

F29DC 2024 Lab 3

Routing

- Shyam Sundar Velmurugan
 - ssv2001@hw.ac.uk
 - H00418621
-

Part 1 - Topology Configuration

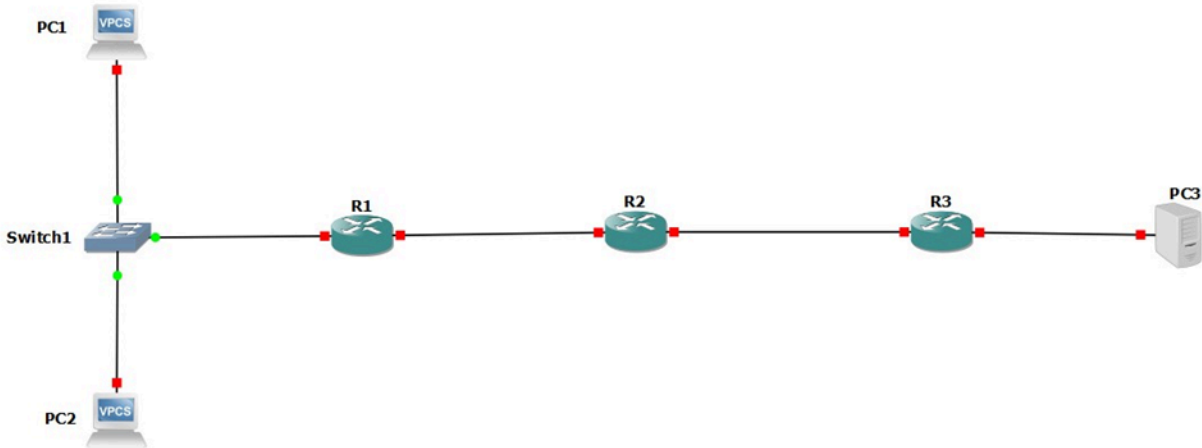


Image 1.1: Setting up the connection between PC1, PC2, PC3, R1, R2, R3 and with the Switch1.

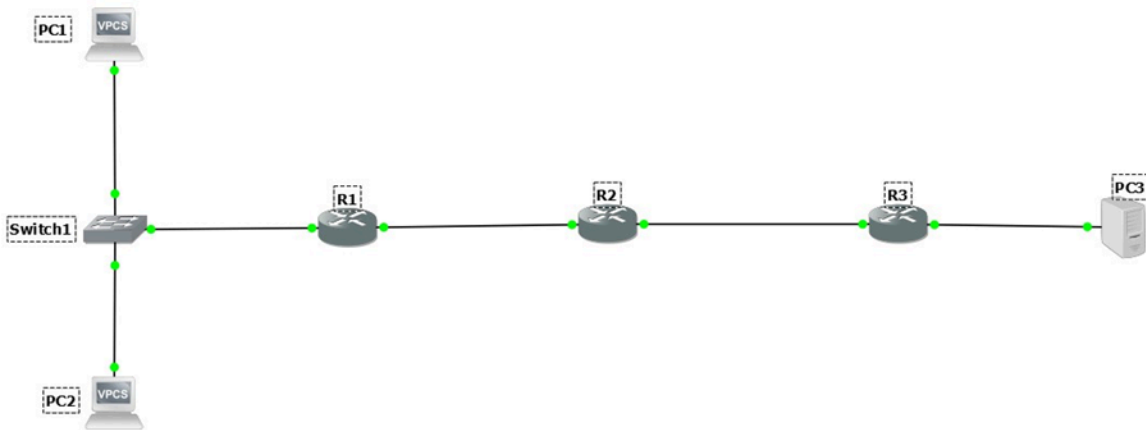


Image 1.2: Starting all the connections.

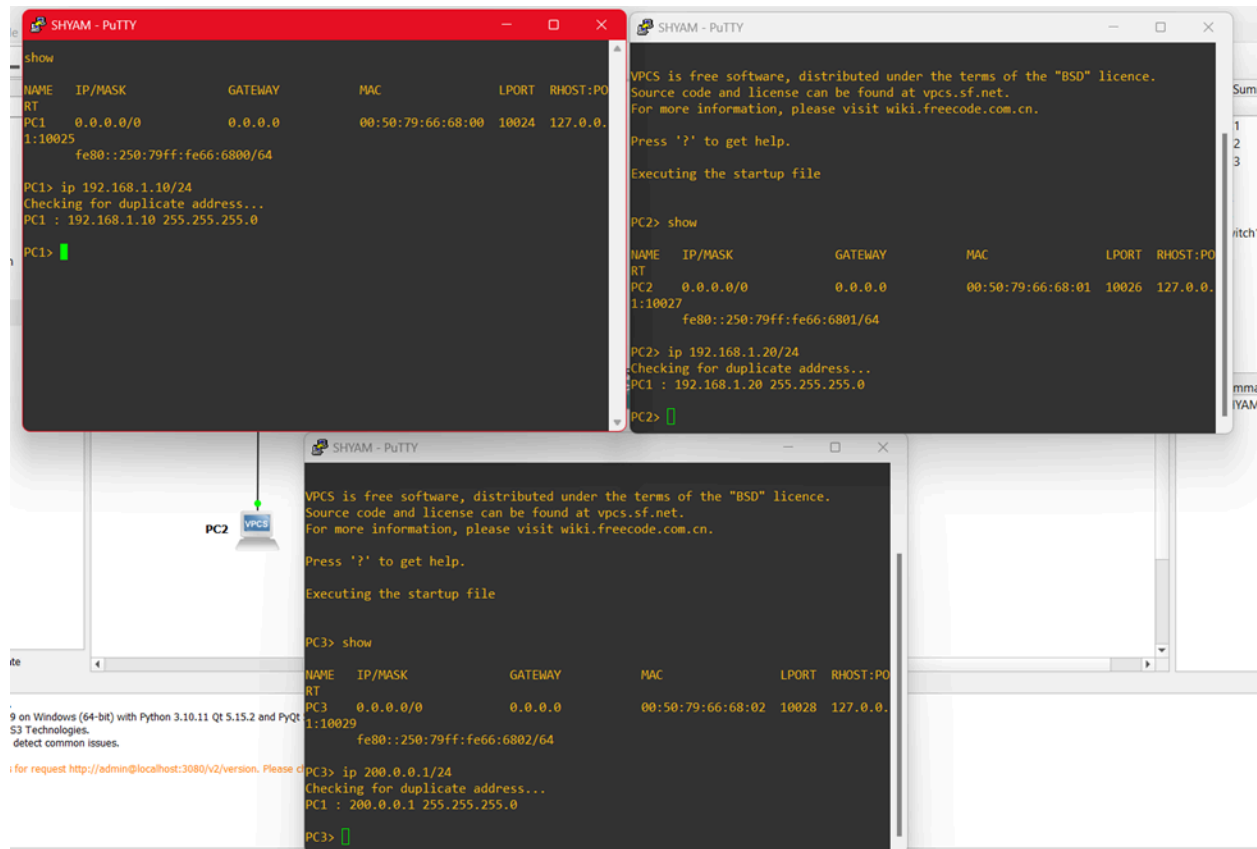
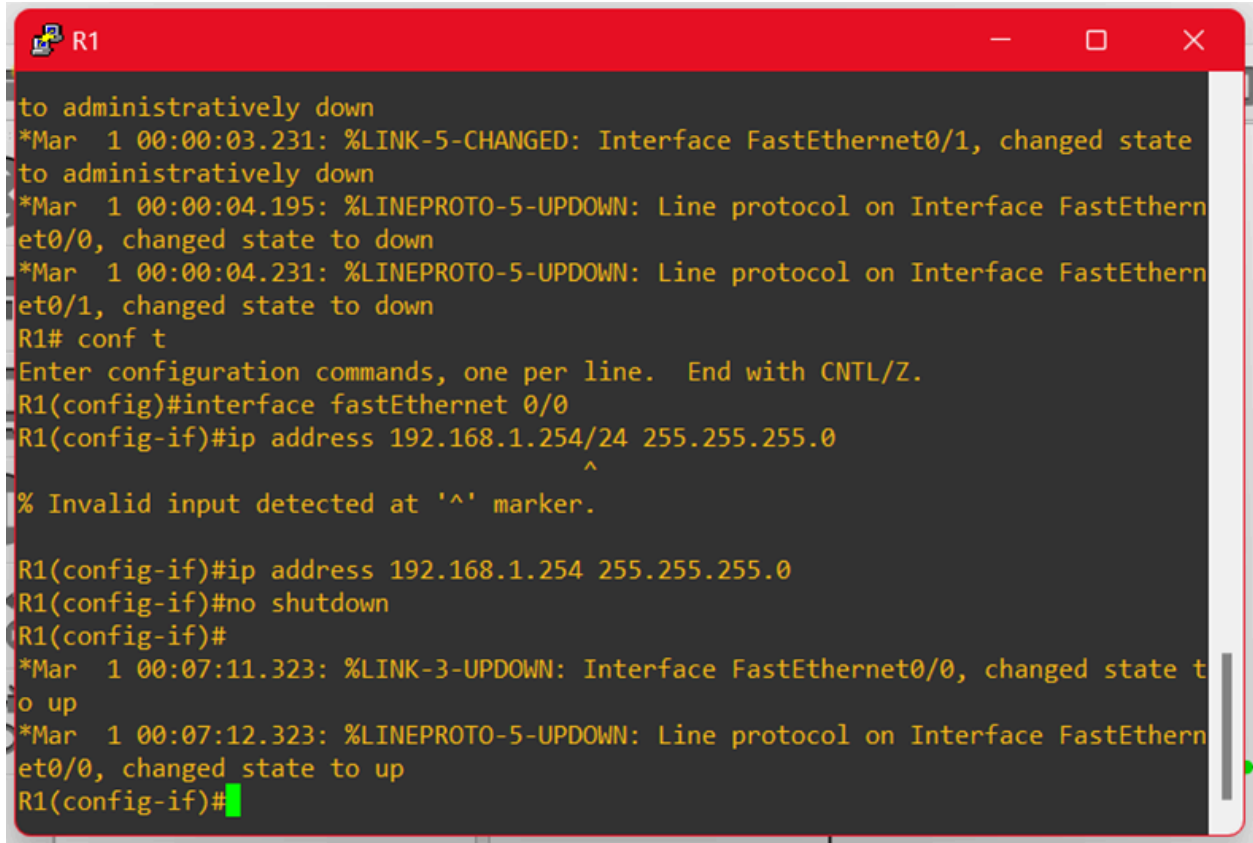


Image 1.3: Providing the IP addresses for all the VPC'S as follow ->

PC1 = 192.168.1.10/24

PC2 = 192.168.1.20/24

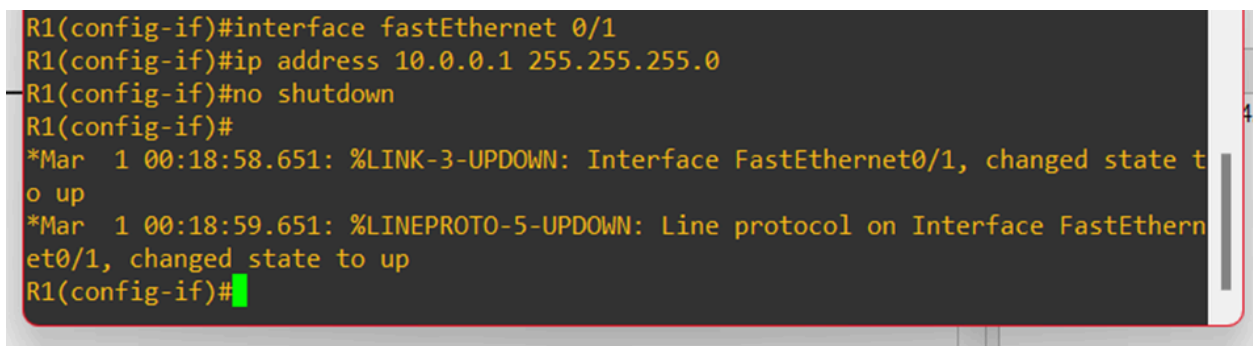
PC3 = 200.0.0.1/24



```
to administratively down
*Mar 1 00:00:03.231: %LINK-5-CHANGED: Interface FastEthernet0/1, changed state
to administratively down
*Mar 1 00:00:04.195: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthern
et0/0, changed state to down
*Mar 1 00:00:04.231: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthern
et0/1, changed state to down
R1# conf t
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#interface fastEthernet 0/0
R1(config-if)#ip address 192.168.1.254/24 255.255.255.0
^
% Invalid input detected at '^' marker.

R1(config-if)#ip address 192.168.1.254 255.255.255.0
R1(config-if)#no shutdown
R1(config-if)#
*Mar 1 00:07:11.323: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state t
o up
*Mar 1 00:07:12.323: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthern
et0/0, changed state to up
R1(config-if)#
```

Image 1.4: Setting up R1 with fast ethernet 0/0 with IP address 192.168.1.254 255.255.255.0 .



```
R1(config-if)#interface fastEthernet 0/1
R1(config-if)#ip address 10.0.0.1 255.255.255.0
R1(config-if)#no shutdown
R1(config-if)#
*Mar 1 00:18:58.651: %LINK-3-UPDOWN: Interface FastEthernet0/1, changed state t
o up
*Mar 1 00:18:59.651: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthern
et0/1, changed state to up
R1(config-if)#
```

Image 1.5: Setting up R1 with fast ethernet 0/1 with IP address 10.0.0.1 255.255.255.0 .

```
R2# conf t
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#interface fastEthernet 0/0
R2(config-if)#ip address 10.0.0.2 255.255.255.0
R2(config-if)#no shutdown
R2(config-if)#
*Mar 1 00:11:59.771: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up
*Mar 1 00:12:00.771: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
R2(config-if)#
```

Image 1.6: Setting up R2 with fast ethernet 0/0 with IP address 10.0.0.2 255.255.255.0 .

```
R2(config-if)# interface fastEthernet 0/1
R2(config-if)#ip address 10.0.2.1 255.255.255.0
R2(config-if)#no shutdown
R2(config-if)#
*Mar 1 00:14:11.103: %LINK-3-UPDOWN: Interface FastEthernet0/1, changed state to up
*Mar 1 00:14:12.103: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up
R2(config-if)#
```

Image 1.7: Setting up R2 with fast ethernet 0/1 with IP address 10.0.2.1 255.255.255.0 .

```
R3#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#interface fastEthernet 0/0
R3(config-if)#ip address 10.0.2.2 255.255.255.0
R3(config-if)#no shutdown
R3(config-if)#
*Mar 1 00:13:25.303: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up
*Mar 1 00:13:26.303: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
R3(config-if)#
```

Image 1.8: Setting up R3 with fast ethernet 0/0 with IP address 10.0.2.2 255.255.255.0 .

```
R3(config-if)#interface fastEthernet 0/1
R3(config-if)#ip address 200.0.0.254 255.255.255.0
R3(config-if)#no shutdown
R3(config-if)#
*Mar 1 00:15:00.979: %LINK-3-UPDOWN: Interface FastEthernet0/1, changed state to up
*Mar 1 00:15:01.979: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up
R3(config-if)#
```

Image 1.9: Setting up R3 with fast ethernet 0/1 with IP address 200.0.0.254 255.255.255.0

```
R1#show ip interface brief
Interface      IP-Address      OK? Method Status      Prot
ocol
FastEthernet0/0 192.168.1.254   YES manual up          up
FastEthernet0/1 10.0.0.1        YES manual up          up
R1#
```

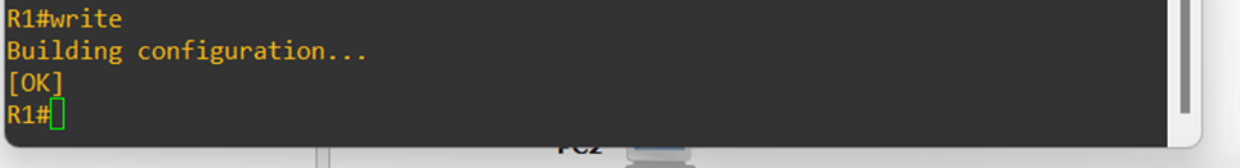
Image 1.10: Checking if we have provided the correct IP address for R1.

```
R2#show ip interface brief
Interface      IP-Address      OK? Method Status      Protocol
FastEthernet0/0 10.0.0.2        YES manual up          up
FastEthernet0/1 10.0.2.1        YES manual up          up
R2#
```

Image 1.11: Checking if we have provided the correct IP address for R2.

```
R3#
*Mar  1 00:27:53.007: %SYS-5-CONFIG_I: Configured from console by console
R3#show ip interface brief
Interface      IP-Address      OK? Method Status      Prot
ocol
FastEthernet0/0 10.0.2.2        YES manual up          up
FastEthernet0/1 200.0.0.254     YES manual up          up
```

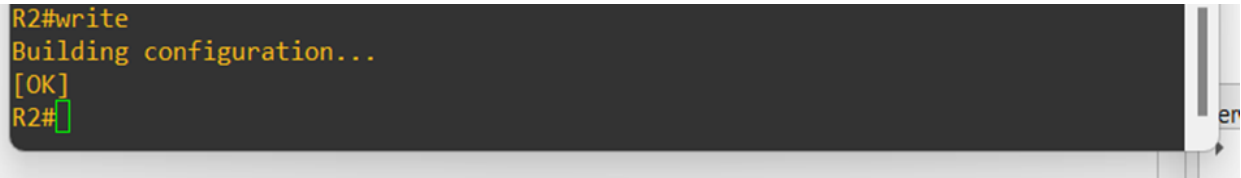
Image 1.12: Checking if we have provided the correct IP address for R3.

A terminal window with a dark background. The text is as follows:

```
R1#write
Building configuration...
[OK]
R1#
```

R1#write
Building configuration...
[OK]
R1#

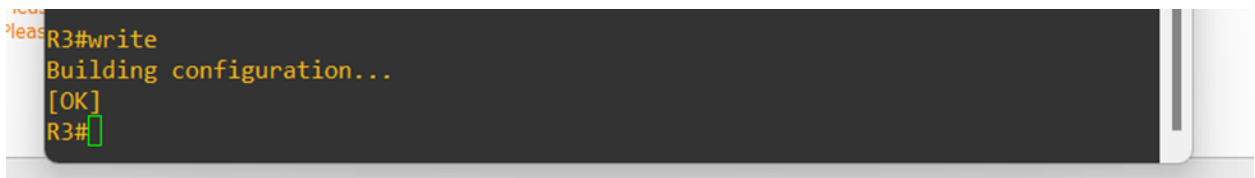
Image 1.13: Using write command to save IP addresses that have been provided to R1.

A terminal window with a dark background. The text is as follows:

```
R2#write
Building configuration...
[OK]
R2#
```

R2#write
Building configuration...
[OK]
R2#

Image 1.14: Using write command to save IP addresses that have been provided to R2.

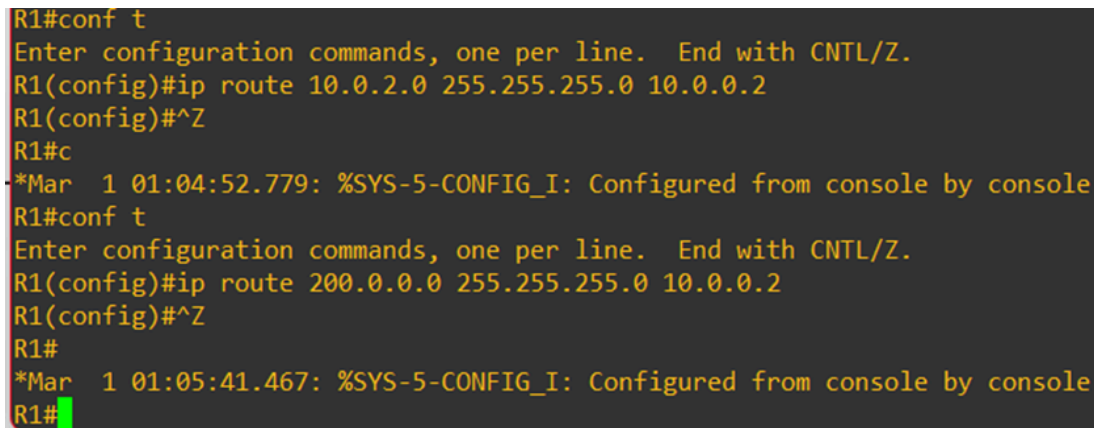
A terminal window with a dark background. The text is as follows:

```
R3#write
Building configuration...
[OK]
R3#
```

R3#write
Building configuration...
[OK]
R3#

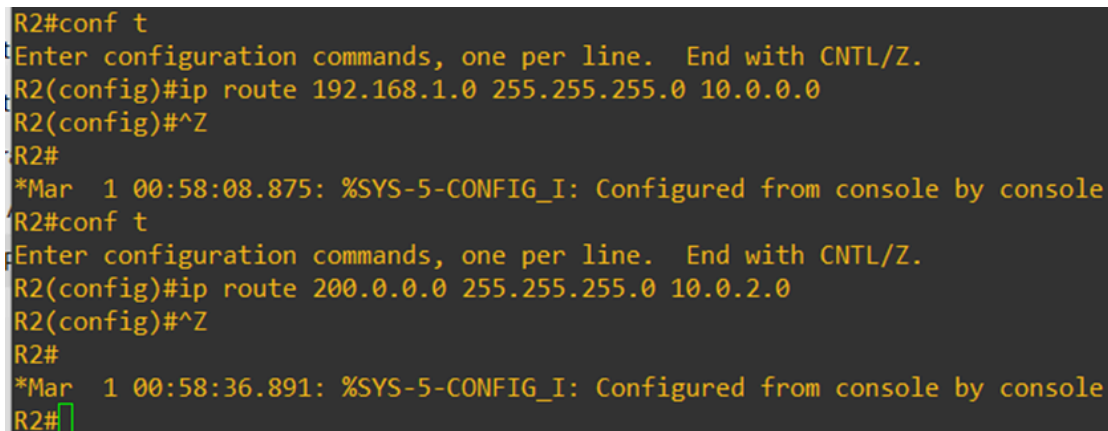
Image 1.15: Using write command to save IP addresses that have been provided to R3.

Part 2 - Static Routing

A terminal window showing the configuration of router R1. The user enters 'conf t' to enter configuration mode, then 'ip route 10.0.2.0 255.255.255.0 10.0.0.2' to set a static route. After pressing Ctrl-Z, a confirmation message appears: '*Mar 1 01:04:52.779: %SYS-5-CONFIG_I: Configured from console by console'. The user then enters 'conf t' again, sets another static route 'ip route 200.0.0.0 255.255.255.0 10.0.0.2', and presses Ctrl-Z again, resulting in another confirmation message: '*Mar 1 01:05:41.467: %SYS-5-CONFIG_I: Configured from console by console'. The prompt returns to 'R1#'.

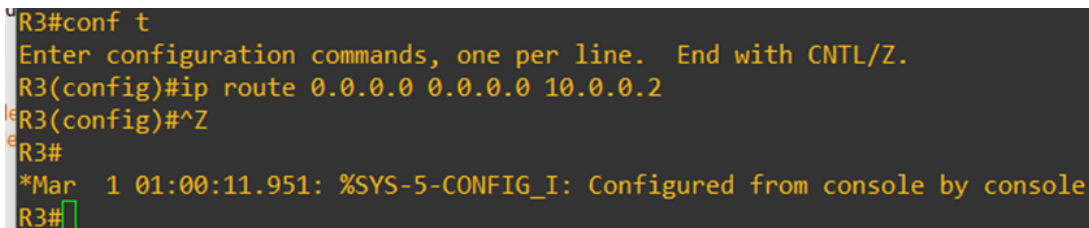
```
R1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#ip route 10.0.2.0 255.255.255.0 10.0.0.2
R1(config)#^Z
R1#
*Mar 1 01:04:52.779: %SYS-5-CONFIG_I: Configured from console by console
R1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#ip route 200.0.0.0 255.255.255.0 10.0.0.2
R1(config)#^Z
R1#
*Mar 1 01:05:41.467: %SYS-5-CONFIG_I: Configured from console by console
R1#
```

Image 2.1: Configuring the static routing for the R1 router.

A terminal window showing the configuration of router R2. The user enters 'conf t' to enter configuration mode, then 'ip route 192.168.1.0 255.255.255.0 10.0.0.0' to set a static route. After pressing Ctrl-Z, a confirmation message appears: '*Mar 1 00:58:08.875: %SYS-5-CONFIG_I: Configured from console by console'. The user then enters 'conf t' again, sets another static route 'ip route 200.0.0.0 255.255.255.0 10.0.2.0', and presses Ctrl-Z again, resulting in another confirmation message: '*Mar 1 00:58:36.891: %SYS-5-CONFIG_I: Configured from console by console'. The prompt returns to 'R2#'.

```
R2#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R2(config)#ip route 192.168.1.0 255.255.255.0 10.0.0.0
R2(config)#^Z
R2#
*Mar 1 00:58:08.875: %SYS-5-CONFIG_I: Configured from console by console
R2#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R2(config)#ip route 200.0.0.0 255.255.255.0 10.0.2.0
R2(config)#^Z
R2#
*Mar 1 00:58:36.891: %SYS-5-CONFIG_I: Configured from console by console
R2#
```

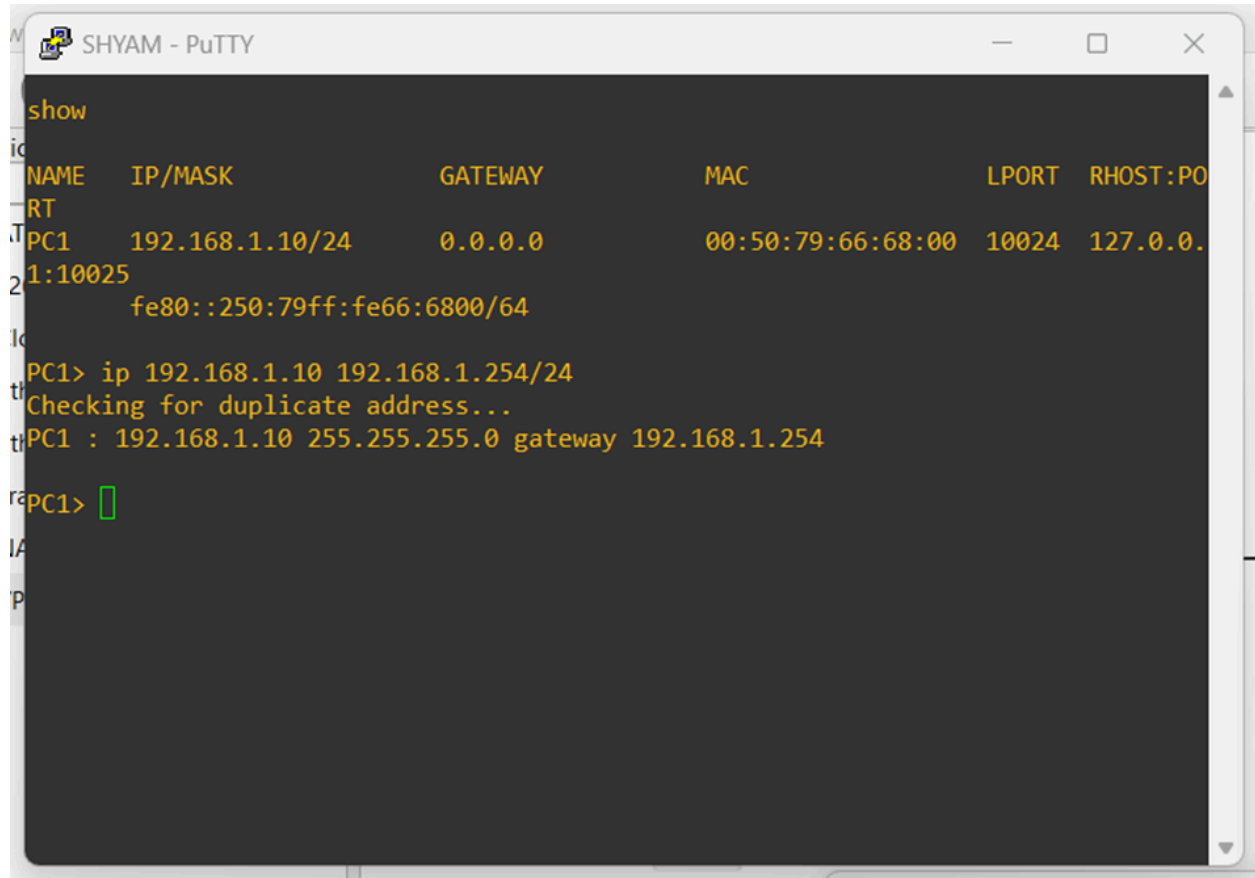
Image 2.2: Configuring the static routing for the R2 router.

A terminal window showing the configuration of router R3. The user enters 'conf t' to enter configuration mode, then 'ip route 0.0.0.0 0.0.0.0 10.0.0.2' to set a static route. After pressing Ctrl-Z, a confirmation message appears: '*Mar 1 01:00:11.951: %SYS-5-CONFIG_I: Configured from console by console'. The prompt returns to 'R3#'.

```
R3#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R3(config)#ip route 0.0.0.0 0.0.0.0 10.0.0.2
R3(config)#^Z
R3#
*Mar 1 01:00:11.951: %SYS-5-CONFIG_I: Configured from console by console
R3#
```

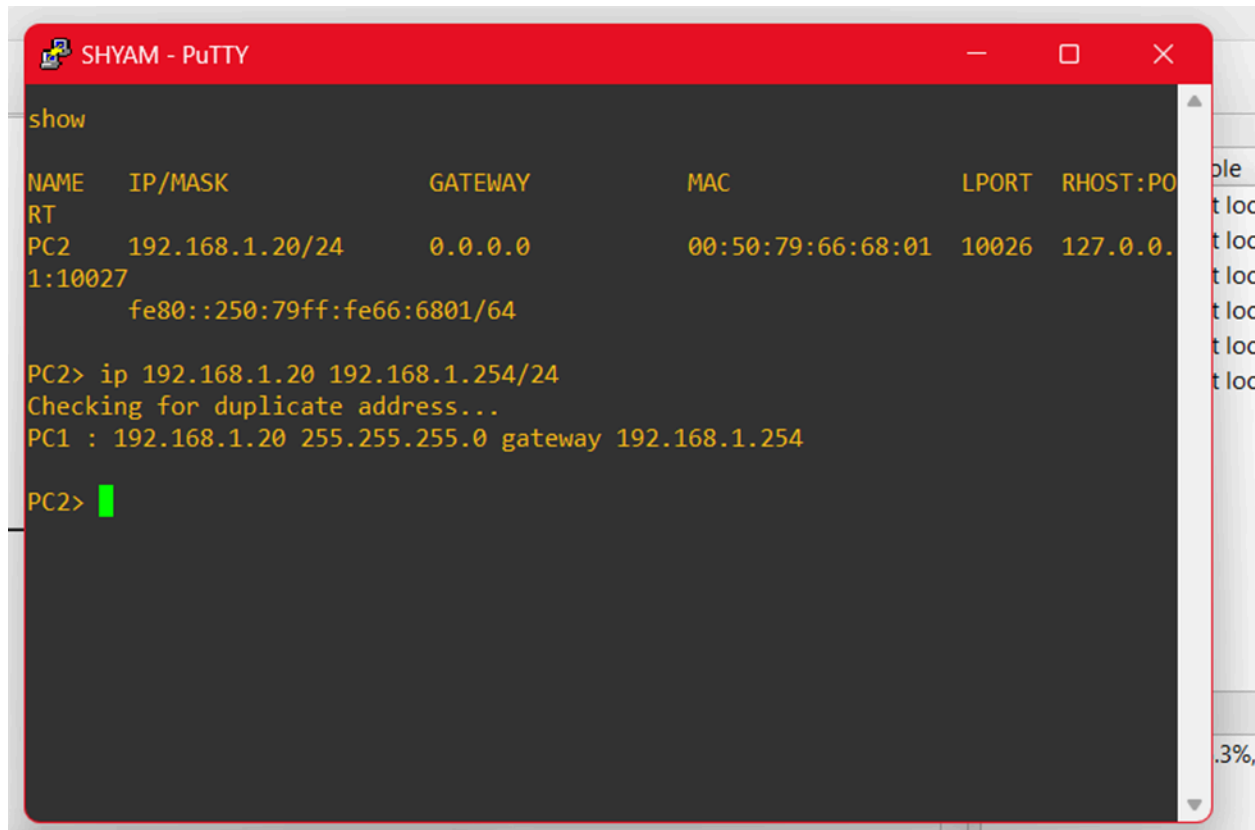
Image 2.3: Configuring the static routing for the R3 router.

When we try pinging from PC1 to R2, the connection won't work and returns as host not reachable, as the static router is connected in such a way that R1 pings from PC1 and reaches R2, but the reply from R2 to PC1 will not be sent back to PC1, thereby returning the error.



```
show
NAME      IP/MASK      GATEWAY      MAC      LPORT  RHOST:PO
RT
PC1       192.168.1.10/24  0.0.0.0      00:50:79:66:68:00  10024  127.0.0.
1:10025
fe80::250:79ff:fe66:6800/64
PC1> ip 192.168.1.10 192.168.1.254/24
Checking for duplicate address...
PC1 : 192.168.1.10 255.255.255.0 gateway 192.168.1.254
PC1> 
```

Image 2.4: Pinging IP address 192.168.1.10 192.168.1.254/24 from PC1.



```
show

NAME      IP/MASK      GATEWAY      MAC      LPORT  RHOST:PO
RT
PC2      192.168.1.20/24      0.0.0.0      00:50:79:66:68:01  10026  127.0.0.
1:10027
      fe80::250:79ff:fe66:6801/64

PC2> ip 192.168.1.20 192.168.1.254/24
Checking for duplicate address...
PC1 : 192.168.1.20 255.255.255.0 gateway 192.168.1.254

PC2> 
```

Image 2.5: Pinging IP address 192.168.1.20 192.168.1.254/24 from PC2.

```
SHYAM - PuTTY

show

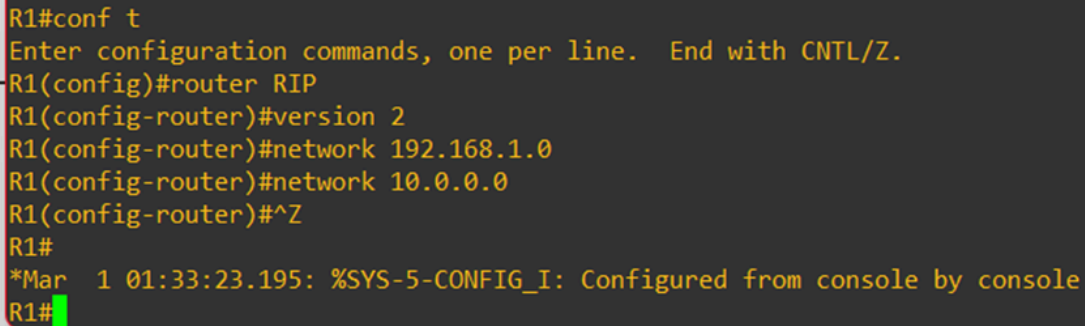
NAME      IP/MASK      GATEWAY      MAC      LPORT  RHOST:PO
RT
PC3       200.0.0.1/24  0.0.0.0      00:50:79:66:68:02  10028  127.0.0.
1:10029
          fe80::250:79ff:fe66:6802/64

PC3> ip 200.0.0.1 200.0.0.254/24
Checking for duplicate address...
PC1 : 200.0.0.1 255.255.255.0 gateway 200.0.0.254

PC3> █
```

Image 2.6: Pinging IP address 200.0.0.1 200.0.0.254/24 from PC3.

Part 3 - RIP

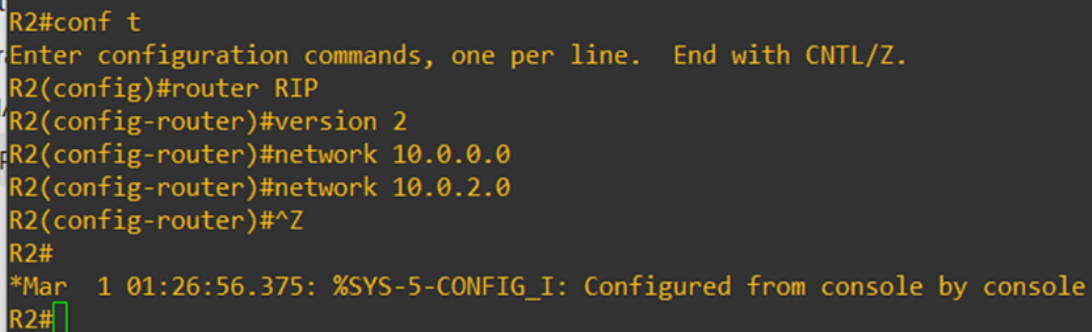
A terminal window showing the configuration of Router R1. The prompt is R1#. The user enters 'conf t' to enter configuration mode. The prompt changes to R1(config)#. The user enters 'router RIP' to enter RIP configuration mode. The prompt changes to R1(config-router)#. The user enters 'version 2' to set the version to 2. The prompt changes to R1(config-router)#. The user enters 'network 192.168.1.0' to advertise the 192.168.1.0 network. The prompt changes to R1(config-router)#. The user enters 'network 10.0.0.0' to advertise the 10.0.0.0 network. The prompt changes to R1(config-router)#. The user enters '^Z' to exit configuration mode. The prompt changes to R1#. A system message is displayed: '*Mar 1 01:33:23.195: %SYS-5-CONFIG_I: Configured from console by console'. The prompt is now R1# with a green cursor.

```
R1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#router RIP
R1(config-router)#version 2
R1(config-router)#network 192.168.1.0
R1(config-router)#network 10.0.0.0
R1(config-router)#^Z
R1#
*Mar 1 01:33:23.195: %SYS-5-CONFIG_I: Configured from console by console
R1#
```

Image 3.1: Setting up the R1's RIP configuration according to the instructions provided

Network 192.168.1.0

Network 10.0.0.0

A terminal window showing the configuration of Router R2. The prompt is R2#. The user enters 'conf t' to enter configuration mode. The prompt changes to R2(config)#. The user enters 'router RIP' to enter RIP configuration mode. The prompt changes to R2(config-router)#. The user enters 'version 2' to set the version to 2. The prompt changes to R2(config-router)#. The user enters 'network 10.0.0.0' to advertise the 10.0.0.0 network. The prompt changes to R2(config-router)#. The user enters 'network 10.0.2.0' to advertise the 10.0.2.0 network. The prompt changes to R2(config-router)#. The user enters '^Z' to exit configuration mode. The prompt changes to R2#. A system message is displayed: '*Mar 1 01:26:56.375: %SYS-5-CONFIG_I: Configured from console by console'. The prompt is now R2# with a green cursor.

```
R2#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R2(config)#router RIP
R2(config-router)#version 2
R2(config-router)#network 10.0.0.0
R2(config-router)#network 10.0.2.0
R2(config-router)#^Z
R2#
*Mar 1 01:26:56.375: %SYS-5-CONFIG_I: Configured from console by console
R2#
```

Image 3.2: Setting up the R2's RIP configuration according to the instructions provided

Network 10.0.0.0

Network 10.0.2.0

```
R3#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#router RIP
R3(config-router)#version 2
R3(config-router)#network 10.0.2.0
R3(config-router)#network 192.168.1.0
R3(config-router)#^Z
R3#
*Mar  1 01:25:48.827: %SYS-5-CONFIG_I: Configured from console by console
R3#
```

Image 3.3: Setting up the R3's RIP configuration according to the instructions provided

Network 10.0.2.0

Network 192.168.1.0

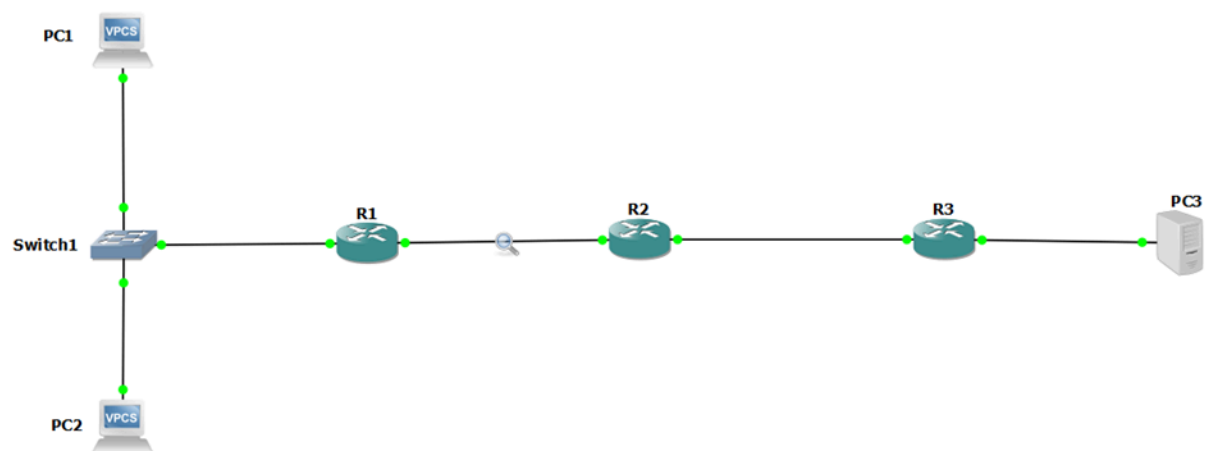


Image 3.4: Checking the traffic with any connection between the routers

(R1 and R2 is being checked here)

