What Causes "Bad CPU ID" Messages?

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Introduction

This document explains what causes "bad CPU ID" messages and how to resolve them. This message is displayed if the software loaded on the router does not recognize the processor in the chassis.

Prerequisites

Requirements

There are no specific prerequisites for this document.

Components Used

This document is not restricted to specific software and hardware versions.

Conventions

Refer to the Cisco Technical Tips Conventions for more information on document conventions.

Background Theory

These messages are most commonly encountered on router platforms for which more advanced processors are available such as the Cisco 7200, 7200VXR, and 7500 Series Routers. Usually, you can resolve this problem with a software upgrade. At bootup, the router displays a message similar to this output taken from a 7200VXR:

```
Self decompressing the image : ##################################
############################################################
############################################################
############################################################
########
[OK]
Bad CPU ID 00002710
System Bootstrap, Version 12.0(19990210:195103) [12.0XE 105], DEVELOPMENT
SOFTWARE
```

```
Copyright (c) 1994−1999 by cisco Systems, Inc.
C7200 platform with 262144 Kbytes of main memory
```

Problem

As mentioned in the Background Theory section, this problem most likely occurs on routers for which newer processors are available. Processors released since the introduction of the router series can cause "bad CPU ID" messages if the Cisco IOS® software image does not recognize the new processors. Processors for the 7200 Series for which this can potentially apply include the NPE−175, NPE−200, NPE−225, NPE−300, and NSE−1. Processors for the 7500 Series for which this can potentially apply include the RSP4+ and RSP8. These scenarios commonly cause "DOWNREV" messages and "Bad CPU ID" messages:

- **The Input/Output (I/O) controller is replaced on 7200 Series Router.**

  If the new controller has an image in bootflash that does not support the existing NPE, then when the boot image boots up, it attempts to load, detects that the router has an NPE in it that is not supported in that version of rxboot and reports "Bad CPU ID." In this case, the router can continue to load the main system image and function properly. However, during the boot cycle the router reports "Bad CPU ID."
- **The boot image is upgraded to a version that does not support the router processor.**

  When you boot up, the boot image attempts to load, detects the router has a CPU (NPE or Route/Switch Processor (RSP)) that is not supported in that version of rxboot, and reports "Bad CPU ID."
- **A 7200 Series NPE is upgraded to a faster NPE without verification that the current boot image supports the new NPE.**

  If the old boot image that is on the bootflash does not support the high−end NPE, then when you boot up, the boot image detects that the router has an NPE in it that is not supported in that version of rxboot and reports "Bad CPU ID." This scenario is less likely to happen on the 7500 Series because the bootflash is contained on the RSP.
- **The main Cisco IOS software image is manually upgraded to a version that does not support the current processor.**

  This scenario happens most commonly with the 7200VXR/NPE300 and the 7500/RSP8. If the boot image is not also changed, it still supports the existing processor. Upon bootup, the boot image loads with no errors reported. However, when an attempt is made to load the main Cisco IOS software image, the router reports "Bad CPU ID" and reloads. In this case, the router can continuously reload based on the configuration register setting and ROM revision level. Usually the router drops back to the boot image (signified by the `(boot)>` prompt) if loading the main system image from Flash fails.
- **Both the boot image and the main Cisco IOS software image are upgraded to versions that do not support the processor.**

  When you boot up, the boot image attempts to load, detects that an unsupported processor is in the system, and reports "Bad CPU ID." However, the router continues to try to boot up with the main Cisco IOS software image. The main Cisco IOS software image attempts to load, detects that an unsupported processor is in the system, and also reports "Bad CPU ID." Based on the configuration register setting and ROM revision, the router drops into ROMMON or continuously reboots.

Boot Process

This section describes the boot process that occurs on the Cisco high−end router platforms. It also explains how this boot process relates to "Bad CPU ID" messages and how it can be used to recover from images

which do not support the processor.

There are usually three different images on Cisco high−end routers. These include the 7200, 7200VXR, and 7500 Series Routers: the bootstrap image, the boot image, and the main system image. This information is considered a "normal" boot sequence with the assumption that all three images are local to the router, are contained in the standard memory locations, and special loading sequences are not specified in the configuration of the router. This information can differ on different platforms (for example, the 2600 router does not contain a boot image).

- **Bootstrap Image**

  When the router boots up, the first image to load is known as the bootstrap image. The bootstrap image is contained in a ROM chip either on the NPE or the I/O controller (this is NPE dependent if there is a ROM on the NPE, the one that is on the I/O controller is not used). The bootstrap image takes care of the basic initialization of the processor and the main I/O. The user can interact with the bootstrap image through a command line interface signified by the `rommon>` prompt. After the bootstrap image loads, it looks in bootflash for the boot image and loads the boot image.
- **Boot Image**

  The image that is in bootflash is known as the boot image. This image can do simple interface initialization. It is used to download main Cisco IOS software images to the router using TFTP in recovery situations. The user can interact with this image through a command−line interface signified by the prompt `Router(boot)#`. The router can be configured to a different name (hostname). Once this image loads, it searches through the system Flash for a valid main Cisco IOS software image. If a valid main Cisco IOS software image is found, the boot image loads it.
- **Main System Image**

  The main Cisco IOS software image is usually loaded by the boot image. This image has the responsibility of routing, interface initialization and coordination, higher level feature execution, and so on. The user can interact with this image through a command line signified by the `Router>` prompt. The router can be configured to a different name (hostname).

You can see these three image versions in the output from the **show version** command (example in this output):

```
Cisco Internetwork Operating System Software IOS (tm) 7200 Software
(C7200−JS−M), Version 12.0(7)XE1, EARLY DEPLOYMENT RELEASE SOFTWARE (fc1)

!−−− This corresponds to the main system IOS image stored in Flash.

TAC:Home:SW:IOS:Specials for info
Copyright (c) 1986−2000 by cisco Systems, Inc.
  Compiled Sat 05−Feb−00 01:02 by lstringr
Image text−base: 0x60008900, data−base: 0x613E8000

ROM: System Bootstrap, Version 11.1(13)CA, EARLY DEPLOYMENT
RELEASE SOFTWARE (fc1)

!−−− This corresponds to the bootstrap image stored in ROM.

BOOTFLASH: 7200 Software (C7200−JS−M), Version 12.0(7)XE1, EARLY
DEPLOYMENT RELEASE SOFTWARE (fc1)

!−−− This corresponds to the boot image stored in bootflash.
```

Solution

Complete these steps in order to eliminate the error message:

1. Identify the NPE or NSE installed. If the router is in boot mode or full Cisco IOS Software mode, issue the **show version** command, as shown in this output.

```
7200#show version
Cisco Internetwork Operating System Software
IOS (tm) 7200 Software (C7200−P−M), Version 12.2(12a),
RELEASE SOFTWARE (fc1)
Copyright (c) 1986−2002 by Cisco Systems, Inc.
Compiled Tue 24−Sep−02 00:37 by pwade
Image text−base: 0x60008940, data−base: 0x610B8000

ROM: System Bootstrap, Version 12.0(19990210:195103) [12.0XE 105],
DEVELOPMENT SOFTWARE

Lima5 uptime is 1 day, 51 minutes
System returned to ROM by reload at 14:03:47 ARG Wed Nov 27 2002
System restarted at 14:05:31 ARG Wed Nov 27 2002
System image file is "slot0:c7200−p−mz.122−12a.bin"

Cisco 7206VXR (NPE300) processor (revision D) with 122880K/40960K
bytes of memory.
Processor board ID 20391634
R7000 CPU at 262Mhz, Implementation 39, Rev 1.0, 256KB L2, 2048KB L3 Cache
6 slot VXR midplane, Version 2.0
```

2. Use the Software Advisor (registered customers only) to determine the minimum version of software required to support your hardware.
3. Issue a **dir bootflash:** command in order to check which version of boot image is on the bootflash. If this boot image version is earlier than what is listed in the Software Advisor (registered customers only) , upgrade the boot image to the version required.
4. Issue a **dir flash:** command in order to see which version of main Cisco IOS software is stored in Flash. If this version of main Cisco IOS software is earlier than what is listed in the Software Advisor (registered customers only) , upgrade the main Cisco IOS software image to the version required.
5. Refer to Cisco Technical Support − Routers if you need assistance in the upgrade these images.

Definitions

Boot image Sometimes referred to as rxboot, this image is used to do the initial booting of a router. This image only handles basic initialization of the system, and does not support any form of routing. This image is contained in the bootflash.

Main Cisco IOS software image This is the image used to route or switch.

7200 This is a high−end router chassis. This chassis can only run with the NPE−100, the NPE−150, the NPE−175, the NPE−200, and the NPE−225. The NPE−300 does not fit into the 7200 Series chassis.

7200VXR This is a high−end router chassis. This chassis can run with all available NPEs. The full potential is only realized with the NPE−300 or later, or the NSE−1 and later.

I/O controller This component handles input and output communication between the NPE and the port adapters.

NPE This component contains the processor of the router. There are currently six flavors of NPEs. They are the NPE−100, the NPE−150, the NPE−175, the NPE−200, the NPE−225, and the NPE−300. The NPE−300

only fits into the 7200VXR chassis. The NPE−300 is the component which the "bad CPU ID" error message is most often seen with. However, it is possible to see such an error message on other NPEs.

Bootflash The bootflash is Flash memory that holds the boot image used to do the initial booting of the router. This memory cannot be configured, and is contained on the I/O controller.

System flash This is Flash memory that holds the main Cisco IOS software image.

Information to Collect if You Open a Cisco Technical Support Case

If you still need assistance after you follow the troubleshooting steps in this document, you can open a case (registered customers only) with Cisco Technical Support. Be sure to include the information listed here:
• Console captures that show the error messages. • Console captures that show the steps you took to troubleshoot the problem and the boot sequence during each step. • The hardware component that failed and the serial number for the chassis. • Troubleshooting logs. • Output from the **show technical−support** command. Attach the collected data to your case in non−zipped, plain text format (.txt). You can upload information to your case with the TAC Service Request Tool (registered customers only) . If you cannot access the Case Query tool, you can send the information in an E−mail attachment to attach@cisco.com. Include your case number in the subject line of your message to attach the relevant information to your case. **Note:** Do not manually reload or power−cycle the router before you collect this information, unless required. This can cause you to lose important information that you need in order to determine the root cause of the problem.

Related Information

- **Cisco 1600 Series Router Hardware Troubleshooting Index Page**
- **Software Installation and Upgrade Procedures**
- **Technical Support − Routers**
- **Technical Support − Cisco Systems**

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