**МИНОБРНАУКИ РОССИИ**

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**Кафедра МО ЭВМ**

отчет

**по лабораторной работе №1**

**по дисциплине «Сети и телекоммуникации»**

Тема: Настройка IP-адресов в сети

|  |  |  |
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**Цель работы.**

Изучение и практическое освоение основ адресации, разрешения физических адресов и простейшей маршрутизации в IP-сетях.

**Задачи.**

1.Исправить структуру сети (если это необходимо), обеспечив корректную доставку кадров на физическом уровне.

2. Задать IP-адреса, маски подсети и шлюзы по умолчанию для всех уз-лов сети, чтобы обеспечить корректную доставку Echo-запроса от PC1 к PC2 и Echo-ответа обратно. Обосновать установки.

3. Выполнить Echo-запрос с PC1 на PC2. Посмотреть вывод программы.

4. Добавить статическую запись ARP для PC3 на PC1 (или для ближайшего к PC1 маршрутизатора, находящегося между PC3 и PC1). Подождать устаревания ARP-таблиц и выполнить Echo-запрос с PC1 на PC3. Объяснить результат.

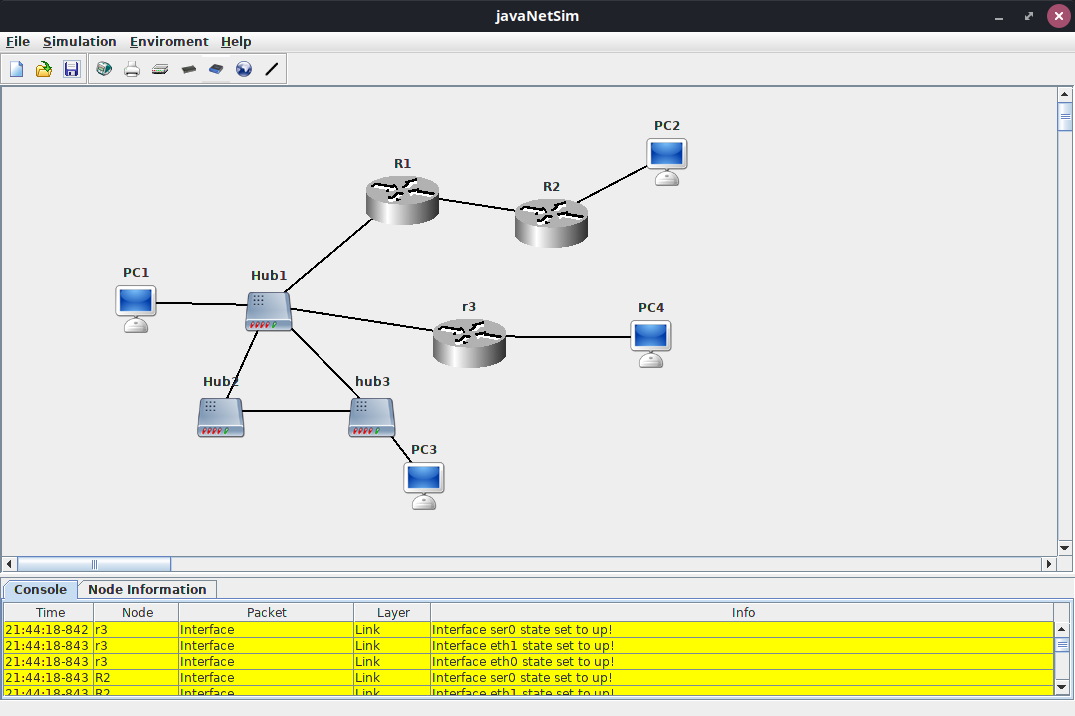
5. Выполнить Echo-запрос на IP-адрес 200.100.0.1 c PC1. Объяснить вывод программы.

6. Выполнить Echo-запросы с PC1 и PC2 на все узлы сети. Убедиться, что Echo-ответы приходят.

**Ход работы.**

Вариант 10. Файл со схемой сети: lab1\_var10.jfst. Сеть между маршрути­заторами R1 и R2: 192.168.0.0. Компьютер PC1 имеет IP-адрес 172.168.0.1. Компьютер PC2 имеет IP-адрес 172.168.0.65

. Компьютер PC4 имеет IP-адрес: 1.0.0.2. Обозначения в задании: K1 – PC1, K2 – PC2, K3 – PC3.

Рисунок 1 – Конфигурация сети

1. Для корректной доставки кадров на физическом уровне необходимо исправить структуру сети: удалить из сети Hub2 и Hub3, так как они приводят к тому, что между Hub1, Hub2 и Hub3 кадры попадают в цикл. Структура сети после исправления представлена на рис. 2.

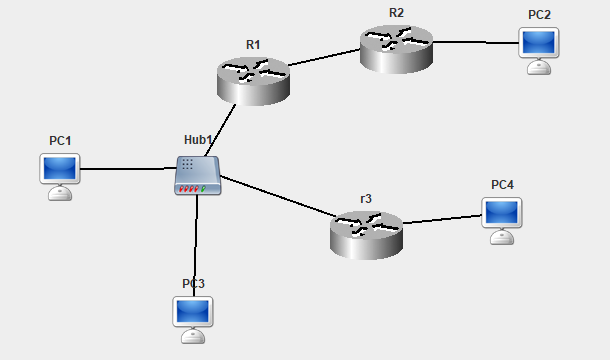


Рисунок 2 – Исправленная конфигурация сети

1. Для обеспечения корректной доставки Echo-запроса от PC1 к PC2 и Echo-ответа обратно были заданы IP-адреса, маски подсети и шлюзы по умолчанию для всех узлов сети. Результаты приведены в табл. 1. При задании маски подсети для PC1 учитывалось, что для того, чтобы запрос, отправленный к PC2, корректно доставлялся, необходимо, чтобы эти компьютеры были в разной подсети. Отсюда маска 255.255.255.192. Для подсети 1.0.0.0 маска была выбрана 255.0.0.0. Для PC3 был задан IP из подсети PC1, так как он соединен к PC1 через хаб.

Таблица 1 - Настройки протокола TCP/IP для всех узлов сети

|  |  |  |  |
| --- | --- | --- | --- |
| Название | IP | Маска подсети | Шлюз по умолчанию |
| PC1 | 172.168.0.1 | 255.255.255.192 | 172.168.0.4 |
| PC2 | 172.168.0.65 | 255.255.255.192 | 172.168.0.70 |
| PC3 | 172.168.0.2 | 255.255.255.192 | 129.64.128.5 |
| PC4 | 1.0.0.2 | 255.0.0.0 | 1.0.0.1 |
| R1 (eth0) | 172.168.0.3 | 255.255.255.192 | 192.168.0.2 |
| R1 (eth1) | 192.168.0.1 | 255.255.255.192 |
| R2 (eth0) | 192.168.0.2 | 255.255.255.192 | 192.168.0.1 |
| R2 (eth1) | 172.168.0.70 | 255.255.255.192 |
| R3 (eth0) | 172.168.0.4 | 255.255.255.192 | 172.168.0.3 |
| R3 (eth1) | 1.0.0.1 | 255.0.0.0 |

После настройки протокола был выполнен Echo-запрос с PC1 на PC2. Результат представлен в табл. 2.

1. Создание Echo-запроса с К1 на К2.

Таблица 2 - Вывод программы после Echo-запроса с PC1 на PC2

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Time | Node | Packet | Layer | Info |
| 21:48:16-927 | PC1 | Echo Request Packet | Network | Created Echo Request packet to 172.168.0.65 |
| 21:48:16-927 | PC1 | ARP Discovery Packet | DataLink | Created ARP discovery packet to source MAC address for IP 172.168.0.4 |
| 21:48:16-927 | PC1 | ARP\_packet | Network | Sending broadcast packet from ProtocolStack. |
| 21:48:16-927 | PC1 | Ethernet Packet | Link | Sending packet from interface BD:B8:A1:1D:5C:A9 |
| 21:48:16-927 | r3 | Ethernet Packet | Link | Recieved and accepted packet at interface 88:34:4B:99:3A:2C |
| 21:48:16-927 | r3 | ARP\_packet | Network | ProtocolStack received packet from local Interface. |
| 21:48:16-927 | r3 | ARP\_packet | Network | Confirmed Packet is for this Network Layer Device. |
| 21:48:16-927 | r3 | ARP Response Packet | DataLink | Created ARP Response packet to 172.168.0.1 |
| 21:48:16-927 | r3 | ARP\_packet | Network | Sending packet from ProtocolStack (to 172.168.0.1). |
| 21:48:16-927 | r3 | Ethernet Packet | Link | Sending packet from interface 88:34:4B:99:3A:2C |
| 21:48:16-927 | PC3 | Ethernet Packet | Link | Recieved and dropped packet at interface 34:53:BD:52:3E:5E |
| 21:48:16-927 | R1 | Ethernet Packet | Link | Recieved and dropped packet at interface A6:8F:C5:18:80:1D |
| 21:48:16-927 | PC1 | Ethernet Packet | Link | Recieved and accepted packet at interface BD:B8:A1:1D:5C:A9 |
| 21:48:16-927 | PC1 | ARP\_packet | Network | ProtocolStack received packet from local Interface. |
| 21:48:16-927 | PC1 | ARP\_packet | Network | Confirmed Packet is for this Network Layer Device. |
| 21:48:16-927 | PC3 | Ethernet Packet | Link | Recieved and accepted packet at interface 34:53:BD:52:3E:5E |
| 21:48:16-927 | PC3 | ARP\_packet | Network | ProtocolStack received packet from local Interface. |
| 21:48:16-927 | R1 | Ethernet Packet | Link | Recieved and accepted packet at interface A6:8F:C5:18:80:1D |
| 21:48:16-928 | R1 | ARP\_packet | Network | ProtocolStack received packet from local Interface. |
| 21:48:16-928 | PC1 | ICMP\_packet | Network | Sending packet from ProtocolStack (to 172.168.0.4). |
| 21:48:16-928 | PC1 | Ethernet Packet | Link | Sending packet from interface BD:B8:A1:1D:5C:A9 |
| 21:48:16-928 | r3 | Ethernet Packet | Link | Recieved and accepted packet at interface 88:34:4B:99:3A:2C |
| 21:48:16-928 | r3 | ICMP\_packet | Network | ProtocolStack received packet from local Interface. |
| 21:48:16-928 | r3 | ICMP\_packet | Network | Packet Received: Network Layer Device is Routable forwarding packet. |
| 21:48:16-928 | r3 | ARP Discovery Packet | DataLink | Created ARP discovery packet to source MAC address for IP 172.168.0.3 |
| 21:48:16-928 | r3 | ARP\_packet | Network | Sending broadcast packet from ProtocolStack. |
| 21:48:16-928 | r3 | Ethernet Packet | Link | Sending packet from interface 88:34:4B:99:3A:2C |
| 21:48:16-928 | PC3 | Ethernet Packet | Link | Recieved and accepted packet at interface 34:53:BD:52:3E:5E |
| 21:48:16-928 | PC3 | ARP\_packet | Network | ProtocolStack received packet from local Interface. |
| 21:48:16-928 | R1 | Ethernet Packet | Link | Recieved and accepted packet at interface A6:8F:C5:18:80:1D |
| 21:48:16-928 | R1 | ARP\_packet | Network | ProtocolStack received packet from local Interface. |
| 21:48:16-928 | R1 | ARP\_packet | Network | Confirmed Packet is for this Network Layer Device. |
| 21:48:16-928 | R1 | ARP Response Packet | DataLink | Created ARP Response packet to 172.168.0.4 |
| 21:48:16-928 | R1 | ARP\_packet | Network | Sending packet from ProtocolStack (to 172.168.0.4). |
| 21:48:16-928 | R1 | Ethernet Packet | Link | Sending packet from interface A6:8F:C5:18:80:1D |
| 21:48:16-928 | r3 | Ethernet Packet | Link | Recieved and accepted packet at interface 88:34:4B:99:3A:2C |
| 21:48:16-928 | r3 | ARP\_packet | Network | ProtocolStack received packet from local Interface. |
| 21:48:16-928 | r3 | ARP\_packet | Network | Confirmed Packet is for this Network Layer Device. |
| 21:48:16-928 | PC3 | Ethernet Packet | Link | Recieved and dropped packet at interface 34:53:BD:52:3E:5E |
| 21:48:16-928 | PC1 | Ethernet Packet | Link | Recieved and dropped packet at interface BD:B8:A1:1D:5C:A9 |
| 21:48:16-928 | PC1 | Ethernet Packet | Link | Recieved and accepted packet at interface BD:B8:A1:1D:5C:A9 |
| 21:48:16-928 | PC1 | ARP\_packet | Network | ProtocolStack received packet from local Interface. |
| 21:48:16-928 | r3 | ICMP\_packet | Network | Forwarding packet from ProtocolStack(to 172.168.0.3). |
| 21:48:16-928 | r3 | Ethernet Packet | Link | Sending packet from interface 88:34:4B:99:3A:2C |
| 21:48:16-928 | PC3 | Ethernet Packet | Link | Recieved and dropped packet at interface 34:53:BD:52:3E:5E |
| 21:48:16-928 | R1 | Ethernet Packet | Link | Recieved and accepted packet at interface A6:8F:C5:18:80:1D |
| 21:48:16-928 | R1 | ICMP\_packet | Network | ProtocolStack received packet from local Interface. |
| 21:48:16-928 | R1 | ICMP\_packet | Network | Packet Received: Network Layer Device is Routable forwarding packet. |
| 21:48:16-928 | R1 | ARP Discovery Packet | DataLink | Created ARP discovery packet to source MAC address for IP 192.168.0.2 |
| 21:48:16-928 | R1 | ARP\_packet | Network | Sending broadcast packet from ProtocolStack. |
| 21:48:16-928 | R1 | Ethernet Packet | Link | Sending packet from interface AF:B1:6F:8D:6C:C6 |
| 21:48:16-928 | R2 | Ethernet Packet | Link | Recieved and accepted packet at interface 32:7C:1D:14:59:66 |
| 21:48:16-928 | R2 | ARP\_packet | Network | ProtocolStack received packet from local Interface. |
| 21:48:16-928 | R2 | ARP\_packet | Network | Confirmed Packet is for this Network Layer Device. |
| 21:48:16-928 | R2 | ARP Response Packet | DataLink | Created ARP Response packet to 192.168.0.1 |
| 21:48:16-928 | R2 | ARP\_packet | Network | Sending packet from ProtocolStack (to 192.168.0.1). |
| 21:48:16-928 | R2 | Ethernet Packet | Link | Sending packet from interface 32:7C:1D:14:59:66 |
| 21:48:16-928 | R1 | Ethernet Packet | Link | Recieved and accepted packet at interface AF:B1:6F:8D:6C:C6 |
| 21:48:16-928 | R1 | ARP\_packet | Network | ProtocolStack received packet from local Interface. |
| 21:48:16-928 | R1 | ARP\_packet | Network | Confirmed Packet is for this Network Layer Device. |
| 21:48:16-928 | R1 | ICMP\_packet | Network | Forwarding packet from ProtocolStack(to 192.168.0.2). |
| 21:48:16-928 | R1 | Ethernet Packet | Link | Sending packet from interface AF:B1:6F:8D:6C:C6 |
| 21:48:16-928 | R2 | Ethernet Packet | Link | Recieved and accepted packet at interface 32:7C:1D:14:59:66 |
| 21:48:16-928 | R2 | ICMP\_packet | Network | ProtocolStack received packet from local Interface. |
| 21:48:16-928 | R2 | ICMP\_packet | Network | Packet Received: Network Layer Device is Routable forwarding packet. |
| 21:48:16-928 | R2 | ARP Discovery Packet | DataLink | Created ARP discovery packet to source MAC address for IP 172.168.0.65 |
| 21:48:16-928 | R2 | ARP\_packet | Network | Sending broadcast packet from ProtocolStack. |
| 21:48:16-928 | R2 | Ethernet Packet | Link | Sending packet from interface 72:90:35:AA:A4:8C |
| 21:48:16-928 | PC2 | Ethernet Packet | Link | Recieved and accepted packet at interface 73:AA:AC:3F:35:47 |
| 21:48:16-928 | PC2 | ARP\_packet | Network | ProtocolStack received packet from local Interface. |
| 21:48:16-928 | PC2 | ARP\_packet | Network | Confirmed Packet is for this Network Layer Device. |
| 21:48:16-928 | PC2 | ARP Response Packet | DataLink | Created ARP Response packet to 172.168.0.70 |
| 21:48:16-928 | PC2 | ARP\_packet | Network | Sending packet from ProtocolStack (to 172.168.0.70). |
| 21:48:16-928 | PC2 | Ethernet Packet | Link | Sending packet from interface 73:AA:AC:3F:35:47 |
| 21:48:16-928 | R2 | Ethernet Packet | Link | Recieved and accepted packet at interface 72:90:35:AA:A4:8C |
| 21:48:16-928 | R2 | ARP\_packet | Network | ProtocolStack received packet from local Interface. |
| 21:48:16-928 | R2 | ARP\_packet | Network | Confirmed Packet is for this Network Layer Device. |
| 21:48:16-928 | R2 | ICMP\_packet | Network | Forwarding packet from ProtocolStack(to 172.168.0.65). |
| 21:48:16-928 | R2 | Ethernet Packet | Link | Sending packet from interface 72:90:35:AA:A4:8C |
| 21:48:16-928 | PC2 | Ethernet Packet | Link | Recieved and accepted packet at interface 73:AA:AC:3F:35:47 |
| 21:48:16-928 | PC2 | ICMP\_packet | Network | ProtocolStack received packet from local Interface. |
| 21:48:16-928 | PC2 | ICMP\_packet | Network | Confirmed Packet is for this Network Layer Device. |
| 21:48:16-928 | PC2 | Echo Reply Packet | Network | Created Echo Reply packet to 172.168.0.1 |
| 21:48:16-928 | PC2 | ICMP\_packet | Network | Sending packet from ProtocolStack (to 172.168.0.70). |
| 21:48:16-928 | PC2 | Ethernet Packet | Link | Sending packet from interface 73:AA:AC:3F:35:47 |
| 21:48:16-928 | R2 | Ethernet Packet | Link | Recieved and accepted packet at interface 72:90:35:AA:A4:8C |
| 21:48:16-928 | R2 | ICMP\_packet | Network | ProtocolStack received packet from local Interface. |
| 21:48:16-928 | R2 | ICMP\_packet | Network | Packet Received: Network Layer Device is Routable forwarding packet. |
| 21:48:16-928 | R2 | ICMP\_packet | Network | Forwarding packet from ProtocolStack(to 192.168.0.1). |
| 21:48:16-928 | R2 | Ethernet Packet | Link | Sending packet from interface 32:7C:1D:14:59:66 |
| 21:48:16-928 | R1 | Ethernet Packet | Link | Recieved and accepted packet at interface AF:B1:6F:8D:6C:C6 |
| 21:48:16-928 | R1 | ICMP\_packet | Network | ProtocolStack received packet from local Interface. |
| 21:48:16-928 | R1 | ICMP\_packet | Network | Packet Received: Network Layer Device is Routable forwarding packet. |
| 21:48:16-928 | R1 | ARP Discovery Packet | DataLink | Created ARP discovery packet to source MAC address for IP 172.168.0.1 |
| 21:48:16-928 | R1 | ARP\_packet | Network | Sending broadcast packet from ProtocolStack. |
| 21:48:16-928 | R1 | Ethernet Packet | Link | Sending packet from interface A6:8F:C5:18:80:1D |
| 21:48:16-928 | r3 | Ethernet Packet | Link | Recieved and accepted packet at interface 88:34:4B:99:3A:2C |
| 21:48:16-928 | r3 | ARP\_packet | Network | ProtocolStack received packet from local Interface. |
| 21:48:16-928 | PC3 | Ethernet Packet | Link | Recieved and accepted packet at interface 34:53:BD:52:3E:5E |
| 21:48:16-928 | PC3 | ARP\_packet | Network | ProtocolStack received packet from local Interface. |
| 21:48:16-928 | PC1 | Ethernet Packet | Link | Recieved and accepted packet at interface BD:B8:A1:1D:5C:A9 |
| 21:48:16-928 | PC1 | ARP\_packet | Network | ProtocolStack received packet from local Interface. |
| 21:48:16-928 | PC1 | ARP\_packet | Network | Confirmed Packet is for this Network Layer Device. |
| 21:48:16-928 | PC1 | ARP Response Packet | DataLink | Created ARP Response packet to 172.168.0.3 |
| 21:48:16-928 | PC1 | ARP\_packet | Network | Sending packet from ProtocolStack (to 172.168.0.3). |
| 21:48:16-928 | PC1 | Ethernet Packet | Link | Sending packet from interface BD:B8:A1:1D:5C:A9 |
| 21:48:16-928 | r3 | Ethernet Packet | Link | Recieved and dropped packet at interface 88:34:4B:99:3A:2C |
| 21:48:16-928 | PC3 | Ethernet Packet | Link | Recieved and dropped packet at interface 34:53:BD:52:3E:5E |
| 21:48:16-928 | R1 | Ethernet Packet | Link | Recieved and accepted packet at interface A6:8F:C5:18:80:1D |
| 21:48:16-928 | R1 | ARP\_packet | Network | ProtocolStack received packet from local Interface. |
| 21:48:16-928 | R1 | ARP\_packet | Network | Confirmed Packet is for this Network Layer Device. |
| 21:48:16-928 | R1 | ICMP\_packet | Network | Forwarding packet from ProtocolStack(to 172.168.0.1). |
| 21:48:16-928 | R1 | Ethernet Packet | Link | Sending packet from interface A6:8F:C5:18:80:1D |
| 21:48:16-928 | r3 | Ethernet Packet | Link | Recieved and dropped packet at interface 88:34:4B:99:3A:2C |
| 21:48:16-928 | PC3 | Ethernet Packet | Link | Recieved and dropped packet at interface 34:53:BD:52:3E:5E |
| 21:48:16-928 | PC1 | Ethernet Packet | Link | Recieved and accepted packet at interface BD:B8:A1:1D:5C:A9 |
| 21:48:16-928 | PC1 | ICMP\_packet | Network | ProtocolStack received packet from local Interface. |
| 21:48:16-928 | PC1 | ICMP\_packet | Network | Confirmed Packet is for this Network Layer Device. |
| 21:48:16-928 | PC1 | Echo Reply Packet | Network | Echo reply packet received from 172.168.0.65 |

1. Добавим статическую запись ARP для K3 на K1. После устаревания ARP-таблиц выполним echo-запрос с К1 на К3.

Таблица 3 – Вывод программы после добавления ARP записи.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Time | Node | Packet | Layer | Info |
| 22:03:19-995 | PC1 | Echo Request Packet | Network | Created Echo Request packet to 172.168.0.2 |
| 22:03:19-995 | PC1 | ICMP\_packet | Network | Sending packet from ProtocolStack (to 172.168.0.2). |
| 22:03:19-995 | PC1 | Ethernet Packet | Link | Sending packet from interface BD:B8:A1:1D:5C:A9 |
| 22:03:19-995 | r3 | Ethernet Packet | Link | Recieved and dropped packet at interface 88:34:4B:99:3A:2C |
| 22:03:19-995 | PC3 | Ethernet Packet | Link | Recieved and accepted packet at interface 34:53:BD:52:3E:5E |
| 22:03:19-995 | PC3 | ICMP\_packet | Network | ProtocolStack received packet from local Interface. |
| 22:03:19-995 | PC3 | ICMP\_packet | Network | Confirmed Packet is for this Network Layer Device. |
| 22:03:19-995 | PC3 | Echo Reply Packet | Network | Created Echo Reply packet to 172.168.0.1 |
| 22:03:19-995 | PC3 | ICMP\_packet | Network | Sending packet from ProtocolStack (to 172.168.0.1). |
| 22:03:19-996 | PC3 | Ethernet Packet | Link | Sending packet from interface 34:53:BD:52:3E:5E |
| 22:03:19-996 | r3 | Ethernet Packet | Link | Recieved and dropped packet at interface 88:34:4B:99:3A:2C |
| 22:03:19-996 | R1 | Ethernet Packet | Link | Recieved and dropped packet at interface A6:8F:C5:18:80:1D |
| 22:03:19-996 | PC1 | Ethernet Packet | Link | Recieved and accepted packet at interface BD:B8:A1:1D:5C:A9 |
| 22:03:19-996 | PC1 | ICMP\_packet | Network | ProtocolStack received packet from local Interface. |
| 22:03:19-996 | PC1 | ICMP\_packet | Network | Confirmed Packet is for this Network Layer Device. |
| 22:03:19-996 | PC1 | Echo Reply Packet | Network | Echo reply packet received from 172.168.0.2 |

Как видно из вывода программы, К1 не создавал ARP-запроса.

1. При попытке отправить Echo-запрос на несуществующий в сети IP-адрес с PC1 происходит следующее: PC1 отправляет пакет на шлюз по умолчанию (R3), шлюз не находит среди своих интерфейсов данную подсеть и, в свою очередь, отправляет пакет на шлюз по умолчанию (R1). Аналогично R1 передает пакет на свой шлюз по умолчанию (R2), а R2 отправляет паке в свой шлюз по умолчанию (R1). В итоге пакет передается между R1 и R2 до тех пор, пока у него не закончится время жизни.

Таблица 4 – Отправка echo-запроса на несуществующий ip.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 22:18:44-384 | PC1 | ICMP\_packet | Network | Confirmed Packet is for this Network Layer Device. |
| 22:18:44-384 | ICMP Time Exceeded |  | Network | Recieved ICMP Time Exceeded from 192.168.0.2 |

1. Результаты отправки пакетов от PC1 и PC2 на все узлы сети представлены в табл. 3, 4. Нетрудно увидеть, что передача запросов и ответов происходит корректно во всех случаях, что свидетельствует о правильной настройки сети.

Таблица 5 - Echo-запросы от PC1 на PC4

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Time | Node | Packet | Layer | Info |
| 22:27:04-544 | PC1 | Ethernet Packet | Link | Sending packet from interface BD:B8:A1:1D:5C:A9 |
| 22:27:04-544 | r3 | Ethernet Packet | Link | Recieved and accepted packet at interface 88:34:4B:99:3A:2C |
| 22:27:04-544 | r3 | ARP\_packet | Network | ProtocolStack received packet from local Interface. |
| 22:27:04-544 | r3 | ARP\_packet | Network | Confirmed Packet is for this Network Layer Device. |
| 22:27:04-544 | r3 | ARP Response Packet | DataLink | Created ARP Response packet to 172.168.0.1 |
| 22:27:04-544 | r3 | ARP\_packet | Network | Sending packet from ProtocolStack (to 172.168.0.1). |
| 22:27:04-544 | r3 | Ethernet Packet | Link | Sending packet from interface 88:34:4B:99:3A:2C |
| 22:27:04-544 | PC3 | Ethernet Packet | Link | Recieved and dropped packet at interface 34:53:BD:52:3E:5E |
| 22:27:04-544 | R1 | Ethernet Packet | Link | Recieved and dropped packet at interface A6:8F:C5:18:80:1D |
| 22:27:04-544 | PC1 | Ethernet Packet | Link | Recieved and accepted packet at interface BD:B8:A1:1D:5C:A9 |
| 22:27:04-544 | PC1 | ARP\_packet | Network | ProtocolStack received packet from local Interface. |
| 22:27:04-544 | PC1 | ARP\_packet | Network | Confirmed Packet is for this Network Layer Device. |
| 22:27:04-544 | PC3 | Ethernet Packet | Link | Recieved and accepted packet at interface 34:53:BD:52:3E:5E |
| 22:27:04-544 | PC3 | ARP\_packet | Network | ProtocolStack received packet from local Interface. |
| 22:27:04-544 | R1 | Ethernet Packet | Link | Recieved and accepted packet at interface A6:8F:C5:18:80:1D |
| 22:27:04-544 | R1 | ARP\_packet | Network | ProtocolStack received packet from local Interface. |
| 22:27:04-544 | PC1 | ICMP\_packet | Network | Sending packet from ProtocolStack (to 172.168.0.4). |
| 22:27:04-544 | PC1 | Ethernet Packet | Link | Sending packet from interface BD:B8:A1:1D:5C:A9 |
| 22:27:04-544 | r3 | Ethernet Packet | Link | Recieved and accepted packet at interface 88:34:4B:99:3A:2C |
| 22:27:04-544 | r3 | ICMP\_packet | Network | ProtocolStack received packet from local Interface. |
| 22:27:04-544 | r3 | ICMP\_packet | Network | Packet Received: Network Layer Device is Routable forwarding packet. |
| 22:27:04-544 | r3 | ARP Discovery Packet | DataLink | Created ARP discovery packet to source MAC address for IP 1.0.0.2 |
| 22:27:04-544 | r3 | ARP\_packet | Network | Sending broadcast packet from ProtocolStack. |
| 22:27:04-544 | r3 | Ethernet Packet | Link | Sending packet from interface 66:28:6D:B1:35:4C |
| 22:27:04-544 | PC4 | Ethernet Packet | Link | Recieved and accepted packet at interface 95:1F:C3:60:B1:C4 |
| 22:27:04-544 | PC4 | ARP\_packet | Network | ProtocolStack received packet from local Interface. |
| 22:27:04-544 | PC4 | ARP\_packet | Network | Confirmed Packet is for this Network Layer Device. |
| 22:27:04-544 | PC4 | ARP Response Packet | DataLink | Created ARP Response packet to 1.0.0.1 |
| 22:27:04-544 | PC4 | ARP\_packet | Network | Sending packet from ProtocolStack (to 1.0.0.1). |
| 22:27:04-544 | PC4 | Ethernet Packet | Link | Sending packet from interface 95:1F:C3:60:B1:C4 |
| 22:27:04-544 | r3 | Ethernet Packet | Link | Recieved and accepted packet at interface 66:28:6D:B1:35:4C |
| 22:27:04-544 | r3 | ARP\_packet | Network | ProtocolStack received packet from local Interface. |
| 22:27:04-544 | r3 | ARP\_packet | Network | Confirmed Packet is for this Network Layer Device. |
| 22:27:04-544 | r3 | ICMP\_packet | Network | Forwarding packet from ProtocolStack(to 1.0.0.2). |
| 22:27:04-544 | r3 | Ethernet Packet | Link | Sending packet from interface 66:28:6D:B1:35:4C |
| 22:27:04-544 | PC4 | Ethernet Packet | Link | Recieved and accepted packet at interface 95:1F:C3:60:B1:C4 |
| 22:27:04-544 | PC4 | ICMP\_packet | Network | ProtocolStack received packet from local Interface. |
| 22:27:04-544 | PC4 | ICMP\_packet | Network | Confirmed Packet is for this Network Layer Device. |
| 22:27:04-544 | PC4 | Echo Reply Packet | Network | Created Echo Reply packet to 172.168.0.1 |
| 22:27:04-544 | PC4 | ICMP\_packet | Network | Sending packet from ProtocolStack (to 1.0.0.1). |
| 22:27:04-544 | PC4 | Ethernet Packet | Link | Sending packet from interface 95:1F:C3:60:B1:C4 |
| 22:27:04-544 | r3 | Ethernet Packet | Link | Recieved and accepted packet at interface 66:28:6D:B1:35:4C |
| 22:27:04-544 | r3 | ICMP\_packet | Network | ProtocolStack received packet from local Interface. |
| 22:27:04-544 | r3 | ICMP\_packet | Network | Packet Received: Network Layer Device is Routable forwarding packet. |
| 22:27:04-544 | r3 | ICMP\_packet | Network | Forwarding packet from ProtocolStack(to 172.168.0.1). |
| 22:27:04-544 | r3 | Ethernet Packet | Link | Sending packet from interface 88:34:4B:99:3A:2C |
| 22:27:04-544 | PC3 | Ethernet Packet | Link | Recieved and dropped packet at interface 34:53:BD:52:3E:5E |
| 22:27:04-544 | R1 | Ethernet Packet | Link | Recieved and dropped packet at interface A6:8F:C5:18:80:1D |
| 22:27:04-544 | PC1 | Ethernet Packet | Link | Recieved and accepted packet at interface BD:B8:A1:1D:5C:A9 |
| 22:27:04-544 | PC1 | ICMP\_packet | Network | ProtocolStack received packet from local Interface. |
| 22:27:04-544 | PC1 | ICMP\_packet | Network | Confirmed Packet is for this Network Layer Device. |
| 22:27:04-544 | PC1 | Echo Reply Packet | Network | Echo reply packet received from 1.0.0.2 |

Таблица 5 – Echo-запрос с PC1 на PC3

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 22:35:41-939 | PC1 | Echo Request Packet | Network | Created Echo Request packet to 172.168.0.2 |
| 22:35:41-939 | PC1 | ARP Discovery Packet | DataLink | Created ARP discovery packet to source MAC address for IP 172.168.0.2 |
| 22:35:41-939 | PC1 | ARP\_packet | Network | Sending broadcast packet from ProtocolStack. |
| 22:35:41-939 | PC1 | Ethernet Packet | Link | Sending packet from interface BD:B8:A1:1D:5C:A9 |
| 22:35:41-939 | r3 | Ethernet Packet | Link | Recieved and accepted packet at interface 88:34:4B:99:3A:2C |
| 22:35:41-939 | r3 | ARP\_packet | Network | ProtocolStack received packet from local Interface. |
| 22:35:41-939 | PC3 | Ethernet Packet | Link | Recieved and accepted packet at interface 34:53:BD:52:3E:5E |
| 22:35:41-939 | PC3 | ARP\_packet | Network | ProtocolStack received packet from local Interface. |
| 22:35:41-939 | PC3 | ARP\_packet | Network | Confirmed Packet is for this Network Layer Device. |
| 22:35:41-939 | PC3 | ARP Response Packet | DataLink | Created ARP Response packet to 172.168.0.1 |
| 22:35:41-939 | PC3 | ARP\_packet | Network | Sending packet from ProtocolStack (to 172.168.0.1). |
| 22:35:41-939 | PC3 | Ethernet Packet | Link | Sending packet from interface 34:53:BD:52:3E:5E |
| 22:35:41-939 | r3 | Ethernet Packet | Link | Recieved and dropped packet at interface 88:34:4B:99:3A:2C |
| 22:35:41-939 | R1 | Ethernet Packet | Link | Recieved and dropped packet at interface A6:8F:C5:18:80:1D |
| 22:35:41-939 | PC1 | Ethernet Packet | Link | Recieved and accepted packet at interface BD:B8:A1:1D:5C:A9 |
| 22:35:41-939 | PC1 | ARP\_packet | Network | ProtocolStack received packet from local Interface. |
| 22:35:41-939 | PC1 | ARP\_packet | Network | Confirmed Packet is for this Network Layer Device. |
| 22:35:41-939 | R1 | Ethernet Packet | Link | Recieved and accepted packet at interface A6:8F:C5:18:80:1D |
| 22:35:41-939 | R1 | ARP\_packet | Network | ProtocolStack received packet from local Interface. |
| 22:35:41-939 | PC1 | ICMP\_packet | Network | Sending packet from ProtocolStack (to 172.168.0.2). |
| 22:35:41-939 | PC1 | Ethernet Packet | Link | Sending packet from interface BD:B8:A1:1D:5C:A9 |
| 22:35:41-939 | r3 | Ethernet Packet | Link | Recieved and dropped packet at interface 88:34:4B:99:3A:2C |
| 22:35:41-939 | PC3 | Ethernet Packet | Link | Recieved and accepted packet at interface 34:53:BD:52:3E:5E |
| 22:35:41-939 | PC3 | ICMP\_packet | Network | ProtocolStack received packet from local Interface. |
| 22:35:41-939 | PC3 | ICMP\_packet | Network | Confirmed Packet is for this Network Layer Device. |
| 22:35:41-939 | PC3 | Echo Reply Packet | Network | Created Echo Reply packet to 172.168.0.1 |
| 22:35:41-939 | PC3 | ICMP\_packet | Network | Sending packet from ProtocolStack (to 172.168.0.1). |
| 22:35:41-939 | PC3 | Ethernet Packet | Link | Sending packet from interface 34:53:BD:52:3E:5E |
| 22:35:41-939 | r3 | Ethernet Packet | Link | Recieved and dropped packet at interface 88:34:4B:99:3A:2C |
| 22:35:41-939 | R1 | Ethernet Packet | Link | Recieved and dropped packet at interface A6:8F:C5:18:80:1D |
| 22:35:41-939 | PC1 | Ethernet Packet | Link | Recieved and accepted packet at interface BD:B8:A1:1D:5C:A9 |
| 22:35:41-939 | PC1 | ICMP\_packet | Network | ProtocolStack received packet from local Interface. |
| 22:35:41-939 | PC1 | ICMP\_packet | Network | Confirmed Packet is for this Network Layer Device. |
| 22:35:41-939 | PC1 | Echo Reply Packet | Network | Echo reply packet received from 172.168.0.2 |

Таблица 6 - Echo-запрос от PC2 на PC1

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Time | Node | Packet | Layer | Info |
| 22:39:24-390 | PC2 | Echo Request Packet | Network | Created Echo Request packet to 172.168.0.1 |
| 22:39:24-390 | PC2 | ARP Discovery Packet | DataLink | Created ARP discovery packet to source MAC address for IP 172.168.0.70 |
| 22:39:24-390 | PC2 | ARP\_packet | Network | Sending broadcast packet from ProtocolStack. |
| 22:39:24-390 | PC2 | Ethernet Packet | Link | Sending packet from interface 73:AA:AC:3F:35:47 |
| 22:39:24-390 | R2 | Ethernet Packet | Link | Recieved and accepted packet at interface 72:90:35:AA:A4:8C |
| 22:39:24-390 | R2 | ARP\_packet | Network | ProtocolStack received packet from local Interface. |
| 22:39:24-390 | R2 | ARP\_packet | Network | Confirmed Packet is for this Network Layer Device. |
| 22:39:24-390 | R2 | ARP Response Packet | DataLink | Created ARP Response packet to 172.168.0.65 |
| 22:39:24-390 | R2 | ARP\_packet | Network | Sending packet from ProtocolStack (to 172.168.0.65). |
| 22:39:24-390 | R2 | Ethernet Packet | Link | Sending packet from interface 72:90:35:AA:A4:8C |
| 22:39:24-390 | PC2 | Ethernet Packet | Link | Recieved and accepted packet at interface 73:AA:AC:3F:35:47 |
| 22:39:24-390 | PC2 | ARP\_packet | Network | ProtocolStack received packet from local Interface. |
| 22:39:24-390 | PC2 | ARP\_packet | Network | Confirmed Packet is for this Network Layer Device. |
| 22:39:24-390 | PC2 | ICMP\_packet | Network | Sending packet from ProtocolStack (to 172.168.0.70). |
| 22:39:24-390 | PC2 | Ethernet Packet | Link | Sending packet from interface 73:AA:AC:3F:35:47 |
| 22:39:24-390 | R2 | Ethernet Packet | Link | Recieved and accepted packet at interface 72:90:35:AA:A4:8C |
| 22:39:24-390 | R2 | ICMP\_packet | Network | ProtocolStack received packet from local Interface. |
| 22:39:24-390 | R2 | ICMP\_packet | Network | Packet Received: Network Layer Device is Routable forwarding packet. |
| 22:39:24-390 | R2 | ARP Discovery Packet | DataLink | Created ARP discovery packet to source MAC address for IP 192.168.0.1 |
| 22:39:24-390 | R2 | ARP\_packet | Network | Sending broadcast packet from ProtocolStack. |
| 22:39:24-390 | R2 | Ethernet Packet | Link | Sending packet from interface 32:7C:1D:14:59:66 |
| 22:39:24-390 | R1 | Ethernet Packet | Link | Recieved and accepted packet at interface AF:B1:6F:8D:6C:C6 |
| 22:39:24-390 | R1 | ARP\_packet | Network | ProtocolStack received packet from local Interface. |
| 22:39:24-390 | R1 | ARP\_packet | Network | Confirmed Packet is for this Network Layer Device. |
| 22:39:24-390 | R1 | ARP Response Packet | DataLink | Created ARP Response packet to 192.168.0.2 |
| 22:39:24-390 | R1 | ARP\_packet | Network | Sending packet from ProtocolStack (to 192.168.0.2). |
| 22:39:24-390 | R1 | Ethernet Packet | Link | Sending packet from interface AF:B1:6F:8D:6C:C6 |
| 22:39:24-390 | R2 | Ethernet Packet | Link | Recieved and accepted packet at interface 32:7C:1D:14:59:66 |
| 22:39:24-390 | R2 | ARP\_packet | Network | ProtocolStack received packet from local Interface. |
| 22:39:24-390 | R2 | ARP\_packet | Network | Confirmed Packet is for this Network Layer Device. |
| 22:39:24-390 | R2 | ICMP\_packet | Network | Forwarding packet from ProtocolStack(to 192.168.0.1). |
| 22:39:24-390 | R2 | Ethernet Packet | Link | Sending packet from interface 32:7C:1D:14:59:66 |
| 22:39:24-390 | R1 | Ethernet Packet | Link | Recieved and accepted packet at interface AF:B1:6F:8D:6C:C6 |
| 22:39:24-390 | R1 | ICMP\_packet | Network | ProtocolStack received packet from local Interface. |
| 22:39:24-390 | R1 | ICMP\_packet | Network | Packet Received: Network Layer Device is Routable forwarding packet. |
| 22:39:24-390 | R1 | ARP Discovery Packet | DataLink | Created ARP discovery packet to source MAC address for IP 172.168.0.1 |
| 22:39:24-390 | R1 | ARP\_packet | Network | Sending broadcast packet from ProtocolStack. |
| 22:39:24-390 | R1 | Ethernet Packet | Link | Sending packet from interface A6:8F:C5:18:80:1D |
| 22:39:24-390 | r3 | Ethernet Packet | Link | Recieved and accepted packet at interface 88:34:4B:99:3A:2C |
| 22:39:24-390 | r3 | ARP\_packet | Network | ProtocolStack received packet from local Interface. |
| 22:39:24-390 | PC3 | Ethernet Packet | Link | Recieved and accepted packet at interface 34:53:BD:52:3E:5E |
| 22:39:24-390 | PC3 | ARP\_packet | Network | ProtocolStack received packet from local Interface. |
| 22:39:24-390 | PC1 | Ethernet Packet | Link | Recieved and accepted packet at interface BD:B8:A1:1D:5C:A9 |
| 22:39:24-390 | PC1 | ARP\_packet | Network | ProtocolStack received packet from local Interface. |
| 22:39:24-390 | PC1 | ARP\_packet | Network | Confirmed Packet is for this Network Layer Device. |
| 22:39:24-390 | PC1 | ARP Response Packet | DataLink | Created ARP Response packet to 172.168.0.3 |
| 22:39:24-390 | PC1 | ARP\_packet | Network | Sending packet from ProtocolStack (to 172.168.0.3). |
| 22:39:24-390 | PC1 | Ethernet Packet | Link | Sending packet from interface BD:B8:A1:1D:5C:A9 |
| 22:39:24-390 | r3 | Ethernet Packet | Link | Recieved and dropped packet at interface 88:34:4B:99:3A:2C |
| 22:39:24-390 | PC3 | Ethernet Packet | Link | Recieved and dropped packet at interface 34:53:BD:52:3E:5E |
| 22:39:24-390 | R1 | Ethernet Packet | Link | Recieved and accepted packet at interface A6:8F:C5:18:80:1D |
| 22:39:24-390 | R1 | ARP\_packet | Network | ProtocolStack received packet from local Interface. |
| 22:39:24-390 | R1 | ARP\_packet | Network | Confirmed Packet is for this Network Layer Device. |
| 22:39:24-390 | R1 | ICMP\_packet | Network | Forwarding packet from ProtocolStack(to 172.168.0.1). |
| 22:39:24-390 | R1 | Ethernet Packet | Link | Sending packet from interface A6:8F:C5:18:80:1D |
| 22:39:24-390 | r3 | Ethernet Packet | Link | Recieved and dropped packet at interface 88:34:4B:99:3A:2C |
| 22:39:24-390 | PC3 | Ethernet Packet | Link | Recieved and dropped packet at interface 34:53:BD:52:3E:5E |
| 22:39:24-390 | PC1 | Ethernet Packet | Link | Recieved and accepted packet at interface BD:B8:A1:1D:5C:A9 |
| 22:39:24-390 | PC1 | ICMP\_packet | Network | ProtocolStack received packet from local Interface. |
| 22:39:24-390 | PC1 | ICMP\_packet | Network | Confirmed Packet is for this Network Layer Device. |
| 22:39:24-390 | PC1 | Echo Reply Packet | Network | Created Echo Reply packet to 172.168.0.65 |
| 22:39:24-390 | PC1 | ARP Discovery Packet | DataLink | Created ARP discovery packet to source MAC address for IP 172.168.0.4 |
| 22:39:24-390 | PC1 | ARP\_packet | Network | Sending broadcast packet from ProtocolStack. |
| 22:39:24-390 | PC1 | Ethernet Packet | Link | Sending packet from interface BD:B8:A1:1D:5C:A9 |
| 22:39:24-390 | r3 | Ethernet Packet | Link | Recieved and accepted packet at interface 88:34:4B:99:3A:2C |
| 22:39:24-390 | r3 | ARP\_packet | Network | ProtocolStack received packet from local Interface. |
| 22:39:24-390 | r3 | ARP\_packet | Network | Confirmed Packet is for this Network Layer Device. |
| 22:39:24-390 | r3 | ARP Response Packet | DataLink | Created ARP Response packet to 172.168.0.1 |
| 22:39:24-390 | r3 | ARP\_packet | Network | Sending packet from ProtocolStack (to 172.168.0.1). |
| 22:39:24-390 | r3 | Ethernet Packet | Link | Sending packet from interface 88:34:4B:99:3A:2C |
| 22:39:24-390 | PC3 | Ethernet Packet | Link | Recieved and dropped packet at interface 34:53:BD:52:3E:5E |
| 22:39:24-390 | R1 | Ethernet Packet | Link | Recieved and dropped packet at interface A6:8F:C5:18:80:1D |
| 22:39:24-390 | PC1 | Ethernet Packet | Link | Recieved and accepted packet at interface BD:B8:A1:1D:5C:A9 |
| 22:39:24-390 | PC1 | ARP\_packet | Network | ProtocolStack received packet from local Interface. |
| 22:39:24-390 | PC1 | ARP\_packet | Network | Confirmed Packet is for this Network Layer Device. |
| 22:39:24-390 | PC3 | Ethernet Packet | Link | Recieved and accepted packet at interface 34:53:BD:52:3E:5E |
| 22:39:24-390 | PC3 | ARP\_packet | Network | ProtocolStack received packet from local Interface. |
| 22:39:24-390 | R1 | Ethernet Packet | Link | Recieved and accepted packet at interface A6:8F:C5:18:80:1D |
| 22:39:24-390 | R1 | ARP\_packet | Network | ProtocolStack received packet from local Interface. |
| 22:39:24-390 | PC1 | ICMP\_packet | Network | Sending packet from ProtocolStack (to 172.168.0.4). |
| 22:39:24-390 | PC1 | Ethernet Packet | Link | Sending packet from interface BD:B8:A1:1D:5C:A9 |
| 22:39:24-390 | r3 | Ethernet Packet | Link | Recieved and accepted packet at interface 88:34:4B:99:3A:2C |
| 22:39:24-390 | r3 | ICMP\_packet | Network | ProtocolStack received packet from local Interface. |
| 22:39:24-390 | r3 | ICMP\_packet | Network | Packet Received: Network Layer Device is Routable forwarding packet. |
| 22:39:24-390 | r3 | ARP Discovery Packet | DataLink | Created ARP discovery packet to source MAC address for IP 172.168.0.3 |
| 22:39:24-390 | r3 | ARP\_packet | Network | Sending broadcast packet from ProtocolStack. |
| 22:39:24-390 | r3 | Ethernet Packet | Link | Sending packet from interface 88:34:4B:99:3A:2C |
| 22:39:24-390 | PC3 | Ethernet Packet | Link | Recieved and accepted packet at interface 34:53:BD:52:3E:5E |
| 22:39:24-390 | PC3 | ARP\_packet | Network | ProtocolStack received packet from local Interface. |
| 22:39:24-390 | R1 | Ethernet Packet | Link | Recieved and accepted packet at interface A6:8F:C5:18:80:1D |
| 22:39:24-390 | R1 | ARP\_packet | Network | ProtocolStack received packet from local Interface. |
| 22:39:24-390 | R1 | ARP\_packet | Network | Confirmed Packet is for this Network Layer Device. |
| 22:39:24-390 | R1 | ARP Response Packet | DataLink | Created ARP Response packet to 172.168.0.4 |
| 22:39:24-390 | R1 | ARP\_packet | Network | Sending packet from ProtocolStack (to 172.168.0.4). |
| 22:39:24-390 | R1 | Ethernet Packet | Link | Sending packet from interface A6:8F:C5:18:80:1D |
| 22:39:24-390 | r3 | Ethernet Packet | Link | Recieved and accepted packet at interface 88:34:4B:99:3A:2C |
| 22:39:24-390 | r3 | ARP\_packet | Network | ProtocolStack received packet from local Interface. |
| 22:39:24-390 | r3 | ARP\_packet | Network | Confirmed Packet is for this Network Layer Device. |
| 22:39:24-390 | PC3 | Ethernet Packet | Link | Recieved and dropped packet at interface 34:53:BD:52:3E:5E |
| 22:39:24-390 | PC1 | Ethernet Packet | Link | Recieved and dropped packet at interface BD:B8:A1:1D:5C:A9 |
| 22:39:24-390 | PC1 | Ethernet Packet | Link | Recieved and accepted packet at interface BD:B8:A1:1D:5C:A9 |
| 22:39:24-390 | PC1 | ARP\_packet | Network | ProtocolStack received packet from local Interface. |
| 22:39:24-390 | r3 | ICMP\_packet | Network | Forwarding packet from ProtocolStack(to 172.168.0.3). |
| 22:39:24-390 | r3 | Ethernet Packet | Link | Sending packet from interface 88:34:4B:99:3A:2C |
| 22:39:24-390 | PC3 | Ethernet Packet | Link | Recieved and dropped packet at interface 34:53:BD:52:3E:5E |
| 22:39:24-390 | R1 | Ethernet Packet | Link | Recieved and accepted packet at interface A6:8F:C5:18:80:1D |
| 22:39:24-390 | R1 | ICMP\_packet | Network | ProtocolStack received packet from local Interface. |
| 22:39:24-390 | R1 | ICMP\_packet | Network | Packet Received: Network Layer Device is Routable forwarding packet. |
| 22:39:24-390 | R1 | ICMP\_packet | Network | Forwarding packet from ProtocolStack(to 192.168.0.2). |
| 22:39:24-390 | R1 | Ethernet Packet | Link | Sending packet from interface AF:B1:6F:8D:6C:C6 |
| 22:39:24-390 | R2 | Ethernet Packet | Link | Recieved and accepted packet at interface 32:7C:1D:14:59:66 |
| 22:39:24-391 | R2 | ICMP\_packet | Network | ProtocolStack received packet from local Interface. |
| 22:39:24-391 | R2 | ICMP\_packet | Network | Packet Received: Network Layer Device is Routable forwarding packet. |
| 22:39:24-391 | R2 | ICMP\_packet | Network | Forwarding packet from ProtocolStack(to 172.168.0.65). |
| 22:39:24-391 | R2 | Ethernet Packet | Link | Sending packet from interface 72:90:35:AA:A4:8C |
| 22:39:24-391 | PC2 | Ethernet Packet | Link | Recieved and accepted packet at interface 73:AA:AC:3F:35:47 |
| 22:39:24-391 | PC2 | ICMP\_packet | Network | ProtocolStack received packet from local Interface. |
| 22:39:24-391 | PC2 | ICMP\_packet | Network | Confirmed Packet is for this Network Layer Device. |
| 22:39:24-391 | PC2 | Echo Reply Packet | Network | Echo reply packet received from 172.168.0.1 |

Таблица 7 – Echo-запрос с PC2 на PC3

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Time | Node | Packet | Layer | Info |
| 22:41:46-010 | PC2 | Echo Request Packet | Network | Created Echo Request packet to 172.168.0.2 |
| 22:41:46-011 | PC2 | ARP Discovery Packet | DataLink | Created ARP discovery packet to source MAC address for IP 172.168.0.70 |
| 22:41:46-011 | PC2 | ARP\_packet | Network | Sending broadcast packet from ProtocolStack. |
| 22:41:46-011 | PC2 | Ethernet Packet | Link | Sending packet from interface 73:AA:AC:3F:35:47 |
| 22:41:46-011 | R2 | Ethernet Packet | Link | Recieved and accepted packet at interface 72:90:35:AA:A4:8C |
| 22:41:46-011 | R2 | ARP\_packet | Network | ProtocolStack received packet from local Interface. |
| 22:41:46-011 | R2 | ARP\_packet | Network | Confirmed Packet is for this Network Layer Device. |
| 22:41:46-011 | R2 | ARP Response Packet | DataLink | Created ARP Response packet to 172.168.0.65 |
| 22:41:46-011 | R2 | ARP\_packet | Network | Sending packet from ProtocolStack (to 172.168.0.65). |
| 22:41:46-011 | R2 | Ethernet Packet | Link | Sending packet from interface 72:90:35:AA:A4:8C |
| 22:41:46-011 | PC2 | Ethernet Packet | Link | Recieved and accepted packet at interface 73:AA:AC:3F:35:47 |
| 22:41:46-011 | PC2 | ARP\_packet | Network | ProtocolStack received packet from local Interface. |
| 22:41:46-011 | PC2 | ARP\_packet | Network | Confirmed Packet is for this Network Layer Device. |
| 22:41:46-011 | PC2 | ICMP\_packet | Network | Sending packet from ProtocolStack (to 172.168.0.70). |
| 22:41:46-011 | PC2 | Ethernet Packet | Link | Sending packet from interface 73:AA:AC:3F:35:47 |
| 22:41:46-011 | R2 | Ethernet Packet | Link | Recieved and accepted packet at interface 72:90:35:AA:A4:8C |
| 22:41:46-011 | R2 | ICMP\_packet | Network | ProtocolStack received packet from local Interface. |
| 22:41:46-011 | R2 | ICMP\_packet | Network | Packet Received: Network Layer Device is Routable forwarding packet. |
| 22:41:46-011 | R2 | ARP Discovery Packet | DataLink | Created ARP discovery packet to source MAC address for IP 192.168.0.1 |
| 22:41:46-011 | R2 | ARP\_packet | Network | Sending broadcast packet from ProtocolStack. |
| 22:41:46-011 | R2 | Ethernet Packet | Link | Sending packet from interface 32:7C:1D:14:59:66 |
| 22:41:46-011 | R1 | Ethernet Packet | Link | Recieved and accepted packet at interface AF:B1:6F:8D:6C:C6 |
| 22:41:46-011 | R1 | ARP\_packet | Network | ProtocolStack received packet from local Interface. |
| 22:41:46-011 | R1 | ARP\_packet | Network | Confirmed Packet is for this Network Layer Device. |
| 22:41:46-011 | R1 | ARP Response Packet | DataLink | Created ARP Response packet to 192.168.0.2 |
| 22:41:46-011 | R1 | ARP\_packet | Network | Sending packet from ProtocolStack (to 192.168.0.2). |
| 22:41:46-011 | R1 | Ethernet Packet | Link | Sending packet from interface AF:B1:6F:8D:6C:C6 |
| 22:41:46-011 | R2 | Ethernet Packet | Link | Recieved and accepted packet at interface 32:7C:1D:14:59:66 |
| 22:41:46-011 | R2 | ARP\_packet | Network | ProtocolStack received packet from local Interface. |
| 22:41:46-011 | R2 | ARP\_packet | Network | Confirmed Packet is for this Network Layer Device. |
| 22:41:46-011 | R2 | ICMP\_packet | Network | Forwarding packet from ProtocolStack(to 192.168.0.1). |
| 22:41:46-011 | R2 | Ethernet Packet | Link | Sending packet from interface 32:7C:1D:14:59:66 |
| 22:41:46-011 | R1 | Ethernet Packet | Link | Recieved and accepted packet at interface AF:B1:6F:8D:6C:C6 |
| 22:41:46-011 | R1 | ICMP\_packet | Network | ProtocolStack received packet from local Interface. |
| 22:41:46-011 | R1 | ICMP\_packet | Network | Packet Received: Network Layer Device is Routable forwarding packet. |
| 22:41:46-011 | R1 | ARP Discovery Packet | DataLink | Created ARP discovery packet to source MAC address for IP 172.168.0.2 |
| 22:41:46-011 | R1 | ARP\_packet | Network | Sending broadcast packet from ProtocolStack. |
| 22:41:46-011 | R1 | Ethernet Packet | Link | Sending packet from interface A6:8F:C5:18:80:1D |
| 22:41:46-011 | r3 | Ethernet Packet | Link | Recieved and accepted packet at interface 88:34:4B:99:3A:2C |
| 22:41:46-011 | r3 | ARP\_packet | Network | ProtocolStack received packet from local Interface. |
| 22:41:46-011 | PC3 | Ethernet Packet | Link | Recieved and accepted packet at interface 34:53:BD:52:3E:5E |
| 22:41:46-011 | PC3 | ARP\_packet | Network | ProtocolStack received packet from local Interface. |
| 22:41:46-011 | PC3 | ARP\_packet | Network | Confirmed Packet is for this Network Layer Device. |
| 22:41:46-011 | PC3 | ARP Response Packet | DataLink | Created ARP Response packet to 172.168.0.3 |
| 22:41:46-011 | PC3 | ARP\_packet | Network | Sending packet from ProtocolStack (to 172.168.0.3). |
| 22:41:46-011 | PC3 | Ethernet Packet | Link | Sending packet from interface 34:53:BD:52:3E:5E |
| 22:41:46-011 | r3 | Ethernet Packet | Link | Recieved and dropped packet at interface 88:34:4B:99:3A:2C |
| 22:41:46-011 | R1 | Ethernet Packet | Link | Recieved and accepted packet at interface A6:8F:C5:18:80:1D |
| 22:41:46-011 | R1 | ARP\_packet | Network | ProtocolStack received packet from local Interface. |
| 22:41:46-011 | R1 | ARP\_packet | Network | Confirmed Packet is for this Network Layer Device. |
| 22:41:46-011 | PC1 | Ethernet Packet | Link | Recieved and dropped packet at interface BD:B8:A1:1D:5C:A9 |
| 22:41:46-011 | PC1 | Ethernet Packet | Link | Recieved and accepted packet at interface BD:B8:A1:1D:5C:A9 |
| 22:41:46-011 | PC1 | ARP\_packet | Network | ProtocolStack received packet from local Interface. |
| 22:41:46-011 | R1 | ICMP\_packet | Network | Forwarding packet from ProtocolStack(to 172.168.0.2). |
| 22:41:46-011 | R1 | Ethernet Packet | Link | Sending packet from interface A6:8F:C5:18:80:1D |
| 22:41:46-011 | r3 | Ethernet Packet | Link | Recieved and dropped packet at interface 88:34:4B:99:3A:2C |
| 22:41:46-011 | PC3 | Ethernet Packet | Link | Recieved and accepted packet at interface 34:53:BD:52:3E:5E |
| 22:41:46-011 | PC3 | ICMP\_packet | Network | ProtocolStack received packet from local Interface. |
| 22:41:46-011 | PC3 | ICMP\_packet | Network | Confirmed Packet is for this Network Layer Device. |
| 22:41:46-011 | PC3 | Echo Reply Packet | Network | Created Echo Reply packet to 172.168.0.65 |
| 22:41:46-011 | PC3 | ARP Discovery Packet | DataLink | Created ARP discovery packet to source MAC address for IP 172.168.0.4 |
| 22:41:46-011 | PC3 | ARP\_packet | Network | Sending broadcast packet from ProtocolStack. |
| 22:41:46-011 | PC3 | Ethernet Packet | Link | Sending packet from interface 34:53:BD:52:3E:5E |
| 22:41:46-011 | r3 | Ethernet Packet | Link | Recieved and accepted packet at interface 88:34:4B:99:3A:2C |
| 22:41:46-011 | r3 | ARP\_packet | Network | ProtocolStack received packet from local Interface. |
| 22:41:46-011 | r3 | ARP\_packet | Network | Confirmed Packet is for this Network Layer Device. |
| 22:41:46-011 | r3 | ARP Response Packet | DataLink | Created ARP Response packet to 172.168.0.2 |
| 22:41:46-011 | r3 | ARP\_packet | Network | Sending packet from ProtocolStack (to 172.168.0.2). |
| 22:41:46-011 | r3 | Ethernet Packet | Link | Sending packet from interface 88:34:4B:99:3A:2C |
| 22:41:46-011 | PC3 | Ethernet Packet | Link | Recieved and accepted packet at interface 34:53:BD:52:3E:5E |
| 22:41:46-011 | PC3 | ARP\_packet | Network | ProtocolStack received packet from local Interface. |
| 22:41:46-011 | PC3 | ARP\_packet | Network | Confirmed Packet is for this Network Layer Device. |
| 22:41:46-011 | R1 | Ethernet Packet | Link | Recieved and dropped packet at interface A6:8F:C5:18:80:1D |
| 22:41:46-011 | PC1 | Ethernet Packet | Link | Recieved and dropped packet at interface BD:B8:A1:1D:5C:A9 |
| 22:41:46-011 | R1 | Ethernet Packet | Link | Recieved and accepted packet at interface A6:8F:C5:18:80:1D |
| 22:41:46-011 | R1 | ARP\_packet | Network | ProtocolStack received packet from local Interface. |
| 22:41:46-011 | PC1 | Ethernet Packet | Link | Recieved and accepted packet at interface BD:B8:A1:1D:5C:A9 |
| 22:41:46-011 | PC1 | ARP\_packet | Network | ProtocolStack received packet from local Interface. |
| 22:41:46-011 | PC3 | ICMP\_packet | Network | Sending packet from ProtocolStack (to 172.168.0.4). |
| 22:41:46-011 | PC3 | Ethernet Packet | Link | Sending packet from interface 34:53:BD:52:3E:5E |
| 22:41:46-011 | r3 | Ethernet Packet | Link | Recieved and accepted packet at interface 88:34:4B:99:3A:2C |
| 22:41:46-011 | r3 | ICMP\_packet | Network | ProtocolStack received packet from local Interface. |
| 22:41:46-011 | r3 | ICMP\_packet | Network | Packet Received: Network Layer Device is Routable forwarding packet. |
| 22:41:46-011 | r3 | ARP Discovery Packet | DataLink | Created ARP discovery packet to source MAC address for IP 172.168.0.3 |
| 22:41:46-011 | r3 | ARP\_packet | Network | Sending broadcast packet from ProtocolStack. |
| 22:41:46-011 | r3 | Ethernet Packet | Link | Sending packet from interface 88:34:4B:99:3A:2C |
| 22:41:46-011 | PC3 | Ethernet Packet | Link | Recieved and accepted packet at interface 34:53:BD:52:3E:5E |
| 22:41:46-011 | PC3 | ARP\_packet | Network | ProtocolStack received packet from local Interface. |
| 22:41:46-011 | R1 | Ethernet Packet | Link | Recieved and accepted packet at interface A6:8F:C5:18:80:1D |
| 22:41:46-011 | R1 | ARP\_packet | Network | ProtocolStack received packet from local Interface. |
| 22:41:46-011 | R1 | ARP\_packet | Network | Confirmed Packet is for this Network Layer Device. |
| 22:41:46-011 | R1 | ARP Response Packet | DataLink | Created ARP Response packet to 172.168.0.4 |
| 22:41:46-011 | R1 | ARP\_packet | Network | Sending packet from ProtocolStack (to 172.168.0.4). |
| 22:41:46-011 | R1 | Ethernet Packet | Link | Sending packet from interface A6:8F:C5:18:80:1D |
| 22:41:46-011 | r3 | Ethernet Packet | Link | Recieved and accepted packet at interface 88:34:4B:99:3A:2C |
| 22:41:46-011 | r3 | ARP\_packet | Network | ProtocolStack received packet from local Interface. |
| 22:41:46-011 | r3 | ARP\_packet | Network | Confirmed Packet is for this Network Layer Device. |
| 22:41:46-011 | PC3 | Ethernet Packet | Link | Recieved and dropped packet at interface 34:53:BD:52:3E:5E |
| 22:41:46-011 | PC1 | Ethernet Packet | Link | Recieved and dropped packet at interface BD:B8:A1:1D:5C:A9 |
| 22:41:46-011 | PC1 | Ethernet Packet | Link | Recieved and accepted packet at interface BD:B8:A1:1D:5C:A9 |
| 22:41:46-011 | PC1 | ARP\_packet | Network | ProtocolStack received packet from local Interface. |
| 22:41:46-011 | r3 | ICMP\_packet | Network | Forwarding packet from ProtocolStack(to 172.168.0.3). |
| 22:41:46-011 | r3 | Ethernet Packet | Link | Sending packet from interface 88:34:4B:99:3A:2C |
| 22:41:46-011 | PC3 | Ethernet Packet | Link | Recieved and dropped packet at interface 34:53:BD:52:3E:5E |
| 22:41:46-011 | R1 | Ethernet Packet | Link | Recieved and accepted packet at interface A6:8F:C5:18:80:1D |
| 22:41:46-011 | R1 | ICMP\_packet | Network | ProtocolStack received packet from local Interface. |
| 22:41:46-011 | R1 | ICMP\_packet | Network | Packet Received: Network Layer Device is Routable forwarding packet. |
| 22:41:46-011 | R1 | ICMP\_packet | Network | Forwarding packet from ProtocolStack(to 192.168.0.2). |
| 22:41:46-011 | R1 | Ethernet Packet | Link | Sending packet from interface AF:B1:6F:8D:6C:C6 |
| 22:41:46-011 | R2 | Ethernet Packet | Link | Recieved and accepted packet at interface 32:7C:1D:14:59:66 |
| 22:41:46-011 | R2 | ICMP\_packet | Network | ProtocolStack received packet from local Interface. |
| 22:41:46-011 | R2 | ICMP\_packet | Network | Packet Received: Network Layer Device is Routable forwarding packet. |
| 22:41:46-011 | R2 | ICMP\_packet | Network | Forwarding packet from ProtocolStack(to 172.168.0.65). |
| 22:41:46-011 | R2 | Ethernet Packet | Link | Sending packet from interface 72:90:35:AA:A4:8C |
| 22:41:46-011 | PC2 | Ethernet Packet | Link | Recieved and accepted packet at interface 73:AA:AC:3F:35:47 |
| 22:41:46-011 | PC2 | ICMP\_packet | Network | ProtocolStack received packet from local Interface. |
| 22:41:46-011 | PC2 | ICMP\_packet | Network | Confirmed Packet is for this Network Layer Device. |
| 22:41:46-011 | PC2 | Echo Reply Packet | Network | Echo reply packet received from 172.168.0.2 |

Таблица 8 – Echo-запрос с PC2 на PC4

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Time | Node | Packet | Layer | Info |
| 22:45:14-884 | PC2 | Echo Request Packet | Network | Created Echo Request packet to 1.0.0.2 |
| 22:45:14-884 | PC2 | ICMP\_packet | Network | Sending packet from ProtocolStack (to 172.168.0.70). |
| 22:45:14-884 | PC2 | Ethernet Packet | Link | Sending packet from interface 73:AA:AC:3F:35:47 |
| 22:45:14-884 | R2 | Ethernet Packet | Link | Recieved and accepted packet at interface 72:90:35:AA:A4:8C |
| 22:45:14-884 | R2 | ICMP\_packet | Network | ProtocolStack received packet from local Interface. |
| 22:45:14-884 | R2 | ICMP\_packet | Network | Packet Received: Network Layer Device is Routable forwarding packet. |
| 22:45:14-884 | R2 | ICMP\_packet | Network | Forwarding packet from ProtocolStack(to 192.168.0.1). |
| 22:45:14-884 | R2 | Ethernet Packet | Link | Sending packet from interface 32:7C:1D:14:59:66 |
| 22:45:14-884 | R1 | Ethernet Packet | Link | Recieved and accepted packet at interface AF:B1:6F:8D:6C:C6 |
| 22:45:14-884 | R1 | ICMP\_packet | Network | ProtocolStack received packet from local Interface. |
| 22:45:14-884 | R1 | ICMP\_packet | Network | Packet Received: Network Layer Device is Routable forwarding packet. |
| 22:45:14-884 | R1 | ICMP\_packet | Network | Forwarding packet from ProtocolStack(to 172.168.0.4). |
| 22:45:14-884 | R1 | Ethernet Packet | Link | Sending packet from interface A6:8F:C5:18:80:1D |
| 22:45:14-884 | r3 | Ethernet Packet | Link | Recieved and accepted packet at interface 88:34:4B:99:3A:2C |
| 22:45:14-884 | r3 | ICMP\_packet | Network | ProtocolStack received packet from local Interface. |
| 22:45:14-884 | r3 | ICMP\_packet | Network | Packet Received: Network Layer Device is Routable forwarding packet. |
| 22:45:14-884 | r3 | ICMP\_packet | Network | Forwarding packet from ProtocolStack(to 1.0.0.2). |
| 22:45:14-884 | r3 | Ethernet Packet | Link | Sending packet from interface 66:28:6D:B1:35:4C |
| 22:45:14-884 | PC4 | Ethernet Packet | Link | Recieved and accepted packet at interface 95:1F:C3:60:B1:C4 |
| 22:45:14-884 | PC4 | ICMP\_packet | Network | ProtocolStack received packet from local Interface. |
| 22:45:14-884 | PC4 | ICMP\_packet | Network | Confirmed Packet is for this Network Layer Device. |
| 22:45:14-884 | PC4 | Echo Reply Packet | Network | Created Echo Reply packet to 172.168.0.65 |
| 22:45:14-884 | PC4 | ICMP\_packet | Network | Sending packet from ProtocolStack (to 1.0.0.1). |
| 22:45:14-884 | PC4 | Ethernet Packet | Link | Sending packet from interface 95:1F:C3:60:B1:C4 |
| 22:45:14-884 | r3 | Ethernet Packet | Link | Recieved and accepted packet at interface 66:28:6D:B1:35:4C |
| 22:45:14-884 | r3 | ICMP\_packet | Network | ProtocolStack received packet from local Interface. |
| 22:45:14-884 | r3 | ICMP\_packet | Network | Packet Received: Network Layer Device is Routable forwarding packet. |
| 22:45:14-884 | r3 | ICMP\_packet | Network | Forwarding packet from ProtocolStack(to 172.168.0.3). |
| 22:45:14-884 | r3 | Ethernet Packet | Link | Sending packet from interface 88:34:4B:99:3A:2C |
| 22:45:14-884 | PC3 | Ethernet Packet | Link | Recieved and dropped packet at interface 34:53:BD:52:3E:5E |
| 22:45:14-884 | R1 | Ethernet Packet | Link | Recieved and accepted packet at interface A6:8F:C5:18:80:1D |
| 22:45:14-884 | R1 | ICMP\_packet | Network | ProtocolStack received packet from local Interface. |
| 22:45:14-884 | R1 | ICMP\_packet | Network | Packet Received: Network Layer Device is Routable forwarding packet. |
| 22:45:14-884 | R1 | ICMP\_packet | Network | Forwarding packet from ProtocolStack(to 192.168.0.2). |
| 22:45:14-884 | R1 | Ethernet Packet | Link | Sending packet from interface AF:B1:6F:8D:6C:C6 |
| 22:45:14-884 | R2 | Ethernet Packet | Link | Recieved and accepted packet at interface 32:7C:1D:14:59:66 |
| 22:45:14-884 | R2 | ICMP\_packet | Network | ProtocolStack received packet from local Interface. |
| 22:45:14-884 | R2 | ICMP\_packet | Network | Packet Received: Network Layer Device is Routable forwarding packet. |
| 22:45:14-884 | R2 | ICMP\_packet | Network | Forwarding packet from ProtocolStack(to 172.168.0.65). |
| 22:45:14-884 | R2 | Ethernet Packet | Link | Sending packet from interface 72:90:35:AA:A4:8C |
| 22:45:14-884 | PC2 | Ethernet Packet | Link | Recieved and accepted packet at interface 73:AA:AC:3F:35:47 |
| 22:45:14-884 | PC2 | ICMP\_packet | Network | ProtocolStack received packet from local Interface. |
| 22:45:14-884 | PC2 | ICMP\_packet | Network | Confirmed Packet is for this Network Layer Device. |
| 22:45:14-884 | PC2 | Echo Reply Packet | Network | Echo reply packet received from 1.0.0.2 |

**Выводы.**

В процессе выполнения данной лабораторной работы были изучены и освоены основы адресации, разрешения физических адресов и простейшая маршрутизация в IP-сетях.