Cisco IOS Release 15.6(3)M2 - Release Notes for Cisco IR800 Industrial Integrated Services Routers and Cisco 1000 Series Connected Grid Routers

The following release notes support the Cisco IOS Releases 15.6(3)M2 release. These release notes are updated to describe new features, limitations, troubleshooting, recommended configurations, caveats, and how to obtain support and documentation.

Contents

This publication consists of the following sections:

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Image Information and Supported Platforms

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

Cisco IOS Release 15.6(3)M2 includes the following Cisco IOS images:

- System Bundled Image: ir800-universalk9-bundle.SSA.156-3.M2.bin

  This bundle contains the following components:

  - IOS: final version 15.6(3)M2, RELEASE SOFTWARE (fc2)
  - Hypervisor: 2.6.23
  - FPGA: 2.6.0
  - BIOS: 13
  - MCU Bootloader : 28
  - MCU Application: 31
  - Guest Operating System: Cisco-GOS,version-1.3.2.3
- System Bundled image: cgr1000-universalk9-bundle.SSA.156-3.M2
  - IOS Version: 15.6(3)M2, RELEASE SOFTWARE (fc2)
  - Hypervisor: 2.0.12
  - FPGA: 2.9.0
  - BIOS: 14
  - Guest Operating System: Cisco-GOS,version-1.2.5.2

The latest downloads for the IR809 and IR829 can be found at:

https://software.cisco.com/download/navigator.html?mdfid=286287045&flowid=75322

Click on the 829 or 809 link to take you to the specific software you are looking for.

Software on the Chassis includes:

- IOS Software
- IOx Cartridges
- IOx Fog Node Software

The IR829 also includes downloads for the AP803 Access Point Module:

- Autonomous AP IOS Software
- Lightweight AP IOS Software

The latest image file for the CGR 1000 Series Cisco IOS image is:

https://software.cisco.com/download/navigator.html?mdfid=284165761&flowid=75122

Note The ir800-universalk9-bundle.SPA.156-3.M2.bin bundle can be copied via Trivial File Transfer Protocol (TFTP) or SCP to the IR800, and then installed using the `bundle install flash:<image name>` command. The ir800-universalk9-bundle.SPA.156-3.M2.bin file can NOT be directly booted using the `boot system flash:/image_name`. Detailed instructions are found in the Cisco IR800 Integrated Services Router Software Configuration Guide.

Note The cipher **dhe-aes-256-cbc-sha** (which is used with the commands **ip http client secure-ciphersuite** and **ip http secure-ciphersuite**) is no longer available in IOS 15.6(3)M and later as part of the weak cipher removal process. This cipher was flagged as a security vulnerability.

Caution A problem exists where the MCU upgrade fails to complete and the IR829 stays in bootloader mode. The router will get stuck in ROMMON and must be RMA to Cisco. The IR829 should only be upgraded to IOS version 15.6(3)M*x*. For example:
If the IR829 is running 15.5(3)M1, DO NOT upgrade to 15.5(3)M2. Go straight to 15.6(3)M*x*.

For details on the CGR1000 installation, please see:

http://www.cisco.com/c/en/us/td/docs/routers/connectedgrid/cgr1000/ios/release/notes/OL-31148-05.html#pgfId-998856

Note Special note for the CGR2K platforms:
Customers using a 4G card should not update to this release. The 77XX modem is not supported.

Known Limitations

This release has the following limitations or deviations for expected behavior:

On the IR800 series routers, there exists a condition where CAF may not be able to start, and Local Manager/Fog Director/ioxclient connectivity/management will not work. The problem occurs when you have Linux Containers (LXC) or Docker applications deployed prior to version 1.2.4.4 or later (for example: 1.0.0.4, 1.1.0.4, 1.2.4.2).

In order to correct this condition, you will have to uninstall the Docker or LXC applications prior to installing the new IR800 IOX image 1.2.4.4 or later, or the IR800 bundle image 15.6(3)M2 or later.

Then you will need to re-compile/re-image the Docker or LXC applications with the newer kernel version (for example from 3.19 to 4.1.30). At this point, you will be able to deploy them after the new IOX 1.2.4.4 (or later) installation.

Note: Starting with Cisco IOS release 15.6(3)M2 or later, IR800 IOX (either Ref Image or signed Dev-Net image) will be based on MontaVista CGX 2.0.0 Linux with the kernel 4.1.30-rt34-yocto-standard.

Caveat CSCvf76265 crosses over several different IOS software releases, and is a platform driver code issue. It is included here as a known limitation with the IR800 and CGR Industrial Routers.

On both the CGR1000 and IR800, the core dump fails to write into the local flash. The IOS is running as a virtual machine and then hypervisor is running underneath. The local flash is provided by the hypervisor as a virtual disk. When a crash occurs, this virtual disk is no longer available therefore copying to flash will fail. The workaround is to use an ftp server to copy the core dump to.

Cellular Interface Naming Convention

There has been some confusion regarding to the naming change for the cellular interfaces. Refer to the following for details.

Router	Controller	SIM	Modem Slot	PDN Interface	Line
IR829	0	0|1	0	Cellular 0	3
IR829	0	0|1	0	Cellular 1	8
IR829 (dual modem) *	0	0	0	Cellular 0/0	3
IR829 (dual modem) *	0	0	0	Cellular 0/1	8
IR829 (dual modem) *	1	1	1	Cellular 1/0	9
IR829 (dual modem) *	1	1	1	Cellular 1/1	15
IR809	0	0|1	0	Cellular 0	3
IR809	0	0|1	0	Cellular 1	8
CGR1120	0	0|1	3/1	Cellular 3/1	3/1
CGR1120 (dual modem) *	0	0	3/1	Cellular 3/1	3/1
CGR1120 (dual modem) *	1	1	4/1	Cellular 4/1	4/1
CGR1240	0	0|1	3/1	Cellular 3/1	3/1
CGR1240(dual modem) *	0	0	3/1	Cellular 3/1	3/1
CGR1240(dual modem) *	1	1	6/1	Cellular 6/1	6/1

Note * As of Release 15.5(3)M2, the only dual-modem scenario supported is two MC7455 modems in both IR829 and CGR1000. You cannot mix modem types.

Major Enhancements

This release includes the following enhancements:

Support for New IR809 SKU

Support has been added for a new addition to the IR809 SKUs to support the Sierra Wireless modem MC7430 in the Asia and Pacific theaters. The new SKU is the IR809G-LTE-LA-K9.

The new SKU appears as in the following examples:

```
IR800#show inventory
NAME: "IR809G-LTE-LA-K9", DESCR: "IR809G-LTE-LA-K9 chassis"
PID: IR809G-LTE-LA-K9  , VID: V00, SN: JMX1934X012

NAME: "Modem 0 on Cellular0", DESCR: "Sierra Wireless MC7430 4G-LA"
PID: MC7430            , VID: 1.0, SN: 355812070058796

IR800#show cellular 0 hardware
Modem Firmware Version = SWI9X30C_02.04.07.00
Modem Firmware built = 2015/11/04 06:51:37
Hardware Version = 1.0
Device Model ID: MC7430
International Mobile Subscriber Identity (IMSI) =
International Mobile Equipment Identity (IMEI) = 355812070058796
Integrated Circuit Card ID (ICCID) =
Mobile Subscriber Integrated Services
Digital Network-Number (MSISDN) =
Modem Status = Online
Current Modem Temperature = 49 deg C
PRI SKU ID = 1102644, PRI version = 000.002, Carrier = Telstra
OEM PRI version = 000.002

IR800#show interface cellular 0
Cellular0 is up (spoofing), line protocol is up (spoofing)
  Hardware is 4G WWAN Modem - Global (APAC & LATAM) Multimode
LTE/DC-HSPA+/HSPA+/HSPA/UMTS/ED
  Internet address will be assigned dynamically by the network
  MTU 1500 bytes, BW 9 Kbit/sec, DLY 100000 usec,
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation SLIP, loopback not set

IR800#show snmp sysobjectid
1.3.6.1.4.1.9.1.24xx   !New OID
```

SFP Support on the IR829

On the IR829, the WAN port GE0 is an SFP port. It can accept either a fiber SFP or Copper SFP. The speed is fixed at 100Mbps or 1Gbps depending on the SFP installed.

Note Speed and duplex commands are not available on the GE0 WAN interface.

The following two Copper SFPs (non I-temp) will be officially supported at 1Gbps:

- Copper SFP - GLC- T
  - Copper 1Gbps, (0 to 70°C), CPN is 30-1410-04
- Copper SFP - SFP-GE-T
  - Copper 1Gbps, (-5 to 85°C), CPN is 30-1421-02

Additional SFPs with added support are:

- GLC-FE-100LX-RGD
  - Fiber (fixed speed of 100Mbps)
- GLC-FE-100FX-RGD
  - Fiber (fixed speed of 100Mbps)
- GLC-TE
  - Copper (fixed speed of 1Gbps)
- GLC-FE-T=
  - Copper 100Mbps

Note Auto negotiation is not supported on these SFPs.

See the Cisco IR829 Industrial Integrated Services Router Hardware Installation Guide for additional information.

Bridge Virtual Interface Support for IR800 Guest-OS

Prior to 15.6(3)M2, only the gigabit ethernet interface was supported as a guest-os interface. Starting with this release, BVI is supported as well.

SSD Lifetime and USB Power Consumption Calculation for Server Module

In the 15.6(3)M2 release, users can check the approximate percentage of remaining SSD lifetime of the storage flash on the server module. Users can also check the power consumption (in mW) of USB drives being connected to the USB ports in the front panel of server module.

Example:

```
Router# show iox host list detail
IOX Server is running. Process ID: 325
Count of hosts registered: 1
```

```
Host registered:
===============
IOX Server Address: FE80::BE16:65FF:FE31:564A; Port: 22222
Link Local Address of Host: FE80::280:FFF:FE11:7000
IPV4 Address of Host: 192.168.168.2
IPV6 Address of Host: fe80::280:fff:fe11:7000
Client Version: 0.4
Session ID: 5
OS Nodename: CGM-Router
Host Hardware Vendor: Cisco Systems, Inc.
Host Hardware Version: 1.0
Host Card Type: not implemented
Host OS Version: 1.3.1.1
OS status: RUNNING
Percentage of SSD
Lifetime remaining: 100
USB power consumed: 200
Interface Hardware Vendor: None
Interface Hardware Version: None
Interface Card Type: None
```

CGR1000 GOS image includes full CAF Support for Local Manager and Fog Director

In the 15.6(3) M2 release, the CGR1000 bundle image will include a new GOS image with full CAF support for Local Manager and Fog Director (1.30 or later). However, for this new GOS image, Cisco only supports PaaS process container apps. The regular PaaS apps or Docker/Container apps are not supported.

New Features for LTE Modems

New features added for LTE cellular modems are:

- Assisted-GPS support on IR800 MC73xx modems
- Multi-PDN support on IR800 MC73xx and MC74xx modems
- 2000B MTU support on cellular interface for IR800 and CGR1000 MC73xx modems

Related Documentation

The following documentation is available:

- Cisco IOS 15.6(3)M cross-platform release notes:

  http://www.cisco.com/c/en/us/td/docs/ios/15_6m_and_t/release/notes/15_6m_and_t.html
- All of the Cisco IR800 Industrial Integrated Services Router documentation can be found here:

  http://www.cisco.com/c/en/us/support/routers/800-series-industrial-routers/tsd-products-support-series-home.html
- All of the Cisco CGR 1000 Series Connected Grid Routers documentation can be found here:

  http://www.cisco.com/c/en/us/support/routers/1000-series-connected-grid-routers/tsd-products-support-series-home.html

Caveats

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

Note You must have a Cisco.com account to log in and access the Cisco Bug Search Tool. If you do not have one, you can register for an account.

For more information about the Cisco Bug Search Tool, see the Bug Search Tool Help & FAQ.

Cisco IOS Release 15.6(3)M2

The following sections list caveats for Cisco IOS Release 15.6(3)M2:

Open Caveats

- **CSCvd70062**

  The running-config always shows the `gyroscope-reading enable` setting even if the feature is disabled. The default setting for the gyroscope-reading feature is disabled, and the setting is supposed to be `no gyroscope-reading enable` in the running-config.

  Workaround:

  Issue the EXEC command **`show platform gyroscope-data`** to check whether the feature is actually enabled or disabled.

- **CSCvc12365**

  On the 800 series routers, configured with Dialer Watch configurations, if the interface cellular is up and device is reloaded, the dial-out does not happen and IP does not appear on cellular interface.

  Workaround:

  Perform a shut then noshut on the cellular interface.

- **CSCvc53663**

  On the CGR1K series, SSH enabling/disabling for IOX does not work consistently.

  When SSH server is enabled or disabled in GOS VM using the i`ox host exec disablessh/enablessh xxxx command`, the operation may randomly fail or succeed.

  Workaround:

  Repeat the command several times until it succeeds.

- **CSCvc80191**

  On the CGR1K series, an ungraceful IOX shutdown may cause previously running apps to get stuck in deployed or failed state after booting.

  If an app is deployed and running and the device is power-cycled or the GOS VM is ungracefully restarted, the app may be stuck in deployed or failed state after booting.

  Workaround:

  Uninstall the app prior to power-cycling the router or ungracefully restart the GOS VM. Re-install the app after booting.

- **CSCvc81796**

  Cgroups error message may occasionally show up during apps operations, such as install/uninstall.

  When an app is installed or uninstalled, this error message may show up in the GOS VM console:

  `/software/apps/work/repo-proc# cgroup: cgcreate (762) created nested cgroup for controller "memory"`
  which has incomplete hierarchy support. Nested cgroups may change behavior in the future. cgroup: "memory" requires setting `use_hierarchy` to 1 on the root.

  Workaround:

  None

- **CSCvd76690**

  Bundle install redundant lengthy time-out right after reload.

  On the IR800 series, right after router reboot, the IOS-VDS hb failure syslog message comes in quite late. Because of this, if the user erroneously tries a bundle install, the following is observed:

  Expected - Bundle install should immediately timeout/fail stating vds not up

  Observation - Bundle install continues for next 15 minutes and then times out.

  Expected - VDS eventually comes up within a minute or two, and can be reached

  Observation - Even though VDS is now accessible, bundle install continues to timeout. So no value add in letting it run.

  Workaround:

  Ping the IP address 127.1.3.1. Proceed with bundle install only if the ping to VDS succeeds.

- **CSCvd74884**

  On repeated reload, MCU reattempts to upgrade application firmware.

  This problem occurs very rarely on the IR800 series. Observed syslog:

  %NOTICE: The system booted with MCU in bootloader mode, which triggers the MCU upgrade.For MCU upgrade, MCU must be in bootloader mode. MCU is going to bootloader mode This might cause System reload.

  Workaround:

  Device eventually comes back up in a couple of reboots.

- **CSCvd74257**

  BVI host list detail only shows IPv6 , not IPv4 address.

  On the IR800 series, IPv4 address does not show up in host list detail. Functionally no impact to Guest-OS, user can ping, ssh IOx v4 interface. It is just TPM issue.

  Workaround:

  Reboot router. No functional impact of defect.

- **CSCvd74252**

  SFP-GE-T in IR829 throws traceback as unrecognized device.

  Workaround:

  ```
  conf t
  service internal
  service unsupported-transceiver
  SFP shows up.
  ```

  Sometimes on system reload it recovers as well.

- **CSCvd47333**

  On the IR800 series, GOS restart times out with multiple applications running.

  With the new graceful shutdown of applications implementation, CAF takes longer to shutdown the apps. GOS restart times out.

  Workaround:

  Wait for 5 minutes. Applications should come up by themselves.

- **CSCvb44930**

On the CGR1K, firmware upgrade fails with an error code 105. Seen on both the MC7430 and MC7455 modems.

Workaround: Reload the router.

- **CSCvf91570**

  On the CGR1K, Third-party modules may show power sequence error when powering up.

  Conditions: Starting with Cisco IOS version 15.6(3)M1b, whenever a third-party module is powered up, the following power sequence error log message may be generated.

```
CGR1000_JAF1626BLCM(config)#no hw-module poweroff 5
CGR1000_JAF1626BLCM(config)#
Sep 11 11:50:45.317 PDT: %CGR1K_SYS-3-MODULE_POWER_SEQ: Module power sequence error,
slot 5 error 5 data 1101
```

  This is due to an enhancement for power sequence error reporting to ensure that Cisco modules are properly powered up. However, for third-party modules, such power sequence error may be safely ignored as long as the module does not have any temperature sensor.

  Workaround: None

- **CSCvf75957**

  Problem Description:

  Bundle install failure/timeout, IOx failure

  Symptoms:

  1. ping to VDS fails:

```
router#ping 127.1.3.1
```

  2. bundle install times out
  3. iox applications are not accessible anymore

  Conditions:

  Typically, when the router is left idle for many weeks and months, there is a possibility to observe this when upgrading to the next software image.

  Root Cause:

  Root cause was that dual modem logs in VDS were not rotating and size increased in time. Due to lack of memory, bundle install attempts failed. Reload the router before reattempting bundle install and image upgrade.

  Issue is seen in all software images supporting dual modem [15.6(3)M and beyond]

  Workaround:

  Reload IOS and system will recover.

- **CSCvd41974**

  Problem Description:

  On IR829 and IR809 platform, there is a Wpan2 interface shown by default in 15.6(3)M2 and beyond software images.

  Condition:

  The show run command will by default show an additional interface, regardless of whether LoRa modem is attached or not.

```
router#show run int wpan 2
Building configuration...
```

```
Current configuration : 78 bytes
!
interface Wpan2
 no ip address
 ieee154 txpower 25
 no ieee154 fec-off
end
```

Workaround:

None

Closed Caveats

The following caveats are fixed with this release:

- **CSCvd16505**

  On the IR829, a rare condition occurred where the device may shut down due to the ignition timer turning on.

  Symptoms: Happens with MCU Firmware 28, Application 30. show ignition shows timer has started countdown to shut-down. Since it is unpredictable, difficult to monitor at all times.

  Workaround: Power device back on. Or upgrade to 15.6(3)M2 with fix as part of MCU Application version 31.

- **CSCvc53541**

  Application Hosting from IOx may not work even if the software is upgraded to the latest working software [15.6(3)M2 and beyond] with the fix. Once the user hits this issue with older versions, following the manual workaround is mandatory.

  Symptoms:

  - No access to local manager
  - Cannot access device from fog director
  - unable to manually start applications
  - CAF does not start
  - The product ID value in CAF is 'default', when it should update with the product ID sent by IOS.

  Workaround:

4. Login to IOx. The simplest method is to reverse telnet to the g0 interface on an IR809, or the g5 interface on an IR829 using port 2070. For Example:

   ```
   IOS# telnet 9.1.2.2 2070
   ```

5. Ensure Line1/4 has '`transport input/output all`' on it.
6. Ensure IPv6 is enabled in the IOx interface.
7. Once logged in, check the following:

   ```
   #monit summary
   ```

   The most likely status is that CAF will be stopped.

8. To resolve the problem:

   ```
   # cd /software/caf/work
   # vi product_id
   Manually delete 'default'
   ```

```
Manually edit the Product_ID of the device to reflect your product ID
For example: IR829GW-LTE-NA-AK9
```

9. Restart CAF again.

```
# monit start caf
```

10. Verify that CAF is up.

```
# monit summary
```

CAF should be in a RUNNING state.

- **CSCvc64283**

  Memory leaks on the CGR 1000.

  Symptoms: There is no specific condition for the leak to be seen. The leak happens in the background.

  Workaround: Resolved
