

Release Notes for the Cisco LoRaWAN Gateway, Release 2.0

First Published: 2017-05-31

Last Modified: 2018-08-27

Release Notes for the Cisco LoRaWAN Gateway, Release 2.0

These release notes include important information about Cisco LoRaWAN Gateway Software Release 2.0 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_k9-2.0.02.tar.gz	Cisco LoRaWAN Gateway OS Image Version 2.0.02 with Semtech Release Version 2.1.0, FPGA Version 58, and HAL Version 4.0.1	LRR 2.2.25
ixm_mdm_i_k9-2.0.0.tar.gz	Cisco LoRaWAN Gateway OS Image Version 2.0.0 with Semtech Release Version 2.1.0, FPGA Version 58, and HAL Version 4.0.1	LRR 2.2.25
ixm_mdm_i_k9-1.0.20.tar.gz	Cisco LoRaWAN Gateway OS Image Version 1.0.20 with Semtech Release Version 2.1.0, FPGA Version 58, and HAL Version 4.0.1	LRR 2.2.25
ixm_mdm_i_k9-1.0.06.tar.gz	Cisco LoRaWAN Gateway OS Image Version 1.0.06 with Semtech Release Version 1.2.0, FPGA Version 48, and HAL Version 3.5.0	LRR 1.8.23
ixm_mdm_i_k9-1.0.05.tar.gz	Cisco LoRaWAN Gateway OS Image Version 1.0.05 with Semtech Release Version 1.2.0, FPGA Version 48, and HAL Version 3.5.0	LRR 1.8.23
ixm_mdm_i_k9-1.0.04.tar.gz	Cisco LoRaWAN Gateway OS Image Version 1.0.04 with Semtech Release Version 1.1.1, FPGA Version 48, and HAL Version 3.4.1	LRR 1.8.23



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

To upgrade to Release 2.0, any older versions must first upgrade to Release 1.0.20.



Note Make sure that FPGA v58 has been upgraded correctly before moving to the next step. 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.

```
IR829#show virtual-lpwa 1 modem info
Name : Virtual-LPWA 1
ModemImageVer : 2.0
BootloaderVer : 20160830_cisco
ModemAgentVer : 1.02
SerialNumber : FOC21028RBH
PID : IXM-LPWA-900-16-K9
UTCTime : 19:14:14.465 UTC Tue Aug 29 2017
IPv4Address : 192.168.1.2
IPv6Address : none
FPGAVersion : 58
TimeZone : UTC
LocalTime : Tue Aug 29 19:14:14 UTC 2017
ACT2 Authentication : PASS
ModemVersionID : V01
ProtocolVersion : 2
ChipID : LSB = 0x28750305 MSB = 0x00f1400e
LoRaSerialNumber : FOC21028R05
LoRaCalc :
<NA,NA,NA,55,37,110,101,93,84,76,68,58,49,39,30,21-NA,NA,NA,50,31,106,97,88
,80,71,63,53,44,34,25,16>
CalTempCelsius : 35
CalTempCodeAD9361 : 92
RSSIOffset : -204.00,-204.00
-203.00,-203.00
AESKey : Unknown
```

Then factory upgrade to Release 2.0 with u-boot upgrade option enabled, like the following example shows.

```
IR829#virtual-lpwa 1 modem install firmware factory flash:ixm_mdm_i_k9-2.0.00.K1.tar.gz ?
  only-u-boot  install uboot only
  uboot        install uboot together
  <cr>
```



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.

1. Erase the certificates.
2. Upgrade the image.
3. Re-download the new certificates.

Virtual Mode Installation

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

Procedure

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

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

- 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 58. 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.

```
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 1 modem info
Name : Virtual-LPWA 1
ModemImageVer : 1.0.20
BootloaderVer : 20160830_cisco
ModemAgentVer : 1.02
SerialNumber : FOC20304ZG8
PID : IXM-LPWA-800-16-K9
UTCTime : 17:30:45.593 UTC Fri Jun 02 2017
IPv4Address : 10.16.16.5
IPv6Address : none
FPGAVersion : 58
TimeZone : CEST
LocalTime : Fri Jun 2 19:30:45 CEST 2017
ACT2 Authentication : PASS
ModemVersionID : V01
ProtocolVersion : 2
ChipID : LSB = 0x28610316 MSB = 0x00f14086
LoRaSerialNumber : FOC203310FV
LoRaCalc :
```

```
<153,140,132,124,116,112,108,104,95,87,78,70,61,57,53,49-156,144,136,128,120,116,112,108,99,91,83,74,66,62,58,54>
CalTempCelsius : 41
CalTempCodeAD9361 : 98
RSSIOffset : -204.35,-205.89
```

```
AESKey : 595EB592055421C06895E4D4CE0FE63D
```

- Step 4** From the CLI on IR809 or IR829, install the image. Using factory mode to install will take more than four minutes.

```
IR829#virtual-lpwa 1 modem install firmware factory flash:ixm_mdm_i_k9-2.0.tar.gz
filepath: flash:ixm_mdm_i_k9-2.0.tar.gz sent to modem
Name : Virtual-LPWA 1
Modem image installed successfully
The modem will reboot in 10 s
IR829#
```

- Step 5** After the image is installed successfully, verify the status.

```
IR829#show virtual-lpwa 1 modem info
Name : Virtual-LPWA 1
ModemImageVer : 2.0
BootloaderVer : 20160830_cisco
ModemAgentVer : 1.02
SerialNumber : FOC20304ZG8
PID : IXM-LPWA-800-16-K9
UTCTime : 18:12:50.141 UTC Fri Jun 02 2017
IPv4Address : 10.16.16.5
IPv6Address : none
FPGAVersion : 58
TimeZone : CEST
LocalTime : Fri Jun 2 20:12:50 CEST 2017
ACT2 Authentication : PASS
ModemVersionID : V01
ProtocolVersion : 2
ChipID : LSB = 0x28610316 MSB = 0x00f14086
LoRaSerialNumber : FOC203310FV
LoRaCalc :
<153,140,132,124,116,112,108,104,95,87,78,70,61,57,53,49-156,144,136,128,120,116,112,108,99,91,83,74,66,62,58,54>
CalTempCelsius : 41
CalTempCodeAD9361 : 98
RSSIOffset : -204.35,-205.89

AESKey : D6E59138224920AA66D99F680CFD9543

IR829#
```

Firmware Upgrade From Standalone Mode

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:

```
IXM-alone#show version
```

```
Corsica Software, Version 2.0.02, RELEASE SOFTWARE
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 2012-2014, 2017 by Cisco Systems, Inc.
Compiled 15-Jun-2017.16:58:41UTC-04:00 by Corsica Team
```

```
ROM: Bootstrap program is Corsica boot loader
Firmware Version : 2.0.02, RELEASE SOFTWARE
Bootloader Version: 20170515_cisco
```

```
Hostname:IXM-alone uptime is 2 weeks, 6 days, 9 hours, 31 minutes
Using secondary system image
```

This product contains cryptographic features and is subject to United States and local country laws governing import, export, transfer and use. Delivery of Cisco cryptographic products does not imply third-party authority to import, export, distribute or use encryption. Importers, exporters, distributors and users are responsible for compliance with U.S. and local country laws. By using this product you agree to comply with applicable laws and regulations. If you are unable to comply with U.S. and local laws, return this product immediately.

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 1026764K bytes of memory.
Last reset from power-on
```

```
Base ethernet MAC Address      : 00:50:43:14:2E:30
Model revision number:         : B0
System serial number:          : FOC20394AA0
```

```
IXM-alone#
```

Step 3 Download the image file to the Cisco LoRaWAN Gateway from a TFTP or FTP 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.

Importers, exporters, distributors and users are responsible for compliance with U.S. and local country laws. By using this product you agree to comply with applicable laws and regulations. If you are unable to comply with U.S. and local laws, return this product immediately.

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 1027308K bytes of memory.
 Last reset from power-on

Base ethernet MAC Address : 00:50:43:14:2E:30
 Model revision number: : B0
 System serial number: : FOC20394AA0

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

Release 2.0 introduces the following new software features:

- Supports standalone mode on the Cisco LoRaWAN Gateway.
- Listen Before Talk (LBT) support for Japan.

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.

Resolved Caveats in Release 2.0.02

- CSCve58587 - Disable IPsec with PSK for 1-2 hours. After re-enabling, IPsec cannot reconnect.
- CSCve65141 - In both virtual mode and standalone mode, "file not found" issue exists with the **show packet-forwarder log name** command.
- CSCve66944 - Fix IPTables so that backup tunnel can be active.
- CSCve68961 - IPsecRefresh happens every 1min, when primary tunnel failure occurs and backup tunnel is up.

Known Issues

- **Symptom:** For virtual mode, uboot option of the modem install command is not supported in Release 1.0.20. If you are using this version and need to upgrade to Release 2.0, you should follow the steps in the following workaround.

Workaround:

1. Upgrade the firmware to Release 2.0 without uboot option:

```
virtual-lpwa X modem firmware install factory flash:XXX
```

2. Upgrade again with uboot or uboot-only option:

```
virtual-lpwa X modem firmware install factory flash:XXX
{uboot|uboot-only}
```

- **CSCve67071**

Symptom: CLI **radio off** is not enabled in nvgen (show running-config).

Workaround: The CLI **radio off** does work, but is just not recorded in **show-running**. User still can use this CLI to disable radio if necessary. Also, radio is on by default when system reboots.

- **CSCve80757**

Symptom: The data range of **iketime** is not accurate:

```
Gateway(config-crypto-ipsecpf)#ipaddr 192.168.3.2 iketime
<1-2147483647> time in seconds (1..4294967295)
```

The max value cannot reach 2147483647.

Workaround: Please use any number not larger than 86400.

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

For information on obtaining documentation, using the Cisco Bug Search Tool (BST), submitting a service request, and gathering additional information, see [What's New in Cisco Product Documentation](#) .

To receive new and revised Cisco technical content directly to your desktop, you can subscribe to the [What's New in Cisco Product Documentation RSS feed](#) . The RSS feeds are a free service.

Cisco and the Cisco logo are trademarks or registered trademarks of Cisco and/or its affiliates in the U.S. and other countries. To view a list of Cisco trademarks, go to this URL: <https://www.cisco.com/c/en/us/about/legal/trademarks.html>. Third-party trademarks mentioned are the property of their respective owners. The use of the word partner does not imply a partnership relationship between Cisco and any other company. (1721R)

© 2017 Cisco Systems, Inc. All rights reserved.