

Release Notes for the Cisco LoRaWAN Gateway, Release 2.0.30

First Published: 2018-04-18

Last Modified: 2018-05-03

Release Notes for the Cisco LoRaWAN Gateway, Release 2.0.30

These release notes include important information about Cisco LoRaWAN Gateway Software Release 2.0.30 and the limitations, restrictions, and caveats, if any, that apply to this release.



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.

Introduction

The Cisco LoRaWAN Gateway is one of the Cisco Internet of Things (IoT) extension module series. It can be connected to the Cisco 809 and 829 Industrial Integrated Services Routers (IR800 series) for virtual mode or standalone for low-power wide-area (LPWA) access and is positioned as a carrier-grade gateway for outdoor deployment, including harsh environments. It adds a ruggedized remote LoRaWAN radio modem interface to create a gateway between the Cisco Field Network Director and a partner's LoRa network server.



Note The Cisco LoRaWAN Gateway was previously named Cisco LoRaWAN Interface Module.

There are two LoRaWAN gateway modes as below:

- Virtual interface mode – IR800 series including the LoRaWAN module as a virtual interface
- Standalone mode – The LoRaWAN module working alone as an Ethernet backhaul gateway

You can configure the LoRaWAN IXM running on virtual interface mode or standalone mode through CLI or IoT FND. For more information, see the [Cisco Wireless Gateway for LoRaWAN Software Configuration Guide](#).

System Requirements

Hardware Supported

Model No.	Description
IXM-LPWA-800-16-K9	Cisco LoRaWAN Gateway, IoT extension module series, radio spectrum from 863–870 MHz, 16 LoRa channels, IP67
IXM-LPWA-900-16-K9	Cisco LoRaWAN Gateway, IoT extension module series, radio spectrum from 902–928 MHz, 16 LoRa channels, IP67

Software Images

Filename	Description	LoRa Forwarder Package (LRR) Version
ixm_mdm_i_k9-2.0.30.tar.gz	Cisco LoRaWAN Gateway OS Image Version 2.0.30 with Semtech Release Version 2.3.0, FPGA Version 61, and HAL Version 5.1.0	LRR 2.2.82 Note The LoRa Forwarder Package is provided by Activity Thingpark. For other third party Network Server, it is vendor dependent.



Note The LRR version has dependencies with the IXM LoRaWAN firmware/FPGA/HAL release. Contact your Cisco representative if you are using different versions.

Installation of a New Software Release

For both standalone mode and virtual mode, after you upgrade the LoRaWAN gateway to Release 2.0.30, you can only downgrade to Release 2.0.20. Downgrading to releases earlier than 2.0.20 is not supported. For example, from Release 2.0.30 to Release 2.0.11, or from Release 2.0.30 to Release 2.0.10, is not supported..

To upgrade to Release 2.0.x, any older versions must first be upgraded to Release 1.0.20. For example, Release 1.0.4, 1.0.5, or 1.0.6 has to be upgraded to 1.0.20 first and then upgraded to Release 2.0.x.

Virtual Mode Installation



Note Before upgrading to Release 2.0.x from Release 1.0.x, make sure you have the FPGA v58 properly installed. The FPGA upgrade will be triggered once the IXM boots up with the image version 1.0.20. After 10 - 15 minutes, you can use the following command to check the FPGA version. Do not install the packet forwarder software or perform radio related configuration while the FPGA is upgrading or downgrading.

```
IR829#show virtual-lpwa 10 modem info
Name : Virtual-LPWA 10
ModemImageVer : 2.0.30
BootloaderVer : 20180130_cisco
ModemAgentVer : 1.02
SerialNumber : FOC20394AEB
PID : IXM-LPWA-800-16-K9
UTCTime : 02:36:09.431 UTC Fri Aug 12 2016
IPv4Address : 192.168.100.2
IPv6Address : none
FPGAVersion : 61
TimeZone : CST
LocalTime : Fri Aug 12 10:36:09 CST 2016
ACT2 Authentication : PASS
ModemVersionID : V01
ProtocolVersion : 2
ChipID : LSB = 0x286cf912 MSB = 0x00f14392
LoRaSerialNumber : FOC20427A86
LoRaCalc :
<142,130,122,114,106,102,98,94,85,76,67,58,50,45,41,37-141,129,121,113,105,101,97,93,84,75,66,57,49,44,40,36>
CalTempCelsius : 34
CalTempCodeAD9361 : 91
RSSIOffset : -204.86,-203.58
AESKey : Unknown
```

Follow this procedure to upgrade to Release 2.0.x:

Procedure

- Step 1** Log in to the IR809 or IR829 system with terminal through SSH or Console.
- Step 2** Copy the image file into IR809 or IR829 from your host, and the image will be stored in flash.

Example:

```
IR829#copy ftp://root:cisco@192.168.0.1/temp/ixm_mdm_i_k9-2.0.x.tar.gz flash:
Destination filename [ixm_mdm_i_k9-2.0.x.tar.gz]?
Accessing ftp://*:*@192.168.0.1/temp/ixm_mdm_i_k9-2.0.x.tar.gz...
Loading temp/ixm_mdm_i_k9-2.0.x.tar.gz
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
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!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
[OK - 70138462/4096 bytes]

70138462 bytes copied in 247.056 secs (283897 bytes/sec)

IR829#dir | include ixm
```

```
68 -rw- 70138462 Jun 2 2017 17:56:22 +00:00 ixm_mdm_i_k9-2.0.x.tar.gz
```

Step 3 (Optional) If you are upgrading from an older version to Release 1.0.20, the upgrade will result in updating the FPGA to version 61. After upgrading the image, no action should be taken while the FPGA is upgrading. You must wait until you get the upgrade status of Ready, as the following example shows.

Example:

```
IR829#show virtual-lpwa 1 modem status
```

```
Name : Virtual-LPWA 1
Status : Running
Uptime : 0:05:02.130000
Door : DoorClose
```

Upgrade Status : Ready

```
IR829#show virtual-lpwa 10 modem info
```

```
Name : Virtual-LPWA 10
ModemImageVer : 2.0.28.900
BootloaderVer : 20180130_cisco
ModemAgentVer : 1.02
SerialNumber : FOC20394AEB
PID : IXM-LPWA-800-16-K9
UTCTime : 02:38:12.143 UTC Fri Aug 12 2016
IPv4Address : 192.168.100.2
IPv6Address : none
FPGAVersion : 61
TimeZone : CST
LocalTime : Fri Aug 12 10:38:12 CST 2016
ACT2 Authentication : PASS
ModemVersionID : V01
ProtocolVersion : 2
ChipID : LSB = 0x286cf912 MSB = 0x00f14392
LoRaSerialNumber : FOC20427A86
LoRaCalc :
<142,130,122,114,106,102,98,94,85,76,67,58,50,45,41,37-141,129,121,113,105,101,97,93,84,75,66,57,49,44,40,36>
CalTempCelsius : 34
CalTempCodeAD9361 : 91
RSSIOffset : -204.86,-203.58
AESKey : Unknown
```

Step 4 Upgrade the firmware to Release 2.0.x using the following factory install CLI:

```
IR829#virtual-lpwa 1 modem install firmware factory flash:ixm_mdm_i_k9-2.0.x.tar.gz
```

Step 5 After the image is installed successfully, verify the status. As shown in the following output, **ModemImageVer** has been updated, but **BootloaderVer** remains the same.

Example:

```
IR829#show virtual-lpwa 10 modem info
```

```
Name : Virtual-LPWA 10
ModemImageVer : 2.0.28.900
BootloaderVer : 20180130_cisco
ModemAgentVer : 1.02
SerialNumber : FOC20394AEB
PID : IXM-LPWA-800-16-K9
UTCTime : 02:38:12.143 UTC Fri Aug 12 2016
IPv4Address : 192.168.100.2
```

```

IPv6Address : none
FPGAVersion : 61
TimeZone : CST
LocalTime : Fri Aug 12 10:38:12 CST 2016
ACT2 Authentication : PASS
ModemVersionID : V01
ProtocolVersion : 2
ChipID : LSB = 0x286cf912 MSB = 0x00f14392
LoRaSerialNumber : FOC20427A86
LoRaCalc :
<142,130,122,114,106,102,98,94,85,76,67,58,50,45,41,37-141,129,121,113,105,101,97,93,84,75,66,57,49,44,40,36>
CalTempCelsius : 34
CalTempCodeAD9361 : 91
RSSIOffset : -204.86,-203.58
AESKey : Unknown

IR829#

```

Step 6 Upgrade the firmware to Release 2.0.x using the same CLI with uboot or uboot-only option:

```

IR829#virtual-lpwa 1 modem install firmware factory flash:ixm_mdm_i_k9-2.0.x.K1.tar.gz ?
no-uboot      install without uboot
only-uboot    install uboot only
uboot         install uboot together
<cr>

```

Note This step is to upgrade the uboot options if the device is upgraded to Release 2.0.x for the first time, because the uboot options are not available for Release 1.0.20. Additionally, to use these uboot options in IR8x9, you must upgrade the IOS image of IR8x9 to Release 15.7(3)M2.

Note If certificates for IPsec have been persistently stored in the module in any image before 2.0, follow this procedure during an upgrade to image 2.0 and later. This applies to both factory and normal upgrades and must be done for proper behavior of the module.

- a. Erase the certificates.
- b. Upgrade the image.
- c. Re-download the new certificates.

Step 7 After the image is installed successfully, verify the status. You will find from the output that both **ModemImageVer** and **BootloaderVer** have been upgraded.

Example:

```

IR829#show virtual-lpwa 10 modem info
Name : Virtual-LPWA 10
ModemImageVer : 2.0.28.900
BootloaderVer : 20180130_cisco
ModemAgentVer : 1.02
SerialNumber : FOC20394AEB

```

Firmware Upgrade From Standalone Mode



Note We assume that you have the latest FPGA v58. If you have loaded any recent release like 2.0.10 or 2.0.11 on the IXM, use the **show inventory** command to check the FPGA status. If the FPGA version is not 58, upgrade first with an image that has FPGA v58.

Refer to the release support matrix on various FPGA version and LRR version support.

Follow these steps to install a new software image on the standalone mode LoRaWAN Gateway:

Procedure

Step 1 Log into the Cisco LoRaWAN Gateway through the console port, or SSH if configured.

Note The console port is 115.2kbs.

Step 2 Check the current version before upgrade.

Example:

```
IXM1#show version
Corsica Software, Version 2.0.11, RELEASE SOFTWARE
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 2012-2014, 2017 by Cisco Systems, Inc.
Compiled 18-Sep-2017.16:19:04UTC-07:00 by Corsica Team
```

```
ROM: Bootstrap program is Corsica boot loader
Firmware Version : 2.0.11, RELEASE SOFTWARE
Bootloader Version: 20180130_cisco
```

```
Hostname:ipsectesting uptime is 21 hours, 45 minutes
Using secondary system image
```

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A summary of U.S. laws governing Cisco cryptographic products may be found at: <http://www.cisco.com/wwl/export/crypto/tool/stqrg.html>

If you require further assistance please contact us by sending email to export@cisco.com.

```
cisco model: IXM-LPWA-900-16-K9
Processor : ARMv7 Processor rev 1 (v7l) with 1027308K bytes of memory.
Last reset from power-on
```

```
Base ethernet MAC Address : 00:50:43:00:02:01
Model revision number: : C0
System serial number: : FOC21028RFP
```

Step 3 Download the image file to the Cisco LoRaWAN Gateway from a TFTP server or from a USB device, and install the image.

Note To download the firmware from an USB device, you should first enable the USB support by executing the **usb enable** command.

Use the following command to download and install the firmware.

```
#archive download-sw firmware{/factory|/normal [/save-reload|/force-reload]}
  path
```

- **/factory** – Upgrade the firmware and delete user data.

Note Avoid using the **/factory** option with this command, because it erases everything and brings back to factory default.

- **/normal** – Upgrade the firmware and keep user data.
- **/save-reload** – Save the current configuration if required and reload the system after successful upgrade.
- **/force-reload** – Do not save the current configuration and reload the system after successful upgrade.
- **path** - The location of the file, which can be usb:, tftp, ftp, or flash:

Example:

```
IXM1#archive download-sw firmware /normal /save-reload
tftp://172.27.74.9/tftpboot/vnallamo/ixm_mdm_i_k9-2.0.30.tar.gz
```

```
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```

```
Download 69253722 bytes took 00:01:31 [hh:mm:ss]
Validating archive...
Validation successful
Extracting images...
Extracted images successfully
Verifying images...
Verification successful
Installing firmware in factory mode...
Background daemon shutting down..
lxcbr0: port 1(veth8ADXTY) entered disabled state
device veth8ADXTY left promiscuous mode
lxcbr0: port 1(veth8ADXTY) entered disabled state
Installation successful!!
System will reload in few seconds...
```

Step 4 After the image is installed successfully, verify the status.

Example:

```
Gateway#show version
Cisco LoRaWAN Gateway Software, Version 2.0.28.900, RELEASE SOFTWARE
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 2012-2018 by Cisco Systems, Inc.
Compiled 1970-01-01 by Cisco LoRaWAN Gateway Team
```

```
ROM: Bootstrap program is Cisco LoRaWAN Gateway boot loader
Firmware Version : 2.0.30, RELEASE SOFTWARE
Bootloader Version: 20180130_cisco
```

```
Hostname:Gateway uptime is 2 minutes
Using secondary system image
```

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A summary of U.S. laws governing Cisco cryptographic products may be found at: <http://www.cisco.com/wwl/export/crypto/tool/stqrg.html>

If you require further assistance please contact us by sending email to export@cisco.com.

```
cisco model: IXM-LPWA-800-16-K9
Processor : ARMv7 Processor rev 1 (v7l) with 1027528K bytes of memory.
Last reset from power-on
```

```
Base ethernet MAC Address : 00:50:43:DF:45:2B
Model revision number: : B0
System serial number: : FOC20394AJC
```

Step 5 Check the FPGA status using the following command:

Example:

```
Gateway#show inventory
Name : Gateway
ImageVer : 2.0.30
BootloaderVer : 20180130_cisco
SerialNumber : FOC21028RFP
PID : IXM-LPWA-900-16-K9
UTCtime : 00:05:54.769 UTC Sat Aug 06 2016
FPGAVersion : Upgrading
FPGAStatus : Upgrading: 22.5%
ChipID : Not available while fpga is upgrading...
TimeZone : UTC
LocalTime : Sat Aug 6 00:05:54 UTC 2016
ACT2 Authentication: PASS
```


Wait until the FPGA is upgraded and shown as 61.

```
IXM1#show inventory
Name : Gateway
ImageVer : 2.0.30
BootloaderVer : 20180130_cisco
SerialNumber : FOC21028RFP
PID : IXM-LPWA-900-16-K9
UTCTime : 00:17:00.902 UTC Sat Aug 06 2016
FPGAVersion : 61
FPGAStatus : Ready
ChipID : Not available. Please turn on radio
TimeZone : UTC
LocalTime : Sat Aug 6 00:17:00 UTC 2016
ACT2 Authentication: PASS
```

Switching Between Standalone Mode and Virtual Mode

When the LoRaWAN gateway is in standalone mode, use the **switchover** EXEC command to switch to the virtual mode.

```
#switchover
```

You can switch the LoRaWAN gateway from virtual mode to standalone mode through IR8x9, using the following command.

```
IR800#virtual-lpwa 1 modem standalone mode enable
```

New and Changed Information

This section contains new and changed information for this release.

New Software Features in Release 2.0.30

Release 2.0.30 introduces the following new software features:

- Support SHA256 for firmware signature and uboot change
- Support to execute firmware validation before flashing to IXM
- Support to launch the followings processes as non-root: ntpd and ledaemon.
- Password protection in filesystem
- Support IXM virtual interface on IR807
- Upgrade linux kernel to higher version
- Remove suid files from the firmware image.

Caveats

This section contains the caveats for this release.

- **CSCvi92370**

Symptom: Upgrading IXM image via USB and having the USB connected to the unit while upgrading can cause problem and block the upgrade.

Workaround: Copy the IXM image to flash and perform archive download via FLASH. Unplug USB while the boot is happening. If the IXM is in error state, simply unplug the USB. The device will recover from the error state after several minutes.

- **CSCvi70922**

Symptom: The **virtual-lpwa packet forwarder install/uninstall** exec commands have no effect.

Workaround: In IOS, the packet forwarder installation exec commands are not supported and have been removed.

- **CSCvh06187**

Symptom: In virtual mode, the XPKI CA server is not supported when SCEP is configured from file instead of profile.

Workaround: Configure the XPKI CA server using the **lpwa modem scep profile** command, and make sure that every parameter is configured properly.

- **CSCvh00511**

Symptom: FTP server does not accept passwords with special characters like ! or #.

Workaround: Avoid using these special characters.

Known Issues

- **Problem:** If the USB is used to upgrade the IXM image and plugged in during boot, IXM may sometimes fall into an error state during boot.

Workaround:

1. Copy the IXM image to flash and perform archive download via FLASH. Unplug the USB while the boot is happening.
2. If the IXM is in error state, simply unplug the USB and the device will recover from the error state after several minutes.

- **Problem:** GPS synchronization issue while UBX is on.

Symptom: There is issue with UBX interoperating with LRR.

Workaround: You are recommended to turn off UBX while LRR is running. Currently, there is no effect on other functions with UBX off.

Related Documentation

These documents provide detailed information about the Cisco LoRaWAN Gateway and are available at: www.cisco.com/go/lorawanmodule

- [Getting Started and Product Document of Compliance for the Cisco LoRaWAN Interface Module](#)
- [Cisco LoRaWAN Gateway Hardware Installation Guide](#)
- [Cisco LoRaWAN Gateway Software Configuration Guide](#)
- [Release Notes for IoT Field Network Director](#)
- [Release Notes for Cisco IR800 Industrial Integrated Services Routers and Cisco 1000 Series Connected Grid Routers](#)
- [Cisco IR800 Integrated Services Router Software Configuration Guide](#)
- [Cisco IoT Field Network Director User Guide](#)

Obtaining Documentation and Submitting a Service Request

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