

Troubleshooting

This reference outlines the standard procedures for diagnosing and correcting operational errors.

- Troubleshooting, on page 1
- Diagnostic mode, on page 1
- Recommendation: prepare information before contacting support, on page 2
- Show interfaces troubleshooting command, on page 2
- Software upgrade methods, on page 3
- Change the configuration register, on page 3
- Recover a lost password, on page 6

Troubleshooting

This section describes the troubleshooting scenarios for the router.

Before troubleshooting a software problem, you must connect a PC to the router via the console port. With a connected PC, you can view status messages from the router and enter commands to troubleshoot a problem.

You can also remotely access the interface by using Telnet. The Telnet option assumes that the interface is up and running.

Diagnostic mode

Diagnostic mode is a router operating mode that

- provides access to a subset of user EXEC mode commands for troubleshooting when the IOS process fails
- enables inspection of router states, configuration management, and process restart capabilities
- offers a more comprehensive troubleshooting interface than limited access methods like ROMMON.

Diagnostic mode access scenarios

The router boots up or accesses diagnostic mode in these scenarios:

- The IOS process or processes fail, in some scenarios. In other scenarios, the system resets when the IOS process or processes fail.

- A user-configured access policy was configured using the **transport-map** command that directs the user into the diagnostic mode.
- A send break signal (**Ctrl-C** or **Ctrl-Shift-6**) was entered while accessing the router, and the router was configured to enter diagnostic mode when a break signal was sent.

In the diagnostic mode, a subset of the commands that are available in user EXEC mode are made available to the users. Among other things, these commands can be used to:

- Inspect various states on the router, including the IOS state.
- Replace or roll back the configuration.
- Provide methods of restarting the IOS or other processes.
- Reboot hardware, such as the entire router, a module, or possibly other hardware components.
- Transfer files into or off of the router using remote access methods such as FTP, TFTP, and SCP.

The diagnostic mode provides a more comprehensive user interface for troubleshooting than previous routers, which relied on limited access methods during failures, such as ROMMON, to diagnose and troubleshoot Cisco IOS problems. The diagnostic mode commands can work when the Cisco IOS process is not working properly. These commands are also available in privileged EXEC mode on the router when the router is working normally.

Recommendation: prepare information before contacting support

If you cannot locate the source of a problem, contact your local reseller for advice. Prepare this information before you call:

- Chassis type and serial number
- Maintenance agreement or warranty information
- Type of software and version number
- Date you received the hardware
- Brief description of the problem
- Brief description of the steps you have taken to isolate the problem

Show interfaces troubleshooting command

Use the **show interfaces** command to display the status of all physical ports and logical interfaces on the router. describes messages in the command output.

The IR1800 supports these interfaces:

- GigabitEthernet 0/0/0 and 0/0/1
- Cellular 0/2/0, Cellular 0/2/1, Cellular 0/3/0, and Cellular 0/3/1
- msata

- WPAN 0/1/0

Software upgrade methods

Software upgrade methods are techniques that

- copy new software images to flash memory over the WAN interface when the existing Cisco IOS software image is in use
- copy new software images over the console port while in ROM monitor mode, and
- boot the router from a software image loaded on a TFTP server from ROM monitor mode when the TFTP server is on the same network as the router.

Change the configuration register

The configuration register controls various boot-time settings on Cisco routers. You may need to modify this register to enable break functionality or change other boot parameters.

Follow these steps to change the configuration register.

Procedure

Step 1 Connect a PC to the CONSOLE port on the router.

Step 2 At the privileged EXEC prompt, use the **show version** command to display the existing configuration register value.

Example:

```
Router# show version
            Cisco IOS XE Software, Version
BLD_V175_THROTTLE_LATEST_20210124_063209_V17_5_0_148
            Cisco IOS Software [Bengaluru], ISR Software
(ARMV8EL_LINUX_IOSD-UNIVERSALK9_IOT-M), Experimental Version 17.5.20210124:064309
[S2C-build-v175_throttle-507-/nobackup/mcpre/BLD-BLD_V175_THROTTLE_LATEST_20210124_063209
226]
            Copyright (c) 1986-2021 by Cisco Systems, Inc.
            Compiled Sun 24-Jan-21 06:10 by mcpre

            ROM: 1.4(REL)

            UUT3_Sec uptime is 17 hours, 37 minutes
            Uptime for this control processor is 17 hours, 38 minutes
            System returned to ROM by reload
            System image file is
"bootflash:ir8100-universalk9.BLD_V175_THROTTLE_LATEST_20210124_063209_V17_5_0_148.SSA.bin"

            Last reload reason: Reload Command

            Technology Package License Information:

            ------------------------------------------------------------------
            Technology Type    Technology-package    Technology-package
```

```
Current              Next Reboot
------------------------------------------------------------
Smart License      Perpetual            network-advantage    network-advantage

Smart License      Subscription          None                 None

The current throughput level is 50000 kbps

Smart Licensing Status: Registration Not Applicable/Not Applicable

cisco IR8140H-P-K9 (1RU) processor with 1948753K/6147K bytes of memory.
Processor board ID FDO2438J89L
Router operating mode: Autonomous
2 Gigabit Ethernet interfaces
32768K bytes of non-volatile configuration memory.
8116912K bytes of physical memory.
8032254K bytes of Bootflash at bootflash:.

Configuration register is 0x2102

Router#
```

Note The configuration register value is shown at the bottom of the output (in this example, `Configuration register is 0x2102`).

Step 3 Record the setting of the configuration register.

Step 4 Use the **config-register** *value* command from privileged EXEC mode to enable or disable the break setting (indicated by the value of bit 8 in the configuration register).

Note

- Break enabled — Bit 8 is set to 0.
- Break disabled (default setting) — Bit 8 is set to 1.

The configuration register value is updated with the new setting, which takes effect after the next router reload.

Configure the configuration register for autoboot

The configuration register controls how the router boots and can be used to change router behavior for advanced troubleshooting scenarios.

Caution Perform this configuration only with guidance from Cisco support, as altering the configuration register is intended for advanced troubleshooting purposes.

Follow these steps to configure the configuration register for autoboot.

Procedure

Step 1 Set the configuration register to 0x0 to boot into ROM, using one of the following methods.

a) In Cisco IOS configuration mode, use the **config-register 0x0** command.

Example:

```
Router(config)# config-register 0x0
```

b) From the ROMmon prompt, use the **confreg 0x0** command.

Example:

```
rommon> confreg 0x0
```

Step 2 Use the **config-register 0x2102** command to set the router to autoboot the Cisco IOS XE software.

Example:

```
Router(config)# config-register 0x2102
```

The configuration register is set to control the router boot behavior as specified.

Reset the router

Reset the router to restore factory defaults or recover from configuration issues by bypassing the current running configuration. Use this procedure when you need to reset a router to factory defaults or recover from a configuration that prevents normal operation. This process uses ROM monitor (ROMmon) mode to bypass the existing configuration.

Follow these steps to reset the router.

Procedure

Step 1 If the break is disabled, turn off the router, wait for 5 seconds, and turn the router back on. Within 60 seconds, push the Reset button.

The terminal displays the ROMmon prompt.

```
rommon 1>
```

Step 2 Use the **confreg 0x2142** command to ignore the running configuration.

Example:

```
rommon 2> confreg 0x2142
```

Step 3 (Optional) Use the **DEVICE_MANAGED_MODE=autonomous** command to set the device managed mode to autonomous.

Example:

```
rommon 3> DEVICE_MANAGED_MODE=autonomous
```

Note Do not configure this command unless the router is in controller mode and needs to be changed to autonomous mode.

Step 4 Use the **sync** command to sync the configuration changes.

Example:

```
rommon 4> sync
```

Step 5 Use the **reset** command to reset the router and apply the configuration register value.

Example:

```
rommon 5> reset
resetting...
```

Note The router reloads with the reset.

Step 6 Use the **confreg** command to verify that the correct value (0x2142) was applied. When prompted to change the configuration, enter **n**.

Example:

```
rommon 1> confreg
            Configuration Summary
            (Virtual Configuration Register: 0x2142)
            enabled are:
            [ 0 ] console baud: 9600
            boot:...... image specified by the boot system commands
            do you wish to change the configuration? y/n [n]: n
```

Step 7 Use the **boot** *filesystem:/image-name* command to boot the image with the configuration register value 0x2142.

Example:

```
rommon 2> boot
bootflash:ir8100-universalk9.BLD_V175_THROTTLE_LATEST_20210207_015223_V17_5_0_161.SSA.bin
```

The router resets and boots with the specified image, bypassing the previous running configuration. You can now reconfigure the device as needed.

Recover a lost password

Use this task to regain access to your router when you have forgotten or lost the password.

Note Password recovery is possible only when you are connected to the router through the console port. These procedures cannot be performed through a Telnet session.

Follow these steps to recover a lost password.

Procedure

Step 1 Reset the router.

Step 2 Change the configuration register to 0x2142.

Step 3 Boot the router with the configuration register value 0x2142 from ROMmon.

Step 4 If you used the Reset button, use the **configure terminal** and **license smart reservation** commands to add the license.

Example:

```
Router# configure terminal
Router(config)# license smart reservation
```

You have successfully recovered access to your router.

What to do next

For additional reset details, see .

Reset the configuration register value

Reset the configuration register value after password recovery or reconfiguration to restore normal device operation. Perform this task after you have recovered or reconfigured a password and need to restore the configuration register to its original value.

Follow these steps to reset the configuration register value after you have recovered or reconfigured a password.

Procedure

Step 1 Use the **configure terminal** command to enter global configuration mode.

Example:

```
Router# configure terminal
```

Step 2 Use the **config-register** *value* command with the original configuration register value that you recorded.

Example:

```
Router(config)# config-register value
```

Step 3 Use the **exit** command to exit configuration mode.

Example:

```
Router(config)# exit
```

Note To return to the configuration that was used before you recovered the lost enable password, do not save the configuration changes before rebooting the router.

Step 4 Reboot the router and enter the recovered password.

The configuration register is reset to its original value, and the router operates with the recovered password configuration.

Configure a console port transport map

Configure a transport map to define policies for console port connections, including how connections wait for VTY lines and what banner messages are displayed to users. This task describes how to configure a transport map for a console port interface on the router.

Follow these steps to configure a console port transport map.

Procedure

Step 1 Use the **enable** command to enable privileged EXEC mode. Enter your password if prompted.

Example:

```
Router> enable
```

Step 2 Use the **configure terminal** command to enter global configuration mode.

Example:

```
Router# configure terminal
```

Step 3 Use the **transport-map type console** *transport-map-name* command to create and name a transport map for handling console connections, and to enter transport map configuration mode.

Example:

```
Router(config)# transport-map type console consolehandler
```

Step 4 Use the **connection wait** [**allow** [**interruptible**] | **none** [**disconnect**]] command to specify how a console connection is handled using this transport map.

Example:

```
Router(config-tmap)# connection wait none
```

Note

- `allow interruptible` — The console connection waits for a Cisco IOS VTY line to become available, and also allows users to enter diagnostic mode by interrupting a console connection that is waiting for a Cisco IOS VTY line to become available. This is the default setting. Users can interrupt a waiting connection by entering Ctrl-C or Ctrl-Shift-6.
- `none` — The console connection immediately enters diagnostic mode.

Step 5 (Optional) Use the **banner** [**diagnostic** | **wait**] *banner-message* command to create a banner message that is seen by users entering diagnostic mode or waiting for the Cisco IOS VTY line because of the console transport map configuration.

Example:

```
Router(config-tmap)# banner diagnostic X
Enter TEXT message. End with the character 'X'.
--Welcome to Diagnostic Mode--
X
Router(config-tmap)#
```

Note
- `diagnostic` — Creates a banner message seen by users directed to diagnostic mode because of the console transport map configuration.
- `wait` — Creates a banner message seen by users waiting for the Cisco IOS VTY line to become available.
- *banner-message* — The banner message, which begins and ends with the same delimiting character.

Step 6 Use the **exit** command to exit transport map configuration mode and re-enter global configuration mode.

Example:

```
Router(config-tmap)# exit
```

Step 7 Use the **transport type console** *console-line-number* **input** *transport-map-name* command to apply the settings defined in the transport map to the console interface.

Example:

```
Router(config)# transport type console 0 input consolehandler
```

Note The *transport-map-name* for this command must match the *transport-map-name* defined in the `transport-map type console` command.

The transport map is configured and applied to the console port, defining how console connections are handled according to the specified policies.

View console port, SSH, and telnet handling configurations

Use the console port, SSH, and Telnet handling configuration commands to view transport map configurations and current access policies for incoming connections. These commands help you verify connection handling settings and banner configurations.

Commands

Use these commands to view console port, SSH, and Telnet handling configurations:

- **show transport-map**
- **show platform software configuration access policy**

Use the **show transport-map** command to view transport map configurations.

showtransport-map [**all | name***transport-map-name*| **type**[**console**]]

This command can be used either in user EXEC mode or privileged EXEC mode.

Example

This example shows transport maps that are configured on the router: console port (`consolehandler`):

```
Router# show transport-map all
Transport Map:
Name: consolehandler Type: Console Transport

Connection:
Wait option: Wait Allow Interruptable Wait banner:

Waiting for the IOS CLI bshell banner:
Welcome to Diagnostic Mode



Router# show transport-map type console
Transport Map:
Name: consolehandler


REVIEW DRAFT - CISCO CONFIDENTIAL

Type: Console Transport

Connection:
Wait option: Wait Allow Interruptable Wait banner:

Waiting for the IOS CLI Bshell banner:
Welcome to Diagnostic Mode



Router# show transport-map type persistent ssh
Transport Map:
Name: consolehandler Type: Console Transport

Connection:
Wait option: Wait Allow Interruptable Wait banner:

Waiting for the IOS CLI Bshell banner:
Welcome to Diagnostic Mode
```

Use the **show platform software configuration access policy** command to view the current configurations for handling the incoming console port, SSH, and Telnet connections. The output of this command provides the current wait policy for each type of connection (Telnet, SSH, and console), as well as information on the currently configured banners.

Unlike the **show transport-map** command, the **show platform software configuration access policy** command is available in diagnostic mode so that it can be entered in scenarios where you need transport map configuration information, but cannot access the Cisco IOS CLI.

Example

This example shows the **show platform software configuration access policy** command.

```
Router# show platform software configuration access policy
The current access-policies

Method : telnet
Rule : wait with interrupt Shell banner:
Welcome to Diagnostic Mode

Wait banner :
Waiting for IOS Process

Method : ssh Rule : wait Shell banner: Wait banner :

Method : console
Rule : wait with interrupt Shell banner:
Wait banner :
```

Factory reset commands

Factory reset commands are network management utilities that:

- remove all customer-specific data on a router or switch that has been added
- erase configuration, log files, boot variables, core files, bootflash, nvram, rommon variables, licenses, and logs, and
- restore the platform to boot up as if new from the factory.

Factory reset command details

The **factory-reset all** command erases the bootflash, nvram, rommon variables, licenses, and logs.

Caution Use of the factory reset command should not be done lightly. All customer configurations will be deleted and the platform will boot up as if new from the factory.

Note factory-reset all does not work if IOS-XE is running in controller mode. Please refer to SDWAN configuration information.

Boot sequence after factory reset includes booting the image and loading the configuration:

Booting the image:

- The bootloader attempts to boot "golden.bin" from the bootflash: partition
- If no "golden.bin" is present, then boot the first image.

Loading the configuration:

- IOS looks for "golden.cfg" file on nvram: partition and applies it upon booting.
- If no "golden.cfg" is present on nvram: then IOS looks for "golden.cfg" file on bootflash: partition and applies it upon booting.
- If no "golden.cfg" is present on bootflash: then configurations are erased and Software Configuration dialog is used.

Example: Factory reset command execution

```
Router#factory-reset all
The factory reset operation is irreversible for all operations. Are you sure? [confirm]
*Enter*

*May 12 09:55:45.831: %SYS-5-RELOAD: Reload requested by Exec. Reload Reason: Factory Reset.

***Return to ROMMON Prompt
```