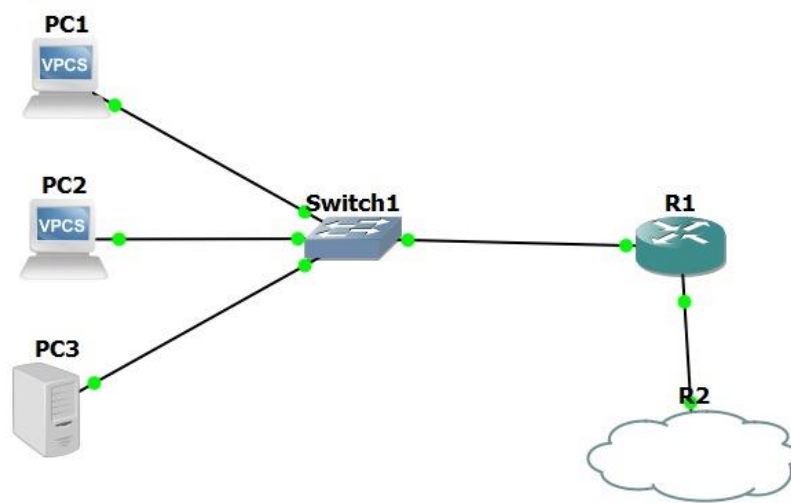# Lab Four

Data Communications

H00373945

Zondwayo Mtine

Part 1 Topology Configuration

Pc 1: Configuring PC-1 to obtain IP address using DHCP

```
PC1> ip dhcp
DDORA IP 192.168.1.1/24 GW 192.168.1.254
```

Pc2: Configuring PC-2 to obtain address using DHCP

```
PC2> ip dhcp
DDORA IP 192.168.1.2/24 GW 192.168.1.254
```

PC3: Configuring Ip address for pc3

```
PC3> ip 192.168.1.201 255.255.255.0 192.168.1.254
```

R1: Setting the IP on the internal as FastEthernet 0/0 and external as FastEthernet 0/1

```
R1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#interface FastEthernet0/0
R1(config-if)#ip address 192.168.1.254 255.255.255.0
R1(config-if)#no shutdown
R1(config-if)#ex
*Mar  1 00:01:23.463: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up
*Mar  1 00:01:24.463: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
R1(config-if)#exit
R1(config)#interface FastEthernet0/1
R1(config-if)#ip address 203.0.113.2 255.255.255.0
R1(config-if)#no shutdown
```

R2: Setting the IP on the internal

```
R2> ip 203.0.113.1 255.255.255.0 203.0.113.2
```

Part 2: DHCP Server

R1 Config

It displays the configuration of the DHCP server on R1, which assigns IP addresses to devices in the range 192.168.1.1 to 192.168.1.200, and sets the DNS server, domain name, and default gateway.

```
R1(config)#ip dhcp excluded-address 192.168.1.201 192.168.1.254
R1(config)#ip dhcp pool OFFICE
R1(dhcp-config)#network 192.168.1.0 255.255.255.0
R1(dhcp-config)#default-router 192.168.1.254
R1(dhcp-config)#dns-server 1.1.1.1
R1(dhcp-config)#domain-name f29dc.hw.ac.uk
R1(dhcp-config)#exit
R1(config)#
```

PC1 Ping test

```
PC1> ping 192.168.1.2/24
84 bytes from 192.168.1.2 icmp_seq=1 ttl=64 time=0.716 ms
84 bytes from 192.168.1.2 icmp_seq=2 ttl=64 time=0.600 ms
84 bytes from 192.168.1.2 icmp_seq=3 ttl=64 time=0.967 ms
84 bytes from 192.168.1.2 icmp_seq=4 ttl=64 time=0.718 ms
84 bytes from 192.168.1.2 icmp_seq=5 ttl=64 time=0.770 ms
```

PC2 Ping test

```
PC2> ping 192.168.1.1/24
84 bytes from 192.168.1.1 icmp_seq=1 ttl=64 time=0.793 ms
84 bytes from 192.168.1.1 icmp_seq=2 ttl=64 time=0.777 ms
84 bytes from 192.168.1.1 icmp_seq=3 ttl=64 time=0.661 ms
84 bytes from 192.168.1.1 icmp_seq=4 ttl=64 time=0.713 ms
84 bytes from 192.168.1.1 icmp_seq=5 ttl=64 time=0.815 ms
```

Part 3: NAT

The access list permits the internal network 192.168.1.0/24, and the NAT overload command translates internal private IPs to the public IP 203.0.113.2 for external access.

```
R1(config)#access-list 1 permit 192.168.1.0 0.0.0.255
R1(config)#ip nat inside source list 1 interface FastEthernet0/1 overload
R1(config)#
*Mar  1 01:41:03.811: %LINEPROTO-5-UPDOWN: Line protocol on Interface NVI0, changed state to up
R1(config)#interface FastEthernet0/0
R1(config-if)#ip nat inside
R1(config-if)#exit
R1(config)#interface FastEthernet0/1
R1(config-if)#ip nat outside
R1(config-if)#exit
```

NAT mappings

```
1#show ip nat translations
```

```
1 0.000000      c4:01:71:88:00:01    c4:01:71:88:00:01    LOOP      60 Reply
2 10.022360     c4:01:71:88:00:01    c4:01:71:88:00:01    LOOP      60 Reply
3 19.998685     c4:01:71:88:00:01    c4:01:71:88:00:01    LOOP      60 Reply
4 30.005000     c4:01:71:88:00:01    c4:01:71:88:00:01    LOOP      60 Reply
5 39.999425     c4:01:71:88:00:01    c4:01:71:88:00:01    LOOP      60 Reply
```

```
 1 0.000000      c4:01:71:88:00:00    c4:01:71:88:00:00       LOOP       60 Reply
 2 9.988940      c4:01:71:88:00:00    c4:01:71:88:00:00       LOOP       60 Reply
 3 19.992982     c4:01:71:88:00:00    c4:01:71:88:00:00       LOOP       60 Reply
 4 29.988507     c4:01:71:88:00:00    c4:01:71:88:00:00       LOOP       60 Reply
 5 34.712639     c4:01:71:88:00:00    CDP/VTP/DTP/PAgP/UD… CDP       365 Device ID: R1  Port ID: F
 6 39.996505     c4:01:71:88:00:00    c4:01:71:88:00:00       LOOP       60 Reply
 7 49.982351     c4:01:71:88:00:00    c4:01:71:88:00:00       LOOP       60 Reply
 8 60.005873     c4:01:71:88:00:00    c4:01:71:88:00:00       LOOP       60 Reply
 9 69.998838     c4:01:71:88:00:00    c4:01:71:88:00:00       LOOP       60 Reply
10 79.985507     c4:01:71:88:00:00    c4:01:71:88:00:00       LOOP       60 Reply
```

Shows the capture of traffic between R1 and R2 using Wireshark. Confirms the network traffic is correctly routed and shows NAT traffic between the two interfaces.