

Troubleshooting Fundamentals Lab – Phase 1.5

Objective

Host D is unable to communicate with host B. Investigate the issue and resolve it, if possible

Topology Overview

There are four hosts in the topology. **Hosts A and B are connected to SW1**, while **Host C and D are connected to SW2**. SW1 and SW2 are connected to RTR1.

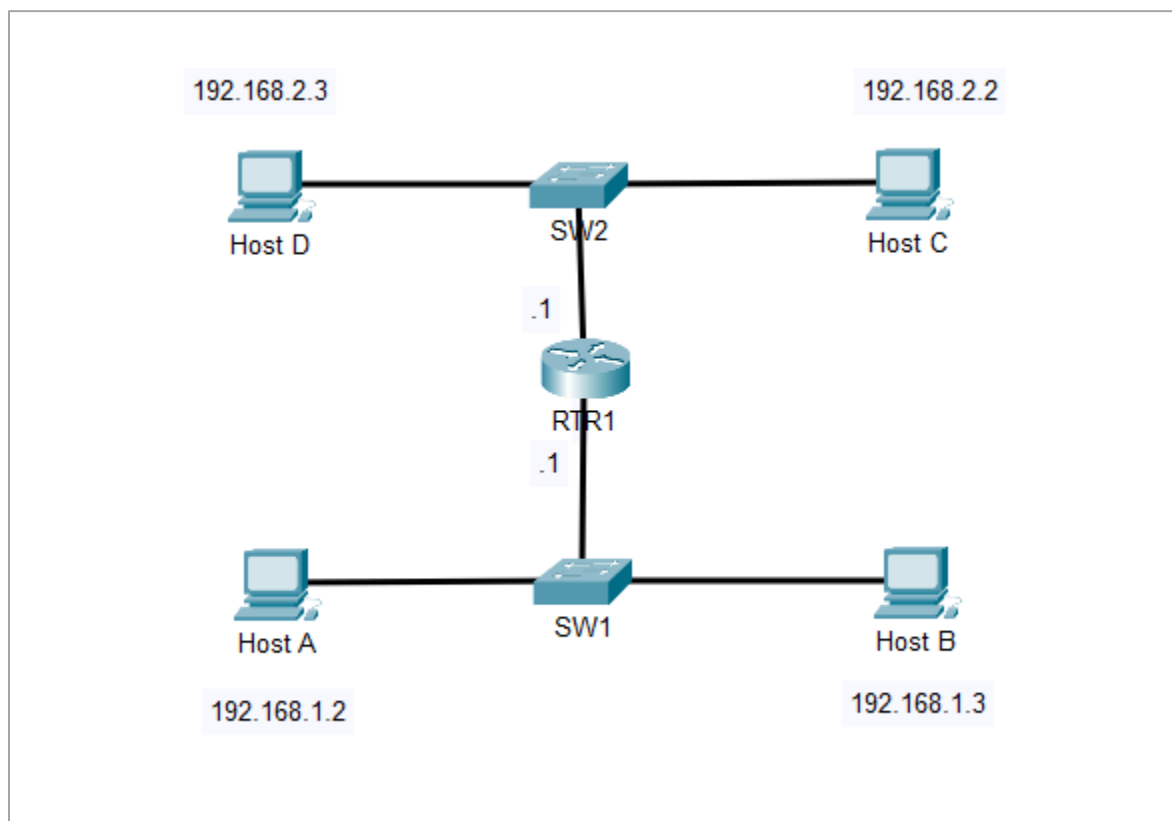


Figure 1 – Lab Topology

Step 1 – Verify the Problem

From **Host D**, ping **Host B**.

Result: **Ping fails**

```
C:\>ping 192.168.1.3

Pinging 192.168.1.3 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 192.168.1.3:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>
```

Figure 2 – Unsuccessful ping from host D to Host B

The Issue is confirmed.

Step 2 – Decide Where to Start

With the issue confirmed, it is understood that Host D does not have reachability to Host B. Host D is in a different network than Host B. Troubleshooting could begin by checking Layer 1 or Layer 2 components but a more efficient starting point is to test Layer 3 reachability. If Layer 3 connectivity is working, it confirms that the necessary Layer 1 and 2 mechanisms are functioning correctly along the path.

What must be true for communication to work? Each requirement becomes something that can be verified.

Layer 3 – Network Requirements

For Host D to communicate with Host B on a different network, the following must be true:

- Host D must have a valid and correctly configured IP address
- Host D must be configured with a default gateway
- Host D must have reachability to its gateway
- The gateway must have a route to the remote network
- Host B must also meet these same requirements

Step 3 – Investigation

On Host D terminal

```
ipconfig
```

Observation:

- Host D has an IP address of **192.168.2.3** with a subnet mask of **255.255.255.248**, placing it in the **192.168.2.0/29** network.
- The usable host range for this subnet is **192.168.2.1–192.168.2.6**.
- Host D has a default gateway configured, and the gateway address falls within this subnet range.

```
C:\>ipconfig

FastEthernet0 Connection: (default port)

    Connection-specific DNS Suffix...:
    Link-local IPv6 Address . . . . .: FE80::20B:BEFF:FE09:4E75
    IPv6 Address . . . . .: ::
    IPv4 Address. . . . .: 192.168.2.3
    Subnet Mask . . . . .: 255.255.255.248
    Default Gateway . . . . .: ::
                              192.168.2.1
```

Figure 3 Host D ipconfig output

From **Host D**, ping the **gateway IP**.

Result: **Ping succeeds**

Observation:

- Host D has reachability to the gateway
- Layer 2 configurations are likely to be correct due to success with IP reachability.

```
C:\>ping 192.168.2.1

Pinging 192.168.2.1 with 32 bytes of data:

Reply from 192.168.2.1: bytes=32 time<1ms TTL=255
Reply from 192.168.2.1: bytes=32 time<1ms TTL=255
Reply from 192.168.2.1: bytes=32 time<1ms TTL=255
Reply from 192.168.2.1: bytes=32 time=1ms TTL=255

Ping statistics for 192.168.2.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>
```

Figure 4 Host D ping to gateway IP

Validate RTR1 is the device with the last octet of 1. Reachability to the correct IP does not guarantee communication with the correct device. There is always the possibility that something was misconfigured.

On RTR1:

```
show ip interface brief
```

```
RTR1#sh ip int br
Interface      IP-Address      OK? Method Status      Protocol
GigabitEthernet0/0/0  192.168.1.1    YES manual up          up
GigabitEthernet0/0/1  192.168.2.1    YES manual up          up
GigabitEthernet0/0/2  unassigned     YES unset  administratively down down
Vlan1          unassigned     YES unset  administratively down down
RTR1#
```

Figure 5 RTR1 show ip interface brief output

Figure 6 reveals that RTR1 has a connected route to Host B's network. The mask CIDR is /29 meaning Host B's last octet of .3 falls within the range of 192.168.1.1 – 192.168.1.6. This route would be adequate for routing traffic to that network.

```
Gateway of last resort is not set

  192.168.1.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.1.0/29 is directly connected, GigabitEthernet0/0/0
L       192.168.1.1/32 is directly connected, GigabitEthernet0/0/0
  192.168.2.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.2.0/29 is directly connected, GigabitEthernet0/0/1
L       192.168.2.1/32 is directly connected, GigabitEthernet0/0/1
RTR1#
```

Figure 6 – RTR1 show ip route output

Figure 7 reveals that connectivity from RTR1 to Host B fails. This is an important clue because RTR1 has an interface on that network segment and reachability should have been successful.

The issue could be caused by Layer 1 or Layer 2 on SW1 and Host B. While this lab will continue verifying Layer 3 components, it would be reasonable to step down to Layer 1 or 2 to determine the root issue.

```
RTR1#ping 192.168.1.3
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.1.3, timeout is 2 seconds:
.....
Success rate is 0 percent (0/5)
RTR1#
```

Figure 7 – RTR1 ping Host B

On Host B, check the IP configuration. *Figure 8* explains the issue. Host B has not been assigned an IP.

```
C:\>ipconfig

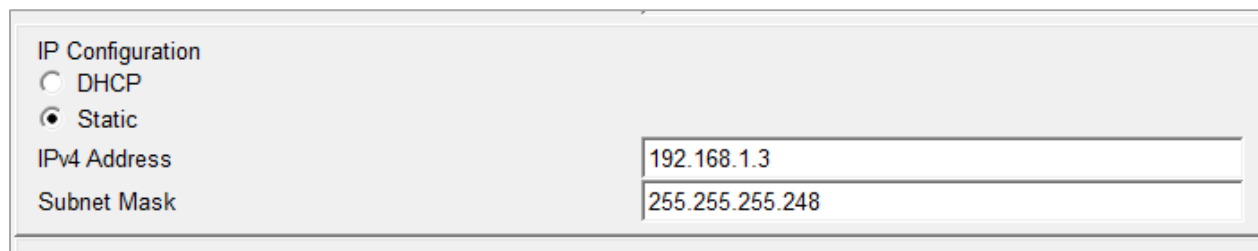
FastEthernet0 Connection: (default port)

    Connection-specific DNS Suffix...:
    Link-local IPv6 Address . . . . .: FE80::250:FFF:FEC2:1BA2
    IPv6 Address . . . . .: ::
    IPv4 Address . . . . .: 0.0.0.0
    Subnet Mask . . . . .: 0.0.0.0
    Default Gateway . . . . .: ::
                                   0.0.0.0
```

Figure 8 – Host D ipconfig output

Step 4 – Correct and Validate

On Host B add an IPv4 address on interface FastEthernet0.



IP Configuration

☐ DHCP

☒ Static

IPv4 Address: 192.168.1.3

Subnet Mask: 255.255.255.248

Figure 10 – Host B IP configuration



Gateway/DNS IPv4

☐ DHCP

☒ Static

Default Gateway: 192.168.1.1

DNS Server:

Figure 11 – Host B default gateway configuration

From **Host B**, ping **Host D**
Result: **Ping succeeds**