New Features For Cisco IOX XE 17.9.1

This chapter contains the following sections:

Install Mode Support

The following table describes the differences between Bundle mode and Install mode:

Cisco IOS XE running on IoT routers has typically made use of the Bundle boot mode. Bundle boot mode is also known as Consolidated boot, and uses a single compressed image. The typical naming convention is <product>-universalk9.<release>.SPA.bin.

This mode provides a consolidated boot process, using local (hard disk, flash) or remote (TFTP) .bin image. Booting via a .bin image means that the router would first have to uncompress the image before booting from it. This led to a longer period of time for the router to boot.

To upgrade the router to a new version of IOS XE, you would point the "boot system" to a new software image. This method is well known and details are available in your products configuration guide.

Starting with IOS XE release 17.9.1, a new boot mode called Install mode has been added to the IoT routers. Install mode uses packages loaded into bootflash, which are read by a packages.conf file. This method provides more control over the software installation process.

Note SMU installation was supported in both bundle boot and install mode. From Cisco IOS XE Release 17.9.x, SMU installation will be stopped if the router is booted up in bundle mode. If the router is booted up in install mode, SMU installation will keep working as it is in previous releases.

Table 1: Bundle Mode vs Install Mode

Bundle Mode	Install Mode
This mode provides a consolidated boot process, using local (hard disk, flash) or remote (TFTP) .bin image.	This mode uses the local (bootflash) packages.conf file for the boot process.
This mode uses a single .bin file.	.bin file is replaced with expanded .pkg files in this mode.
CLI: `Router(config)#boot system bootflash:<filename>`	CLI: `#install add file bootflash: [activate commit]`
To upgrade in this mode, point the boot system to the new image.	To upgrade in this mode, use the **install** commands.
Image Auto-Upgrade: When a new Field-Replaceable Unit (FRU) is inserted in a modular chassis, manual intervention is required to get the new FRU running with the same version as the active FRUs.	Image Auto-Upgrade: When a new FRU is inserted in a modular chassis, the joining FRU is auto-upgraded to the image version in sync with the active FRUs.
Rollback: Rollback to the previous image with multiple Software Maintenance Updates (SMUs) may require multiple reloads.	Rollback: Enables rollback to an earlier version of Cisco IOS XE software, including multiple patches in single reload.

For additional information, please see Cisco IOS XE Installation Methods.

Cellular Boot Time Improvements

Numerous improvements have been made in the Cellular link up-time with IOS-XE release 17.9.1. In previous releases, the cellular interface was taking approximately two and a half minutes to come up and pass traffic after the router booted up. The Cellular link up-time has been improved by approximately 20% in this release.

IOS XE Downgrade Warning

This feature will present a warning when issuing a **boot system flash** command followed by a file name of an image which has a version number lower than the one of the running image. The downgrade operation will still be possible by ignoring the warning message presented to the user. Booting an image with the same or higher version of the running image is allowed without warning. The feature is only intended for images already loaded on the bootflash of the router, this means only for the **boot system flash** <*file_name*> CLI (excluding other sources/devices like ftp, mop, rpc, tftp, rom).

The following are examples of how the system compares versions:

When comparing two version numbers as follows:

- 17.7.1
- 17.7.1c

The version with the letter (17.7.1c) will be considered the most updated one.

When comparing two version numbers as follows:

- 17.7.3a
- 17.7.3f

The comparison will be made taking into consideration the alphabetical order. In the case above 17.7.3f will be considered the most updated one.

SNMP Polling of Temperature OID

Support has been added for SNMP MIB to be able to return values from temperature sensors. The output should look similar to the **show environment** CLI.

The output of a **show environment** on an IR1101:

```
IR1101#show environment

Number of Critical alarms:  0
Number of Major alarms:     0
Number of Minor alarms:     0

 Slot        Sensor          Current State   Reading
Threshold(Minor,Major,Critical,Shutdown)
 ----------  --------------  --------------- ------------
----------------------------------------
 R0          Temp: TS1       Normal          42    Celsius      (75 ,80 ,90 ,na )(Celsius)
 R0          Temp: TS2       Normal          37    Celsius      (75 ,80 ,90 ,na )(Celsius)
```

The output from an snmpwalk would look similar to this:

```
[root@sg-centos-hv ~]# snmpwalk -v 2c -c public 33.33.33.204 1.3.6.1.4.1.9.9.13.1.3.1
SNMPv2-SMI::enterprises.9.9.13.1.3.1.2.1 = STRING: "Sensor 1"
SNMPv2-SMI::enterprises.9.9.13.1.3.1.3.1 = Gauge32: 48
SNMPv2-SMI::enterprises.9.9.13.1.3.1.4.1 = INTEGER: 93
SNMPv2-SMI::enterprises.9.9.13.1.3.1.5.1 = INTEGER: 0
SNMPv2-SMI::enterprises.9.9.13.1.3.1.6.1 = INTEGER: 1
SNMPv2-SMI::enterprises.9.9.13.1.3.1.7.1 = INTEGER: 0
```

The ciscoEnvMonTemperatureStatusEntry oid is 1.3.6.1.4.1.9.9.13.1.3.1:

- ciscoEnvMonTemperatureStatusIndex (.1)
- ciscoEnvMonTemperatureStatusDescr (.2)
- ciscoEnvMonTemperatureStatusValue (.3)
- ciscoEnvMonTemperatureThreshold (.4)
- ciscoEnvMonTemperatureLastShutdown (.5)
- ciscoEnvMonTemperatureStatus (.6)

GPS Mode Enabled By Default

In IOS XE versions prior to 17.9.1, GPS was enabled by defaut, however, GPS Mode was disabled by default. This required that the user perform an additional modem power-cycle after the router came up in order to use GPS.

Starting with IOS XE 17.9.1, GPS Mode will be enabled by default, and will be set to standalone mode. This will help reduce the cellular link up time.

Note This only applies to the cellular based GPS. This does not apply to the GPS/GNSS module in IR1800 (DR module), IR8140 (native GPS) and IR8340 (Timing module).

Use the following command to check cellular GPS status:

```
Router# show cellular <slot> gps
auto-reset Enable reset modem automatically after configuring GPS enable or mode
```

Packet Capture Support for CANBUS

When enabled, this feature will capture packets sent and received on the IR1800 series CANBUS. Once captured, the data will be exported as a packet capture (PCAP) file to allow for further examination. The feature is configured in exec mode and is only temporary, meaning it is not permanent across a reboot/reload.

A file name is required for the capture. The default location for the capture file is at bootflash:/canbus_dumplogs. If the capture is started without specifying the file initially, or after the router is reloaded, you will get the following message when you check the status:

```
canbus packetdump file pcapfile path bootflash:/canbus_dumplogs/pcapfile didn't start
```

After stopping the capture, if you want to start the capture again without specifying the file name, the old specified name will be overwritten.

Use the following command to specify the name of the capture file:

```
Router#monitor canbus packetdump file <filename>
```

Note You do not need to specify the path, the only supported path is the default path **bootflash:/canbus_dumplogs**

Use the following command to start the capture using the specified <filename> from the command above:

```
Router#monitor canbus packetdump start
```

Use the following command to stop the capture:

```
Router#monitor canbus packetdump stop
```

Use the following command to check the status of the monitoring:

```
Router#show canbus packetdump
```

Command Examples

```
Router#monitor canbus packetdump ?
file CAN Bus interface packet capture destination file
start CAN Bus interface packet capture start
stop CAN Bus interface packet capture stop

Router#monitor canbus packetdump file canbusfile
Router#show canbus packetdump
canbus packetdump file canbusfile path bootflash:/canbus_dumplogs/canbusfile didn't start

Router#monitor canbus packetdump start
Router#show canbus packetdump
canbus packetdump file canbusfile path bootflash:/canbus_dumplogs/canbusfile started

Router#monitor canbus packetdump stop
Router#show canbus packetdump
canbus packetdump file canbusfile path bootflash:/canbus_dumplogs/canbusfile didn't start
```

GPS and Dead Reckoning Support for the J1939 Connector

Automotive Dead-Reckoning (DR) refers to the capability of a GNSS receiver to continue to navigate on an automotive platform when there are an insufficient number of GNSS satellite signals available. To do this, the receiver uses information provided by external sensors concerning the state of the vehicle in order to propagate the navigation solution.

Automotive DR requires information regarding the change in directional heading of the vehicle, which is provided by a three-axis digital gyroscope. Automotive DR also requires information about speed and direction of the vehicle. Speed is provided by an odometer (wheel tick) count, which is input into the IRM-GNSS-ADR pluggable module.

The automotive DR feature also accepts data from a three-axis digital accelerometer, which provides information that can be used to determine the orientation of the gyro when it is installed at a tilt angle. This information is also used to estimate elevation. The accelerometer is integrated within the sensor included inside the pluggable module.

Prior to the 17.9.1 release, only mode obdii was available. In 17.9.1, mode j1939 is added with the existing default mode obdii.

The J1939 connector is supported on heavy duty trucks, which provides speed and reverse status data to be fed into the GPS/DR module using J1939 protocol. It is configured through the command line interface under the controller.

Configuration

The following CLIs are available.

To show what is available for dead reckoning:

```
Router(config-controller)#dead-reckoning ?
enable enable GPS feature
mode DR mode configuration
nmea NMEA Configuration
```

To configure mode j1939:

```
Router(config)#controller Gps-Dr
Router(config-controller)#dead-reckoning mode j1939
```

To view the status:

```
Router#show platform hardware gps dead-reckoning
============================
DR Vehicle interface mode: J1939
GPS/DR Vendor Info: TELIT
GPS/DR module FW Version: V33-1.0.5-CLDR-4.7.10-N115R115-003291-3
DR Calibration Status:
DR is not calibrated
Odometer is not calibrated
Gain is not calibrated
Offset is not calibrated

CAN Bus Status:
CAN Bus Tx Count: 1874
CAN Bus Tx error Count: 0

CAN Bus Rx Count: 571
CAN NULL packet Bus RX Count: 0
CAN Bus Rx unsupported packet Count: 448

CAN Bus TX to DR Count: 123
CAN Bus TX to DR error Count: 0

DR data:
DR Sample TimeStamp in usec: 0
DR odometer count received from module: 0
DR odometer count sent to module: 1353
DR odometer is not valid from module
DR odometer delta count from module: 0
DR reverse status: 0

DR in use for location fix: No
time duration for loss of line of sight:
travel distance for loss of line of sight:
travel heading error at exit:
travel yaw error at exit:
travel gyro gain error at exit:
position error at exit:
position error ratio at exit:
position noise error at exit:
Raw Accel Data in X: 0
Raw Accel Data in Y: 0
Raw Accel Data in Z: 0
Raw Gyro Data in X: 0
Raw Gyro Data in Y: 0
Raw Gyro Data in Z: 0
```