Administering the Cisco LoRaWAN Gateway

This chapter describes how to perform one-time operations to administer the Cisco LoRaWAN Gateway.

Managing the System Time and Date

You can manage the system time and date on your LoRaWAN Gateway, either by using automatic configuration, such as the Network Time Protocol (NTP), or by using the GPS as a source for the clock.

Network Time Protocol (NTP)

Network Time Protocol (NTP) is designed to time-synchronize a network of devices. NTP runs over User Datagram Protocol (UDP), which runs over IP. NTP is documented in RFC 1305 and RFC 5905.

An NTP network usually gets its time from an authoritative time source, such as a radio clock or an atomic clock attached to a time server. NTP then distributes this time across the network. NTP is extremely efficient; no more than one packet per minute is necessary to synchronize two devices to within a millisecond of one another.

The communications between devices running NTP (known as *associations*) are usually statically configured; each device is given the IP address of all devices with which it should form associations. Accurate timekeeping is possible by exchanging NTP messages between each pair of devices with an association. However, in a LAN environment, NTP can be configured to use IP broadcast messages instead. This alternative reduces configuration complexity because each device can simply be configured to send or receive broadcast messages. However, in that case, information flow is one-way only.

NTP Version 4

NTP version 4 is implemented on the modem. NTPv4 is an extension of NTP version 3. NTPv4 supports both IPv4 and IPv6 and is backward-compatible with NTPv3.

NTPv4 provides these capabilities:

- Suppport for IPv6. (Note that IXM supports only IPv4.)
- Improved security compared to NTPv3. The NTPv4 protocol provides a security framework based on public key cryptography and standard X509 certificates.
- Automatic calculation of the time-distribution hierarchy for a network. Using specific multicast groups, NTPv4 automatically configures the hierarchy of the servers to achieve the best time accuracy for the lowest bandwidth cost. This feature leverages site-local IPv6 multicast addresses.

Configuring NTP Server

Beginning in privileged EXEC mode, follow these steps to configure the NTP server:

Procedure

	Command or Action	Purpose
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**ntp server** {**ip** *name* | **address** *address* }	Defines the NTP server that provides the clocking source for the modem.
Step 3	**exit**	Return to privileged EXEC mode.
Step 4	**show ntp status**	(Optional) Show NTP status to verify the configuration.
Step 5	**show ntp associations**	(Optional) Show the NTP associations with upstream servers.
Step 6	**copy running-config startup-config**	(Optional) Save your entries in the configuration file.

What to do next

To disable the NTP service, use the **no ntp server** *hostname* global configuration command.

Configuring a System Name and Prompt

You configure the system name on the LoRaWAN Gateway to identify it. By default, the system name and prompt are *Router* .

Beginning in privileged EXEC mode, follow these steps to manually configure a system name:

Procedure

	Command or Action	Purpose
Step 1	**configure terminal**	Enter global configuration mode.

	Command or Action	Purpose
Step 2	**hostname** *name*	Manually configure a system name. The default setting is *Router* . The name must follow the rules for ARPANET hostnames. They must start with a letter, exit with a letter or digit, and have as interior characters only letters, digits, and hyphens. Names can be up to 63 characters.
Step 3	**exit**	Return to privileged EXEC mode.
Step 4	**show running-config**	Verify your entries.
Step 5	**copy running-config startup-confi**g	(Optional) Save your entries in the configuration file.

What to do next

When you set the system name, it is also used as the system prompt.

To return to the default hostname, use the **no hostname** global configuration command.

Configuring GPS as the Clock Source

Beginning in privileged EXEC mode, follow these steps to configure GPS as the gateway clock source:

Procedure

	Command or Action	Purpose
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**clock gpstime enable**	Use the GPS as the modem clock source.
Step 3	**exit**	Return to privileged EXEC mode.

Configuring UBX Support for GPS

The UBX protocol is the communication convention used by certain GPS receiver chips. The UBX format is binary as opposed to text-based. UBX Protocol messages operate over an asynchronous serial connection following the RS-232 standard. Messages are classified into different categories such as Configuration, Timing, Informative, Monitor, and Navigation. Messages sent to the chip are either commands or enquiries.

Beginning in privileged EXEC mode, follow these steps to configure the UBX support for GPS.

Procedure

	Command or Action	Purpose
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**gps ubx enable**	Enable the UBX protocol to UART output. To disable the UBX support, use the **no** form of the command.
Step 3	**exit**	Return to privileged EXEC mode.
Step 4	**copy running-config startup-config**	(Optional) Save your entries in the configuration file.

Checking and Saving the Running Configuration

You can check the configuration settings that you entered or changes that you made by entering this privileged EXEC command:

```
Router# show running-config
```

To store the configuration or changes you have made to your startup configuration in flash memory, enter this privileged EXEC command:

```
Router# copy running-config startup-config
```

This command saves the configuration settings that you made. If you fail to do this, your configuration will be lost the next time you reload the system. To display information stored in the NVRAM section of flash memory, use the **show startup-config** privileged EXEC command.

Reloading IXM

The **reload** command halts the system. If the system is not set to manually boot up, it reboots itself. Use the **reload** command after you save the LoRaWAN Gateway configuration information to the startup configuration (**copy running-config startup-config**).

Using Reset Button

A Cisco Wireless Gateway for LoRaWAN that has already been configured can be reset to the manufacturing configuration by pressing the **Reset** button located at the side of the Console port on the device.

If you press the **Reset** button and release it in less than 5 seconds, the system will reboot immediately with the last saved configuration.

If you press the **Reset** button and release it after more than 5 seconds, the system will reboot immediately and restore to the factory default.