

Troubleshooting Fundamentals Lab – Phase 1.6

Objective

Host E is unable to communicate with hosts A and B. Investigate the issue and resolve it, if possible

Topology Overview

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

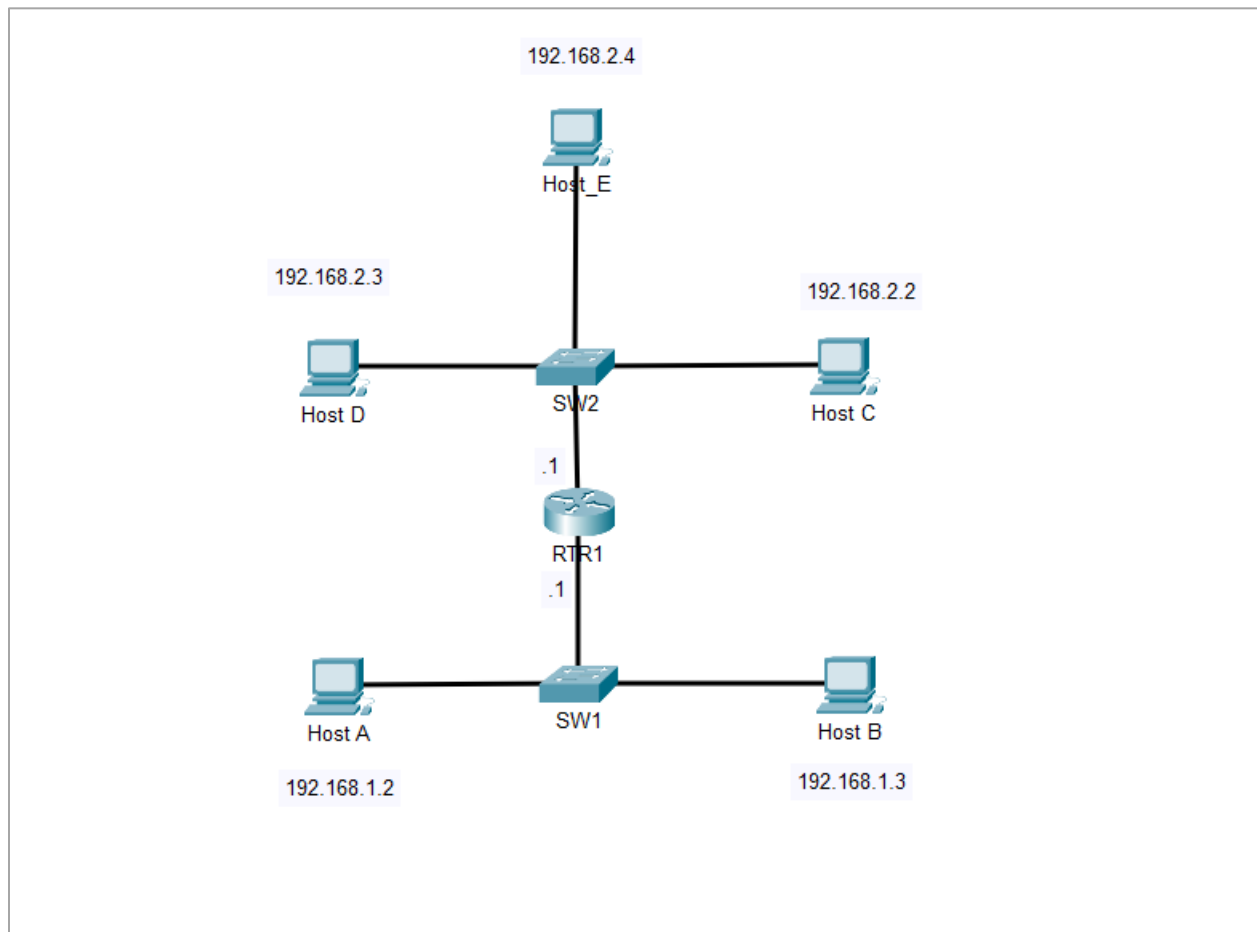


Figure 1 – Lab Topology

Step 1 – Verify the Problem

From **Host E**, ping **Hosts A** and **B**.

Result: **Ping fails**

```
C:\>ping 192.168.1.2

Pinging 192.168.1.2 with 32 bytes of data:

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

Ping statistics for 192.168.1.2:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

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),
```

Figure 2 – Unsuccessful ping from host E to hosts A and B

The issue is confirmed.

Step 2 – Decide Where to Start

With the issue confirmed, it is understood that Host E does not have reachability to hosts A and B.

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

Layer 3 – Network Requirements

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

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

Step 3 – Investigation

Check host E's IP configurations

```
C:\>ipconfig

FastEthernet0 Connection: (default port)

    Connection-specific DNS Suffix...:
    Link-local IPv6 Address . . . . .: FE80::2D0:97FF:FE44:8586
    IPv6 Address . . . . .: ::
    IPv4 Address. . . . .: 192.168.2.4
    Subnet Mask . . . . .: 255.255.255.248
    Default Gateway . . . . .: ::
                          192.168.2.1
```

Figure 3 – host E ipconfig output

Observation:

- Host E has an IP.
- Host E has a default gateway configured.

From **Host E**, ping the **gateway IP**

Result: **Ping Fails**

Observation:

- Host E does not have reachability to the gateway

```
C:\>ping 192.168.2.1

Pinging 192.168.2.1 with 32 bytes of data:

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

Ping statistics for 192.168.2.1:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

Figure 4 – host E failed reachability to gateway

On RTR1:

```
show ip interface brief
```

Observation:

- RTR1's interface is up/up
- RTR1's IP matches the gateway assigned to Host E

```
RTR1>en
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

The next logical troubleshooting step would be to move from Layer 3 troubleshooting down to Layer 1 or Layer 2. This would involve validating items such as cable connectivity or verifying that VLAN assignments are correct. However, in this lab, following that path would lead in the wrong direction. The reason is that the output shown in *Figure 5* does not provide enough information to draw a reliable conclusion.

One of the most important lessons in troubleshooting is that the network will only answer the questions you ask. If the question is incomplete, the answer may be misleading. Effective troubleshooters recognize when the information they have is insufficient and know when to dig deeper before changing direction.

On RTR1, view the running configurations for interface GigabitEthernet0/0/1 and the route table.

Observation:

- The IP assigned to interface GigabitEthernet0/0/1 has a CIDR of **/30**.
- The range of IP's is **192.168.1.1 – 192.168.1.2**.
- Host E's IP does not fall within this range.

```
interface GigabitEthernet0/0/1
description SW2
ip address 192.168.2.1 255.255.255.252
duplex auto
speed auto
```

Figure 6 – RTR1 show run interface GigabitEthernet0/0/1 output

```
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    192.168.2.0/30 is directly connected, GigabitEthernet0/0/1
L    192.168.2.1/32 is directly connected, GigabitEthernet0/0/1

RTR1#
```

Figure 7 – RTR1 show ip route output

The initial validation of RTR1's IP address gave the false impression that the device was configured correctly. During troubleshooting, this happens frequently because quick checks often hide important details, such as subnet masks. If reachability to the gateway from hosts **C** and **D** had been tested first, the troubleshooting process likely would have shifted toward validating **Host E's** Layer 1 and Layer 2 connectivity instead because hosts **C** and **D** would have had reachability. The order in which troubleshooting steps are performed can influence how the problem is interpreted and which direction the investigation takes. Experienced troubleshooters understand this and focus on asking the right questions and performing tests that provide the most reliable information.

Over the course of your networking career, you will discover that many issues are caused by small, easily overlooked details. Despite their simplicity, these minor problems can still lead to unnecessary downtime if they are not carefully identified.

Step 4 – Correct and Validate

On RTR1, change the subnet mask on interface GigabitEthernet0/0/1 to **255.255.255.248**.

From **Host D**, Ping **Host A**.

Result: Ping is successful