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Introduction

This document describes how to analyze commonly seen hardware failure symptoms on the Aggregation Services Routers 903 (ASR903) and their troubleshooting methodology.

Prerequisites

Requirements

Cisco recommends that you have basic knowledge of these topics:

- Cisco IOS-XE software
- ASR 903 CLI

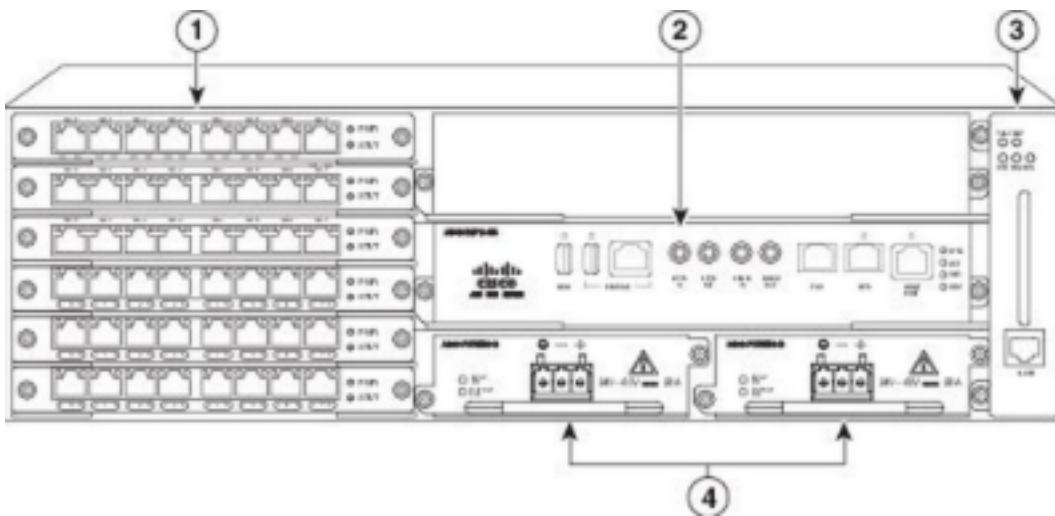
Components Used

The information in this document was created from devices in a specific lab environment where failure symptoms were observed. All of the devices used in this document started with a cleared (default) configuration. If your network is live, make sure that you understand the potential impact of any command

Overview

The Cisco ASR 903 Router is a fully-featured aggregation platform designed for the cost-effective delivery of converged mobile and business services.

The platform comprises of the following major Field Replaceable Units (FRU) as depicted in the figure below:



Label Component

- 1 Interface modules (IM)
- 2 Two Route Switch Processor (RSP) unit slots. Supports RSP1A-55, RSP1B-55, RSP2A-64 and RSP2B-64
- 3 Fan tray
- 4 Redundant DC power units

During normal operation, any of the Field Replaceable Units (FRU's) can exhibit failure symptoms. Often this ends up in replacement of the hardware components which may not be necessarily a hardware failure. By following certain troubleshooting techniques you can recover these modules from its failure state and thereby reduce network downtime.

Troubleshoot

Failure reported by DC Power Supply (

- Measure input DC Voltage at the DC PSU (Power Supply Unit) connector using a Multi-meter to verify the power source. The reading should be in the range of 24V to 60V.
- If the input voltage reading is OK, check status of the LED's on the panel ('Input Ok' and 'Output Fail'). If both LEDs are OFF, replace the DC PSU.
- If 'Input OK' LED is green, but 'output Fail' LED is amber/red then first remove the input power connector and then jack out the complete DC PSU. Wait for 15 seconds. Insert the DC PSU back and connect input power connector. This exercise needs to be done for both the DC PSU (if system has two DC PSU).
- If 'Input OK' LED is green, and 'output FAIL' LED is not glowing at all, replace the DC PSU.

Note: Router can be operational with single Power Supply. The secondary Power Supply unit needs to be physically inserted if not powered ON.

Failure reported by Fan Tray

The Cisco ASR 903 Router uses a modular fan tray that is separate from the power supply. The fan tray contains twelve fans and provides sufficient capacity to maintain operation even in the event of a fan failure. There are two types of Fan Tray modules (

Scenario 1: Individual Fan module in the Tray has failed

Use the command "show platform" or "show facility-alarm status" to determine status of Fans in the Tray. In the event of a Fan failure, the Fan tray status will be displayed as "fail" along with the details of the individual units which has failed.

```
ASR903#show platform | in FAN|State
Chassis type: ASR-903
```

```
Slot Type State Insert time (ago)
```

```
P2 A903-FAN-E f2, f4, f6, fail 05:00:00ASR903#sh facility-alarm status
```

```
System Totals Critical: 1 Major: 3 Minor: 0
```

```
Source Severity Description [Index] Fan Tray CRITICAL Multiple Fan Failures [2] Fan Tray MAJOR
Fan 2 Failure [5] Fan Tray MAJOR Fan 4 Failure [7] Fan Tray MAJOR Fan 6 Failure [9]
```

These outputs show Fan modules in slot f2, f4 and f6 have failed and need to be replaced.

Scenario 2: Fan Tray reported as "Unknown"

In some cases, the Fan Tray may be reported as "Unknown" in the "show platform" output and the Network Management System (NMS) station may generate an alarm as well.

```
ASR903#sh platform | in P2
Chassis type: ASR-903
```

```
Slot Type State Insert Time (ago)
```

```
P2 Unknown N/A never
```

Perform the following steps which may help recover the module:

- Perform a physical reset of the FAN module. Allow at least 2 minutes for the system to reinitialize after the fan tray has been removed or replaced. If you are using the model "A903-FAN-E" with dust filter, try cleaning the filter to make sure it is not clogging the FAN modules.
- Perform a power cycle of the router and verify if the FAN Tray is detected or not.
- If the FAN tray is still reporting "unknown", a replacement may be required to resolve the issue.

Note: There is a known cosmetic defect which is documented in [CSCuu75796](#) where the FAN tray will be reported as unknown. To avoid erroneous failure messages, allow at least 2 minutes for the system to reinitialize after the fan tray has been removed or replaced.

Failure reported by RSP

Scenario 1: RSP is reported as Unknown

```
ASR903#show platform | in R1
Chassis type: ASR-903
```

```
Slot Type State Insert Time (ago)
R1      A903-RSP1B-55      unknown      1d01h
```

- Execute the command "hw-module slot R1 reload" and verify if the processor is initializing.
- If the standby RSP toggles between "booting" and "unknown" state without transitioning to "init,standby" state, the issue is mostly due to missing IOS-XE image in the local bootflash.
- Use USB flash drive with a valid IOS-XE image to boot the RSP. If the module continues to be in "unknown" state, perform a physical reseal of the module.
- If all the above steps fail, collect console logs from the RSP module and open a service request with TAC.

Scenario 2: Standby RSP toggles between "booting" and "init,standby" state

One of the common reasons for the standby RSP module to exhibit this behavior is because of configuration sync failure between the active and standby RSP. The following commands should be executed to verify this:

```
ASR903#show redundancy config-sync failures bem
ASR903#show redundancy config-sync failures mcl
ASR903#show redundancy config-sync failures prc
```

If there are failures reported in any of the above commands then implement the following workaround and verify whether RSP is staying UP.

```
ASR903# config terminal
ASR903(config)#redundancy
ASR903(config)#mode sso
ASR903(config-red)#no policy config-sync lbl prc reload
ASR903(config-red)#no policy config-sync bulk prc reload
ASR903(config-red)#end
```

If the RSP module continues to remain in a boot loop, check the device logs for any link errors as indicated below. If yes, the RSP module may need to be replaced if a physical reseal does not fix it.

```
%IOSXE-3-PLATFORM: R0/0: kernel: pciehp 0000:02:07.0:pcie24: Link Training Error occurs
%IOSXE-3-PLATFORM: R0/0: kernel: pciehp 0000:02:07.0:pcie24: Failed to check link status
```

Interface Module(IM) fails to initialize

Whenever a module is installed, the IM transitions through specific states (out of service->inserted->booting->OK). If an Interface Module (IM) in any of the six available slots fails past the booting state, perform the following steps:

```
ASR903#sh platform
Chassis type: ASR-903
```

```
Slot Type State Insert Time (ago)
0/4      A900-IMA8S      inserted/unkown      00:27:02      (physical)
```

- Reload the affected module using the command "hw-module subslot <slot/subslot> reload" command. Verify if the module has recovered.

```
ASR903#hw-module subslot 0/1 reload
Proceed with reload of module? [confirm]
%IOSXE_OIR-6-SOFT_RELOADSPA: SPA(A900-IMA1X) reloaded on subslot 0/1
```

- Physically reseal the module in the same slot. If module stays "unknown", try inserting it in

another slot to rule out a faulty line card slot on the chassis.

- Observe the logs and watch for any kernel/link errors as indicated below:

```
%IOSXE-3-PLATFORM: R0/0: kernel:pciehp 0000:02:07.0:pcie24: Link Training Error occurs
%IOSXE-3-PLATFORM: R0/0: kernel:pciehp 0000:02:07.0:pcie24: Failed to check link status
The "link training" error basically means that there's a communication error along the Peripheral Component Interconnect Express (PCIe) bus for a particular slot. The PCIe hot plug module is hosted on the RSP engine. Perform a RSP switch-over so that the modules are registered with the PCIe bus of the standby RSP (Route-Switch Processor). If the module recovers post the switchover, the previous active RSP module needs to be replaced.
ASR903#redundancy
force-switchover
Proceed with switchover to standby RP? [confirm]
```

Note: For further assistance please open a service request with Cisco Technical Assistance Centre (TAC) with details of the troubleshooting done as well as the 'show tech-support' output from the router.