Using Dual Rate Ports

Dual rate ports support both SFP and SFP+ optic modules.

Note Dual rate ports are not supported on Cisco ASR 920 Series Router (ASR-920-24SZ-IM, ASR-920-24SZ-M, ASR-920-24TZ-M, and ASR-920-12SZ-D).

Note Effective with Cisco IOS XE Bengaluru 17.4.1 release, on 1G interface or 1G mode on a dual rate port, when negotiation is configured (for example, if the default is 'negotaiton auto' and 'no negotiation auto' is configured), you can find the interface flap once during bootup. This is an expected behavior.

See the **Supported SFP** chapter in the *Cisco ASR 920 Series Aggregation Services Router Hardware Installation Guide* .

Restrictions for Dual Port

For more information on licensing, see, *Activating Port Upgrade and Bulk Port License on Cisco ASR 920 Series Router.*

- When a dual rate port operates in 1G mode, autonegotiation is forced on the interface. For the link to be operationally up, ensure that the peer device is also configured with autonegotiation.

- If a 10G license is installed and activated for a dual rate port and an SFP is installed in that port, the interface comes up in 1G mode.

- If a 10G license is installed and activated for a dual rate port and an SFP+ is installed in that port, the interface comes up in 10G mode.

- If a 10G license is not installed for particular port but an SFP is installed on that port, the interface comes up in 1G mode.

- If sufficient 10G licenses or bulk port licenses are not available or activated for a port and an SFP+ is installed in that port, the 10G mode is not enabled and the interface will be in **link down state** . The following system warning message is displayed:

```
Warning: SFP+ inserted at port 5 tengig license not in use
```

   - However, if the 10G license is installed and activated after the insertion of the SFP+ the interface comes up in 10G mode automatically.

Note Do not issue another license command until the previous license command is processed completely. As part of the license command, multiple dual port EEM scripts will be running. These scripts, in turn, copy the port configuration. After executing completely, the previous configuration is restored. However, if you change the port configuration while the command is still executing, changes will not be in effect.

- If an activated 10G license is uninstalled or deactivated for a port with SFP+, the interface is initialized to 1G mode and 10G interfaces is administratively down.

- Dual rate interfaces in 1G mode cannot be bundled with another 1G port under a port channel interface. However, two dual rate interfaces of the same bandwidth can be bundled together. For example,

   - Interface Te0/0/11 and Interface Gig0/0/3 cannot be bundled in a port channel interface even if interface Te 0/0/11 is operating in 1G mode

   - Interface Te0/0/11 and Interface Te0/0/12 can be bundled together under a port channel interface provided they have the same bandwidth (1G or 10G).

- After changing an SFP on a dual rate port, you must wait for approximately three minutes before attempting any other SFP changes in that port.

- In case of ASR-920-10SZ-PD, ASR-920-8S4Z-PD and ASR-920-12CZ-A:

   - The maximum default VTY lines supported by Cisco IOS XE is 5, and atleast 2 VTY (VTY 0 and 1) lines must be kept free for the dual rate EEM script to work as stated in the general EEM configuration guidelines at *Embedded Event Manager Configuration Guide*.

- In case of ASR-920-4SZ-D, ASR-920-12SZ-A/Cisco ASR-920-12SZ-D, and ASR-920-12SZ-IM:

   - The maximum default VTY lines supported by Cisco IOS XE is 5, and atleast 4 VTY lines must be kept free for the dual rate EEM script to work as stated in the general EEM configuration guidelines at *Embedded Event Manager Configuration Guide*.

Note Ensure that the VTY used for the dual rate EEM script is not used by any other transport protocols such as SSH, Telnet.

If AAA is configured on the VTY used by the dual rate EEM script, then it might take time to authorize each command, thus causing timeout issues.

If more than 5 VTYs are required, you can increase the number of VTY lines by running the **vty line 0** n command where range 0 to n represents the total number of VTY lines permitted on the router.

• Copper SFPs are not supported in dual rate ports for ASR920-12SZ-IM.

• Dual rate EEM script triggers DHCP renegotiation. The **dualrate_eem_policy.tcl** script is triggered when there is a 10G to 1G optics change or vice versa in a dual rate front panel interface.

• We recommend that you wait for 30 seconds between the removal and insertion of an SFP on an interface.

Prerequisites for Dual Port

When a dual rate port operates in 1G mode, auto negotiation is forced on the interface. For the link to be operationally up, ensure that the peer device is also configured with auto negotiation.

Whenever there is a physical swap of optics from 1G to 10G or vice-versa on Cisco ASR 920 Series Routers (ASR-920-12CZ-A, ASR-920-4SZ-A, ASR-920-12SZ-IM, ASR-920-10SZ-PD, and ASR-920-8S4Z-PD), a system internal EEM script is triggered to program the hardware registers. However configuration such as AAA/TACACS can cause the EEM script (dualrate_eem_policy) to timeout with following error.

```
%HA_EM-6-LOG: Mandatory.dualrate_eem_policy.tcl: 1Process Forced Exit- MAXRUN timer expired
```

Ensure the following procedure for the devices that are configured with AAA authentication for their VTY access:

1. AAA or TACACS server must authenticate the devices by ensuring:

   a. the reachability

   b. the correct username credentials configured for EEM (*refer point-3 below*)

   Note If the mentioned criteria fails, then the EEM script prompts MAXRUN Timeout Error.

2. Avoid MAXRUN timeout error by bypassing the authorization.

   a. Unconfigure the current policy using the following command.

      ```
      no event manager policy Mandatory.dualrate_eem_policy.tcl type system
      ```

   b. Reconfigure the policy with Authorization bypass using the following command.

      ```
      event manager policy Mandatory.dualrate_eem_policy.tcl type system authorization
      bypass
      ```

3. Ensure correct authorization of EEM with TACACS.

   Ensure EEM script can pick the username from the following command.

   ```
   event manager session cli username <Username privilege 15>
   ```

   Example:

   ```
   event manager session cli username Cisco_user1 privilege 15
   ```

   The matching username (here, *Cisco_user1*) should be configured in TACACS.

Information About Dual Port

This feature offers the flexibility of retaining the existing 1G connections, and upgrading to a 10G connection by installing the SFP+ modules when required. For more information, see Restrictions .

The router can detect the removal of an SFP and an insertion of an SFP+ module, or the removal of an SFP+ and an insertion of an SFP module, and trigger mode change events in the system. Depending on the event type, the events generate the following messages:

```
%IOSXE_SPA-6-DUAL_RATE_CHANGE: TenGigabitEthernet0/0/13: MODE_10G
%IOSXE_SPA-6-DUAL_RATE_CHANGE: TenGigabitEthernet0/0/13: MODE_1G
```

The above events in turn, trigger the following actions:

- Current running configuration is saved to a temporary file on the bootflash: on the router.

Note Ensure that at least 10MB of free space is available on the bootflash:, else the script and dual rate functionality itself may fail.

- Configurations are changed to default values on the interface.
- Interface is shut down.
- Running configuration (stored in bootflash:) is re-applied.
- If the interface was previously in administratively up state, it is brought up.
- If the running configuration was the same as the start up configuration, the configuration is saved after the OIR of the SFP/SFP+.

Note It is highly recommended that you wait for the interfaces to be administratively up before performing a subsequent OIR.

Note Features such as, QoS that rely on the bandwidth of the interface for service policy configuration may need to be reconfigured as the previously-configured service policy may no longer be applicable. Perform a careful verification of such features and consider reconfiguring them as required.

Note Since the configuration are reapplied on detection of change of SFP type, depending on the size of the configuration on the router, the reapplication of configuration may take some time. It is recommended that you wait for 60 seconds before verifying the configuration.

Use the following command to debug failures and collect EEM debug logs:

debug event manager tcl cli_lib

Verifying the Interface Mode

To verify the mode change (1G/10G), interface speed and media type inserted, run the following command:

```
Router# show interface tenGigabitEthernet 0/0/5

TenGigabitEthernet0/0/5 is up, line protocol is up
  Hardware is 2xGE-4x10GE-FIXED, address is badb.adba.fb85 (bia badb.adba.fb85)
  Internet address is 10.1.3.1/24
  MTU 1500 bytes, BW 10000000 Kbit/sec, DLY 10 usec,
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation ARPA, loopback not set
  Keepalive set (10 sec)
  Full Duplex, 10000Mbps, link type is force-up, media type is 10GBase-SR
  output flow-control is unsupported, input flow-control is unsupported
  ARP type: ARPA, ARP Timeout 04:00:00
  Last input never, output 00:13:56, output hang never
  Last clearing of "show interface" counters never
  Input queue: 0/375/0/0 (size/max/drops/flushes); Total output drops: 0
  Queueing strategy: fifo


Router# show interface GigabitEthernet 0/0/7
TenGigabitEthernet0/0/5 is up, line protocol is up
  Hardware is 2xGE-4x10GE-FIXED, address is badb.adba.fb85 (bia badb.adba.fb85)
  Internet address is 10.1.3.1/24
  MTU 1500 bytes, BW 1000000 Kbit/sec, DLY 10 usec,
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation ARPA, loopback not set
  Keepalive set (10 sec)
  Full Duplex, 1000Mbps, link type is force-up, media type is ZX
  output flow-control is unsupported, input flow-control is unsupported
  ARP type: ARPA, ARP Timeout 04:00:00
  Last input never, output 00:13:56, output hang never
  Last clearing of "show interface" counters never
  Input queue: 0/375/0/0 (size/max/drops/flushes); Total output drops: 0
  Queueing strategy: fifo
```