Online Insertion and Removal of Cards on the Cisco cBR

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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.

OIR on Cisco cBR

OIR is supported on the following FRUs in a Cisco cBR Series Router:

- Supervisor Card
- Supervisor PIC
- Interface Card
- Interface PIC

How To Perform an OIR

Note Before performing OIR, execute the following commands to power off the Supervisor Card:

```
hw-module slot [ R0 | R1 ] stop
hw-module slot [ R0 | R1 ] start
```

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.

- Any time a physical Online Insertion/Removal (OIR) is performed, the removed module must be left out 30-60 seconds before re-inserting it in the cBR-8 chassis.
- 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.

Refer to the hardware installation guide for inserting or removing any card.

Supervisor Card and Supervisor PIC supports OIR without any software operation, but here are some recommendations if you need to perform OIR of the Supervisor Card and Supervisor PIC:

- Check the Active/Standby state of the Supervisor Card or Supervisor PIC, which will perform OIR, by using the **show redundancy** command.
- Use the **redundancy force-switchover** command if the location of the Supervisor Card or Supervisor PIC is on the active slot.
- Perform OIR.

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

If you are performing an OIR on a standby Supervisor Card or a Supervisor PIC, cBR-8 might show error messages, which you can ignore. When you insert the Supervisor Card or a Supervisor 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: CBR-8-CCAP-CHASS

Slot      Type                State                 Insert time (ago)
--------- ------------------- --------------------- -----------------
7         CBR-CCAP-LC-40G     ok                    06:03:17
SUP0      CBR-CCAP-SUP-160G   inserted              06:25:13
 R0                           ok, active
 F0                           ok, active
 4                            ok, active
 4/1      CBR-SUP-8X10G-PIC   ok                    06:23:08
P0        PWR-3KW-AC-V2       ok                    06:23:28
P1        PWR-3KW-AC-V2       ok                    06:23:28
P2        PWR-3KW-AC-V2       ok                    06:23:28
P3        PWR-3KW-AC-V2       ok                    06:23:28
P4        PWR-3KW-AC-V2       ok                    06:23:28
P5        PWR-3KW-AC-V2       ok                    06:23:28
P11       CBR-FAN-ASSEMBLY    ok                    06:23:28
P11       CBR-FAN-ASSEMBLY    ok                    06:23:28
P12       CBR-FAN-ASSEMBLY    ok                    06:23:28
P13       CBR-FAN-ASSEMBLY    ok                    06:23:28
P14       CBR-FAN-ASSEMBLY    ok                    06:23:28
```

After Removing the Line Card

```
Router#show platform
Chassis type: CBR-8-CCAP-CHASS

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

```
SUP0       CBR-CCAP-SUP-160G   inserted             06:35:13
 R0                            ok, active
 F0                            ok, active
 4                             ok, active
 4/1       CBR-SUP-8X10G-PIC   ok                   06:33:08
P0         PWR-3KW-AC-V2       ok                   06:33:28
P1         PWR-3KW-AC-V2       ok                   06:33:28
P2         PWR-3KW-AC-V2       ok                   06:33:28
P3         PWR-3KW-AC-V2       ok                   06:33:28
P4         PWR-3KW-AC-V2       ok                   06:33:28
P5         PWR-3KW-AC-V2       ok                   06:33:28
P11        CBR-FAN-ASSEMBLY    ok                   06:33:28
P11        CBR-FAN-ASSEMBLY    ok                   06:33:28
P12        CBR-FAN-ASSEMBLY    ok                   06:33:28
P13        CBR-FAN-ASSEMBLY    ok                   06:33:28
P14        CBR-FAN-ASSEMBLY    ok                   06:33:28
```

After Inserting the Line Card

```
Router#show platform
Chassis type: CBR-8-CCAP-CHASS

Slot       Type                State                Insert time (ago)
---------- ------------------- -------------------- -----------------
7          CBR-CCAP-LC-40G     booting              00:00:35
SUP0       CBR-CCAP-SUP-160G   inserted             06:45:13
 R0                            ok, active
 F0                            ok, active
 4                             ok, active
 4/1       CBR-SUP-8X10G-PIC   ok                   06:43:08
P0         PWR-3KW-AC-V2       ok                   06:43:28
P1         PWR-3KW-AC-V2       ok                   06:43:28
P2         PWR-3KW-AC-V2       ok                   06:43:28
P3         PWR-3KW-AC-V2       ok                   06:43:28
P4         PWR-3KW-AC-V2       ok                   06:43:28
P5         PWR-3KW-AC-V2       ok                   06:43:28
P11        CBR-FAN-ASSEMBLY    ok                   06:43:28
P11        CBR-FAN-ASSEMBLY    ok                   06:43:28
P12        CBR-FAN-ASSEMBLY    ok                   06:43:28
P13        CBR-FAN-ASSEMBLY    ok                   06:43:28
P14        CBR-FAN-ASSEMBLY    ok                   06:43:28
```

```
Router#show platform
Chassis type: CBR-8-CCAP-CHASS

Slot       Type                State                Insert time (ago)
---------- ------------------- -------------------- -----------------
7          CBR-CCAP-LC-40G     ok                   00:03:35
SUP0       CBR-CCAP-SUP-160G   inserted             06:25:13
 R0                            ok, active
 F0                            ok, active
 4                             ok, active
 4/1       CBR-SUP-8X10G-PIC   ok                   06:46:08
P0         PWR-3KW-AC-V2       ok                   06:46:28
P1         PWR-3KW-AC-V2       ok                   06:46:28
P2         PWR-3KW-AC-V2       ok                   06:46:28
P3         PWR-3KW-AC-V2       ok                   06:46:28
P4         PWR-3KW-AC-V2       ok                   06:46:28
P5         PWR-3KW-AC-V2       ok                   06:46:28
P11        CBR-FAN-ASSEMBLY    ok                   06:46:28
P11        CBR-FAN-ASSEMBLY    ok                   06:46:28
```

```
P12        CBR-FAN-ASSEMBLY    ok                  06:46:28
P13        CBR-FAN-ASSEMBLY    ok                  06:46:28
P14        CBR-FAN-ASSEMBLY    ok                  06:46:28
```