Online Insertion and Removal of Cards on the Cisco Remote PHY Shelf 7200

About OIR

Online Insertion and Removal (OIR) was developed to enable you to replace faulty parts without affecting system operation. When a card is inserted, power is available on the card, and it initializes itself to start working.

Hot swap functionality allows the system to determine when a change occurs in the unit's physical configuration, and reallocate the unit's resources to allow all interfaces to function adequately. This feature allows interfaces on the card to be reconfigured while other interfaces on the router remain unchanged. The interrupt routine must ensure that the interrupt line has reached a stable state.

The software performs the necessary tasks involved in handling the removal and insertion of the card. A hardware interrupt is sent to the software subsystem when a hardware change is detected, and the software reconfigures the system:

- When a card is inserted, it is analyzed and initialized in such a way that the end user can configure it properly. The initialization routines used during OIR are the same as those called when the router is powered on. System resources, also handled by software, are allocated to the new interface.

- When a card is removed, the resources associated with the empty slot must either be freed or altered to indicate the change in its status.

What Does an OIR Do?

When an OIR is performed, the router:

1. Rapidly scans the backplane for configuration changes.

2. Initializes all newly inserted interfaces and places them in the administratively shut down state.

3. Brings all previously configured interfaces on the card back to the state they were in when they were removed. Any newly inserted interfaces are put in the administratively shut down state.

The only effect on the routing tables is that routes through a removed interface are deleted, as are routes learned through that interface. The Address Resolution Protocol (ARP) cache is selectively flushed, and routing caches are completely flushed.

If a card is reinserted into the same slot from which it was removed, or if an identical card is inserted in its place, many of the control blocks from the previous installation are reused. This is necessary due to the implementation by Cisco IOS-XE software of certain control blocks, and has the benefit of saving the configuration from the previously installed card.

Guidelines for Performing an OIR

It is always safer to power down the router when you perform any hardware changes, but here are some recommendations if you need to perform an OIR. The system may indicate a hardware failure if you do not follow proper procedures.

- Insert only one card at a time; you must allow the system time to complete the preceding tasks before you remove or insert another interface processor. If you disrupt the sequence before the system completes its verification, it can cause the system to detect spurious hardware failures.

- Insert the cards swiftly and firmly, but do not shove them in.

- If present, be sure to use the little plastic levers on the side of the card to lock the card in.

- If the OIR is successful, there is absolutely no need to schedule a reload of the router.

If you get a LONGSTALL message after an OIR, or a CPUHOG during the OIR process, but encounter no other problems, you may safely ignore those messages.

OIR on Cisco Remote PHY Shelf 7200

OIR is supported on the following FRUs in a Cisco Remote PHY Shelf 7200:

- Interface PIC

How Do I Perform an OIR?

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- Insert the cards swiftly and firmly, but do not shove them in.

- If present, be sure to use the little plastic levers on the side of the card to lock the card in.

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- Check the Active/Standby state of the PIC, which will perform OIR, by using the **show redundancy** command.

- Use the **redundancy force-switchover** command if the location of the PIC is on the active slot.

- Perform OIR.

  When you perform an OIR, the power supply to the corresponding PIC is cut off.

If you are performing an OIR on a standby PIC, the Cisco Remote PHY Shelf 7200 might show error messages, which you can ignore. When you insert the PIC the next time, the card will function properly.

Verifying Status after an OIR

Execute the **show platform** command to check the status.

Before Removing the Line Card

```
Router#show platform
Chassis type: HA-RPHY-CHASSIS

Slot        Type                 State
----------  -------------------- ---------------
  LC0       HA-RPHY-6x12-LC      OK
  LC1       HA-RPHY-6X12-LC      OK
  LC2       HA-RPHY-6X12-LC      OK
  LC3       HA-RPHY-6X12-LC      OK
  LC4       HA-RPHY-6X12-LC      OK
  LC5       HA-RPHY-6X12-LC      OK
  LC6       HA-RPHY-6X12-LC      OK
  LC7       HA-RPHY-6X12-LC      OK
  LC8       HA-RPHY-6X12-LC      OK
  LC9       HA-RPHY-6X12-LC      OK
  LC10      HA-RPHY-6X12-LC      OK
  LC11      HA-RPHY-6X12-LC      OK
  LC12      HA-RPHY-6X12-LC      OK
  PIC0      HA-RPHY-PIC          OK
  PIC1      HA-RPHY-PIC          OK
  PIC2      HA-RPHY-PIC          OK
  PIC3      HA-RPHY-PIC          OK
  PIC4      HA-RPHY-PIC          OK
  PIC5      HA-RPHY-PIC          OK
  P0        CBR-AC-PS            OK
  P1        CBR-AC-PS            OK
  P2        CBR-AC-PS            OK
  P3        CBR-AC-PS            OK
  FAN0      UNKNOWN              NORMAL
  FAN1      UNKNOWN              NORMAL
  FAN2      UNKNOWN              NORMAL
  FAN3      UNKNOWN              NORMAL
  FAN4      UNKNOWN              NORMAL
```

After Removing the Line Card

Line Card has been reomved on a Cisco Remote PHY Shelf 7200 (Remove RPD_12):

```
Router#show platform
Chassis type: HA-RPHY-CHASSIS

Slot        Type                 State
----------  -------------------  ---------------
  LC0       HA-RPHY-6x12-LC      OK
  LC1       HA-RPHY-6X12-LC      OK
  LC2       HA-RPHY-6X12-LC      OK
  LC3       HA-RPHY-6X12-LC      OK
  LC4       HA-RPHY-6X12-LC      OK
  LC5       HA-RPHY-6X12-LC      OK
  LC6       HA-RPHY-6X12-LC      OK
  LC7       HA-RPHY-6X12-LC      OK
  LC8       HA-RPHY-6X12-LC      OK
  LC9       HA-RPHY-6X12-LC      OK
  LC10      HA-RPHY-6X12-LC      OK
  LC11      HA-RPHY-6X12-LC      OK
  PIC0      HA-RPHY-PIC          OK
  PIC1      HA-RPHY-PIC          OK
  PIC2      HA-RPHY-PIC          OK
  PIC3      HA-RPHY-PIC          OK
  PIC4      HA-RPHY-PIC          OK
  PIC5      HA-RPHY-PIC          OK
  P0        CBR-AC-PS            OK
  P1        CBR-AC-PS            OK
  P2        CBR-AC-PS            OK
  P3        CBR-AC-PS            OK
  FAN0      UNKNOWN              NORMAL
  FAN1      UNKNOWN              NORMAL
  FAN2      UNKNOWN              NORMAL
  FAN3      UNKNOWN              NORMAL
  FAN4      UNKNOWN              NORMAL
```

After Inserting the Line Card

Line Card has been inserted on a Cisco Remote PHY Shelf 7200, and is booting (Re-insert RPD_12):

```
Router#show platform
Chassis type: HA-RPHY-CHASSIS

Slot        Type                 State
----------  -------------------  ---------------
  LC0       HA-RPHY-6x12-LC      OK
  LC1       HA-RPHY-6X12-LC      OK
  LC2       HA-RPHY-6X12-LC      OK
  LC3       HA-RPHY-6X12-LC      OK
  LC4       HA-RPHY-6X12-LC      OK
  LC5       HA-RPHY-6X12-LC      OK
  LC6       HA-RPHY-6X12-LC      OK
  LC7       HA-RPHY-6X12-LC      OK
  LC8       HA-RPHY-6X12-LC      OK
  LC9       HA-RPHY-6X12-LC      OK
  LC10      HA-RPHY-6X12-LC      OK
  LC11      HA-RPHY-6X12-LC      OK
  LC12      UNKNOWN              BOOTING
  PIC0      HA-RPHY-PIC          OK
  PIC1      HA-RPHY-PIC          OK
  PIC2      HA-RPHY-PIC          OK
  PIC3      HA-RPHY-PIC          OK
  PIC4      HA-RPHY-PIC          OK
  PIC5      HA-RPHY-PIC          OK
```

```
  P0       CBR-AC-PS            OK
  P1       CBR-AC-PS            OK
  P2       CBR-AC-PS            OK
  P3       CBR-AC-PS            OK
  FAN0     UNKNOWN             NORMAL
  FAN1     UNKNOWN             NORMAL
  FAN2     UNKNOWN             NORMAL
  FAN3     UNKNOWN             NORMAL
  FAN4     UNKNOWN             NORMAL
```

Line Card has been inserted on a Cisco Remote PHY Shelf 7200, and has completed booting (Re-insert RPD_12):

```
Router#show platform
Chassis type: HA-RPHY-CHASSIS

Slot       Type                 State
---------- -------------------- ---------------
  LC0      HA-RPHY-6x12-LC      OK
  LC1      HA-RPHY-6X12-LC      OK
  LC2      HA-RPHY-6X12-LC      OK
  LC3      HA-RPHY-6X12-LC      OK
  LC4      HA-RPHY-6X12-LC      OK
  LC5      HA-RPHY-6X12-LC      OK
  LC6      HA-RPHY-6X12-LC      OK
  LC7      HA-RPHY-6X12-LC      OK
  LC8      HA-RPHY-6X12-LC      OK
  LC9      HA-RPHY-6X12-LC      OK
  LC10     HA-RPHY-6X12-LC      OK
  LC11     HA-RPHY-6X12-LC      OK
  LC12     HA-RPHY-6X12-LC      OK
  PIC0     HA-RPHY-PIC          OK
  PIC1     HA-RPHY-PIC          OK
  PIC2     HA-RPHY-PIC          OK
  PIC3     HA-RPHY-PIC          OK
  PIC4     HA-RPHY-PIC          OK
  PIC5     HA-RPHY-PIC          OK
  P0       CBR-AC-PS            OK
  P1       CBR-AC-PS            OK
  P2       CBR-AC-PS            OK
  P3       CBR-AC-PS            OK
  FAN0     UNKNOWN             NORMAL
  FAN1     UNKNOWN             NORMAL
  FAN2     UNKNOWN             NORMAL
  FAN3     UNKNOWN             NORMAL
  FAN4     UNKNOWN             NORMAL
```