignition enable
ignition sense
ignition battery-type 12v
ignition off-timer 300
ignition undervoltage threshold 9 0
```

Verify the Ignition Power Management Configuration

show running-config

On the device, use the **show running-config** command, filtering for ignition, to show the ignition power management configuration.

The following example is for a 12 V battery. Note that configuring the battery type as 12 V configures the sense-voltage threshold automatically to 13,000 mV.

```
Device#show running-config | section ignition
ignition off-timer 300
ignition undervoltage threshold 9 000
ignition battery-type 12v
ignition sense-voltage threshold 13 000
ignition sense
ignition enable
```

The following example is for a 24 V battery. Note that configuring the battery type as 24 V configures the sense-voltage threshold automatically to 26,000 mV.

```
Device#show running-config | section ignition
ignition off-timer 300
ignition undervoltage threshold 9 000
ignition battery-type 24v
ignition sense-voltage threshold 26 000
ignition sense
ignition enable
```

show ignition

On the device, use the **show ignition** command to show ignition power management configuration information.

- Configuring the battery type to 12 V configures the sense on value to 13.2 V and sense off to 12.8 V, and this appears in the **show ignition** output.
- Configuring the battery type to 24 V configures the sense on value to 26.2 V and sense off to 25.8 V, and this appears in the **show ignition** output.

The following example is for a 12 V battery:

```
Device#show ignition
Status:
Ignition management: Disabled
Input voltage: 17.672 V
Ignition status: Power on
Ignition Sense: Disabled
Shutdown timer: 0.0 s to off [will begin power down at ~100 sec]
Config-ed battery: 12v
Thresholds:
Undervoltage: 9.000 V
Overvoltage: 37.000 V
Sense on: 13.200 V
Sense off: 12.800 V
Undervoltage timer: 20.0 s
Overvoltage timer: 1.0 s
Ignition-Off timer: 300.0 s
```




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Digital IO

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Digital IO

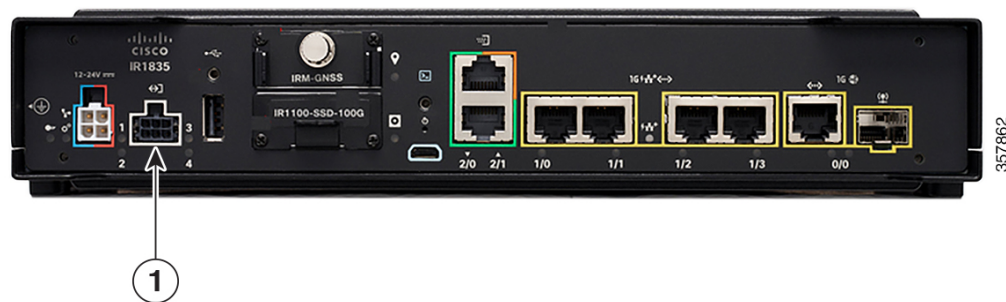
Table 2: Feature History

Feature Name	Release Information	Description
Digital IO	Cisco IOS XE Catalyst SD-WAN Release 17.9.1a Cisco vManage Release 20.9.1	The Cisco IR1835 supports four general-purpose input/output (GPIO) ports. You can configure a GPIO port as an input or an output alarm.

Information About Digital IO

The Cisco IR1835 supports four general-purpose input/output (GPIO) ports, also called digital IO (or I/O) ports. You can configure contacts in the digital IO port to receive digital sensor input or provide digital output. For example, sensors might provide information about the environment in which the router is installed, and the digital output might trigger an external alarm or other notification device, or a type of actuator. Because the digital output for this feature is often used to trigger an external alarm, descriptions of this feature often use the alarm terminology. Each contact in the port can operate as a dry or wet contact. The contacts are protected up to +60 V.

Figure 1: Digital IO Port on a Cisco IR1835 Router



Digital IO is similar to the alarm in and alarm out features supported on Cisco Industrial Ethernet (IE) Series switches and Cisco Industrial Router (IR) Series routers. The differences are that the alarm in is a dedicated input and the alarm out is a dedicated output, whereas the digital IO ports can be used for input or output. alarm out includes a relay to provide normally open (NO) or normally closed (NC) terminals.

For more information, including digital IO limitations, see [Digital IO](#) in the *Cisco Catalyst IR1800 Rugged Series Router Software Configuration Guide*.

Supported Devices

Cisco IR1835 router

Use Cases for Digital IO

In one use case, a Cisco IR1835 router is installed in an outdoor utility cabinet exposed to weather conditions. Using the digital IO port, you can connect sensors to the router that indicate the heat and humidity in the cabinet, and indicate whether the cabinet is properly closed. Using these sensor inputs, you can configure an alarm state triggered by excessive heat or humidity, or when the cabinet is not properly closed.

The alarm state can trigger sending a message to a central location to enable you to take appropriate action if the utility cabinet conditions require attention.

Enable Digital IO Using a CLI Template

1. Enable digital IO, such as to trigger an alarm, on a contact. For *contact-number*, the range is 1 to 4.


```
alarm contact contact-number enable
```
2. Configure the alarm severity value. The default is minor. For *contact-number*, the range is 1 to 4.


```
alarm contact contact-number severity {none | minor | major | critical}
```
3. Configure the alarm threshold, in the range of 1,600 to 2,700 mV. The default is 1,600 mV. For *contact-number*, the range is 1 to 4.


```
alarm contact contact-number threshold threshold
```

4. Configure the alarm trigger mode. The default is closed, meaning that the digital input is triggered if the circuit connected to the contact is closed, providing current. This may be used to trigger an alarm. For *contact-number*, the range is 1 to 4.

```
alarm contact contact-number trigger {open | closed}
```

5. For a particular contact, configure the router to provide power for an IO circuit (using the **wet** option) or not provide power (using the **dry** option). The default is **dry**. For *contact-number*, the range is 1 to 4.

```
alarm contact contact-number application {dry | wet}
```

6. Configure a contact to be in output mode, and configure whether the router provides current on the contact. Use **1** for high (provide current) or **0** for low (do not provide current). The choice of high or low for a digital IO output depends on the digital IO circuitry that the router is communicating with, and is beyond the scope of this documentation. For *contact-number*, the range is 1 to 4.

If you configure a contact to be in output mode, then for that contact, do not use any of the commands relevant only to input, such as **severity**, **threshold**, **trigger**, or **application**.

```
alarm contact contact-number output {0 | 1}
```

7. Configure a description for the digital IO handled by a particular contact. The description string can be up to 80 alphanumeric characters long. The description is included in system messages that relate to the contact number. For *contact-number*, the range is 1 to 4.

```
alarm contact contact-number description descriptive-text
```

Here is a complete configuration example that enables contact 1 in input mode and configures the input parameters:

```
alarm contact 1 enable
alarm contact 1 severity minor
alarm contact 1 threshold 1600
alarm contact 1 trigger closed
alarm contact 1 application dry
alarm contact 1 description "Sensor indicating enclosure open"
```

Here is a complete configuration example that enables contact 1 in output mode:

```
alarm contact 1 enable
alarm contact 1 output 1
alarm contact 1 description "Sensor indicating enclosure open"
```

Verify the Digital IO Status

On the device, use the **show alarm** command, filtering for digital IO and the contact (range 1 to 4) you want to view.

```
Router#show alarm | section Digital I/O 2
Digital I/O 2:
Description: External digital I/O port 2
Status: Not Asserted
Application: Dry
Severity: minor
Trigger: Closed
Voltage: 3300mV
Threshold: 1600mV
Mode: Input
```




CHAPTER 5

GPS Dead Reckoning

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GPS Dead Reckoning

Table 3: 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
```



CHAPTER 6

Configure WIM on Cisco Catalyst IR1800 Rugged Series Routers

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Configure WIM on Cisco Catalyst IR1800 Rugged Series Routers

Table 4: Feature History

Feature	Release Information	Description
Configure WIM on Cisco Catalyst IR 1800 Rugged Series Routers	Cisco IOS XE Catalyst SD-WAN Release 17.14.1a Cisco Catalyst SD-WAN Manager Release 20.14.1	Configure and manage the Wi-Fi Interface Module (WIM) on Cisco Catalyst IR1800 Rugged Series Routers using Cisco SD-WAN Manager.

Information about Configuring WIM on Cisco Catalyst IR1800 Rugged Routers

The WIM features a pluggable 802.11ax module with WiFi-6 (802.11ax), 2x2 MIMO, two spatial streams, an extended temperature range, and versatile RF coverage with external RP-SMA antenna connectors, including Flexible Antenna Port feature support. For more information on WIM, see [Cisco Wi-Fi Interface Module Overview](#).

The WIM module supports three modes of operation and they are:

- [Control and Provisioning of Wireless Access Points \(CAPWAP\) mode](#)
- [Cisco Embedded Wireless Controllers \(EWC\) mode](#)
- [Work Group Bridge \(WGB\) mode](#)

Starting from Cisco IOS XE Catalyst SD-WAN Release 17.14.1a, configure WIM on Cisco Catalyst IR1800 Rugged Routers using Cisco SD-WAN Manager in CAPWAP and WGB modes. When you configure the WIM in the CAPWAP mode, an external wireless LAN controller manages the module. The WIM module features two radios. In the WGB mode, set up each radio for either wireless access or WGB uplink. To enable Wireless Access, configure one or both radios to Root AP Mode. For WGB uplink, set up one radio to operate in WGB mode.



Note Configure either or both the radios using the Root AP mode. Only one of the radios can be configured for WGB uplink activity.

Supported Devices for Configuring WIM in Cisco Catalyst IR1800 Rugged Routers

The following Cisco Catalyst IR1800 modules are supported by Cisco SD-WAN Manager for configuring WIM:

- Catalyst IR1821-K9
- Catalyst IR1831-K9
- Catalyst IR1833-K9
- Catalyst IR1835-K9

Prerequisites for Configuring WIM on Cisco Catalyst IR1800 Rugged Routers

Ensure that the Cisco Catalyst IR1800 devices are running Cisco IOS XE Catalyst SD-WAN Release 17.14.1a or later releases.

Restrictions for Configuring WIM on Cisco IR1800 Rugged Routers

- You can't change the login credentials of the WIM using Cisco SD-WAN Manager. For more information see, [Default WIM Passwords](#).

- The Cisco SD-WAN Manager doesn't support changing from the CAPWAP to the WGB mode and the vice-versa. To change modes, see [Converting Between Modes](#).
- You can map a SSID profile to only one radio at a time.

Use Cases for Configuring WIM on Cisco Catalyst IR1800 Rugged Routers

Configure the WIM for different types of WAN connections, such as LTE, MPLS, broadband, or satellite using Cisco SD-WAN Manager and monitor the WIM using real time commands. Configure, manage and deploy both the WIM and WAN connections on Cisco Catalyst IR 1800 Rugged routers using Cisco SD-WAN Manager.

Configure WIM on Cisco Catalyst IR1800 Rugged Routers in CAPWAP Mode

In Cisco SD-WAN Manager, configure WIM on Cisco Catalyst IR1800 Rugged Routers in CAPWAP Mode using the CLI templates. For more information about using CLI templates, see [CLI Add-on Feature Templates](#) and [CLI Templates](#).



Note By default, CLI templates execute commands in global config mode.

1. Create a VLAN interface dedicated only to the layer 2 interface:

```
interface Vlan id
```

2. Assign the layer 2 interface to the VLAN that you created:

```
interface Wlan-GigabitEthernet0/1/4 switchport access vlan id  
switchport trunk native vlan vlan id  
switchport mode trunk
```

3. Create a DHCP pool for the VLAN:



Note Skip this step if you are using an external DHCP server.

```
ip dhcp pool vlan id  
network ip subnet ip mask  
default-router router ip address
```

The following example shows how to create a VLAN interface:

```
interface Vlan 50,100-200
```

The following example shows how to assign a layer 2 interface to the created VLAN

```
interface Wlan-GigabitEthernet0/1/4 switchport access vlan id
switchport access vlan 50,100-200
switchport trunk native vlan vlan 50,100-200
switchport mode trunk
```

The following example shows how to create a DHCP pool for the VLAN:

```
ip dhcp pool vlan 50,100-200
network 255.255.255.0 255.0.0
default-router 192.0.2.1
```

Configure WIM on Cisco Catalyst IR1800 Rugged Routers in WGB Mode

In Cisco SD-WAN Manager, configure WIM on Cisco Catalyst IR1800 Rugged Routers in WGB Mode using the CLI templates. For more information about using CLI templates, see [CLI Add-on Feature Templates](#) and [CLI Templates](#).



Note By default, CLI templates execute commands in global config mode.

1. Enter the wireless-bridge submode:

```
wireless-bridge
```

2. Create a WLAN profile for open authentication:

```
ssid-profile ssid profile name ssid ssid name authentication open
```

3. Create a WLAN profile for WPA2-PSK authentication:

```
ssid-profile ssid profile name ssid ssid name authentication auth-type key-management wpa2 secret-key secret key word the unencrypted secret key
```

4. Assign the WLAN profile to the Wi-Fi radio using the WGB mode:

```
dot11Radio 0 or 1 mode wgb ssid-profile ssid profile name
```

5. Assign the WLAN profile to the Wi-Fi radio using the uWGB mode:

```
dot11Radio 0 or 1 mode uwgb client_mac ssid-profile ssid profile name
```

6. Assign the WLAN profile to the root-AP mode to serve wireless clients:

```
dot11Radio 0 or 1 mode root-ap
```

7. Add a VLAN interface:

```
dot11Radio 0 or 1 mode root-ap wlan wlan profile name
```

8. Enable the radio:

```
dot11Radio 0 or 1 enable
```

9. Assign the operating channel for radio in root-AP mode:

```
dot11Radio 0 or 1 channel channel-number width
```

The following example shows how to configure a clear text password:

```
wireless-bridge
ssid-profile wlan2 ssid secured_ssid authentication psk key-management wpa2 secret-key 0
12345678
dot11Radio 0 mode wgb ssid-profile test-ssid
```



```

dot11Radio 0 mode root-ap
dot11Radio 1 mode root-ap wlan test-wlan
dot11Radio 0 enable
dot11Radio 1 enable
dot11Radio 0 channel 5 10

```

Verify Configuring WIM on Cisco Catalyst IR1800 Rugged Routers

Verify the Status of WIM

The following is a sample output from the **show wireless-bridge status** command:

```

Device# show wireless-bridge status
Module Operating Mode : CAPWAP Mode
Module Status         : Module State Ready
Software Version      : 17.11.0.155
Module Session Status : Login Success

```

Verify the Status of WIM in WGB Mode

The following is a sample output from the **show wireless-bridge wlans** command:

```

Device# show wireless-bridge wlans
wlan band oper vlan #client wlan-mode SSID
-----
  0   5g   up    0         0   uplink  WGB_uplink

```

Verify the Status of the Connected Clients

The following is a sample output from the **show wireless-bridge clients** command:

```

Device# show wireless-bridge clients
Client-MAC-Addr  band  status      wlan  DeviceType  SSID
-----
  40:ED:00:1C:7E:EC  2.4g  Associated   2    wireless   000_aab
  40:ED:00:1C:85:3B  2.4g  Associated   2    wireless   000_aab

```

Monitor WIM on Cisco Catalyst IR1800 Rugged Routers Using Cisco SD-WAN Manager

Monitor WLAN Output

1. From the Cisco SD-WAN Manager menu, choose **Monitor > Devices > Real Time**.
2. In the **Device Options** field, type **wireless SSID** and choose **Wireless SSID** from the drop-down list.

See the details of the WLAN along with the VLAN ID associated with them.



Note The real-time command **wireless SSID** doesn't show the SSID type.

Monitor Client Details

1. From the Cisco SD-WAN Manager menu, choose **Monitor > Devices > Real Time**.
2. In the **Device Options** field, type **wireless Clients** and choose **Wireless Clients** from the drop-down list.

See the details of the clients with their MAC addresses.



Note

- The real-time command **wireless Clients** doesn't show the client types.
 - View both the wired and wireless client details using the **wireless Clients** realtime command.
-



CHAPTER 7

Global Navigation Satellite System Support on PIMs

- [Global Navigation Satellite System Support on PIMs, on page 23](#)
- [Information About GNSS on PIMs, on page 23](#)
- [Benefits of GNSS, on page 24](#)
- [Supported Devices for GNSS on PIMs, on page 24](#)
- [Configure GNSS on PIMs Using a CLI Template, on page 24](#)
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Global Navigation Satellite System Support on PIMs

Table 5: 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 known 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 *

```

