



Configuring Gigabit Ethernet Interfaces

This chapter explains how to configure the Gigabit Ethernet (GE) interface on the Cisco ASR 901 router.

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Configuring the Interface

To configure the GE interface, complete the following steps:



Note

In the following procedure, press the Return key after each step unless otherwise noted. At any time, you can exit the privileged level and return to the user level by entering disable at the Router# prompt.

Procedure

	Command or Action	Purpose
Step 1	enable Example: Router> enable	Enters enable mode.
Step 2	configure terminal Example: Router# configure terminal	Enters configuration mode.

	Command or Action	Purpose
Step 3	interface gigabit ethernet <i>slot/port</i> Example: <pre>Router(config)# interface gigabit ethernet 0/1</pre>	Specifies the port adapter type and the location of the interface to be configured. The slot is always 0 and the port is the number of the port.
Step 4	cdp enable Example: <pre>Router(config-if)# cdp enable</pre>	Enables Cisco Discovery Protocol on the router, use the cdp enable command.
Step 5	end Example: <pre>Router(config-if)# end</pre>	Exits configuration mode.

Setting the Speed and Duplex Mode

The Gigabit Ethernet ports of the Cisco ASR 901 Router can run in full or half- duplex mode—10 Mbps, 100 Mbps or 1000 Mbps (1 Gbps). The Cisco ASR 901 router has an auto-negotiation feature that allows the router to negotiate the speed and duplex mode with the corresponding interface at the other end of the connection.

Auto-negotiation is the default setting for the speed and transmission mode.

When you configure an interface speed and duplex mode, follow these guidelines:

- If both ends of the line support auto-negotiation, use the default auto-negotiation settings.
- When auto-negotiation is turned on, it auto-negotiates both speed and the duplex mode.
- If one interface supports auto-negotiation, and the interface at the other end does not, configure the duplex mode and speed on both interfaces. If you use the auto-negotiation setting on the supported side, the duplex mode setting is set at half-duplex.
- Auto-negotiation must be enabled for 1000M full duplex Gigabit Ethernet devices; otherwise behavior is unpredictable.
- To configure different speeds (10M / 100M), auto-negotiation should be disabled.

Speed and duplex can be configured only on the following interfaces:

- Copper gigabitethernet interfaces (0/0-3)
- Combo gigabitethernet interface (0/4-7), when the media type is configured as RJ-45



Note

In the following procedure, press the **Return** key after each step unless otherwise noted. At any time, you can exit the privileged level and return to the user level by entering **disable** at the `Router#` prompt.



Note From the Cisco IOS Release 15.5(3)S onwards, to make 10 G port work with 10 Gbps speed, you must use 10G SFP+ pluggable and for it to work in 1 Gbps speed, you must use the 1G SFP. This is specific to 10G port only.

To configure speed and duplex operation, complete these steps in the interface configuration mode:

Procedure

	Command or Action	Purpose
Step 1	duplex [half full] Example: Router(config-if)# duplex half	Specify the duplex operation.
Step 2	speed [1000 100 10] Example: Router(config-if)# speed 1000	Specify the speed.

Enabling the Interface

To enable the interface, complete these steps:



Note In the following procedure, press the Return key after each step unless otherwise noted. At any time, you can exit the privileged level and return to the user level by entering disable at the Router# prompt.

Procedure

	Command or Action	Purpose
Step 1	no shutdownno shutdown Example: Router(config)# interface gigabitethernet 0/1	Specify the port adapter type and the location of the interface to be configured. The <i>type number</i> is always 0 and the <i>type number</i> is the number of the port.
Step 2	no shutdown	Enable the gigabit Ethernet interface using the no shutdown command.

Modifying MTU Size on the Interface

Complete the following steps to modify the MTU size on Gigabit Ethernet interface:



Note To configure mtu under SVI interface, use mtu bytes command since ip mtu bytes command is not supported under SVI interface.



Note Maximum frame size allowed is calculated as the sum of configured MTU value and size of Layer 2 header.

Procedure

	Command or Action	Purpose
Step 1	enable Example: <pre>Router> enable</pre>	Enables privileged EXEC mode. <ul style="list-style-type: none"> • Enter your password if prompted.
Step 2	configure terminal Example: <pre>Router# configure terminal</pre>	Enters global configuration mode.
Step 3	interface gigabitethernet slot/port Example: <pre>Router(config)# interface gigabitethernet 0/1</pre>	Selects a Gigabit Ethernet interface and enters interface configuration mode. <ul style="list-style-type: none"> • <i>slot/port</i>—Specifies the slot and port number.
Step 4	mtu bytes Example: <pre>Router(config-if)# mtu 6000</pre>	Configures the MTU size for Gigabit Ethernet interface. <ul style="list-style-type: none"> • <i>bytes</i>—The range is from 1500 to 9216. The default is 9216. <p>Note To set the MTU size to its default value, use the no mtu or default mtu command.</p> <p>Note Maximum frame size allowed is calculated as the sum of configured MTU value and size of Layer 2 header.</p>

Verifying the MTU Size

To verify the MTU size, use the **show interface gigabitethernet** and **show interface mtu** commands.

```
Router# show interface gigabitethernet 0/1
GigabitEthernet0/1 is up, line protocol is up (connected)
  Hardware is Gigabit Ethernet, address is 4055.398d.bd05 (bia 4055.398d.bd05)
  MTU 6000 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 auto, media type is RJ45
  output flow-control is unsupported, input flow-control is unsupported
  ARP type: ARPA, ARP Timeout 04:00:00
  Last input never, output never, output hang never
  Last clearing of "show interface" counters 21:01:41
  Input queue: 0/200/0/0 (size/max/drops/flushes); Total output drops: 0
  Queueing strategy: fifo
  Output queue: 0/40 (size/max)
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
    0 packets input, 0 bytes, 0 no buffer
    Received 0 broadcasts (0 IP multicasts)
    0 runs, 0 giants, 0 throttles
    0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored
    0 watchdog, 0 multicast, 0 pause input
    0 packets output, 0 bytes, 0 underruns

Router# show interface mtu
Port      Name      MTU
Gi0/0          9216
Gi0/1          6000
Gi0/2          3000
Gi0/3          9216
Gi0/4          9216
Gi0/5          9216
Gi0/6          9216
Gi0/7          9216
Gi0/8          9216
Gi0/9          9216
Gi0/10         9216
Gi0/11         9216
```

MAC Flap Control

A MAC flap occurs when a switch receives packets from two different interfaces, with the same source MAC address. This happens when wrong configurations such as loops are introduced in networks. MAC flapping can cause CPU hogs and software induced crashes, if preventive action is not taken.

The two main aspects of MAC flap control feature are:

- Identification of MAC Flapping—Identified when MAC movement counter threshold is hit at specified time intervals.
- Preventive Action—Err-Disabling is done in one of the ports that has MAC flapping.

This feature is disabled by default and can be enabled or disabled through the CLI. You can configure the maximum number of MAC movements that are allowed in a specified time interval, beyond which the MAC movement is termed as flapping.

Once the port is err-disabled, it can be administratively brought up using the **shut** and **no shut** commands.

Restrictions and Limitations

- If MAC learning is done in tens of thousands, the CPU may slow down. This feature does not address the slow down or CPU hog due to MAC learning.
- When the router is learning tens of thousands of MACs, and there are a couple of genuine MAC movements (not due to a loop), they are not tagged as MAC flapping since these are valid MAC movements.
- Average MAC Movement issue

For example, let us assume that MAC movement counter is configured for a maximum of 5 MAC movements in 10 seconds.

If 2000 MACs have contributed for 4 MAC movements each in 10 seconds, the total number of AC movements will be 8000. Since the individual MAC threshold is not hit in this case, the router does not take any preventive action. However, this condition may not really occur in practice.

Configuring MAC Flap Control

Complete the following steps to configure MAC Flap control:

Procedure

	Command or Action	Purpose
Step 1	configure terminal Example: Router# configure terminal	Enter global configuration mode.
Step 2	mac-flap-ctrl on per-mac <i>mac-movement</i> <i>time-interval</i> Example: Router(config)# mac-flap-ctrl on per-mac 20 10	Enables MAC flap control. <ul style="list-style-type: none"> • <i>mac-movement</i>—Maximum number of MAC movements that are allowed in the specified time. • <i>time-interval</i>—Time interval that can elapse before the MAC movements are tagged as flapping. <p>If values are not specified for the above parameters, the default values are taken by the router. The default values for the counters are five and ten; that is five movements in ten seconds.</p> <p>The no form of the command disables this feature.</p>

Configuring a Combo Port

A combo port is considered as a single interface with dual front ends (an RJ-45 connector and an SFP module connector). The dual front ends of a combo port are non-redundant interfaces; the Cisco ASR 901 Router activates only one connector of the pair. Combo ports can be configured as copper ports or small form-factor pluggable (SFP) module ports.

By default, the Cisco ASR 901 Router selects the RJ-45 connector. However, you can use the **media-type** command to manually select the media type. When the media type is auto-select, the router gives preference to SFP module if both copper and fiber-optic signals are simultaneously detected.



Note

- When DOM is enabled on a port (with active SFP link status) and the SFP encounters violations of any kind, an error message is displayed, irrespective of the port being combo or non-combo.
- When the media type is auto-select, the Cisco ASR 901 Router configures both types with auto negotiation of speed and duplex.
- When the media type is auto-select, you cannot use 100M SFPs.
- When the media type is auto-select, you cannot use the **speed** and **duplex** commands.
- When the media type is auto-select, the Cisco ASR 901 Router uses the following criteria to select the type:
 - If only one connector is installed, that interface is active and remains active until the media is removed or the router is reloaded.
 - If both media are installed in the combo port, the router gives preference to the SFP module interface.
 - If both media are installed in the combo port, when the SFP module interface is inactive, the RJ-45 connector is selected. When the SFP module interface recovers and becomes active, the RJ-45 connector is disabled and the router gives preference to the SFP module interface.
 - If both media are installed in the combo port, and the router is reloaded or the port is disabled and then re-enabled through the **shutdown** and the **no shutdown** interface configuration commands, the router gives preference to the SFP module interface.
- Copper SFPs are not supported on combo ports in Cisco ASR 901 Router



Note

Copper SFPs auto-negotiation is not mandatory for 1000Ba devices.

Procedure

	Command or Action	Purpose
Step 1	enable Example: Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> • Enter your password if prompted.

	Command or Action	Purpose
Step 2	configure terminal Example: Router# configure terminal	Enters global configuration mode.
Step 3	interface gigabitethernet <i>slot/port</i> Example: Router(config)# interface gigabitethernet 0/1	Selects a Gigabit Ethernet interface and enters interface configuration mode. <ul style="list-style-type: none"> • <i>slot/port</i>—Specifies the slot and port number.
Step 4	media-type {auto-select rj45 sfp} Example: Router(config-if)# media-type rj45	Configures the media type. <ul style="list-style-type: none"> • auto-select—Specifies dynamic selection of the physical connection. • rj45—Specifies an RJ-45 physical connection. • sfp—Specifies an SFP physical connection for fiber media.
Step 5	end Example: Router(config-if)# end	Exits interface configuration mode and enters privileged EXEC mode.

Verifying the Media Type

To verify the media type, use the **show interface gigabitethernet** command.

Following is a sample output when the media type is RJ-45:

```
Router# show interface gigabitethernet 0/1
GigabitEthernet0/1 is up, line protocol is up (connected)
  Hardware is Gigabit Ethernet, address is 4055.398d.bd05 (bia 4055.398d.bd05)
  MTU 9216 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 auto, media type is RJ45
  output flow-control is unsupported, input flow-control is unsupported
```

Following is a sample output when fiber-optic is selected as the physical connection:

```
Router# show interface gigabitethernet 0/7
GigabitEthernet0/7 is up, line protocol is up (connected)
  Hardware is Gigabit Ethernet, address is 4055.398d.bd0b (bia 4055.398d.bd0b)
  MTU 9216 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 auto, media type is SX
  output flow-control is unsupported, input flow-control is unsupported
```


Following is a sample output when the media type is auto-select and the interface is down:

```
Router# show interface gigabitethernet 0/7
GigabitEthernet0/7 is down, line protocol is down (notconnect)
  Hardware is Gigabit Ethernet, address is 0000.0000.0000 (bia 0000.0000.0000)
  MTU 9216 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 auto, media type is unknown
  output flow-control is unsupported, input flow-control is unsupported
```

