Release Notes for Cisco Catalyst IR1101, IR1800, IR8140, IR8340, and Cisco ESR 6300 Routers - (Cisco IOS XE Dublin 17.11.1a)

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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, Cisco Catalyst IR8340 Rugged Series Routers, and Cisco ESR6300 Embedded Series Routers running Cisco IOS XE 17.11.1a.

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 the EU868, IND865 and RU864 RF regional profile. Cisco LoRaWAN Pluggable Interface Module designed for RF regional profile US915, AS923 and AU915.

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)

Cisco ESR6300 Embedded Series Router



The ESR6300 is a small form factor embedded router module with a board size of 3.0 in. x 3.775 in. (76.2 mm x 95.885 mm).

The more compact design simplifies integration and offers system integrators the ability to use the Cisco ESR6300 in a wide variety of embedded applications. The ESR module is available with a Cisco-designed cooling plate customized to the ESR, as well as without the cooling plate for system integrators who want to design their own custom thermal solution.

There are two ESR6300 SKUs:

- ESR-6300-NCP-K9: Embedded Router Board without a cooling plate
- ESR-6300-CON-K9: Embedded Router Board with a cooling plate

Both SKUs offer the following port and module interfaces:

- Four GE LAN ports
- Two combo GE WAN ports
- One USB 3.0 port
- One mSATA module interface

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:
mSATA	msata
IR1101 Base Unit Alarm input	alarm contact 0

Port	Naming Convention
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

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 Cellular Interface in WIM slot	Wl0/1/4 Cellular 0/3/0
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

Port	Naming Convention
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
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

Port	Naming Convention
GPIO	alarm contact 1-2
USB Port	usb0:
Console Port	Line console 0

Cisco ESR6300 Embedded Series Router

Port	Naming Convention
Gigabit Ethernet combo port WAN Layer3	GigabitEthernet0/0/0 GigabitEthernet0/0/1
Gigabit Ethernet LAN Layer 2 ports	GigabitEthernet0/1/0 GigabitEthernet0/1/1 GigabitEthernet0/1/2 GigabitEthernet0/1/3
Cellular Interface	Cellular 0/3/0
USB Port	usbflash0: (IOS and rommon)
Console Port	Line console 0

Software Images for Cisco IOS XE Release 17.11.1a

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

Cisco IOS XE Release 17.11.1a includes the following Cisco images.

Table 2: Software Images for Cisco IOS-XE, Release 17.11.1a

Router	Image Type	Filename
IR1101	Universal	ir1101-universalk9.17.11.01a.SPA.bin
	NPE	ir1101-universal9_npe.17.11.01a.SPA.bin
IR1800	Universal	IR1800-universalk9.17.11.01a.SPA.bin
	NPE	IR1800-universal9_npe.17.11.01a.SPA.bin
IR8140	Universal	IR8100-universalk9.17.11.01a.SPA.bin
	NPE	IR8100-universal9_npe.17.11.01aa.SPA.bin

Router	Image Type	Filename
IR8340	Universal	IR8340-universalk9.17.11.01a.SPA.bin
	NPE	IR8340-universalk9_npe.17.11.01a.SPA.bin
ESR6300	Universal	c6300-universalk9.17.11.01a.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	—	https://software.cisco.com/download/home/286329300/type/
P-LTEAP18-GL IRMH-LTEAP18-GL	LM960	32.00.1x7	https://software.cisco.com/download/home/286324947/type
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
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

Cellular Module	Modem	Firmware Version	Software Download Link
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 17.11.1a

The following sections describe the major enhancements available in Cisco IOS XE 17.11.1a 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 21.

Async Serial Port for Console

The IR1101 console port is a USB port. Some installations require that the console port be an RS232 port. This release provides a workaround that allows the Async 0/2/0 port to be used as a console port.

This change requires to ROMMON variables as well as IOS XE. You will need to setup both Mini-USB console and Async 0/2/0 with the same baudrate and 8-N-1.

To change the ROMMON variable, perform the following:

1. Access ROMMON by following the procedure in the IR1101 Software configuration Guide.
2. Set the ROMMON variable CONSOLE_SERIAL with value as 1 using the following command in ROMMON: set CONSOLE_SERIAL=1
3. sync

When ROMMON detects CONSOLE_SERIAL=1, it should start to use the new variable. It will also pass console=ttyS1 as boot parameter instead of console=ttyS0.

After setting the ROMMON variable, then boot up the Cisco IOS XE 17.11.1a image. It will read the new variable and use console=ttyS1 as boot parameter instead of console=ttyS0. Cisco IOS XE 17.11.1a should update the new ROMMON image. Then, reboot the device again and setup auto boot if needed.

Note Async 0/2/0 pinout is EIA-TIA-561 DTE. When CONSOLE_SERIAL=1 is setup, Async 0/2/0 won't exist. Do NOT perform a factory reset or downgrade the software below 17.11.

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 21.

LoRaWAN Pluggable Interface Module Support

These release adds support for the LoRaWAN Pluggable Interface Module which was first available on the IR1101.

Note This is a software parity release only. The LoRaWAN Pluggable Interface Module is neither orderable or hardware deployment ready for the IR1800 until the product is announced. Please reach out to your Cisco contact for any additional info.

The Cisco LoRaWAN Pluggable Interface Module supports eight channels of LoRa connectivity.

There are two different P-LPWA modules:

- The P-LPWA-900 is designed for RF regional profile US915, AS923 and AU915 as defined by the LoRa Alliance RF regional profile specifications.
- The P-LPWA-800 is designed for the EU868, IND865 and RU864 RF regional profile as defined by the LoRa Alliance RF regional profile specifications.

The Cisco LoRaWAN pluggable modules can be managed by command line interface (CLI), or the Cisco IOS XE Web User Interface (WebUI).

Details on installation, configuration, and regulatory information are found in the Cisco LoRaWAN Pluggable Interface Module Installation and Configuration Guide.

Cisco IoT Operations Dashboard (OD) Support to Configure and Manage the WP-WIFI6-x Module

Cisco IOS XE release 17.11.1a provides additional capabilities to the Cisco Wi-Fi Interface Module (WIM).

This section contains the following:

WGB Concurrent Radio

Cisco IOS XE 17.11.1a supports the Cisco Wi-Fi Interface Module (WIM) configuration of concurrent radio in Workgroup Bridge (WGB) mode. This feature applies to the WIM that already has the CAPWAP image on Cisco IOS XE 17.11.1a and the unified client image.

The following table lists the Cisco Operational Dashboard use case and corresponding CLIs:

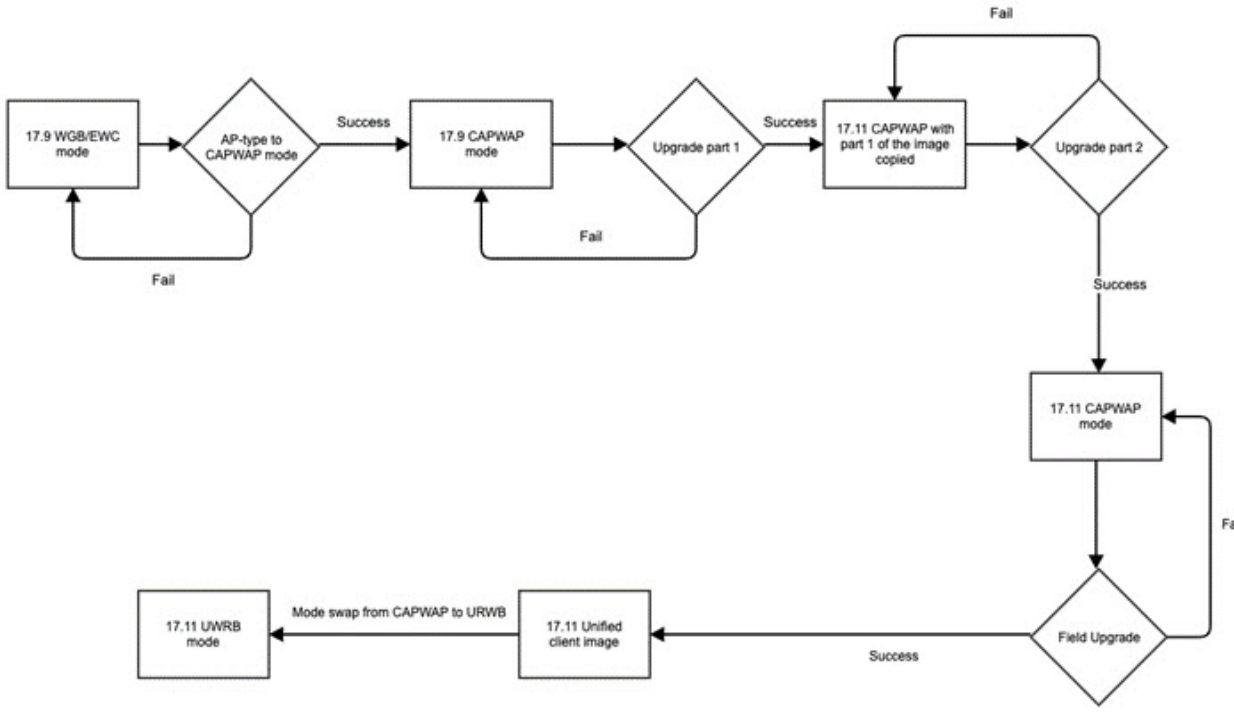
Use Case	CLI
Choose 2.4GHz or 5GHz frequency for the WiFi access or WiFi uplink.	show platform hardware subslot 0/3 module device "config start" show platform hardware subslot 0/3 module device “send_cmd configure dot11Radio <0|1> mode root-ap” show platform hardware subslot 0/3 module device “config end”
Enable Concurrent Radio.	N/A If root-radio is configured, it will be enabled. There is no additional CLI for it. On the Router, configure a unique MAC address for WGB uplink VLAN interface: `interface Vlan <WGB uplink VLAN number> mac-address <unique mac addr>` **Note** <unique mac address> - Derived from GigabitEthernet0/0/0 interface mac address + 4
Configure the SSID profile with a customer-defined name.	show platform hardware subslot 0/3 module device “config start”
Configure SSID (in the profile) with a customer-defined name. Configure the Authentication type (in the profile).	show platform hardware subslot 0/3 module device "config start” show platform hardware subslot 0/3 module device “send_cmd configure ssid-profile <profile-name> ssid <ssid-name> authentication <auth-type> key-management <key-mgmt>” show platform hardware subslot 0/3 module device “config end”
Choose between WGB or uWGB (universal) options.	show platform hardware subslot 0/3 module device “config start” show platform hardware subslot 0/3 module device “send_cmd configure dot11Radio <0/1> mode uwgb <client mac> ssid-profile <ssid>” show platform hardware subslot 0/3 module device “config end” **Note** <client mac> - Wired client mac connected to the IR1800.

Use Case	CLI
Get running configuration. Get Wi-Fi Mode. Get Radio allocated to WGB vs Wi-Fi.	show platform hardware subslot 0/3 module device “show running-config”
Get list of Wi-Fi clients.	show platform hardware subslot 0/3 module device “show controllers dot11 0 client” show platform hardware subslot 0/3 module device “ show client summary”
Get hardware status. Get AP status after firmware bootup.	show hw status
Get WGB connection status.	show platform hardware subslot 0/3 module device “show wgb dot11 associations” show platform hardware subslot 0/3 module device “show run”
Get AP Firmware version.	show platform hardware subslot 0/3 module device “show ver”
Radio traffic monitoring for 2.4 & 5Ghz radio.	show platform hardware subslot 0/3 module device “show interface dot11 <0/1>”

Firmware Upgrade

The firmware on the Cisco Wi-Fi Interface Module (WIM) needs to be upgraded from Cisco IOS XE release 17.9.1 to 17.11.1a. In order to perform the upgrade, the WIM needs to be in CAPWAP mode.

The following figure illustrates the work-flow to upgrade the module:



Prerequisites

The following prerequisites exist:

- There must be a network connection between the IR1800 and the AP.
- The IR1800 will need a tftp server enabled for the AP to obtain the images.

Upgrade Steps

This section provides the steps to upgrade the AP Firmware.

Procedure

Step 1 If not already in CAPWAP mode, convert from your existing mode to CAPWAP.

Example:

```
# ap-type capwap

AP serving in WGB mode, system will reboot when ap type is changed to CAPWAP.
Do you want to proceed? (y/n): Y
```

a) Reload the device.
b) Log back in with Username/Password.

Step 2 Upgrade the CAPWAP 17.11.1a images.

a) **archive download-sw /reload tftp://**<*IP of IR1800 TFTP*>**/ap1g8-k9w8-tar.**<*version*>

b) The device will reload automatically.
c) Log back in with Username/Password.

Step 3 Upgrade the second image.

a) **archive download-sw /reload tftp://***<IP of IR1800 TFTP>***/ap1g8t-k9c1-tar.***<version>**
b) Allow the image to upgrade.

```
**********************************************************
Detected field upgrading URWB by CAPWAP image...
New URWB image will be added into flash, but EWC will be removed.
Are you sure to proceed? (y/n) Y
```

c) The device will reload automatically.
d) Log back in with Username/Password.

Step 4 Once the upgrade is completed, the **configure boot mode** command can be used to swap from CAPWAP to URWB mode.

```
#configure boot mode urwb
Image swapping will restore the device to factory settings.
Are you sure to proceed? (y/n) Y
```

Step 5 You can verify the AP version with the **show version** command.

```
#show version
Cisco AP Software, (ap1g8t), [build-info]
Processor board ID FOC251943PG
AP Running Image     : 11.4.8.87
Primary Boot Image   : 11.4.8.87
Backup Boot Image    : 11.4.8.87
```

What to do next

If you want to perform a downgrade from Cisco IOS XE release 17.11.1a back to 17.9.1, perform the following:

#archive download-sw /reload tftp://*<IP of IR1800 TFTP>* **/ap1g8**

The image will download and the device will reload. The device comes back up in CAPWAP mode using Cisco IOS XE 17.9.1

Switch Between CAPWAP and WGB Mode

In Cisco IOS XE 17.11.1a, support has been added for switching the Cisco Wi-Fi Interface Module (WIM) running mode between Control and Provisioning of Wireless Access Points Protocol (CAPWAP) mode and workgroup bridge (WGB) concurrent radio mode. This feature applies to the WIM that already has the CAPWAP image on Cisco IOS XE 17.11.1a and the unified client image.

The following table shows the command and corresponding behaviors to support the switch mode operation:

Current Mode	Target Mode	CLI	Behavior
CAPWAP	WGB concurrent radio	show platform hardware subslot 0/3 module device "config start" show platform hardware subslot 0/3 module device "configure boot mode wgb" show platform hardware subslot 0/3 module device "config end"	Factory reset and the WP-WIFI6-x will run the unified client image
WGB concurrent radio	CAPWAP	show platform hardware subslot 0/3 module device "config start" show platform hardware subslot 0/3 module device "configure boot mode capwap" show platform hardware subslot 0/3 module device "config end"	Factory reset and the WP-WIFI6-x will run the CAPWAP image

GNSS Support on the GPS/Dead Reckoning Module (IRM-GNSS-ADR)

Prior to the Cisco IOS XE 17.11.1a release, the only GNSS constellation supported was GPS. This release introduces support for GPS and Galileo.

Note Only ONE constellation can be enabled at a time.

There are new CLI options available to support the new constellation:

Configuration Commands:

```
(config-controller)# controller gps
<no> dead-reckoning constellation <gps | galileo |gnss >
```

Note The default setting is gps mode. The new galileo and gnss options in the above CLI example is used to configure Galileo and Multiple/Simultaneous GNSS (GPS + Galileo etc) respectively.

Show Commands

```
show platform hardware gps <mode | status | details>
....
Current Constellation Configured =  gps | galileo | gnss
....
```

Any changes made to the configuration will require the router to be rebooted.

More information is available in the Configuring GPS chapter of the IR1800 Software Configuration Guide.

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 21.

Galileo Support for GNSS

Hardware on the IR8140 supports the following constellations: GPS, Galileo, GLONASS, BeiDou. By default, GPS and GLONASS are enabled.

Note Only ONE constellation can be enabled at a time.

For release 17.11.1a, Galileo support will be enabled in addition to the currently enabled GPS and GLONASS. BeiDou support may be added in the future.

Configuration YANG Model and CLI Template Support for WPAN

Currently WPAN supports the operational YANG model but not the configuration model. The configuration model will be implemented that covers the WPAN-specific configuration CLIs under WPAN interfaces, including those part of the WPAN subsystem as well as the mesh-security CLIs. Both WPAN and Virtual-WPAN interfaces will be supported.

Note The **install-firmware** command is excluded from this change.

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 21.

VXLAN L3 Support for the IR8340

VXLAN is a MAC in IP/UDP(MAC-in-UDP) encapsulation technique with a 24-bit segment identifier in the form of a VXLAN ID. The larger VXLAN ID allows LAN segments to scale to 16 million in a cloud network. In addition, the IP/UDP encapsulation allows each LAN segment to be extended across existing Layer 3 networks, making use of Layer 3 equal-cost multipath (ECMP).

There are three modes of configuration that have been tested.

1. VxLAN with Ingress Replication
2. VxLAN L3 VNI
3. VxLAN L2 VNI

Complete information on VXLAN is contained in the BGP EVPN VXLAN Configuration Guide.

Secure Data Wipe

This feature is to ensure the secure data wipe functionality performs the same as the other IoT routers.

Secure data wipe is a Cisco wide initiative to ensure storage devices on all the IOS XE based platforms to be properly purged using NIST SP 800-88r1 compliant secure erase commands. Whenever possible, IoT platforms will leverage the corresponding ENG design and implementation available so far on their platforms.

Performing a Secure Data Wipe

To enable the feature, perform the following:

```
Router#factory-reset all secure
The factory reset operation is irreversible for securely reset all. Are you sure? [confirm]Y
```



Important This operation may take hours. Please do not power cycle.

To check the log after the command is executed, and booting up IOS XE, perform the following:

```
Router#show platform software factory-reset secure log
Factory reset log:
#CISCO DATA SANITIZATION REPORT:# IR1800
Purge ACT2 chip at 12-08-2022, 15:17:28
ACT2 chip Purge done at 12-08-2022, 15:17:29
mtd and backup flash wipe start at 12-08-2022, 15:17:29
mtd and backup flash wipe done at 12-08-2022, 15:17:29.
```

Major Enhancements in ESR6300

There are no new features specific to the ESR6300.

Also see the Major Enhancements Common to all IoT Routers, on page 21.

Major Enhancements Common to all IoT Routers

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

Change to Smart Licensing Packaging

This release brings the IoT routing products inline with other Integrated Service Routers (ISR).

Smart Licensing Overview

Cisco Smart Licensing is a flexible licensing model that provides users with an easier, faster, and more consistent way to purchase and manage software across the Cisco portfolio and across their organization. And it's secure. With Smart Licensing users get:

- Easy Activation: Smart Licensing establishes a pool of software licenses that can be used across the entire organization—no more Product Activation Keys (PAKs).
- Cisco License Central provides a complete view into all of your Cisco products and services in an easy-to-use portal, so you always know what you have and what you are using.
- License Flexibility: Your software is not node-locked to your hardware, so you can easily use and transfer licenses as needed.

Smart Licensing Using Policy (SLP), was previously referred to as Smart Licensing Enhanced (SLE), and is the default mode starting with Cisco IOS-XE release 17.3.2. SLE replaced Smart Software Licensing. This feature change for Cisco IOS XE release 17.11.1a focuses on the licensing packaging.

License Levels

The following are the license levels available for all Cisco IR devices.

Base Licenses

- Network Essentials
- Network Advantage (includes Network Essentials)

Note These licenses are ordered through Cisco Commerce Workspace (CCW), and are permanent.

Add-on Licenses — These can be subscribed for a fixed term of three, five, or seven years.

- Digital Networking Architecture (DNA) Essentials
- DNA Advantage (includes DNA Essentials)

Note These licenses are ordered through Cisco Commerce Workspace (CCW), and relate to DNA-C and SDWAN. For further information, see the Cisco SD-WAN and Cisco DNA Center web pages.

The following tables provide details on the licensing levels:

Table 4: Network Essentials (Perpetual License)

Essential Switch Capabilities	Layer 2, Routed Access(RIP, EIGRP Stub, OSPF (1000 routes)), PBR, PIM Stub Multicast (1000 routes) PVLAN, VRRP, PBR, CDP, QoS, FHS, 802.1x, Macsec-128, CoPP, SXP, IP SLA Responder SSO **Note** For the device to be compliant with the DNA Essential License it must not exceed 1000 routes in the routing table regardless of how the routes were learned.
DevOps Integration	• Netconf, Restconf, gRPC • Yang Data Models • GuestShell (On-Box Python) • PnP Agent, ZTP

Table 5: Network Advantage (Perpetual License) Contains all of the Network Essentials plus the following:

IoT & Mobility	CoAP
Full Routing Functionality	BGP, HSRP, OSPF, ISIS,GLBP

Flexible Network Segmentation	VRF, VXLAN, LISP, SGT, MPLS
High Availability & Resiliency	NSF, GIR, Stackwise Virtual*, ISSU/eFSU, Patching (CLI)
Optimize Bandwidth Utilization with Multicast	MSDP, mVPN, AutoRP, PIM-BIDIR

Table 6: DNA Essentials (3,5,7 year terms)

Basic Automation	• PnP Application • LAN Automation • Embedded Event Manager
Basic Assurance	• Health Dashboards – Network and Client • Basic Device & Wired Client Health Monitoring

Table 7: DNA Advantage (3,5,7 year terms) Contains all of the DNA Essentials plus the following:

Advanced Automation	• Encrypted Traffic Analytics • DNA Service for Bonjour
Assurance & Analytics	• Compliance, Custom Reports • Switch 360 & Wired Client 360

Licensing Throughput Levels

In addition to configuring the license level, it is also possible to configure the throughput level on the device. The throughput level determines the bandwidth limit which is applied to encrypted traffic. There is no limit applied to the non-encrypted (clear) traffic going through a device.

Important To comply with global export regulations, if more than 250Mbs of encrypted traffic is required, then an "uncapped" – platform dependent – selection must be done on CCW, as well as an HSEC license.

This limit is imposed bidirectionally. This means that if the throughput limit is set to 250Mbps then up to 250Mbps of encrypted traffic can flow through the device in either direction. For example, the device can both receive and transmit up to 250Mbps of encrypted traffic. There is no limit applied on unencrypted traffic.

When the throughput level on the device is set to 'uncapped' there are no limits imposed on both encrypted and unencrypted traffic flowing through it.

Note To avoid confusion on throughput limits and IOS XE software releases, please note the following:

Cisco IOS XE release 17.11.1a and earlier running on the ESR6300, IR1800, and IR8140 platforms support boost, uncapped, and unlimited licenses. These are configured using the **platform hardware throughput level 2G** CLI.

Future Cisco IOS XE release 17.12.1 and later running on the ESR6300, IR1800, and IR8140 support the same licenses, but will be configured using the **platform hardware throughput level uncapped** CLI.

With future Cisco IOS XE release 17.12.1 and later, the **platform hardware throughput level 2G** and the **platform hardware throughput level uncapped** CLIs will both provide the same throughput as the uncapped license.

The following table shows the throughput limits (also referred to as Tier license) supported on IoT devices as of Cisco IOS XE 17.11.1a release.

Platform	25 Mbps bidirectional (Tier 0)	50 Mbps bidirectional	Up to 200 Mbps bidirectional (Tier 1)	250 Mbps bidirectional	2 Gbps	Uncapped (Tier 2)
ESR 6300	N/A	Yes	N/A	Yes	Yes	To be supported starting with 17.12.1
ESR-6300-LIC-K9	N/A	Yes	N/A	N/A	N/A	Yes
IR1101	N/A	N/A	N/A	Yes	N/A	Supported starting with 17.10.1.
IR1800	N/A	Yes	N/A	Yes	Yes	To be supported starting with 17.12.1
IR8100	N/A	Yes	Yes	Yes	Yes	To be supported starting with 17.12.1
IR8300	Yes	N/A	Yes	N/A	N/A	Yes

Command Line Interface

The following commands are available:

license boot level *<network-essentials/network-advantage>*

The throughput level can be configured using the following CLI on all IR devices except IR8300:

platform hardware throughput level *<limit>*

On the IR8300, the throughput level can be configured using the following CLI:

platform hardware throughput crypto *<limit>*

To see the throughput configured on the device, use the following CLI:

```
show version | include throughput
The current crypto throughput level is: 50000 kbps
```

Galileo Support on the LTE Pluggable Modules

GPS was the only GNSS constellation supported in earlier releases. The Cisco IOS XE 17.11.1a release introduces support for Galileo constellation.



Note You can enable only one constellation at a time.



Note These examples use the <slot/port> number for the IR8140 router. Use the <slot/port> number that matches your router model.

Configuration Commands

```
config# controller cellular <slot/port>
(config-controller)# <no> lte gps constellation <gps | galileo | gnss >
```

Example:

```
(config-controller)#lte gps constellation ?
  galileo  select Galileo as active constellation
  gps      select GPS as active constellation
  gnss      select multiple GNSS as active constellation
```



Note The default setting is GPS mode.

The galileo and gnss options in this CLI configure Galileo and simultaneous GNSS modes, such as GPS and Galileo.

If you disable the GPS configuration, make sure that no constellation is configured. This maintains consistency with GPS mode configuration. For example:

```
config# controller Cellular 0/2/0
(config-controller)# no lte gps constellation gps
```

Show Commands

This example shows the current GNSS constellation as Galileo:

```
#show cellular 0/2/0 gps detail
GPS Feature =  enabled
GPS Mode Configured =  standalone
Current Constellation Configured =  galileo
GPS Port Selected =  Dedicated GPS port
GPS Status =  GPS acquiring
```

Any changes made to the configuration will require the router to be rebooted.

More information is available in the Cellular Pluggable Interface Module Configuration Guide.

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

Cisco ESR6300 Embedded Series Router

ESR6300 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).

IOx on the ESR6300

Note IOx development is not supported on the ESR6300. While this is platform independent code, it is unsupported and untested on this device.

Deprecation of Weak Ciphers in Cisco IOS XE Release 17.11.1 and Later

The minimum Rivest, Shamir, and Adleman (RSA) key pair size must be 2048 bits. The compliance shield on the device must be disabled using the crypto engine compliance shield disable command to use the weak RSA key.

For additional information see Field Notice: FN - 72511 - RSA Keys Less Than 2048 Bits Are Not Supported for SSH in Cisco IOS XE Release 17.11.1 and Later - Workaround Provided.

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 and ESR6300 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.

SSH Algorithms for Common Criteria Certification Limitation

Starting from Cisco IOS XE Release 17.10, the following Key Exchange and MAC algorithms are removed from the default list:

- Key Exchange algorithm:
  - diffie-hellman-group14-sha1
- MAC algorithms:
  - hmac-sha1
  - hmac-sha2-256
  - hmac-sha2-512

Note You can use the **ip ssh server algorithm kex** command to configure the Key Exchange algorithm and the **ip ssh server algorithm mac** command to configure the MAC algorithms.

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 17.11.1a

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

Identifier	Description	Platform
CSCwc31184	FN980: ATT sim attached with wrong profile during sim switching.	P-5GS6-GL
CSCwa76815	Line range limitations on controller mode.	IR1101
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
CSCwb40769	PTP Dot1as Latency accuracy is seen 13ms on latest 1781 image	IR8340

Identifier	Description	Platform
CSCvz19429	PTP Forward mode functionality is not working.	IR8340
CSCvw58347	Last reporter of IGMPV3 report is all "0" if receiver connected on SVI interface.	IR8340
CSCwc28468	SDWAN mode: vManage always fails to push any template to device if device is running in FIPS mode.	ESR6300
CSCwd09947	Day0 Webui Error: Router failed to issue 192.168.x.x address to workstation for dayzero WebUI launch.	IR1101 IR1800
CSCwd58723	IR1100 crashes with concurrent IPSec traffic and macsec traffic (device to client).	IR1101
CSCwd38611	FN980 modem is not showing in show inventory after multiple modem-power cycle.	P-5GS6-GL
CSCwf22381	WAN SFP link goes down after reloading Peer.	IR1800
CSCwf84896	Bootflash doesn't have enough space to install new image	IR1101

Resolved Caveats in Cisco IOS XE 17.11.1a

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

Identifier	Description	Platform
CSCwd56131	LTE modem doesn't show GSM bands. **Note** This defect started with release 17.5.1	IR1101
CSCwd28373	ESR-6300 can´t ping from SVI to another ESR-6300 SVI.	ESR 6300
CSCwc25912	PUNT Policer messages when DLEP conf is attached.	ESR6300
CSCwc24547	Cellular serviceability feature is not enabled on IR8340	IR8340

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