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**САНКТ-ПЕТЕРБУРГСКИЙ ГОСУДАРСТВЕННЫЙ**  
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**ОТЧЕТ**  
**по лабораторной работе №2**  
**по дисциплине «Сети и телекоммуникации»**  
**Тема: Настройка таблиц маршрутизации.**

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## Цель работы.

Изучение методов статической маршрутизации в IP-сетях, а также овладение управлением таблицами маршрутизации на узлах сетевого уровня.

## Задание.

1. Для всех узлов сети установить IP-адреса, маски подсетей и шлюзы по умолчанию, чтобы добиться успешного выполнения Echo-запроса ближайших соседей (находящихся в одной подсети).

2. Настроить таблицы маршрутизации на маршрутизаторах, чтобы добиться доставки пакетов от узла K1 к узлу K2 и обратно, от узла K2 к K3 и обратно, от узла K3 к K1 и обратно. Пакеты должны доходить до узлов кратчайшим путем.

3. Настроить таблицы маршрутизации на узлах K1, K2 и K3, чтобы обеспечить кратчайшую доставку пакетов между этими узлами, если это невозможно было обеспечить в п. 2.

4. В отчете привести конфигурацию TCP/IP для каждого из узлов, таблицы маршрутизации, результаты Echo-запросов между узлами K1, K2 и K3, а также обоснование правильности и оптимальности выбранных маршрутов.

## Вариант 13.

Файл со схемой сети: lab2\_var13.jfst. Все маршрутизаторы и компьютеры имеют адреса из диапазона 172.1.1.1 – 172.254.254.254. Обозначения в задании: K1 – PC1, K2 – PC2, K3 – PC3. На рисунке 1 представлена схема сети.

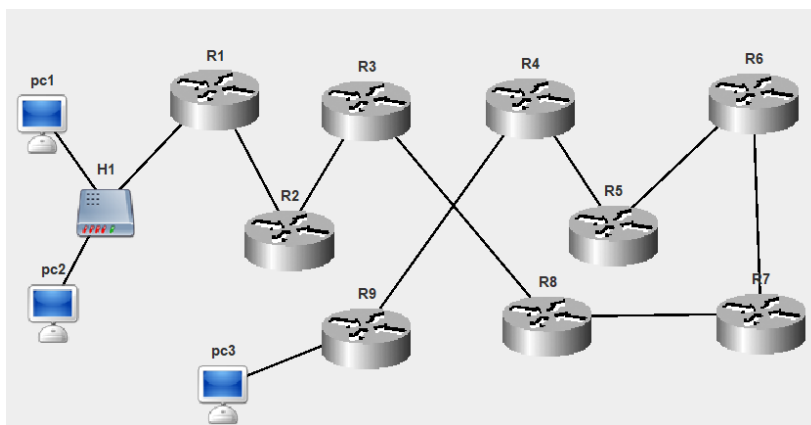


Рисунок 1. Схема сети.

## Выполнение работы.

### 1. Настройки протокола TCP/IP:

Для каждой подсети была применена бесклассовая адресация с своей маской подсети для отделения адреса сети от адреса узла. На каждом узле прописан шлюз так, чтобы узлы из одной сети смогли связаться с узлами из другой.

- 1) Подсеть **172.1.1.0**, включающая pc1, pc2, H1 и R1, представлена в таблице 1.

Таблица 1. Подсеть **172.31.128.0**

Имя узла	Интерфейс	IP-адрес	Маска подсети (CIDR = 29)	Шлюз
Pc1	Eth0	172.1.1.1	255.255.255.248	172.1.1.3
Pc2	Eth0	172.1.1.2	255.255.255.248	172.1.1.3
R1	Eth0	172.1.1.3	255.255.255.248	172.1.1.10

- 2) Подсеть **172.1.1.8**, между маршрутизаторами R1 и R2, представлена в таблице 2.

Таблица 2. Подсеть **172.1.1.8**

Имя узла	Интерфейс	IP-адрес	Маска подсети (CIDR = 30)	Шлюз
R1	Eth1	172.1.1.9	255.255.255.252	172.1.1.10
R2	Eth0	172.1.1.10	255.255.255.252	172.1.1.14

- 3) Подсеть **172.1.1.12**, между маршрутизаторами R2 и R3, представлена в таблице 3.

Таблица 3. Подсеть **172.1.1.12**

Имя узла	Интерфейс	IP-адрес	Маска подсети (CIDR = 30)	Шлюз
R2	Eth1	172.1.1.13	255.255.255.252	172.1.1.14

R3	Eth0	172.1.1.14	255.255.255.252	172.1.1.18
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- 4) Подсеть **172.1.1.16**, между маршрутизаторами R3 и R8, представлена в таблице 4.

Таблица 4. Подсеть **172.1.1.16**

Имя узла	Интерфейс	IP-адрес	Маска подсети (CIDR = 30)	Шлюз
R3	Eth1	172.1.1.17	255.255.255.252	172.1.1.18
R8	Eth0	172.1.1.18	255.255.255.252	172.1.1.22

- 5) Подсеть **172.1.1.20**, между маршрутизаторами R8 и R7, представлена в таблице 5.

Таблица 5. Подсеть **172.1.1.20**

Имя узла	Интерфейс	IP-адрес	Маска подсети (CIDR = 30)	Шлюз
R8	Eth1	172.1.1.21	255.255.255.252	172.1.1.22
R7	Eth0	172.1.1.22	255.255.255.252	172.1.1.26

- 6) Подсеть **172.1.1.24**, между маршрутизаторами R7 и R6, представлена в таблице 6.

Таблица 6. Подсеть **172.1.1.24**

Имя узла	Интерфейс	IP-адрес	Маска подсети (CIDR = 30)	Шлюз
R7	Eth1	172.1.1.25	255.255.255.252	172.1.1.26
R6	Eth0	172.1.1.26	255.255.255.252	172.1.1.30

- 7) Подсеть **172.1.1.28**, между маршрутизаторами R6 и R5, представлена в таблице 7.

Таблица 7. Подсеть **172.1.1.28**

Имя узла	Интерфейс	IP-адрес	Маска подсети (CIDR = 30)	Шлюз
R6	Eth1	172.1.1.29	255.255.255.252	172.1.1.30
R5	Eth1	172.1.1.30	255.255.255.252	172.1.1.34

- 8) Подсеть **172.1.1.32**, между маршрутизаторами R5 и R4, представлена в таблице 8.

Таблица 8. Подсеть **172.1.1.32**

Имя узла	Интерфейс	IP-адрес	Маска подсети (CIDR = 30)	Шлюз
R5	Eth0	172.1.1.33	255.255.255.252	172.1.1.34
R4	Eth1	172.1.1.34	255.255.255.252	172.1.1.38

- 9) Подсеть **172.1.1.36**, между маршрутизаторами R4 и R9, представлена в таблице 9.

Таблица 9. Подсеть **172.1.1.36**

Имя узла	Интерфейс	IP-адрес	Маска подсети (CIDR = 30)	Шлюз
R4	Eth0	172.1.1.37	255.255.255.252	172.1.1.38
R9	Eth1	172.1.1.38	255.255.255.252	172.1.1.37

- 10) Подсеть **172.1.1.40**, включающая pc3 и R9, представлена в таблице 10.

Таблица 10. Подсеть **172.1.1.40**

Имя узла	Интерфейс	IP-адрес	Маска подсети (CIDR = 30)	Шлюз
Рс3	Eth0	172.1.1.42	255.255.255.252	172.1.1.38
R9	Eth0	172.1.1.41	255.255.255.252	172.1.1.37

2. Для обеспечения маршрутизации между K1, K2 и K3 сети были созданы статические записи для маршрутизаторов:

```
S 172.1.1.0/255.255.255.248[0] via 172.1.1.9 (eth0)
S* default/0.0.0.0[0] via 172.1.1.14 (eth0)
C 172.1.1.13/255.255.255.252 is directly connected, eth1
C 172.1.1.10/255.255.255.252 is directly connected, eth0
```

Рисунок 2. Таблица маршрутов для R2.

```
S 172.1.1.0/255.255.255.248[0] via 172.1.1.13 (eth0)
S* default/0.0.0.0[0] via 172.1.1.18 (eth0)
C 172.1.1.17/255.255.255.252 is directly connected, eth1
C 172.1.1.14/255.255.255.252 is directly connected, eth0
```

Рисунок 3. Таблица маршрутов для R3.

```
S 172.1.1.0/255.255.255.248[0] via 172.1.1.17 (eth0)
S* default/0.0.0.0[0] via 172.1.1.22 (eth0)
C 172.1.1.21/255.255.255.252 is directly connected, eth1
C 172.1.1.18/255.255.255.252 is directly connected, eth0
```

Рисунок 4. Таблица маршрутов для R8.

```
S 172.1.1.0/255.255.255.248[0] via 172.1.1.21 (eth0)
S* default/0.0.0.0[0] via 172.1.1.26 (eth0)
C 172.1.1.25/255.255.255.252 is directly connected, eth1
C 172.1.1.22/255.255.255.252 is directly connected, eth0
```

Рисунок 5. Таблица маршрутов для R7.

```
S 172.1.1.0/255.255.255.248[0] via 172.1.1.25 (eth0)
S* default/0.0.0.0[0] via 172.1.1.30 (eth0)
C 172.1.1.29/255.255.255.252 is directly connected, eth1
C 172.1.1.26/255.255.255.252 is directly connected, eth0
```

Рисунок 6. Таблица маршрутов для R6.

```
S 172.1.1.0/255.255.255.248[0] via 172.1.1.29 (eth1)
S* default/0.0.0.0[0] via 172.1.1.34 (eth0)
C 172.1.1.30/255.255.255.252 is directly connected, eth1
C 172.1.1.33/255.255.255.252 is directly connected, eth0
```

Рисунок 7. Таблица маршрутов для R5.

```
S 172.1.1.0/255.255.255.248[0] via 172.1.1.33 (eth1)
S* default/0.0.0.0[0] via 172.1.1.38 (eth0)
C 172.1.1.34/255.255.255.252 is directly connected, eth1
C 172.1.1.37/255.255.255.252 is directly connected, eth0
```

Рисунок 8. Таблица маршрутов для R4.

Для маршрутизаторов R1 и R9 были прописаны только default gateway на R2 и R4 соответственно.

### 3. Маршрутизация между K1 и K2:

22:16:37-326	pc1	Echo Request Packet	Network	Created Echo Request packet to 172.1.1.2
22:16:37-326	pc1	ARP_packet	Network	Sending broadcast packet from ProtocolStack.
22:16:37-326	pc2	ARP_packet	Network	ProtocolStack received packet from local Interface.
22:16:37-326	pc2	ARP_packet	Network	Confirmed Packet is for this Network Layer Device.
22:16:37-326	pc2	ARP_packet	Network	Sending packet from ProtocolStack (to 172.1.1.1).
22:16:37-326	pc1	ARP_packet	Network	ProtocolStack received packet from local Interface.
22:16:37-326	pc1	ARP_packet	Network	Confirmed Packet is for this Network Layer Device.
22:16:37-326	R1	ARP_packet	Network	ProtocolStack received packet from local Interface.
22:16:37-326	pc1	ICMP_packet	Network	Sending packet from ProtocolStack (to 172.1.1.2).
22:16:37-326	pc2	ICMP_packet	Network	ProtocolStack received packet from local Interface.
22:16:37-326	pc2	ICMP_packet	Network	Confirmed Packet is for this Network Layer Device.
22:16:37-326	pc2	Echo Reply Packet	Network	Created Echo Reply packet to 172.1.1.1
22:16:37-326	pc2	ICMP_packet	Network	Sending packet from ProtocolStack (to 172.1.1.1).
22:16:37-326	pc1	ICMP_packet	Network	ProtocolStack received packet from local Interface.
22:16:37-326	pc1	ICMP_packet	Network	Confirmed Packet is for this Network Layer Device.
22:16:37-326	pc1	Echo Reply Packet	Network	Echo reply packet received from 172.1.1.2

Маршрут (PC1 – PC2) – кратчайший от PC1 к PC2 и от PC2 к PC1.

### 4. Маршрутизация между K2 и K3:

22:20:07-716	pc2	Echo Request Packet	Network	Created Echo Request packet to 172.1.1.42
22:20:07-716	pc2	ARP_packet	Network	Sending broadcast packet from ProtocolStack.
22:20:07-716	pc1	ARP_packet	Network	ProtocolStack received packet from local Interface.
22:20:07-716	R1	ARP_packet	Network	ProtocolStack received packet from local Interface.
22:20:07-716	R1	ARP_packet	Network	Confirmed Packet is for this Network Layer Device.
22:20:07-716	R1	ARP_packet	Network	Sending packet from ProtocolStack (to 172.1.1.2).
22:20:07-716	pc2	ARP_packet	Network	ProtocolStack received packet from local Interface.
22:20:07-716	pc2	ARP_packet	Network	Confirmed Packet is for this Network Layer Device.
22:20:07-716	pc2	ICMP_packet	Network	Sending packet from ProtocolStack (to 172.1.1.3).
22:20:07-716	R1	ICMP_packet	Network	ProtocolStack received packet from local Interface.
22:20:07-716	R1	ICMP_packet	Network	Packet Received: Network Layer Device is Routable forwarding packet.
22:20:07-716	R1	ARP_packet	Network	Sending broadcast packet from ProtocolStack.
22:20:07-716	R2	ARP_packet	Network	ProtocolStack received packet from local Interface.
22:20:07-716	R2	ARP_packet	Network	Confirmed Packet is for this Network Layer Device.
22:20:07-716	R2	ARP_packet	Network	Sending packet from ProtocolStack (to 172.1.1.9).
22:20:07-716	R1	ARP_packet	Network	ProtocolStack received packet from local Interface.
22:20:07-716	R1	ARP_packet	Network	Confirmed Packet is for this Network Layer Device.
22:20:07-716	R1	ICMP_packet	Network	Forwarding packet from ProtocolStack(to 172.1.1.10).

22:20:07-716	R2	ICMP_packet	Network	ProtocolStack received packet from local Interface.
22:20:07-716	R2	ICMP_packet	Network	Packet Received: Network Layer Device is Routable forwarding packet.
22:20:07-716	R2	ARP_packet	Network	Sending broadcast packet from ProtocolStack.
22:20:07-716	R3	ARP_packet	Network	ProtocolStack received packet from local Interface.
22:20:07-716	R3	ARP_packet	Network	Confirmed Packet is for this Network Layer Device.
22:20:07-716	R3	ARP_packet	Network	Sending packet from ProtocolStack (to 172.1.1.13).
22:20:07-716	R2	ARP_packet	Network	ProtocolStack received packet from local Interface.
22:20:07-716	R2	ARP_packet	Network	Confirmed Packet is for this Network Layer Device.
22:20:07-716	R2	ICMP_packet	Network	Forwarding packet from ProtocolStack(to 172.1.1.14).
22:20:07-716	R3	ICMP_packet	Network	ProtocolStack received packet from local Interface.
22:20:07-716	R3	ICMP_packet	Network	Packet Received: Network Layer Device is Routable forwarding packet.
22:20:07-716	R3	ARP_packet	Network	Sending broadcast packet from ProtocolStack.
22:20:07-716	R8	ARP_packet	Network	ProtocolStack received packet from local Interface.
22:20:07-716	R8	ARP_packet	Network	Confirmed Packet is for this Network Layer Device.
22:20:07-716	R8	ARP_packet	Network	Sending packet from ProtocolStack (to 172.1.1.17).
22:20:07-716	R3	ARP_packet	Network	ProtocolStack received packet from local Interface.
22:20:07-716	R3	ARP_packet	Network	Confirmed Packet is for this Network Layer Device.
22:20:07-716	R3	ICMP_packet	Network	Forwarding packet from ProtocolStack(to 172.1.1.18).
22:20:07-716	R8	ICMP_packet	Network	ProtocolStack received packet from local Interface.
22:20:07-716	R8	ICMP_packet	Network	Packet Received: Network Layer Device is Routable forwarding packet.
22:20:07-716	R8	ARP_packet	Network	Sending broadcast packet from ProtocolStack.
22:20:07-716	R7	ARP_packet	Network	ProtocolStack received packet from local Interface.
22:20:07-716	R7	ARP_packet	Network	Confirmed Packet is for this Network Layer Device.
22:20:07-716	R7	ARP_packet	Network	Sending packet from ProtocolStack (to 172.1.1.21).
22:20:07-716	R8	ARP_packet	Network	ProtocolStack received packet from local Interface.
22:20:07-716	R8	ARP_packet	Network	Confirmed Packet is for this Network Layer Device.
22:20:07-716	R8	ICMP_packet	Network	Forwarding packet from ProtocolStack(to 172.1.1.22).
22:20:07-716	R7	ICMP_packet	Network	ProtocolStack received packet from local Interface.
22:20:07-716	R7	ICMP_packet	Network	Packet Received: Network Layer Device is Routable forwarding packet.
22:20:07-716	R7	ARP_packet	Network	Sending broadcast packet from ProtocolStack.
22:20:07-716	R6	ARP_packet	Network	ProtocolStack received packet from local Interface.
22:20:07-716	R6	ARP_packet	Network	Confirmed Packet is for this Network Layer Device.
22:20:07-716	R6	ARP_packet	Network	Sending packet from ProtocolStack (to 172.1.1.25).
22:20:07-716	R7	ARP_packet	Network	ProtocolStack received packet from local Interface.
22:20:07-716	R7	ARP_packet	Network	Confirmed Packet is for this Network Layer Device.
22:20:07-716	R7	ICMP_packet	Network	Forwarding packet from ProtocolStack(to 172.1.1.26).
22:20:07-716	R6	ICMP_packet	Network	ProtocolStack received packet from local Interface.
22:20:07-716	R6	ICMP_packet	Network	Packet Received: Network Layer Device is Routable forwarding packet.
22:20:07-716	R6	ARP_packet	Network	Sending broadcast packet from ProtocolStack.
22:20:07-716	R5	ARP_packet	Network	ProtocolStack received packet from local Interface.
22:20:07-716	R5	ARP_packet	Network	Confirmed Packet is for this Network Layer Device.
22:20:07-716	R5	ARP_packet	Network	Sending packet from ProtocolStack (to 172.1.1.29).



22:20:07-716	R6	ARP_packet	Network	ProtocolStack received packet from local Interface.
22:20:07-716	R6	ARP_packet	Network	Confirmed Packet is for this Network Layer Device.
22:20:07-716	R6	ICMP_packet	Network	Forwarding packet from ProtocolStack(to 172.1.1.30).
22:20:07-716	R5	ICMP_packet	Network	ProtocolStack received packet from local Interface.
22:20:07-716	R5	ICMP_packet	Network	Packet Received: Network Layer Device is Routable forwarding packet.
22:20:07-716	R5	ARP_packet	Network	Sending broadcast packet from ProtocolStack.
22:20:07-716	R4	ARP_packet	Network	ProtocolStack received packet from local Interface.
22:20:07-716	R4	ARP_packet	Network	Confirmed Packet is for this Network Layer Device.
22:20:07-716	R4	ARP_packet	Network	Sending packet from ProtocolStack (to 172.1.1.33).
22:20:07-716	R5	ARP_packet	Network	ProtocolStack received packet from local Interface.
22:20:07-716	R5	ARP_packet	Network	Confirmed Packet is for this Network Layer Device.
22:20:07-716	R5	ICMP_packet	Network	Forwarding packet from ProtocolStack(to 172.1.1.34).
22:20:07-716	R4	ICMP_packet	Network	ProtocolStack received packet from local Interface.
22:20:07-716	R4	ICMP_packet	Network	Packet Received: Network Layer Device is Routable forwarding packet.
22:20:07-716	R4	ARP_packet	Network	Sending broadcast packet from ProtocolStack.
22:20:07-716	R9	ARP_packet	Network	ProtocolStack received packet from local Interface.
22:20:07-716	R9	ARP_packet	Network	Confirmed Packet is for this Network Layer Device.
22:20:07-716	R9	ARP_packet	Network	Sending packet from ProtocolStack (to 172.1.1.37).
22:20:07-716	R4	ARP_packet	Network	ProtocolStack received packet from local Interface.
22:20:07-716	R4	ARP_packet	Network	Confirmed Packet is for this Network Layer Device.
22:20:07-716	R4	ICMP_packet	Network	Forwarding packet from ProtocolStack(to 172.1.1.38).
22:20:07-716	R9	ICMP_packet	Network	ProtocolStack received packet from local Interface.
22:20:07-716	R9	ICMP_packet	Network	Packet Received: Network Layer Device is Routable forwarding packet.
22:20:07-716	R9	ARP_packet	Network	Sending broadcast packet from ProtocolStack.
22:20:07-716	pc3	ARP_packet	Network	ProtocolStack received packet from local Interface.
22:20:07-716	pc3	ARP_packet	Network	Confirmed Packet is for this Network Layer Device.
22:20:07-716	pc3	ARP_packet	Network	Sending packet from ProtocolStack (to 172.1.1.41).
22:20:07-716	R9	ARP_packet	Network	ProtocolStack received packet from local Interface.
22:20:07-716	R9	ARP_packet	Network	Confirmed Packet is for this Network Layer Device.
22:20:07-716	R9	ICMP_packet	Network	Forwarding packet from ProtocolStack(to 172.1.1.42).
22:20:07-716	pc3	ICMP_packet	Network	ProtocolStack received packet from local Interface.
22:20:07-716	pc3	ICMP_packet	Network	Confirmed Packet is for this Network Layer Device.
22:20:07-716	pc3	Echo Reply Packet	Network	Created Echo Reply packet to 172.1.1.2
22:20:07-716	pc3	ICMP_packet	Network	Sending packet from ProtocolStack (to 172.1.1.41).
22:20:07-716	R9	ICMP_packet	Network	ProtocolStack received packet from local Interface.
22:20:07-716	R9	ICMP_packet	Network	Packet Received: Network Layer Device is Routable forwarding packet.
22:20:07-716	R9	ICMP_packet	Network	Forwarding packet from ProtocolStack(to 172.1.1.37).
22:20:07-716	R4	ICMP_packet	Network	ProtocolStack received packet from local Interface.
22:20:07-716	R4	ICMP_packet	Network	Packet Received: Network Layer Device is Routable forwarding packet.
22:20:07-716	R4	ICMP_packet	Network	Forwarding packet from ProtocolStack(to 172.1.1.33).
22:20:07-716	R5	ICMP_packet	Network	ProtocolStack received packet from local Interface.
22:20:07-716	R5	ICMP_packet	Network	Packet Received: Network Layer Device is Routable

			forwarding packet.
22:20:07-716	R5 ICMP_packet	Network	Forwarding packet from ProtocolStack(to 172.1.1.29).
22:20:07-716	R6 ICMP_packet	Network	ProtocolStack received packet from local Interface.
22:20:07-716	R6 ICMP_packet	Network	Packet Received: Network Layer Device is Routable forwarding packet.
22:20:07-716	R6 ICMP_packet	Network	Forwarding packet from ProtocolStack(to 172.1.1.25).
22:20:07-716	R7 ICMP_packet	Network	ProtocolStack received packet from local Interface.
22:20:07-716	R7 ICMP_packet	Network	Packet Received: Network Layer Device is Routable forwarding packet.
22:20:07-716	R7 ICMP_packet	Network	Forwarding packet from ProtocolStack(to 172.1.1.21).
22:20:07-716	R8 ICMP_packet	Network	ProtocolStack received packet from local Interface.
22:20:07-716	R8 ICMP_packet	Network	Packet Received: Network Layer Device is Routable forwarding packet.
22:20:07-716	R8 ICMP_packet	Network	Forwarding packet from ProtocolStack(to 172.1.1.17).
22:20:07-716	R3 ICMP_packet	Network	ProtocolStack received packet from local Interface.
22:20:07-716	R3 ICMP_packet	Network	Packet Received: Network Layer Device is Routable forwarding packet.
22:20:07-716	R3 ICMP_packet	Network	Forwarding packet from ProtocolStack(to 172.1.1.13).
22:20:07-716	R2 ICMP_packet	Network	ProtocolStack received packet from local Interface.
22:20:07-716	R2 ICMP_packet	Network	Packet Received: Network Layer Device is Routable forwarding packet.
22:20:07-716	R2 ICMP_packet	Network	Forwarding packet from ProtocolStack(to 172.1.1.9).
22:20:07-716	R1 ICMP_packet	Network	ProtocolStack received packet from local Interface.
22:20:07-716	R1 ICMP_packet	Network	Packet Received: Network Layer Device is Routable forwarding packet.
22:20:07-716	R1 ICMP_packet	Network	Forwarding packet from ProtocolStack(to 172.1.1.2).
22:20:07-716	pc2 ICMP_packet	Network	ProtocolStack received packet from local Interface.
22:20:07-716	pc2 ICMP_packet	Network	Confirmed Packet is for this Network Layer Device.
22:20:07-716	pc2 Echo Reply Packet	Network	Echo reply packet received from 172.1.1.42

Маршрут (PC2 – R1 – R2 – R3 – R8 – R7 – R6 – R5 – R4 – R9 - PC3) – кратчайший от PC2 к PC3 и от PC3 к PC2.

## 5. Маршрутизация между K3 и K1:

22:24:48-066	pc3 Echo Request Packet	Network	Created Echo Request packet to 172.1.1.1
22:24:48-066	pc3 ICMP_packet	Network	Sending packet from ProtocolStack (to 172.1.1.41).
22:24:48-067	R9 ICMP_packet	Network	ProtocolStack received packet from local Interface.
22:24:48-067	R9 ICMP_packet	Network	Packet Received: Network Layer Device is Routable forwarding packet.
22:24:48-067	R9 ICMP_packet	Network	Forwarding packet from ProtocolStack(to 172.1.1.37).
22:24:48-067	R4 ICMP_packet	Network	ProtocolStack received packet from local Interface.
22:24:48-067	R4 ICMP_packet	Network	Packet Received: Network Layer Device is Routable forwarding packet.
22:24:48-067	R4 ICMP_packet	Network	Forwarding packet from ProtocolStack(to 172.1.1.33).
22:24:48-067	R5 ICMP_packet	Network	ProtocolStack received packet from local Interface.
22:24:48-067	R5 ICMP_packet	Network	Packet Received: Network Layer Device is Routable for-

			warding packet.
22:24:48-067	R5	ICMP_packet	Network Forwarding packet from ProtocolStack(to 172.1.1.29).
22:24:48-067	R6	ICMP_packet	Network ProtocolStack received packet from local Interface.
22:24:48-067	R6	ICMP_packet	Network Packet Received: Network Layer Device is Routable for- warding packet.
22:24:48-067	R6	ICMP_packet	Network Forwarding packet from ProtocolStack(to 172.1.1.25).
22:24:48-067	R7	ICMP_packet	Network ProtocolStack received packet from local Interface.
22:24:48-067	R7	ICMP_packet	Network Packet Received: Network Layer Device is Routable for- warding packet.
22:24:48-067	R7	ICMP_packet	Network Forwarding packet from ProtocolStack(to 172.1.1.21).
22:24:48-067	R8	ICMP_packet	Network ProtocolStack received packet from local Interface.
22:24:48-067	R8	ICMP_packet	Network Packet Received: Network Layer Device is Routable for- warding packet.
22:24:48-067	R8	ICMP_packet	Network Forwarding packet from ProtocolStack(to 172.1.1.17).
22:24:48-067	R3	ICMP_packet	Network ProtocolStack received packet from local Interface.
22:24:48-067	R3	ICMP_packet	Network Packet Received: Network Layer Device is Routable for- warding packet.
22:24:48-067	R3	ICMP_packet	Network Forwarding packet from ProtocolStack(to 172.1.1.13).
22:24:48-067	R2	ICMP_packet	Network ProtocolStack received packet from local Interface.
22:24:48-067	R2	ICMP_packet	Network Packet Received: Network Layer Device is Routable for- warding packet.
22:24:48-067	R2	ICMP_packet	Network Forwarding packet from ProtocolStack(to 172.1.1.9).
22:24:48-067	R1	ICMP_packet	Network ProtocolStack received packet from local Interface.
22:24:48-067	R1	ICMP_packet	Network Packet Received: Network Layer Device is Routable for- warding packet.
22:24:48-067	R1	ICMP_packet	Network Forwarding packet from ProtocolStack(to 172.1.1.1).
22:24:48-067	pc1	ICMP_packet	Network ProtocolStack received packet from local Interface.
22:24:48-067	pc1	ICMP_packet	Network Confirmed Packet is for this Network Layer Device.
22:24:48-067	pc1	Echo Reply Packet	Network Created Echo Reply packet to 172.1.1.42
22:24:48-067	pc1	ICMP_packet	Network Sending packet from ProtocolStack (to 172.1.1.3).
22:24:48-067	R1	ICMP_packet	Network ProtocolStack received packet from local Interface.
22:24:48-067	R1	ICMP_packet	Network Packet Received: Network Layer Device is Routable for- warding packet.
22:24:48-067	R1	ICMP_packet	Network Forwarding packet from ProtocolStack(to 172.1.1.10).
22:24:48-067	R2	ICMP_packet	Network ProtocolStack received packet from local Interface.
22:24:48-067	R2	ICMP_packet	Network Packet Received: Network Layer Device is Routable for- warding packet.
22:24:48-067	R2	ICMP_packet	Network Forwarding packet from ProtocolStack(to 172.1.1.14).
22:24:48-067	R3	ICMP_packet	Network ProtocolStack received packet from local Interface.
22:24:48-067	R3	ICMP_packet	Network Packet Received: Network Layer Device is Routable for- warding packet.
22:24:48-067	R3	ICMP_packet	Network Forwarding packet from ProtocolStack(to 172.1.1.18).
22:24:48-067	R8	ICMP_packet	Network ProtocolStack received packet from local Interface.
22:24:48-067	R8	ICMP_packet	Network Packet Received: Network Layer Device is Routable for- warding packet.
22:24:48-067	R8	ICMP_packet	Network Forwarding packet from ProtocolStack(to 172.1.1.22).
22:24:48-067	R7	ICMP_packet	Network ProtocolStack received packet from local Interface.
22:24:48-067	R7	ICMP_packet	Network Packet Received: Network Layer Device is Routable for-

		warding packet.
22:24:48-067	R7 ICMP_packet	Network Forwarding packet from ProtocolStack(to 172.1.1.26).
22:24:48-067	R6 ICMP_packet	Network ProtocolStack received packet from local Interface.
22:24:48-067	R6 ICMP_packet	Network Packet Received: Network Layer Device is Routable forwarding packet.
22:24:48-067	R6 ICMP_packet	Network Forwarding packet from ProtocolStack(to 172.1.1.30).
22:24:48-067	R5 ICMP_packet	Network ProtocolStack received packet from local Interface.
22:24:48-067	R5 ICMP_packet	Network Packet Received: Network Layer Device is Routable forwarding packet.
22:24:48-067	R5 ICMP_packet	Network Forwarding packet from ProtocolStack(to 172.1.1.34).
22:24:48-067	R4 ICMP_packet	Network ProtocolStack received packet from local Interface.
22:24:48-067	R4 ICMP_packet	Network Packet Received: Network Layer Device is Routable forwarding packet.
22:24:48-067	R4 ICMP_packet	Network Forwarding packet from ProtocolStack(to 172.1.1.38).
22:24:48-067	R9 ICMP_packet	Network ProtocolStack received packet from local Interface.
22:24:48-067	R9 ICMP_packet	Network Packet Received: Network Layer Device is Routable forwarding packet.
22:24:48-067	R9 ICMP_packet	Network Forwarding packet from ProtocolStack(to 172.1.1.42).
22:24:48-067	pc3 ICMP_packet	Network ProtocolStack received packet from local Interface.
22:24:48-067	pc3 ICMP_packet	Network Confirmed Packet is for this Network Layer Device.
22:24:48-067	pc3 Echo Reply Packet	Network Echo reply packet received from 172.1.1.1

Маршрут (PC3 – R9 – R4 – R5 – R6 – R7 – R8 – R3 – R2 – R1 – PC1) – кратчайший от PC3 к PC1 и от PC1 к PC3.

Маршрутизация между K1, K2 и K3 успешна, так как при каждом из верхних запросов был получен и ответ в обратном направлении. Построенные нами маршруты являются оптимальными, так как мы не можем исключить из цепей маршрутов ни одно устройство так, чтобы не разорвать соединение между конечными устройствами.

### **Выводы.**

В ходе выполнения лабораторной работы изучены и освоены на практике методы статической IP-адресации, получены навыки управления таблицами маршрутизации на узлах сетевого уровня.