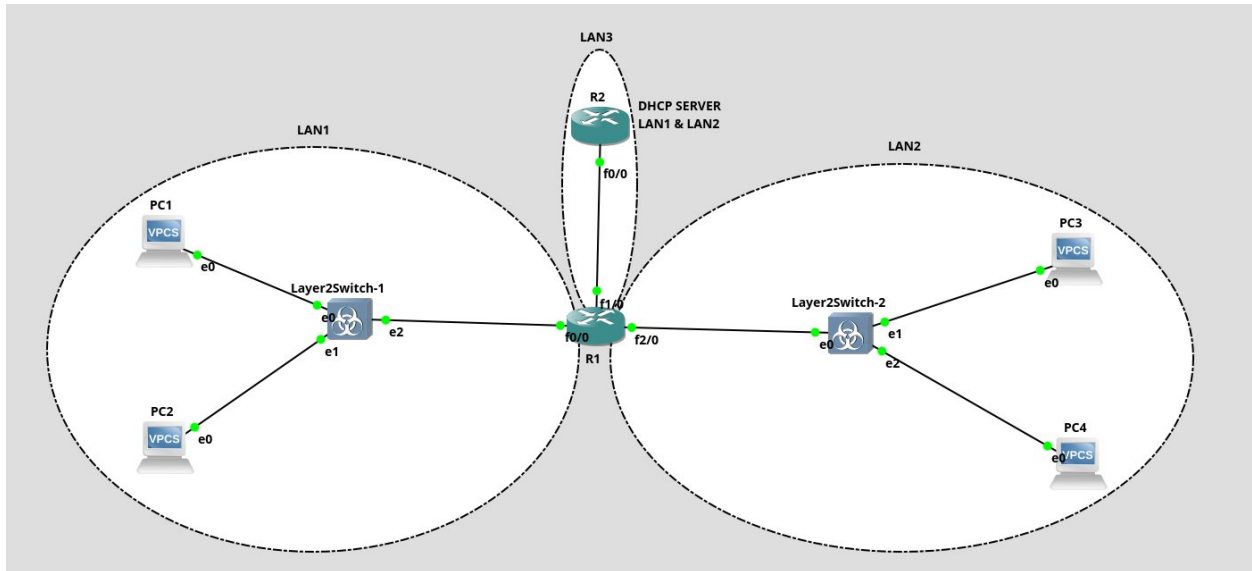


Лабораторная работа №4

Пункт 1



Определим адреса для LAN1, LAN2 и LAN3:

- LAN1 – 192.168.1.0/24
- LAN2 – 192.168.2.0/24
- LAN3 – 192.168.3.0/24

Назначим адреса 192.168.1.1/24, 192.168.2.1/24 и 192.168.3.1/24 для R1. Для R2 назначим адрес 192.168.3.2/24:

(R1)

Enable

Configure

```
interface FastEthernet 0/0
```

```
ip address 192.168.1.1 255.255.255.0
```

```
no shutdown
```

```
interface FastEthernet 2/0
```

```
ip address 192.168.2.1 255.255.255.0
```

```
no shutdown
```

```
interface FastEthernet 1/0  
  
ip address 192.168.3.1 255.255.255.0  
  
no shutdown
```

(R2)

Enable

Configure

```
interface FastEthernet 0/0  
  
ip address 192.168.3.2 255.255.255.0  
  
no shutdown
```

Пункт 2

Настроим на маршрутизаторе R2 DHCP-сервер для обслуживания сетей LAN1 и LAN2:

(R2)

Enable

Configure

```
ip dhcp pool LAN1_pool  
  
network 192.168.1.0 255.255.255.0  
  
default-router 192.168.1.1  
  
lease 5  
  
ip dhcp excluded-address 192.168.1.1  
  
ip dhcp pool LAN2_pool  
  
network 192.168.2.0 255.255.255.0  
  
default-router 192.168.2.1  
  
lease 5  
  
ip dhcp excluded-address 192.168.2.1
```

Пункт 3

Настроим статическую маршрутизацию между подсетями:

(R2)

```
ip route 192.168.1.0 255.255.255.0 192.168.3.1
```

```
ip route 192.168.2.0 255.255.255.0 192.168.3.1
```

(R1)

```
interface FastEthernet 0/0
```

```
ip helper-address 192.168.3.2
```

```
interface FastEthernet 2/0
```

```
ip helper-address 192.168.3.2
```

Пункт 4

Проверим работоспособность протокола DHCP и маршрутизации, выполнив ping между всеми VPC. Для этого на каждом VPC получим адрес при помощи ip dhcp:

```
PC1> ip dhcp
DDORA IP 192.168.1.2/24 GW 192.168.1.1
PC1> █
```

```
PC1> ping 192.168.1.3
84 bytes from 192.168.1.3 icmp_seq=1 ttl=64 time=10.366 ms
84 bytes from 192.168.1.3 icmp_seq=2 ttl=64 time=4.674 ms
84 bytes from 192.168.1.3 icmp_seq=3 ttl=64 time=0.582 ms
^C
PC1> ping 192.168.2.2
84 bytes from 192.168.2.2 icmp_seq=1 ttl=63 time=30.002 ms
84 bytes from 192.168.2.2 icmp_seq=2 ttl=63 time=15.000 ms
84 bytes from 192.168.2.2 icmp_seq=3 ttl=63 time=15.057 ms
^C
PC1> ping 192.168.2.3
84 bytes from 192.168.2.3 icmp_seq=1 ttl=63 time=30.370 ms
84 bytes from 192.168.2.3 icmp_seq=2 ttl=63 time=15.922 ms
84 bytes from 192.168.2.3 icmp_seq=3 ttl=63 time=14.738 ms
^C
PC1> █
```

2. DHCP Offer – DHCP сервер предлагает адрес

The screenshot displays the Wireshark network protocol analyzer interface. The top menu bar includes File, Edit, View, Go, Capture, Analyze, Statistics, Telephony, Wireless, Tools, and Help. The packet list on the left shows a DHCP ACK packet (342) from 192.168.1.3 to 192.168.1.1. The packet details pane on the right shows the DHCP ACK message type, boot reply, and various options including server identifier, lease time, renewal time, and subnet mask. The packet bytes pane on the right shows the raw data in hexadecimal and ASCII.

Packet List:

No.	Time	Source	Destination	Protocol	Length	Info
11	12.818422	0.0.0.0	255.255.255.255	DHCP	406	DHCP Discover - Transaction ID 0x67466855
13	13.818459	0.0.0.0	255.255.255.255	DHCP	406	DHCP Discover - Transaction ID 0x67466855
17	14.546168	192.168.1.1	192.168.1.3	DHCP	342	DHCP Offer - Transaction ID 0x67466855
18	14.546195	192.168.1.1	192.168.1.3	DHCP	342	DHCP Offer - Transaction ID 0x67466855
20	16.818548	0.0.0.0	255.255.255.255	DHCP	406	DHCP Request - Transaction ID 0x67466855
21	16.848872	192.168.1.1	192.168.1.3	DHCP	342	DHCP ACK - Transaction ID 0x67466855

Packet Details:

- Frame 21: 342 bytes on wire (2736 bits), 342 bytes captured (2736 bits) on interface 0
- Ethernet II, Src: cc:01:00:c6:00:00 (cc:01:00:c6:00:00), Dst: 00:50:79:66:68:01
- Internet Protocol Version 4, Src: 192.168.1.1, Dst: 192.168.1.3
- User Datagram Protocol, Src Port: 67, Dst Port: 68
- Dynamic Host Configuration Protocol (ACK) **DHCP ACK**
 - Message type: Boot Reply (2) **Reply server->client**
 - Hardware type: Ethernet (0x01)
 - Hardware address length: 6
 - Hops: 0
 - Transaction ID: 0x67466855
 - Seconds elapsed: 0
 - Bootp flags: 0x0000 (Unicast)
 - Client IP address: 192.168.1.3 **запрашиваемый IP**
 - Your (client) IP address: 192.168.1.3 **выданный IP**
 - Next server IP address: 0.0.0.0
 - Relay agent IP address: 192.168.1.1 **relay IP (R1)**
 - Client MAC address: 00:50:79:66:68:01 (00:50:79:66:68:01) **MAC PC2**
 - Client hardware address padding: 00000000000000000000
 - Server host name not given
 - Boot file name not given
 - Magic cookie: DHCP
 - Option: (53) DHCP Message Type (ACK)
 - Option: (54) DHCP Server Identifier (192.168.3.2) **IP адрес DHCP сервера**
 - Option: (51) IP Address Lease Time **время на которое выдан IP**
 - Option: (58) Renewal Time Value
 - Option: (59) Rebinding Time Value
 - Option: (1) Subnet Mask (255.255.255.0) **маска сети**
 - Option: (3) Router **маршрутизатор по умолчанию (R1)**
 - Option: (255) End
 - Padding: 00000000000000000000000000000000

Packet Bytes:

Offset	Hex	ASCII
0000	00 50 79 66 68 01 cc 01 60 c6 00 00 08 00 45 00	Pyfh...
0010	01 48 00 0d 00 00 ff 11 37 43 c0 a8 01 01 c0 a8	H.....
0020	01 03 00 43 00 44 01 34 3b 00 02 01 06 00 67 46	.....C D 4
0030	68 55 00 00 00 00 c0 a8 01 03 c0 a8 01 03 00 00	hu.....P
0040	00 00 c0 a8 01 01 01 50 79 66 68 01 00 00 00 00	.....
0050	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
0060	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
0070	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
0080	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
0090	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00a0	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00b0	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00c0	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00d0	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00e0	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00f0	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
0100	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
0110	00 00 00 00 00 00 63 82 53 63 35 01 05 36 04 c0	.....c..
0120	a8 03 02 33 04 00 06 97 08 3a 04 00 03 4b c0 3b	.....3...
0130	04 00 05 c4 90 01 04 ff ff ff 00 03 04 c0 a8 01	.....
0140	01 ff 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
0150	00 00 00 00 00 00	.....

Status Bar: Packets: 32 - Displayed: 6 (18.8%) Profile: Default

Пункт 6

Сохраним файлы конфигураций устройств с именами, соответствующими именам устройств. Конфигурацию получим при помощи «show running»