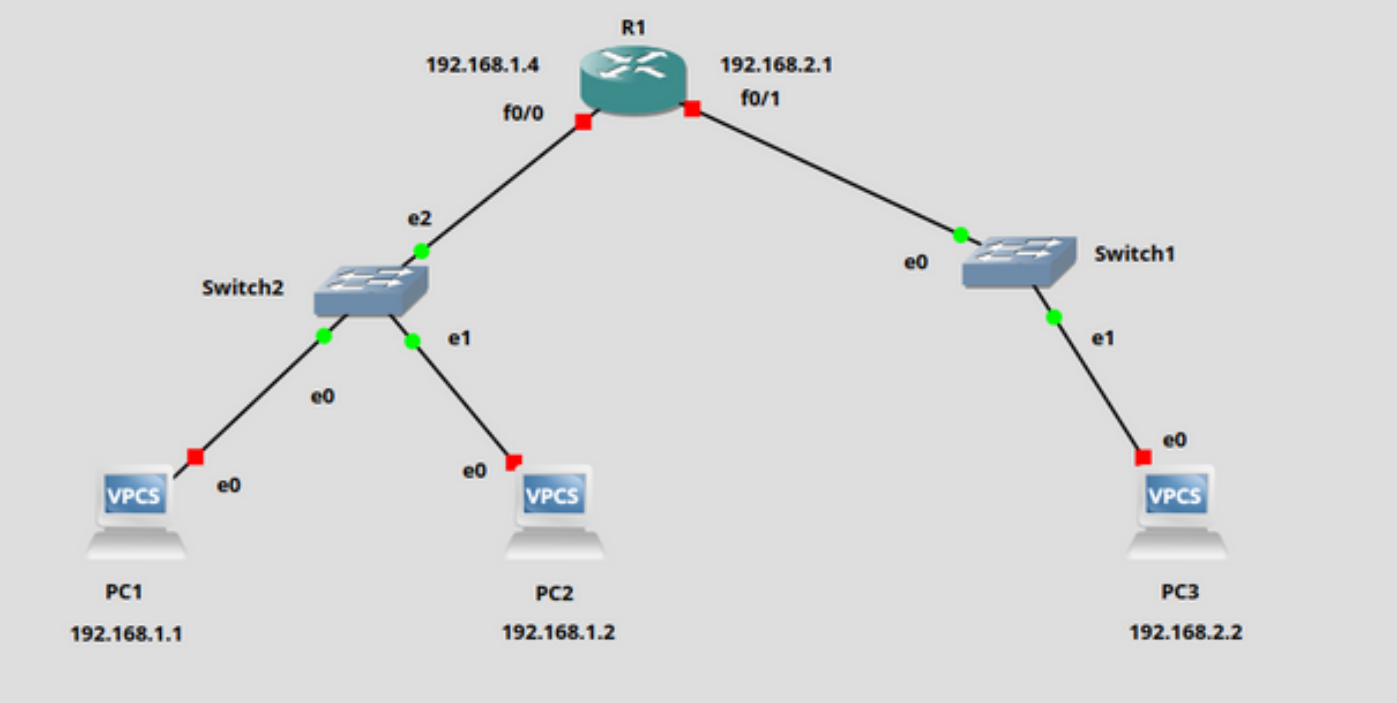
**2. Basic Network Troubleshooting Module: Simulate common network issues and implement basic troubleshooting solutions (e.g., ping, traceroute).**

**# Background Research for the problem statement:**

- Subnetting and IP addressing.
- Configuration of VPCs with IP addresses and gateways
- Configuration of router and router commands along with different modes in the router.
- Configuration of router to route traffic between different VPCs.
- PING and TRACE commands for troubleshooting and verifying connectivity.




**Configurations:**

**PC1:**

IP/MASK: 192.168.1.1/24

Gateway: 192.168.1.1

MAC: 00:50:79:66:68:00

LPORT: 10014

RHOST:PORT: 127.0.0.1:10015

MTU: 1500

**PC2:**

IP/MASK: 192.168.1.2/24

Gateway: 192.168.1.1

MAC: 00:50:79:66:68:01

LPORT: 10016

RHOST:PORT: 127.0.0.1:10017

MTU: 1500

**PC3:**

IP/MASK: 192.168.2.3/24

Gateway: 192.168.2.1.

MAC: 00:50:79:66:68:02

LPORT: 10018

RHOST:PORT: 127.0.0.1:10019

MTU: 1500

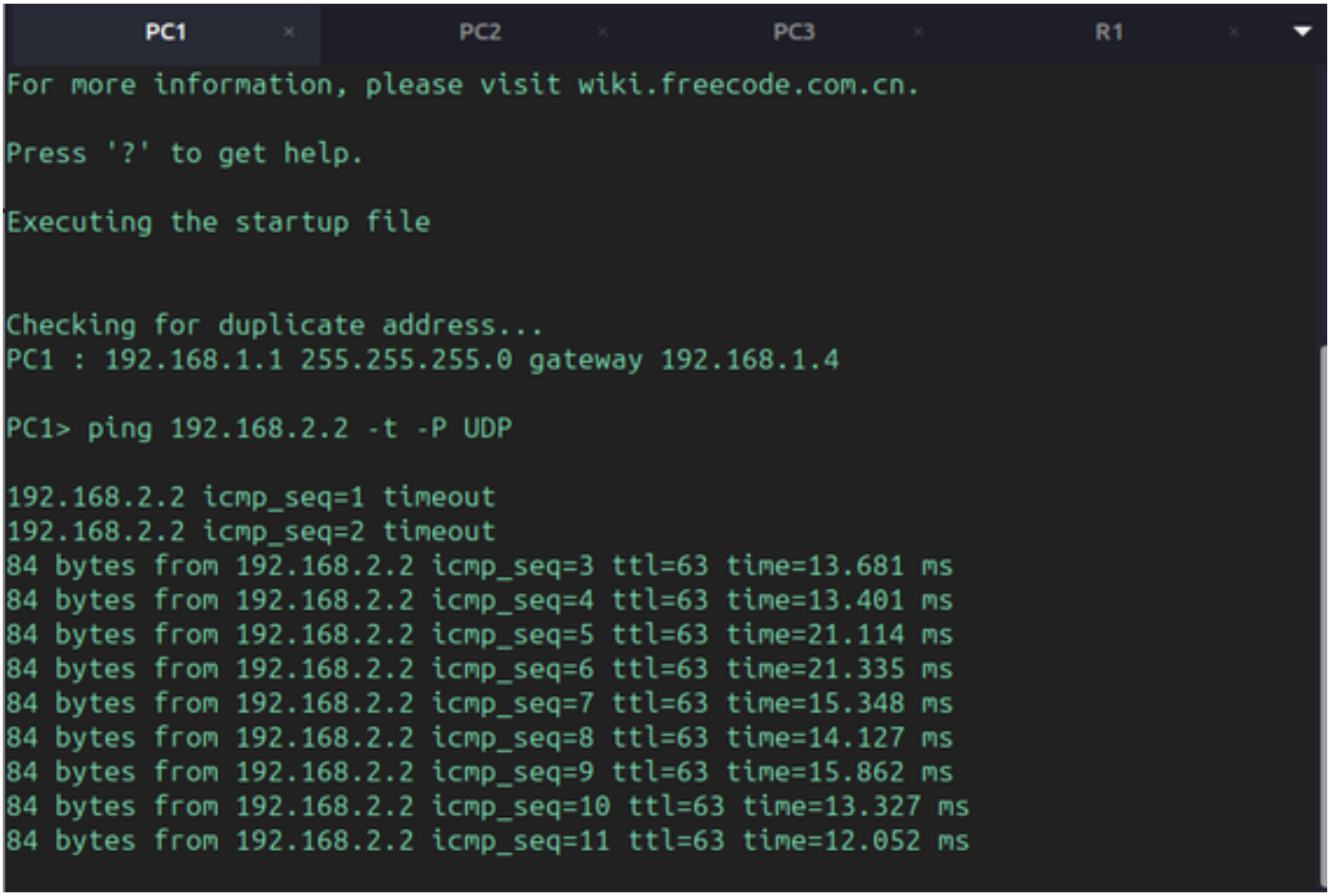
**Router:**

```
interface FastEthernet0/0
 ip address 192.168.1.4 255.255.255.0
 duplex auto
 speed auto
!
interface FastEthernet0/1
 ip address 192.168.2.1 255.255.255.0
 duplex auto
 speed auto
!
```

**# Observations:**

- **Ping:**

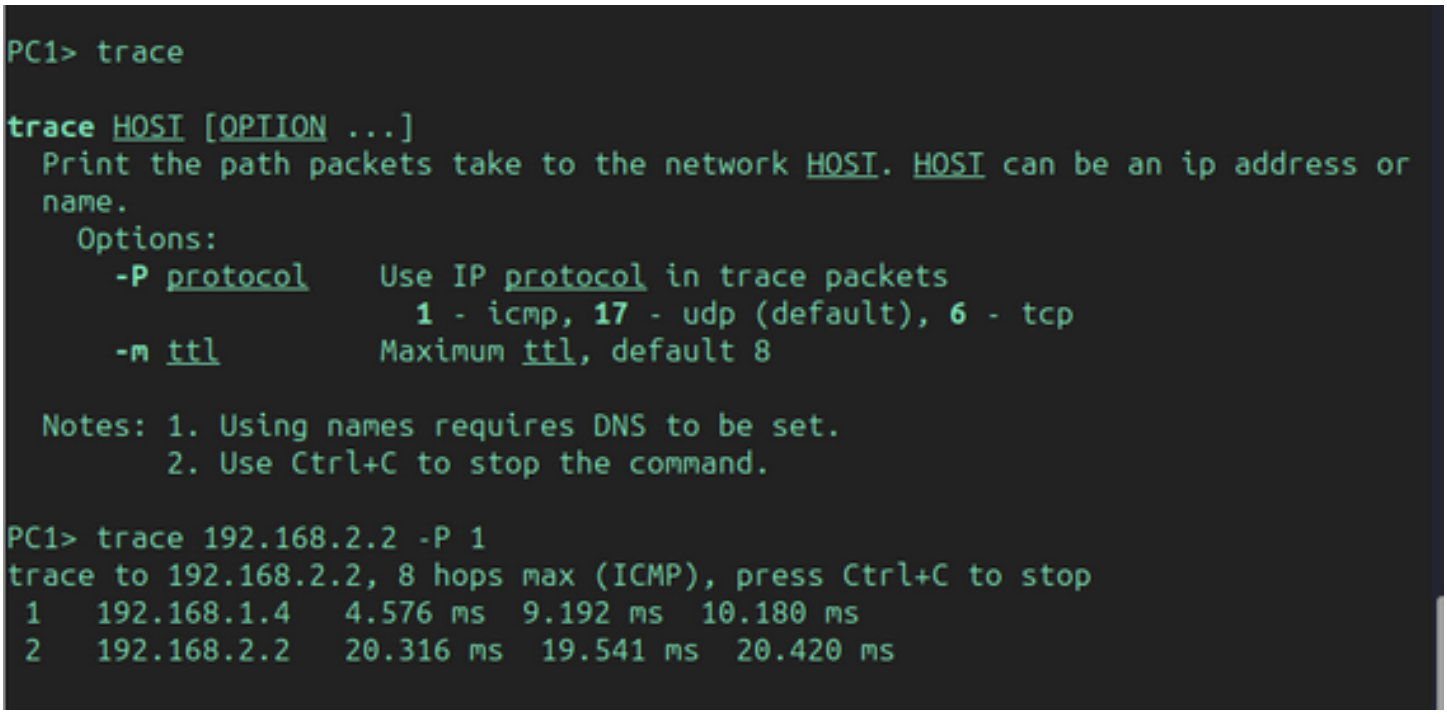
  - Connectivity between devices.
  - Ping fails or high latency.
  - Analyzed to find out network delays.
  - Used different Protocols to send packets using the ping command.




- **Trace command:**

  - It helped to find out path packets taken between source and destination.
  - The network route can be easily analyzed.

- Helps to find out routers or switches causing delays.




- **IP addressing and Subnetting:**

  - Ensured consistent IP addressing across devices.
  - Subnetting helps to divide a network within.