

ASR9000 Ethernet Loopback Testing

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Using Loopbacks to Test Ethernet Interfaces

When necessary, loopbacks can be used to find problems with line cards, fabric, Network Processors (NPs), transceivers, or optical transit paths.

There are two primary kinds of loopbacks: internal and external.

Internal loops can be done remotely, but don't provide as much information.

External loops must be performed at the site, but give the greatest amount of information.

The below examples use this interface:

```
RP/0/RSP0/CPU0:ASR9001-F# show run int tenGigE 0/0/1/1
interface TenGigE0/0/1/1
  ipv4 address 10.100.101.1 255.255.255.0
!
```

Internal loopback

This is a basic test that can be performed without access to a remote site. It can find problems with the CPU, fabric path, NP and transceiver, but it cannot find optical or transit problems.

Configure the Loopback

This is traffic impacting

```
RP/0/RSP0/CPU0:ASR9001-F# configure
RP/0/RSP0/CPU0:ASR9001-F(config)# int tenGigE 0/0/1/1
RP/0/RSP0/CPU0:ASR9001-F(config-if)# loopback internal
RP/0/RSP0/CPU0:ASR9001-F(config-if)# commit
RP/0/RSP0/CPU0:ASR9001-F(config-if)# end
```

Clear Counters

This clears counters on both the interface and controller.

```
RP/0/RSP0/CPU0:ASR9001-F# clear counters tenGigE 0/0/1/1
Clear "show interface" counters on this interface [confirm]
```

Ping the Local IP

```
RP/0/RSP0/CPU0:ASR9001-F# ping 10.100.101.1 count 10000 size 1500 timeout 0
pings with timeout=0 may result in system instability and
control protocol flaps resulting in traffic impact.
DO you really want to continue[confirm with only 'y' or 'n'] [y/n] :y
Type escape sequence to abort.
Sending 10000, 1500-byte ICMP Echos to 10.100.101.1, timeout is 0 seconds:
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
```

[output omitted]

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
Success rate is 100 percent (10000/10000), round-trip min/avg/max = 1/1/5 ms
```

Check Interface Counters

```
RP/0/RSP0/CPU0:ASR9001-F# show interfaces tenGigE 0/0/1/1
TenGigE0/0/1/1 is up, line protocol is up
  Interface state transitions: 3
  Hardware is TenGigE, address is 70e4.2217.ba65 (bia 70e4.2217.ba65)
  Layer 1 Transport Mode is LAN
  Internet address is 10.100.101.1/24
  MTU 1514 bytes, BW 10000000 Kbit (Max: 10000000 Kbit)
    reliability 255/255, txload 0/255, rxload 0/255
  Encapsulation ARPA,
  Full-duplex, 10000Mb/s, link type is force-up
  output flow control is off, input flow control is off
  loopback set (External),
  ARP type ARPA, ARP timeout 04:00:00
  Last input 00:00:00, output 00:00:00
  Last clearing of "show interface" counters 00:02:40
  5 minute input rate 685000 bits/sec, 126 packets/sec
  5 minute output rate 685000 bits/sec, 126 packets/sec
    10003 packets input, 15140657 bytes, 0 total input drops 0 drops for unrecognized upper-
level protocol Received 0 broadcast packets, 3 multicast packets 0 runts, 0 giants, 0 throttles,
0 parity 0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort 10003 packets output,
15140657 bytes, 0 total output drops Output 0 broadcast packets, 3 multicast packets 0 output
errors, 0 underruns, 0 applique, 0 resets 0 output buffer failures, 0 output buffers swapped out
0 carrier transitions
```

Check the Controller Counters

```
RP/0/RSP0/CPU0:ASR9001-F# show controllers tenGigE 0/0/1/1 stats
Statistics for interface TenGigE0/0/1/1 (cached values):
```

Ingress:

```
Input total bytes          = 15140657
Input good bytes           = 15140657
```

```
Input total packets = 10003 Input 802.1Q frames = 0 Input pause frames = 0 Input pkts 64
bytes = 0 Input pkts 65-127 bytes = 0 Input pkts 128-255 bytes = 3 Input pkts 256-511 bytes = 0
Input pkts 512-1023 bytes = 0 Input pkts 1024-1518 bytes = 10000 Input pkts 1519-Max bytes = 0
Input good pkts = 10003 Input unicast pkts = 10000 Input multicast pkts = 3 Input broadcast pkts
= 0 Input drop overrun = 0 Input drop abort = 0 Input drop invalid VLAN = 0 Input drop invalid
DMAC = 0 Input drop invalid encap = 0 Input drop other = 0 Input error giant = 0 Input error
runt = 0 Input error jabbers = 0 Input error fragments = 0 Input error CRC = 0 Input error
collisions = 0 Input error symbol = 0 Input error other = 0 Input MIB giant = 0 Input MIB jabber
= 0 Input MIB CRC = 0 Egress: Output total bytes = 15140657 Output good bytes = 15140657 Output
total packets = 10003 Output 802.1Q frames = 0 Output pause frames = 0 Output pkts 64 bytes = 0
Output pkts 65-127 bytes = 0 Output pkts 128-255 bytes = 3 Output pkts 256-511 bytes = 0 Output
pkts 512-1023 bytes = 0 Output pkts 1024-1518 bytes = 10000 Output pkts 1519-Max bytes = 0
Output good pkts = 10003 Output unicast pkts = 10000 Output multicast pkts = 3 Output broadcast
pkts = 0 Output drop underrun = 0 Output drop abort = 0 Output drop other = 0 Output error other
= 0
```

External Loopback

This test verifies the linecard Central Processing Unit (CPU), fabric path, NP, transceiver, and optics.

This test requires a length of fiber cable to physically loop the transmit (Tx) signals into the receive (Rx) port.

Configure the Loopback

This is traffic impacting

```
RP/0/RSP0/CPU0:ASR9001-F# configure
RP/0/RSP0/CPU0:ASR9001-F(config)# interface tenGigE 0/0/1/1
RP/0/RSP0/CPU0:ASR9001-F(config-if)# loopback external
RP/0/RSP0/CPU0:ASR9001-F(config-if)# commit
RP/0/RSP0/CPU0:ASR9001-F(config-if)# end
```

Clear Counters

This clears counters on both the interface and controller.

```
RP/0/RSP0/CPU0:ASR9001-F# clear counters
Clear "show interface" counters on all interfaces [confirm]
```

Ping the Local IP

```
RP/0/RSP0/CPU0:ASR9001-F# ping 10.100.101.1 count 10000 size 1500 timeout 0
pings with timeout=0 may result in system instability and
control protocol flaps resulting in traffic impact.
DO you really want to continue[confirm with 'y' or 'n'] [y/n] :y
Type escape sequence to abort.
Sending 10000, 1500-byte ICMP Echos to 10.100.101.1, timeout is 0 seconds:
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
```

[output omitted]

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
Success rate is 100 percent (10000/10000), round-trip min/avg/max = 1/1/5 ms
```

Check Interface Counters

```
RP/0/RSP0/CPU0:ASR9001-F# show interfaces tenGigE 0/0/1/1
TenGigE0/0/1/1 is up, line protocol is up
  Interface state transitions: 7
  Hardware is TenGigE, address is 70e4.2217.ba65 (bia 70e4.2217.ba65)
  Layer 1 Transport Mode is LAN
  Internet address is 10.100.101.1/24
  MTU 1514 bytes, BW 10000000 Kbit (Max: 10000000 Kbit)
    reliability 255/255, txload 0/255, rxload 0/255
  Encapsulation ARPA,
  Full-duplex, 10000Mb/s, link type is force-up
  output flow control is off, input flow control is off
  loopback set (Internal),
  ARP type ARPA, ARP timeout 04:00:00
  Last input 00:00:00, output 00:00:00
  Last clearing of "show interface" counters 00:00:32
  5 minute input rate 504000 bits/sec, 52 packets/sec
  5 minute output rate 504000 bits/sec, 52 packets/sec
    10001 packets input, 15140219 bytes, 0 total input drops 0 drops for unrecognized upper-
level protocol Received 0 broadcast packets, 1 multicast packets 0 runts, 0 giants, 0 throttles,
0 parity 0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort 10001 packets output,
15140219 bytes, 0 total output drops Output 0 broadcast packets, 1 multicast packets 0 output
errors, 0 underruns, 0 applique, 0 resets 0 output buffer failures, 0 output buffers swapped out
0 carrier transitions
```

Check Controller Counters

```
RP/0/RSP0/CPU0:ASR9001-F# show controllers tenGigE 0/0/1/1 stats
Statistics for interface TenGigE0/0/1/1 (cached values):

Ingress:
  Input total bytes          = 15140219
  Input good bytes          = 15140219

  Input total packets = 10001 Input 802.1Q frames = 0 Input pause frames = 0 Input pkts 64
bytes = 0 Input pkts 65-127 bytes = 0 Input pkts 128-255 bytes = 1 Input pkts 256-511 bytes = 0
Input pkts 512-1023 bytes = 0 Input pkts 1024-1518 bytes = 10000 Input pkts 1519-Max bytes = 0
Input good pkts = 10001 Input unicast pkts = 10000 Input multicast pkts = 1 Input broadcast pkts
= 0 Input drop overrun = 0 Input drop abort = 0 Input drop invalid VLAN = 0 Input drop invalid
DMAC = 0 Input drop invalid encap = 0 Input drop other = 0 Input error giant = 0 Input error
runt = 0 Input error jabbers = 0 Input error fragments = 0 Input error CRC = 0 Input error
collisions = 0 Input error symbol = 0 Input error other = 0 Input MIB giant = 0 Input MIB jabber
= 0 Input MIB CRC = 0 Egress: Output total bytes = 15140219 Output good bytes = 15140219 Output
total packets = 10001 Output 802.1Q frames = 0 Output pause frames = 0 Output pkts 64 bytes = 0
Output pkts 65-127 bytes = 0 Output pkts 128-255 bytes = 1 Output pkts 256-511 bytes = 0 Output
```

pkts 512-1023 bytes = 0 Output pkts 1024-1518 bytes = 10000 Output pkts 1519-Max bytes = 0
Output good pkts = 10001 Output unicast pkts = 10000 Output multicast pkts = 1 Output broadcast
pkts = 0 Output drop underrun = 0 Output drop abort = 0 Output drop other = 0 Output error other
= 0

References

[Cisco ASR 9000 Series Aggregation Services Router Interface and Hardware Component Command Reference, Release 4.3.x Chapter: Ethernet Interface Commands on the Cisco ASR 9000 Series Router](#)