Release Notes for Cisco Catalyst IR1101, IR1800, IR8140, and IR8340 Routers - (Cisco IOS XE 17.13.1a)

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Introduction to this Document

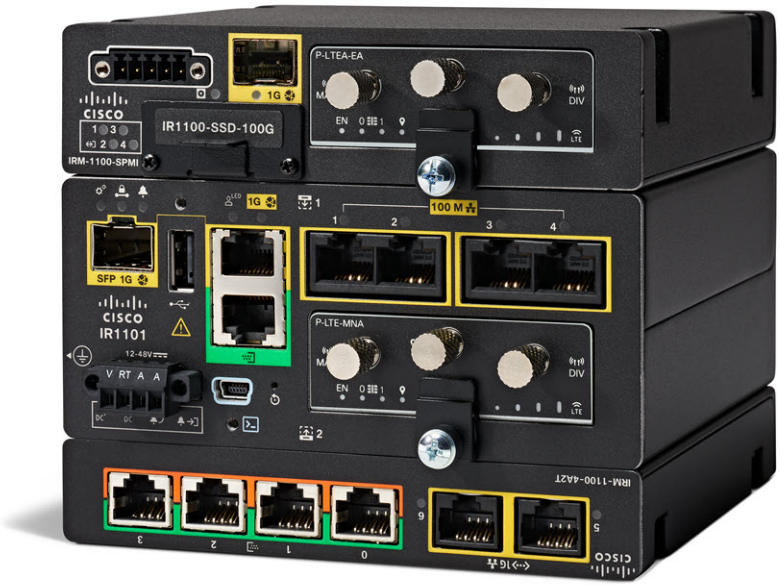
This Release Notes document provides information about the Cisco Catalyst IR1101 Rugged Series Routers, Cisco Catalyst IR1800 Rugged Series Routers, Cisco Catalyst IR8140 Heavy Duty Series Routers,and Cisco Catalyst IR8340 Rugged Series Routers running Cisco IOS XE 17.13.1a.

Note Beginning with this release, the Cisco ESR6300 Embedded Series Router release notes are a separate document. Release Notes for Cisco ESR 6300 Router

This document describes the new features, limitations, troubleshooting, besides providing recommended configurations, caveats, and information on how to obtain support and documentation.

Note The documentation set for this product strives to use bias-free language. For purposes of this documentation set, bias-free is defined as language that does not imply discrimination based on age, disability, gender, racial identity, ethnic identity, sexual orientation, socioeconomic status, and intersectionality. Exceptions may be present in the documentation due to language that is hardcoded in the user interfaces of the product software, language used based on RFP documentation, or language that is used by a referenced third-party product.

Cisco Catalyst IR1101 Rugged Series Router



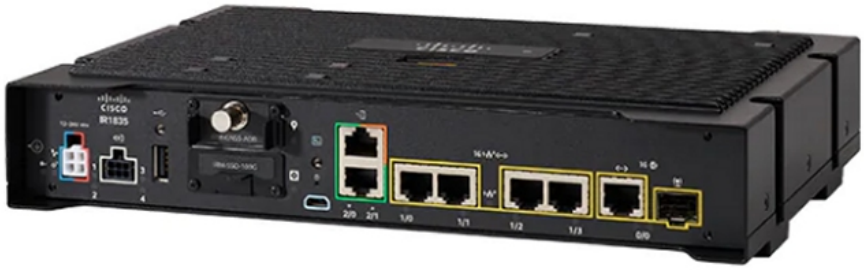
The Cisco Catalyst IR1101 Rugged Series Router is a next-generation modular industrial router, which has a base platform with additional pluggable modules that can be added. The pluggable modules provide the flexibility of adding different interfaces to the IR1101 platform, for example, a cellular module, which provides 5G and Fourth-Generation Long-Term Evolution (4G LTE) cellular networks.

The IR1101 also has expansion modules that adds key capabilities to the IR1101. The expansion modules are:

SKU ID	Description
IRM-1100-SPMI	Expansion Module with 1 GE SFP, 1 Pluggable Module, 4 GPIO ports on 1 Digital I/O Connector, and 1 mSATA SSD Slot.
IRM-1100-SP	Expansion Module with 1 GE SFP and1 Pluggable Module.
IRM-1100-4A2T	Expansion Module with an additional four asynchronous serial ports and two Ethernet RJ45 LAN interfaces.
Cellular pluggable modules	A number of pluggable modules are available for cellular connectivity.
IRM-SSD-100G	100 GB pluggable industrial SSD.

SKU ID	Description
P-LPWA-800 P-LPWA-900	Cisco LoRaWAN Pluggable Interface Module designed for RF regional profile US915, AS923 and AU915. Cisco LoRaWAN Pluggable Interface Module designed for the EU868, IND865 and RU864 RF regional profile.
P-LTE-450	Cisco 450MHz Category-4 LTE Pluggable Interface Module.

Cisco Catalyst IR1800 Rugged Series Router



The Cisco Catalyst IR1800 Rugged Series Router is a modular industrial router. The IR1800 series has four base platforms with additional pluggable modules that can be added. The pluggable modules provide the flexibility of adding different interfaces to the base platform.

The IR1800 series consists of four base platforms:

- IR1821
- IR1831
- IR1833
- IR1835

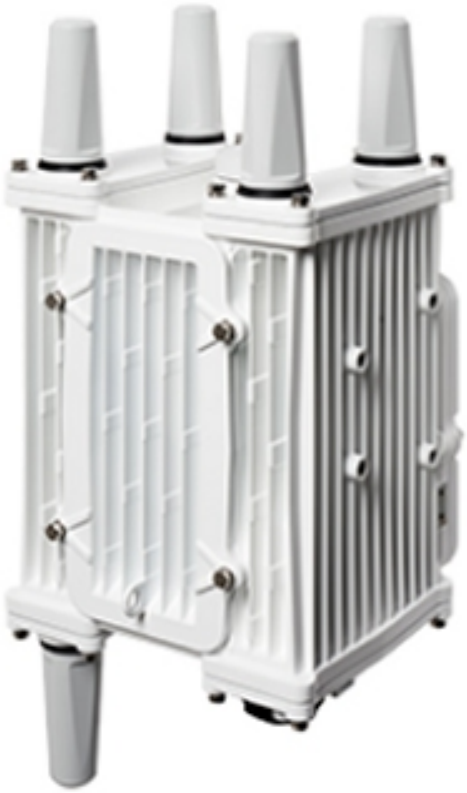
The IR1800 series features a base platform with modularity, which includes:

SKU ID	Description
IRM-GNSS-ADR	GPS Module with Automotive Dead Reckoning.
WP-WIFI6-x	Wi-Fi 6 Network Interface Module (NIM).
Cellular pluggable modules	A number of pluggable modules are available for cellular connectivity.
IRM-SSD-100G	100 GB pluggable industrial SSD.

Table 1: Differences Between the IR1800 Series Routers' Features

Feature	IR1821	IR1831	IR1833	IR1835
Processor Frequency	600 MHz	600 MHz	600 MHz	1200 MHz
DDR Memory	4 GB	4 GB	4 GB	8 GB
Flash Storage	4 GB	4 GB	4 GB	8 GB
PIM Slot	1	2	2	2
Wi-Fi-6 NIM Module Slot	1	1	1	1
PoE	No	No	Yes	Yes
SSD Module Slot	No	No	Yes	Yes
GPS FRU Module Slot	No	No	Yes	Yes
Digital I/O	No	No	No	Yes
Asynchronous Serial Interface	(1) RS232 DTE	(1) RS232 DTE (1) RS232 DCE	(1) RS232 DTE (1) RS232 DCE	(1) RS232 DTE (1) RS232 DCE/RS485

Cisco Catalyst IR8140 Heavy Duty Series Router



The Cisco Catalyst IR8140 Heavy Duty Series Router (IR8140H), is a next-generation modular IP67 Industrial Router for outdoor use.

These are the two IR8140H models:

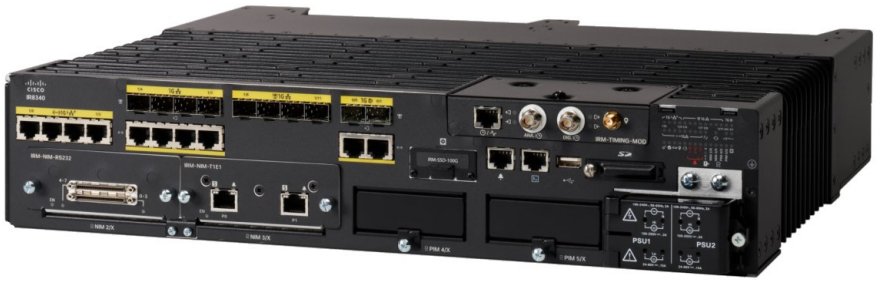
- IR8140H-P-K9 (with PoE PSE)
- IR8140H-K9 (without PoE PSE)

The IR8140H series features contains four external module slots plus two onboard WAN ports, and supports the following:

- 60-W PSU
- CPU 1.2 GHz
- 8GB RAM
- 8GB Flash Storage
- GPS onboard receiver

- 900-MHz WPAN – OFDM/FSK Module
- mSATA module
- 1x 1-Gigabit Ethernet SFP WAN
- 1x 1-Gigabit Ethernet Cu WAN
- PoE (15 W) supported only in the IR8140H-P-K9 PID
- 12VDC_OUT port (only available when PoE is not in use)
- Battery Backup Units (BBUs): Up to three
- 2x Alarm ports (Digital I/O)
- IRMH modules for CAT 4 LTE, CAT 6 LTE, CAT 18 LTE, and 5G

Cisco Catalyst IR8340 Rugged Series Router



The Cisco Catalyst IR8340 Rugged Series Router, is the first all-in-one industrial-grade, integrated routing, switching, and security platform.

The IR8340 router features two Pluggable Interface Module (PIM) slots, two single-wide IRM-NIM slots, plus 12 onboard LAN ports, and two WAN ports, and supports the following:

- 150W or 250W PSU, low-voltage DC and high-voltage AC/DC options
- PTP on LAN ports - Default, power and Dot1as profiles
- Dual slots for 5G and 4G LTE PIM
- T1/E1 Network Interface Modules (NIM)
- 8-port Asynchronous/Synchronous Network Interface Module (NIM) IRM-NIM-RS232
- mSATA module
- 2 x 1-G Combo WAN ports
- 4 x 1-G Copper LAN ports
- 4 x 1-G Combo LAN ports
- 4 x 1-G SFP LAN ports

- PoE PoE+ UPoE (up to 60 W) support on LAN ports 1-4
- 2 x IN and 1 x OUT Alarm ports (RJ45)

Interface Naming Conventions

Cisco Catalyst IR1101 Rugged Series Router

The following section shows the names of the interfaces on each of the IoT routers.

Port	Naming Convention
Gigabit Ethernet combo port	GigabitEthernet0/0/0
Gigabit Ethernet SFP port on IRM-1100	GigabitEthernet0/0/5
Gigabit Ethernet on IRM-1100-4A2T mounted on the Expansion side	gigabitetherenet 0/0/5 gigabitetherenet 0/0/6
Fast Ethernet ports	FastEthernet0/0/1 FastEthernet0/0/2 FastEthernet0/0/3 FastEthernet0/0/4
Cellular Interface on IR1101 Base	Cellular 0/1/0 Cellular 0/1/1
Cellular Interface on IRM-1100 mounted on the top (EM) side	Cellular 0/3/0 Cellular 0/3/1
Cellular Interface on IRM-1100 mounted on the bottom (CM) side	Cellular 0/4/0 Cellular 0/4/1
Asynchronous Serial Interface Base	Async0/2/0
IRM-1100-4A2T is mounted on the top (EM) side	async 0/3/0 async 0/3/1 async 0/3/2 async 0/3/3
IRM-1100-4A2T is mounted on the bottom (CM) side	async 0/4/0 async 0/4/1 async 0/4/2 async 0/4/3
USB	usbflash0:

Port	Naming Convention
mSATA	msata
IR1101 Base Unit Alarm input	alarm contact 0
GPIO on IRM-1100	alarm contact 1-4
LoRaWAN interface on IR1101 Base	LORAWAN0/1/0
LoRaWAN interface on the top (EM) side	LORAWAN0/3/0
Gigabit Ethernet interface for LTE 450MHz module on IR1101 Base	GI0/1/0 GI0/1/0.x for multiPDN operation
Gigabit Ethernet interface for LTE 450MHz module mounted on the bottom (CM) side	GI0/4/0

Cisco Catalyst IR1800 Rugged Series Router

Port	Naming Convention
Gigabit Ethernet combo port	GigabitEthernet0/0/0
Gigabit Ethernet ports	GigabitEthernet0/1/0 GigabitEthernet0/1/1 GigabitEthernet0/1/2 GigabitEthernet0/1/3
Cellular Interface	Cellular 0/4/0 Cellular 0/4/1 Cellular 0/5/0 Cellular 0/5/1
Asynchronous Serial Interface	Async0/2/0 Async0/2/1 (when the base platform supports two asynchronous serial interfaces)
Wi-Fi Interface	Wl0/1/4
USB	usbflash0:
mSATA	msata
GPIO	alarm contact 1-4

Cisco Catalyst IR8140 Heavy Duty Series Router

Port	Naming Convention
Gigabit Ethernet ports	GigabitEthernet0/0/0 GigabitEthernet0/0/1
Cellular Interface	Cellular 0/2/0 OR Cellular 0/3/0
SSD	Virtual port Group0
WPAN	Wpan 0/1/0 Wpan 0/2/0 Wpan 0/3/0
Digital IO	alarm contact 1-2

Cisco Catalyst IR8340 Rugged Series Router

Port	Naming Convention
Gigabit Ethernet WAN ports	GigabitEthernet0/0/0 GigabitEthernet0/0/1
Gigabit Ethernet LAN ports	GigabitEthernet0/1/0 GigabitEthernet0/1/1 GigabitEthernet0/1/2 GigabitEthernet0/1/3 GigabitEthernet0/1/4 GigabitEthernet0/1/5 GigabitEthernet0/1/6 GigabitEthernet0/1/7 GigabitEthernet0/1/8 GigabitEthernet0/1/9 GigabitEthernet0/1/10 GigabitEthernet0/1/11
Cellular Interface	Cellular 0/4/0 Cellular 0/4/1 Cellular 0/5/0 Cellular 0/5/1

Port	Naming Convention
NIM Interface (Asynchronous/Synchronous Serial Ports or E1/T1 ports)	0/2/0 0/2/1 0/3/0 0/3/1
mSATA SSD	msata
GPIO	alarm contact 1-2
USB Port	usb0:
Console Port	Line console 0

Software Images for Cisco IOS XE Release 17.13.1a

Note You must have a Cisco.com account to download the software.

Cisco IOS XE Release 17.13.1a includes the following Cisco images.

Table 2: Software Images for Cisco IOS-XE, Release 17.13.1a

Router	Image Type	Filename
IR1101	Universal	ir1101-universalk9.17.13.1a.SPA.bin
	NPE	ir1101-universal9_npe.17.13.1a.SPA.bin
IR1800	Universal	IR1800-universalk9.17.13.1a.SPA.bin
	NPE	IR1800-universal9_npe.17.13.1a.SPA.bin
IR8140	Universal	IR8100-universalk9.17.13.1a.SPA.bin
	NPE	IR8100-universal9_npe.17.13.1a.SPA.bin
IR8340	Universal	IR8340-universalk9.17.13.1a.SPA.bin
	NPE	IR8340-universalk9_npe.17.13.1a.SPA.bin

The latest software downloads for the routers can be found at:

https://software.cisco.com/download/home/286323433

Click the link corresponding to your device to take you to the specific software you are looking for.

Cellular Module Modem Firmware, OEM/PRI for Cisco IoT Polaris Platforms

This section contains the latest modem firmware available for each of the modems used by the Cisco IoT Industrial routers.

Note Cisco IOS XE updates do not automatically update the modem firmware. The user should check and update to the latest firmware. See the following table for the latest information:

See the Cisco Firmware Upgrade Guide for 4G LTE and 5G Cellular Modems for upgrade instructions.

Table 3: Cellular Module Modem Firmware

Cellular Module	Modem	Firmware Version	Software Download Link
P-5GS6-GL	FN980	38.03.0202	https://software.cisco.com/download/home/286329300/type/284285628/release/38.03.0202
P-LTEA7-NA	EM7411	01.14.22.00	https://software.cisco.com/download/home/286333933/type
P-LTEA7-EAL	EM7421	01.14.22.00	https://software.cisco.com/download/home/286333937/type
P-LTEA7-JP	EM7431	01.14.22.00	https://software.cisco.com/download/home/286333939/type
P-LTEAP18-GL IRMH-LTEAP18-GL	LM960	32.00.1x7	https://software.cisco.com/download/home/286324947/type
P-LTE-450	IPS-701	—	Firmware upgrades are only available through the manufacturer Intelliport. See the 450MHz Category-4 LTE PIM chapter of the Cellular Pluggable Interface Module Configuration Guide.
P-LTEA-EA IRMH-LTEA-EA	EM7455	02.32.11.00	https://software.cisco.com/download/home/286308426/type
P-LTEA-LA IRMH-LTEA-LA	EM7430	02.33.03.00	https://software.cisco.com/download/home/286308413/type

Cellular Module	Modem	Firmware Version	Software Download Link
P-LTE-VZW	WP7601	02.37.0x.00	https://software.cisco.com/download/home/286322139/type
P-LTE-US	WP7603	02.37.0x.00	https://software.cisco.com/download/home/286322143/type
P-LTE-JN	WP7605	02.28.03	https://software.cisco.com/download/home/286322156/type
P-LTE-GB	WP7607	02.37.03.05	https://software.cisco.com/download/home/286322147/type
P-LTE-IN	WP7608	02.28.03	https://software.cisco.com/download/home/286322152/type
P-LTE-AU	WP7609	02.28.03	https://software.cisco.com/download/home/286323720/type
P-LTE-MNA	WP7610	02.37.0x.00	https://software.cisco.com/download/home/286324942/type

New Features in Cisco IOS XE 17.13.1a

The following sections describe the major enhancements available in Cisco IOS XE 17.13.1a on each of the routers.

Major Enhancements in IR1101

This section describes the new features for the IR1101.

Also see the Major Enhancements Common to all IoT Routers, on page 22.

IOx Access to USB Storage

Customers have requested the ability to mount the host a USB thumb drive within the Docker container running on IOx. The bootflash has a limited number of read/write cycles, and a container continuously writing on the eMMC would prematurely wear out the unit. Using the USB thumb drive will allow Docker containers to write in a continuous manner without compromising the integrity of the bootflash.

Feature Requirements and Limitations

The following apply to this feature:

- The filesystem types supported for USB thumb drives on the IR1101 are: VFAT, EXT2 and EXT3. However, IOx only supports mounting of USB thumb drives with EXT2 and EXT3 filesystem. Cisco recommends EXT3 for the following reasons:
  - EXT3 is a journaling filesystem, which means there are not fragmentation issues.
  - Read/Writes are significantly faster with EXT3 filesystems
  - VFAT has a 4 GB maximum file-size limitation, which is a problem with container continuously writing large files.
- If the USB thumb drive is removed while a write operation by IOx apps is in progress, all the files included in the copy operation will be lost.
- If the USB thumb drive is removed while IOX and the app are using it, IOX will still be in running state. The functionality of the app using USB thumb drive as storage will be severely impacted, since it will not be able to read and/or write on the USB thumb drive.

Making the USB Thumb Drive Available to the IOx App

In order to make the USB thumb drive available to the IOx app, you need to issue a run option. See the following example:

```
Router(config-app-hosting-docker)#run-opts 1 "-v /mnt/usb0:/usbflash0"
```

This command will mount the USB thumb drive file system within the IOx application filesystem, and it will be available in the /usbflash0 folder, as showed by the following log from an IOx application:

```
/ # ls -al usbflash0/
total 705424
drwxrwxrwx    4 root     root          4096 Nov 10 22:42 .
drwxr-xr-x    1 root     root          4096 Nov 15 17:22 ..
-rw-r--r--    1 65534    65534    720025859 Nov 10 22:46 ir1101-universalk9.SSA.bin
drwx------    2 65534    65534        16384 Nov  8 16:32 lost+found
#
```

P-LTE-450 Support on Autonomous Mode

This release introduces two modes of setting the required credentials to communicate with the module. The username and password that should be used in these CLIs can be found on the sticker label that comes with the P-LTE-450 module.

Important You MUST set the username and password before performing any P-LTE-450 parameter configuration.

Configuration

The recommended configuration is through the Config mode:

```
interface GigabitEthernet 0/1/0
lte450 credential username username password password
```

Using the Exec mode:

```
hw-module subslot 0/1 lte450 set-info username username password password [encrypt]
```

Note Execution of this command will create a file called **bootflash:lte450.info** and should not be deleted.

P-LTE-450 Support Over SDWAN/vManage

The P-LTE-450 is a 450MHz Category-4 LTE PIM, which addresses LTE use cases primarily targeting utility, public safety, and critical infrastructure maintained by public organizations in Europe and other world regions. The module supports only Band 31 and 72 for LTE 450MHz networks.

Support for the P-LTE-450 was introduced in IOS XE 17.12.1a. This release introduces support for the P-LTE-450 over SDWAN /vManage.

Guidelines and Limitations

The following are the limitations of the P-LTE-450 with SDWAN/vManage:

- No PNP support on P-LTE-450 as a primary link.
- P-LTE-450 parameter configuration is only supported with CLI templates.
- P-LTE-450 credential configuration via vManage is not supported on this release. Will be supported in the vManage 20.16 release.

Additional Documentation

Additional documentation for SDWAN/vManage is available at the following links:

- User Documentation for Cisco IOS XE Catalyst SD-WAN Release 17
- Cisco Catalyst SD-WAN
- Cisco SD-WAN Support Information
- Cisco vManage Monitor Overview
- Managing the SD-Routing Device Using Cisco SD-WAN Manager

Major Enhancements in IR1800

This section describes the new features for the IR1800.

Also see the Major Enhancements Common to all IoT Routers, on page 22.

Change in Vendor for GNSS Module

This feature applies to the IR1833 and IR1835 only. There was a change in chip manufacturers on the IRM-GNSS-ADR pluggable module. There have been no changes in functionality, however you will see a change in the display of vendor information and firmware version.

See the following example:

```
Router#show platform hardware gps dead-reckoning
DR Vehicle interface mode: OBDDII
GPS/DR Vendor Info: VIC3DA
GPS/DR module FW Version: 4.6.18.11
DR Calibration Status:
```

```
DR is not calibrated
Odometer is not calibrated
Gain is not calibrated
Offset is not calibrated

CAN Bus Status:
CAN Bus Tx Count: 11
CAN Bus Tx error Count: 150930
```

IOX Access to IR1800 On-board Accelerometer and Gyroscope

This feature allows on-board accelerometer and gyroscope sensor data to be streamed to IOX via a TTY. This feature is disabled by default, and will keep feature parity with IR829 accelerometer and gyroscope sensor data feature. The CLIs for this feature are defined below.

Configuration Commands

The following commands are available:

```
Router(config)#acc-gyro ?
  enable     Enable
  frequency  Frequency in reading

Router(config)#acc-gyro freq ?
  four/sec  Reading 4 times per second
  one/min   Reading 1 times per minute
  one/sec   Reading 1 time per second (default value)
  ten/min   Reading 10 times per minute
```

Show Commands

The following command is available:

```
Router# show platform hardware acc-gyro sensor-data

Date                Time   G-X     G-Y     G-Z    XL-X    XL-Y   XL-Z
2022:10:26:16:58:13.855143 1137.50 -297.50 621.25 -18.056 -3.111 -966.057
2022:10:26:16:58:14.863668 1058.75 -122.50 735.00 -17.629 -2.989 -965.996
2022:10:26:16:58:15.869117 1207.50 -140.00 726.25 -18.361 -3.294 -965.813
2022:10:26:16:58:16.874036 1268.75 -192.50 717.50 -18.178 -3.050 -965.874
2022:10:26:16:58:17.884764 1163.75 -420.00 717.50 -18.056 -2.989 -965.813
2022:10:26:16:58:18.894063 1347.50 -148.75 708.75 -18.117 -3.477 -965.935
2022:10:26:16:58:19.900830 1137.50 -315.00 577.50 -18.239 -3.599 -965.935
2022:10:26:16:58:20.908765 1137.50 -131.25 726.25 -17.873 -3.538 -965.813
2022:10:26:16:58:21.916674 1137.50 -262.50 726.25 -18.361 -2.867 -965.935
2022:10:26:16:58:22.927371 1137.50 -323.75 516.25 -17.934 -3.477 -965.569
2022:10:26:16:58:23.934275 1120.00 -647.50 516.25 -18.361 -3.416 -965.752
2022:10:26:16:58:24.940819 1111.25 -262.50 743.75 -18.422 -2.989 -965.386
2022:10:26:16:58:25.947471 1190.00 -201.25 673.75 -17.995 -3.416 -966.057
2022:10:26:16:58:26.953120 1093.75 -288.75 577.50 -17.995 -3.233 -965.874
2022:10:26:16:58:27.961469 1137.50 -428.75 551.25 -18.117 -2.745 -965.996
2022:10:26:16:58:28.971354 1050.00 -271.25 717.50 -18.361 -3.233 -965.508
2022:10:26:16:58:29.981967 1172.50 78.75 840.00 -18.117 -3.538 -965.386
```

Other

The existing **debug hardware acc-gyro sensor-data** command has been enhanced to provide additional debug messages for better serviceability. The debug messages will cover the following:

- How frequent the sensor data are pushed from the module to IOS, it must at least once per second.
- The latest sensor data received from the module.

Unified Threat Defense (UTD)

Unified Threat Defense (UTD) is Cisco's premier network security solution which provides a comprehensive suite of security features, such as:

- Enterprise Firewall
- IPS/IDS
- Advanced Malware Protection
- URL Filtering
- DNS Security

UTD is available on the IR1835 router.

IR1835 Limitations

The following are product specific limitations:

- UTD container requires a minimum space of 1.8 GB.
- UTD is supported in both Autonomous mode and Controller Mode, but in Autonomous mode, only IPS/IDS features are supported.
- The UTD configuration supports the Cloud-Low profile only.
- On-Box Web-Filtering Database is not supported.
- SSL proxy is not supported.

License and Supported Features

To enable UTD features the DNA Essentials license is required, in addition to Network Essentials. The license is required only in sd-router (autonomous mode).

If Cisco Secure Malware Analytics is also desired, then DNA Advantage license is required, in addition to Network Advantage.

Feature Configuration

Configuration on the IR1835 is the same as on other products. For information please refer to:

- Intrusion Prevention System
- URL Filtering
- Advanced Malware Protection

vManage Support for EWC Mode on the Cisco Wi-Fi Interface Module

The Cisco Wi-Fi Interface Module (WIM), is a pluggable interface available for all models of the IR1800 series. The PID is WP-WIFI6-x where x signifies the regulatory domain.

vManage support for EWC mode on the WIM module allows the user to configure the module in EWC mode with wlan profiles, radio profiles, and management details of the EWC from the router in SDWAN mode.

The WIM is configured from vManage using feature template “ISR1K/IR18 Wireless” and verify the show wireless-lan commands in vManage.

With this release of IOS XE, vManage support has been added for the EWC Controller ONLY.

Additional Documentation

Additional documentation for SDWAN/vManage is available at the following links:

- User Documentation for Cisco IOS XE Catalyst SD-WAN Release 17
- Cisco Catalyst SD-WAN
- Cisco SD-WAN Support Information
- Cisco vManage Monitor Overview
- Managing the SD-Routing Device Using Cisco SD-WAN Manager

Major Enhancements in IR8140

This section describes the new features for the IR8140.

Also see the Major Enhancements Common to all IoT Routers, on page 22.

WPAN Serviceability Enhancement

The serviceability enhancements for WPAN are in two categories.

Enhancement to WPAN IOSd logging

The WPAN subsystem in IOSd only supports the legacy buginf-based logging controlled by debug CLIs inherited from the classic IOS version of WPAN. IOS XE has binary trace logging support (btrace), which has several advantages such as, some log levels can be on-by-default and even when enabling more detailed logging, the storage is more compact and allows logs to be available for a longer period of time. As part of this enhancement, support for btrace-based logging will be added to the WPAN and meshsec subsystems in IOSd. The feature enablement/disablement can be controlled via the standard **set platform software trace** CLIs.

Packet capture for WPAN

Previous versions of IOS XE did not support the monitor capture feature. This release enables part of this feature to be able to capture packets on the WPAN interface, including the IPv6 packets.

There are also enhancements to the existing mechanism of capturing all 802.15.4 packets sent and received by the WPAN module. The enhancement will be to make it possible to create 802.15.4 pcap files on the IR8140 locally, which canthen be downloaded. 802.15.4 captures will be implemented using WPAN exec commands **wpan 0/X/0 ieee154 <options>** rather than integrating with “monitor capture” CLIs because this type of capture is sufficiently different from the type that “monitor capture” supports.

The following CLIs are available:

Command	Purpose
wpan 0/X/0 ieee154 capture start file *<path>*	Starts capturing to specified file.

Command	Purpose
wpan 0/X/0 ieee154 capture start server	Starts capture server
wpan 0/X/0 ieee154 capture flush	Flushes current capture buffer from memory to the file
wpan 0/X/0 ieee154 capture stop	Stops the capture and also flushes the buffer.
show wpan 0/X/0 ieee154 capture	Shows information about the 802.15.4 capture status

Note File captures are buffered in memory. Before copying the file, you should run the flush command as described above to make sure the file has the latest captured data in it, or use the stop command to stop the capture which will also flush it.

Major Enhancements in IR8340

This section describes the new features for the IR8340.

Also see the Major Enhancements Common to all IoT Routers, on page 22.

PTP Over HSR Support for the IR8340

High-availability Seamless Redundancy (HSR is previously supported on the IR8340 in IOS XE version 17.8.x. The previous operating mode used Doubly Attached Nodes implementing HSR (DANHs). This release provides support for Precision Time Protocol (PTP) support as well.

Feature Scenarios

The design of PTP over HSR feature considers the following scenarios:

- **HSR Node Type**: The switch can operate in either DANH mode or Redbox mode. However, the IR8340 switch is most likely to be deployed in Redbox mode with SAN devices connected via the interlink port. Only HSR-SAN mode is supported in IR8340 with one ring instance.
- **Location of the PTP GMC / PTP Secondary Device**: The PTP GMC or secondary device can be located either outside the HSR ring connected via the Redbox or it can be located within the HSR ring on a DANH device.
- **PTP Mode**: For PTP over HSR, the IR8340 can operate in either Power profile Boundary Clock mode or P2P Transparent Clock mode. Forward mode is not applicable in Power Profile and will not be supported. Default profile Boundary Clock mode and E2E Transparent Clock mode will also not be supported.
- **PTP Message Type**: The following PTP message types are considered:
  - Sync, Announce and FollowUp
  - PDelayRequest, PDelayResponse & PDelayResponseFollowup
- **Source/Destination Port**: The PTP packets can be received from or be sent out of the following ports:
  - HSR Port

- b. Interlink port of Redbox
- CPU Originated/Terminated

Feature Limitations

Only power profile will be supported.

- Boundary Clock (BC) – Power profile
- Transparent Clock (TC) – Peer-to-peer transparent (P2P) power profile

The PTP over HSR will be supported for only one PTP clock domain at any given time.

Only one HSR ring at a time is supported on the IR8340.

- Ports Gig0/1/4 and Gig0/1/5
- Ports Gig0/1/6 and Gig0/1/7

PTP over HSR shall be supported with GNSS/Telecom enabled on the system. The Redbox shall be in PRTC/Wan to LAN conversion mode with ports being in Primary state only.

The other clock domains can have non HSR interfaces configured with PTP over HSR enabled on one domain.

Using the Timing Card as a Reference Clock for NTP

The IR8340 has the option to update GNSS time to NTP using the **ntp refclock gps** command. If the IR8340 has a timing card inserted, it can provide more accurate time to NTP than the time based on the system oscillator. When GNSS gets unlocked or disabled, the IR8340 is able to use the time from the timing card.

New Command Option

A new command **ntp refclock timing-card** has been added, which adds the timing card local clock as a refclock. This CLI will be present only when timing card is detected in the IR8340.

NTP polls for time from the timing card at stipulated intervals.

Configuration Examples

To configure the device to use the timing card as the reference:

```
router(config)#ntp master
router(config)#ntp refclock timing-card
```

To view the status:

```
router#show ntp status
Clock is synchronized, stratum 4, reference is 127.127.7.1
nominal freq is 250.0000 Hz, actual freq is 249.9997 Hz, precision is 2**10
ntp uptime is 6200 (1/100 of seconds), resolution is 4016
reference time is E8DB7E3A.DC6A8158 (15:36:50.861 IST Thu Oct 19 2023)
clock offset is 1.0000 msec, root delay is 0.00 msec
root dispersion is 3940.44 msec, peer dispersion is 3938.29 msec
loopfilter state is 'CTRL' (Normal Controlled Loop), drift is 0.000001064 s/s
system poll interval is 16, last update was 11 sec ago.

router#show ntp associations

address ref clock st when poll reach delay offset disp
```

```
~127.127.1.1 .LOCL. 7 14 16 7 0.000 0.000 1938.4
*~127.127.7.1 .TCLO. 3 15 16 3 0.000 1.000 3938.2
* sys.peer, # selected, + candidate, - outlyer, x falseticker, ~ configured
```

SSL Proxy Support

This release supports TLS/SSL proxy for UDT on the IR8340.

The security feature interaction with SSL traffic is divided into two parts:

- **Decryption Policy Handling** — Policy that dictate when to decrypt SSL traffic(CPP).
- **TLS Proxy Service Integration** — Integration with SSL proxy services for decrypting SSL traffic for security inspection.

Note This feature is supported only in controller mode.

vManage Support for the IR8340 T1/E1 and Serial Modules

This release offers support for the IR8340 T1/E1 and Serial Modules on the IR8340. R8340 T1/E1 and Serial module configuration is supported only through CLI template.

Note Reboot is required after changing the mode of T1/E1 card to either T1 or E1.

The IR8340 router has two Network Interface Module (NIM) slots, 0/2 and 0/3. The T1/E1 Network Interface Module IRM-NIM-2T1E1 can be installed in these two slots. It is a 2-port channelized data module and supports 24/31 channel groups for T1/E1 per port. Each T1/E1 module has two ports, P0 and P1. Each port is linked to a controller in the configuration shown below:

- If the module is in slot 0/2, it has two controllers 0/2/0 and 0/2/1
- If the Module is in slot 0/3, it has two controllers 0/3/0 and 0/3/1

Use RJ-48 cables to connect the T1/E1 modules between two devices.

T1/E1 Configuration Guidelines

- Use CLI template to enable the card type for T1/E1 followed by reboot. The following is a configuration example:

  ```
  card type t1 0 2
  ```

- After reboot, apply the controller configurations using CLI template. The following is a configuration example:

  ```
  controller T1 0/2/0
  framing esf
  linecode b8zs
  cablelength long 0db
  channel-group 0 timeslots 1
  channel-group 1 timeslots 2
  channel-group 2 timeslots 3
  interface Serial0/2/0:0
  ip address 1.1.1.1 255.255.255.0
  ```

IRM-NIM-RS232 Module

The 8-port Asynchronous/Synchronous Network Interface Module (NIM) IRM-NIM-RS232 provides asynchronous/synchronous serial connections supporting EIA-RS232 for the Cisco IR8340 Router.

The IR8340 router has two NIM slots, 0/2 and 0/3. The serial NIMs can be installed in these two slots.

Each RS-232 Serial Module has 8 serial interfaces. The interface numbers are:

- serial 0/2/0 - serial 0/2/7 — If the serial module is in slot 0/2
- serial 0/3/0 - serial 0/3/7 — If the serial module is in slot 0/3

Feature Support

The following features are supported:

- Supports DCE and DTE
- Each serial port can be configured as either Asynchronous or Synchronous mode
- A maximum speed of 256 kbps is supported for RS232 Synchronous port
- A maximum speed of 230.4 kbps is supported for Asynchronous port

Serial Port Configuration Guidelines

Guidelines for configuring serial ports:

- Use CLI template to enable the operational mode for the serial port (either sync or async)

Note The default is sync.

- Use CLI template to enable the supported configurations for sync and async ports

Sample configuration for serial async which could be applied using CLI template from vManage:

```
interface Serial0/3/0
physical-layer async
no ip address
encapsulation raw-tcp
end
```

Additional Documentation

Additional documentation for SDWAN/vManage is available at the following links:

- User Documentation for Cisco IOS XE Catalyst SD-WAN Release 17
- Cisco Catalyst SD-WAN
- Cisco SD-WAN Support Information
- Cisco vManage Monitor Overview
- Managing the SD-Routing Device Using Cisco SD-WAN Manager

Major Enhancements Common to all IoT Routers

This section describes the new features that are common to all routers.

Additional Modem Support for Cellular Pluggable Modules

This release offers support for additional modems on the IR1101 and the IR1800.

The LTE Cat6 Pluggable Interface Modules (PIMs) will be updated with Cat7 modems. The following table shows the product transition:

Table 4: Cat6 to Cat7 Transition

Cat6 (Current)	Cat7 (Refreshed)
Sierra Wireless EM7455/7430	Sierra Wireless EM7411/7421/7431
Cat6 LTE Advanced	Cat7 LTE Advanced

The following are the new PIDs that will be available:

- P-LTEA7-NA
- P-LTEA7-EAL
- P-LTEA7-JP
- P-5GS6-R16SA

Important For the new PIDs mentioned above, the following cellular functions have not been tested, and are not supported with IOS XE release 17.13.1 although the CLI commands may permit:

- GNSS/NMEA
- Cellular Dying-Gasp
- eSIM/eUICC support

Note There is no new or changed command line interface with these new modems.

SD-WAN Remote Access (SD-WAN RA)

SD-WAN RA is now supported on the IoT routers with IOS XE 17.13.1. SD-WAN RA is a combination of two features:

- IOS-XE SD-WAN
- IOS-XE FlexVPN Remote Access Server

Note All IoT devices only support the SD-WAN RA Client.

Information on SD-WAN Remote Access can be found in the following guide:

Cisco Catalyst SD-WAN Remote Access

Additional Documentation

Additional documentation for SDWAN/vManage is available at the following links:

- User Documentation for Cisco IOS XE Catalyst SD-WAN Release 17
- Cisco Catalyst SD-WAN
- Cisco SD-WAN Support Information
- Cisco vManage Monitor Overview
- Managing the SD-Routing Device Using Cisco SD-WAN Manager

Support for SD-Routing

This feature allows you to perform the basic management capabilities through Cisco SD-WAN Manager on the Cisco IOS XE devices that are operating in non-SD-WAN mode. From Cisco IOS XE 17.13.1 onwards, such devices will be referred as SD-Routing devices. You can use a single Network Management System (NSM) (Cisco SD-WAN Manager) to manage and monitor all the Cisco IOS XE routers and help in simplifying solution deployments.

The following table describes the different features with links to more information:

Table 5: Features for IOS XE 17.13.1

Feature	Description	Link to Documentation
Cisco SD-Routing Cloud OnRamp for Multicloud	Cisco SD-Routing Cloud OnRamp for Multicloud extends enterprise WAN to public clouds. This multicloud solution helps to integrate public cloud infrastructure into the Cisco Catalyst SD-Routing devices. With these capabilities, the devices can access the applications hosted in the cloud.	https://www.cisco.com/content/en/us/td/docs/routers/cloud_edge/c8300/software_config/cat8300swcfg-xe-17-book/m-cloud-onramp-for-sd-routing.html
Schedule Software Upgrade on SD-Routing Devices	With this feature, you can schedule software image upgrade on Cisco SD-Routing devices. This allows you to avoid any downtime due to the software upgrade process.	https://www.cisco.com/content/en/us/td/docs/routers/cloud_edge/c8300/software_config/cat8300swcfg-xe-17-book/m-software-upgrade.html
SD-Routing Configuration Group	The SD-Routing Configuration Group feature provides a simple, reusable, and structured method to configure the SD-Routing device using Cisco Catalyst SD-WAN Manager.	https://www.cisco.com/content/en/us/td/docs/routers/cloud_edge/c8300/software_config/cat8300swcfg-xe-17-book/m-configuration-group.html

Feature	Description	Link to Documentation
Support for Flexible NetFlow Application Visibility on SD-Routing Devices	The Flexible NetFlow (FNF) feature provides statistics on packets flowing through the device and helps to identify the tunnel or service VPNs. Also, it provides visibility for all the traffic that passes through the VPN0 on Cisco SD-Routing devices by using the SD-Routing Application Intelligence Engine (SAIE).	https://www.cisco.com/content/en/us/td/docs/routers/cloud_edge/c8300/software_config/cat8300swcfg-xe-17-book/fnf-applic-visibty.html
Speed Test for SD-Routing Devices	Cisco SD-WAN Manager allows you to measure the network speed and available bandwidth.	https://www.cisco.com/content/en/us/td/docs/routers/cloud_edge/c8300/software_config/cat8300swcfg-xe-17-book/m-speed-test.html
Application Performance Monitor	The Application Performance Monitor feature introduces a simplified framework that enables you to configure intent-based performance monitors. With this framework, you can view real-time, end-to-end application performance filtered by client segments, network segments, and server segments.	https://www.cisco.com/content/en/us/td/docs/routers/cloud_edge/c8300/software_config/cat8300swcfg-xe-17-book/m-app-perfom-monit.html
Support for Packet Capture for SD-Routing	This feature allows you to configure options to capture the bidirectional IPv6 traffic data to troubleshoot connectivity on the SD-Routing devices	https://www.cisco.com/content/en/us/td/docs/routers/cloud_edge/c8300/software_config/cat8300swcfg-xe-17-book/m-pack-capt-for-sd-rout.html

The feature works on IoT routers in the same way as other Cisco routers, and details are available here:

Managing the SD-Routing Device Using Cisco SD-WAN Manager

Change in CLI Output for the FN980 5G Modem

This release has a different output to the **show cellular 0/x/0 radio band** command. The module will no longer display the 5G-SA band information by default. However, once the 5G-SA has been enabled, the band information will then be displayed.

See the following command examples using an IR1101 running IOS XE 17.13.1 with an FN980 modem:

```
IR1101#show cellular 0/1/0 radio band

LTE bands supported by modem:
- Bands 2 4 5 12 14 26 29 30 46 48 66.
LTE band Preference settings for the active sim(slot 1):
- Bands 2 4 5 12 14 26 29 30 46 48 66.

NR5G NSA bands supported by modem:
- Bands 2 5 12 66 77.
NR5G NSA band Preference settings for the active sim(slot 1):
- Bands 2 5 12 66 77.

3G bands supported by modem:
Index: <none>
```

```
3G band Preference settings for the active sim(slot 1):
Index: <none>

==========================================
Band index reference list:

For LTE and 5G, indices 1-128 correspond to bands 1-128.

For 3G, indices 1-64 maps to the 3G bands mentioned against each above.

IR1101#
```

```
IR1101#show cellular 0/1/0 hard

*Nov  8 12:13:31.969: Graphit 5G RSRP/RSRQ LTE modem:[1]
Modem Firmware Version = M0H.030202
Host Firmware Version = A0H.000302
Device Model ID =  FN980
International Mobile Subscriber Identity (IMSI) = 001010123456789
International Mobile Equipment Identity (IMEI) = 359661100035795
Integrated Circuit Card ID (ICCID) = 89860000502000180722
Mobile Subscriber Integrated Services
Digital Network-Number (MSISDN) =
Modem Status = Modem Online
Current Modem Temperature = 40 deg C
PRI version = 1080-114, Carrier = Generic GCF
OEM PRI version = 1080-114
IR1101#
```

```
IR1101#show cellular 0/1/0 radio band

LTE bands supported by modem:
- Bands 1 2 3 4 5 7 8 12 13 14 17 18 19 20 25 26 28 29 30 32 34 38 39 40 41 42 43 46 48 66
 71.
LTE band Preference settings for the active sim(slot 0):
- Bands 1 2 3 4 5 7 8 12 13 14 17 18 19 20 25 26 28 29 30 32 34 38 39 40 41 42 43 46 48 66
 71.

NR5G NSA bands supported by modem:
- Bands 1 2 3 5 7 8 12 20 25 28 38 40 41 48 66 71 77 78 79.
NR5G NSA band Preference settings for the active sim(slot 0):
- Bands 1 2 3 5 7 8 12 20 25 28 38 40 41 48 66 71 77 78 79.

NR5G SA bands supported by modem:
- Bands <none>
NR5G SA band Preference settings for the active sim(slot 0):
- Bands <none>

3G bands supported by modem:
Index:
  23 - UMTS Band 1: 2100 MHz (IMT)
  24 - UMTS Band 2: 1900 MHz (PCS A-F)
  26 - UMTS Band 4: 1700 MHz (AWS A-F)
  27 - UMTS Band 5: US 850 MHz  (CLR)
  50 - UMTS Band 8: 900 MHz  (E-GSM)
  51 - UMTS Band 9: Japan 1700 MHz
  61 - UMTS Band 19: 800 MHz (800 Japan)
3G band Preference settings for the active sim(slot 0):
Index:
  23 - UMTS Band 1: 2100 MHz (IMT)
  24 - UMTS Band 2: 1900 MHz (PCS A-F)
  26 - UMTS Band 4: 1700 MHz (AWS A-F)
  27 - UMTS Band 5: US 850 MHz  (CLR)
  50 - UMTS Band 8: 900 MHz  (E-GSM)
  51 - UMTS Band 9: Japan 1700 MHz
```

```
  61 - UMTS Band 19: 800 MHz (800 Japan)

==========================================

Band index reference list:

For LTE and 5G, indices 1-128 correspond to bands 1-128.

For 3G, indices 1-64 maps to the 3G bands mentioned against each above.

IR1101#
```

Related Documentation

Cisco Catalyst IR1101 Rugged Series Router

IR1101 documentation landing page

Cisco Catalyst IR1800 Rugged Series Router

IR1800 documentation landing page

Cisco Catalyst IR8140 Heavy Duty Series Router

IR8100 documentation landing page

Cisco Catalyst IR8340 Rugged Series Router

IR8340 documentation landing page

Product Independent Documentation

Cisco Industrial Routers and Industrial Wireless Access Points Antenna Guide

Cisco IOS XE 17.x

Cisco SD-WAN

Cisco IoT Field Network Director

Cisco Industrial Network Director

Cisco IoT Operations Dashboard

Known Limitations

Smart Licensing Using Policy

Starting with Cisco IOS XE 17.6.1, with the introduction of Smart Licensing Using Policy, even if you configure a hostname for a product instance or device, only the Unique Device Identifier (UDI) is displayed. This change in the display can be observed in all licensing utilities and user interfaces where the hostname was displayed in earlier releases. It does not affect any licensing functionality. There is no workaround for this limitation.

The licensing utilities and user interfaces that are affected by this limitation include only the following: Cisco Smart Software Manager (CSSM), Cisco Smart License Utility (CSLU), and Smart Software Manager On-Prem (SSM On-Prem).

Expansion Module on the IR1101

The expansion module IR1101 does not support +1500 MT size on LAN interfaces. See this Caveat for details.

Standalone MAC Authentication Bypass (MAB) Limitation

Standalone MAC Authentication Bypass (MAB) is an authentication method that grants network access to specific MAC addresses regardless of 802.1X capability or credentials. The IR1100 crashes with concurrent IPSec traffic and macsec traffic (device to client).

Refer to the following table for details:

Details	Release Affected	Release Fixed
MAB/Dot1x may not work if the global type-6 encryption setting is enabled. If users still want to use MAB/Dot1x, they should disable the type-6 encryption and enable type-7 encryption.	17.4.X 17.5.X 17.6.1 17.6.2 17.7.1	17.3.5 Fixed in these future releases: 17.6.3 17.7.2 17.8.1 and later.
dACL and device-tracking features are not supported on the IR1101 due to a hardware limitation. dACL is supported on the IR1800 series. Therefore, features such as MAB and Dot1x should not be used with the optional dACL/device-tracking enabled.	**Note** Occurs in all releases.	Hardware limitation, no software fix available.

Caveats

Caveats describe unexpected behavior in Cisco IOS XE releases. Caveats listed as open in a prior release are carried forward to the next release as either open or resolved.

The Cisco Bug Search Tool (BST) is a gateway to the Cisco bug-tracking system, which maintains a comprehensive list of defects and vulnerabilities in Cisco products and software. The BST provides you with detailed defect information about your products and software.

Open Caveats in Cisco IOS XE 17.13.1a

To view the details of a caveat, click on the identifier.

Identifier	Description	Platform
CSCwi04881	Async DNP3 port keeps flapping in 1101 devices.	IR1101

Identifier	Description	Platform
CSCwi66681	Modem resets frequently on 17.12.02 with RSSI spikes upto -130 dBm	Any cellular pluggable module with Sierra Wireless modem
CSCvz30726	High CF/TE,Turnaround and Latency number after reload of router.	IR8340
CSCwa92737	IR8340 throws CPP/FMAN Download errors on attaching ngsw class-map using etype classification.	IR8340
CSCwd38611	FN980 modem is not showing in show inventory after multiple modem-power cycle.	P-5GS6-GL
CSCwi29218	IR8340:Traffic is impacted when HSR link goes down with 100mbps speed.	IR8340

Resolved Caveats in Cisco IOS XE 17.13.1a

To view the details of a caveat, click on the identifier.

Identifier	Description	Platform
CSCwi43664	Module Out of Service upon reload.	WP-WIFI6-x
CSCwf22018	IR1101: CDP is not working on WAN port.	IR1101
CSCwf22381	IR1800: WAN SFP link goes down after reloading Peer.	IR1800
CSCwf75697	IR8340: HSR Ring traffic fails on reload with GLC-FE-100FX-RGD SFP.	IR8340
CSCwh10876	IR1101: Ping is not successful after reload the device with switchport config in gi0/0/0.	IR1101
CSCwh77749	IR1101: internal USB hub fails to enumerate resulting in Cellular 0/3/0 not functioning.	IR1101
CSCwf51308	IR1835 in crash-reload-cycle with partner IOx app reading GPS.	IR1835
CSCwf75701	IR1831: Adding CANA oid for CISCO-IGNITION-MIB.my.	IR1831
CSCwh29080	IR1800 WP-WIFI6 out of service, error "IM authentication failed for slot/bay 0/3".	IR1800
CSCwh46672	Cannot configure G0/0/0 interface on IR1101 using default vManage feature templates.	IR1101

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The Cisco Bug Search Tool (BST) is a gateway to the Cisco bug-tracking system, which maintains a comprehensive list of defects and vulnerabilities in Cisco products and software. The BST provides you with detailed defect information about your products and software.

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The Cisco Feature Navigator provides links to browse Cisco products and find relevant features and licenses. It also allows you to compare platforms, determine common features between products, and identify unique product features.

The CFN also has a tab that provides a MIB Locator.

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