**МИНОБРНАУКИ РОССИИ**

**Санкт-Петербургский государственный**

**электротехнический университет**

**«ЛЭТИ» им. В.И. Ульянова (Ленина)**

**Кафедра МОЭВМ**

отчет

**по лабораторной работе №2**

**по дисциплине «Сети и Телекоммуникации»**

Тема: Сетевой уровень – статическая маршрутизация

Вариант 2

|  |  |  |
| --- | --- | --- |
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Санкт-Петербург

2018

**Цель работы**

Изучить методы статической маршрутизации в IP – сетях. Научиться управлять таблицами маршрутизации на узлах сетевого уровня.

**Постановка задачи**

1. Для всех узлов сети установить IP адреса, маски подсетей и шлюзы по-умолчанию, чтобы добиться успешного выполнения эхо-запроса ближайших соседей.
2. Настроить таблицы маршрутизации на маршрутизаторах, чтобы добиться доставки пакетов от узла К1 к узлу К2 и обратно, от узла К2 к К3 и обратно, от узла К3 к К1 и обратно.
3. Настроить таблицы маршрутизации на узлах К1, К2 и К3 чтобы обеспечить кратчайшую доставку пакетов между этими узлами, если это невозможно обеспечить в пункте 2.

**Выполнение задания**

1. Для всех узлов сети установлены IP адреса в заданном диапазоне, согласно заданию.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Name: R7 | Default gateway: 10.0.0.4 |  |  |  |  |
| Interface: cua0 | Type: Console | MAC address: Not Applicable | IP address: Not Applicable | Subnet mask: Not Applicable | Link name: Not Connected |
| Interface: eth0 | Type: Copper Ethernet | MAC address: 5B:51:24:29:A6:4C | IP address: 172.168.1.101 | Subnet mask: 255.255.255.0 | Link name: PC3-TO-R7 |
| Interface: eth1 | Type: Copper Ethernet | MAC address: 9D:49:70:81:84:4B | IP address: 10.0.0.7 | Subnet mask: 255.0.0.0 | Link name: R7-TO-H2 |
| Interface: ser0 | Type: Serial | MAC address: Not Applicable | IP address: IP Address not set | Subnet mask: 0.0.0.0 | Link name: Not Connected |
| Name: R6 | Default gateway: 172.168.4.2 |  |  |  |  |
| Interface: cua0 | Type: Console | MAC address: Not Applicable | IP address: Not Applicable | Subnet mask: Not Applicable | Link name: Not Connected |
| Interface: eth0 | Type: Copper Ethernet | MAC address: C6:1A:67:30:B0:14 | IP address: 172.168.4.1 | Subnet mask: 255.255.255.0 | Link name: R5-TO-R6 |
| Interface: eth1 | Type: Copper Ethernet | MAC address: AF:74:87:53:92:80 | IP address: 172.168.2.102 | Subnet mask: 255.255.255.0 | Link name: R6-TO-H4 |
| Interface: ser0 | Type: Serial | MAC address: Not Applicable | IP address: IP Address not set | Subnet mask: 0.0.0.0 | Link name: Not Connected |
| Name: R5 | Default gateway: 172.168.4.1 |  |  |  |  |
| Interface: cua0 | Type: Console | MAC address: Not Applicable | IP address: Not Applicable | Subnet mask: Not Applicable | Link name: Not Connected |
| Interface: eth0 | Type: Copper Ethernet | MAC address: B9:B8:A8:3B:26:C3 | IP address: 10.0.0.5 | Subnet mask: 255.0.0.0 | Link name: H2-TO-R5 |
| Interface: eth1 | Type: Copper Ethernet | MAC address: 16:70:AF:2F:49:1F | IP address: 172.168.4.2 | Subnet mask: 255.255.255.0 | Link name: R5-TO-R6 |
| Interface: ser0 | Type: Serial | MAC address: Not Applicable | IP address: IP Address not set | Subnet mask: 0.0.0.0 | Link name: Not Connected |
| Name: R4 | Default gateway: 10.0.0.7 |  |  |  |  |
| Interface: cua0 | Type: Console | MAC address: Not Applicable | IP address: Not Applicable | Subnet mask: Not Applicable | Link name: Not Connected |
| Interface: eth0 | Type: Copper Ethernet | MAC address: C2:AB:6E:B2:1E:15 | IP address: 10.0.0.4 | Subnet mask: 255.0.0.0 | Link name: H2-TO-R4 |
| Interface: eth1 | Type: Copper Ethernet | MAC address: C7:98:88:48:4A:63 | IP address: 172.168.2.101 | Subnet mask: 255.255.255.0 | Link name: H4-TO-R4 |
| Interface: ser0 | Type: Serial | MAC address: Not Applicable | IP address: IP Address not set | Subnet mask: 0.0.0.0 | Link name: Not Connected |
| Name: R3 | Default gateway: 172.168.3.1 |  |  |  |  |
| Interface: cua0 | Type: Console | MAC address: Not Applicable | IP address: Not Applicable | Subnet mask: Not Applicable | Link name: Not Connected |
| Interface: eth0 | Type: Copper Ethernet | MAC address: 90:21:3F:4A:8A:55 | IP address: 172.168.3.3 | Subnet mask: 255.255.255.0 | Link name: R3-TO-H3 |
| Interface: eth1 | Type: Copper Ethernet | MAC address: 2F:60:70:2D:A0:2A | IP address: 10.0.0.3 | Subnet mask: 255.0.0.0 | Link name: H2-TO-R3 |
| Interface: ser0 | Type: Serial | MAC address: Not Applicable | IP address: IP Address not set | Subnet mask: 0.0.0.0 | Link name: Not Connected |
| Name: R2 | Default gateway: 10.0.0.7 |  |  |  |  |
| Interface: cua0 | Type: Console | MAC address: Not Applicable | IP address: Not Applicable | Subnet mask: Not Applicable | Link name: Not Connected |
| Interface: eth0 | Type: Copper Ethernet | MAC address: A4:C3:78:64:16:29 | IP address: 172.168.3.2 | Subnet mask: 255.255.255.0 | Link name: R2-TO-H3 |
| Interface: eth1 | Type: Copper Ethernet | MAC address: A5:81:3A:B5:49:33 | IP address: 10.0.0.2 | Subnet mask: 255.0.0.0 | Link name: H2-TO-R2 |
| Interface: ser0 | Type: Serial | MAC address: Not Applicable | IP address: IP Address not set | Subnet mask: 0.0.0.0 | Link name: Not Connected |
| Name: R1 | Default gateway: 172.168.3.2 |  |  |  |  |
| Interface: cua0 | Type: Console | MAC address: Not Applicable | IP address: Not Applicable | Subnet mask: Not Applicable | Link name: Not Connected |
| Interface: eth0 | Type: Copper Ethernet | MAC address: 4D:18:25:23:87:6E | IP address: 172.168.0.102 | Subnet mask: 255.255.255.0 | Link name: H1-TO-R1 |
| Interface: eth1 | Type: Copper Ethernet | MAC address: 45:6A:46:3D:6F:2C | IP address: 172.168.3.1 | Subnet mask: 255.255.255.0 | Link name: R1-TO-H3 |
| Interface: ser0 | Type: Serial | MAC address: Not Applicable | IP address: IP Address not set | Subnet mask: 0.0.0.0 | Link name: Not Connected |
| Name: H4 | Default gateway: Not Applicable |  |  |  |  |
| Interface: eth0 | Type: Copper Ethernet | MAC address: Not Applicable | IP address: Not Applicable | Subnet mask: Not Applicable | Link name: R6-TO-H4 |
| Interface: eth1 | Type: Copper Ethernet | MAC address: Not Applicable | IP address: Not Applicable | Subnet mask: Not Applicable | Link name: H4-TO-R4 |
| Interface: eth2 | Type: Copper Ethernet | MAC address: Not Applicable | IP address: Not Applicable | Subnet mask: Not Applicable | Link name: H4-TO-PC4 |
| Interface: eth3 | Type: Copper Ethernet | MAC address: Not Applicable | IP address: Not Applicable | Subnet mask: Not Applicable | Link name: Not Connected |
| Interface: eth4 | Type: Copper Ethernet | MAC address: Not Applicable | IP address: Not Applicable | Subnet mask: Not Applicable | Link name: Not Connected |
| Name: H3 | Default gateway: Not Applicable |  |  |  |  |
| Interface: eth0 | Type: Copper Ethernet | MAC address: Not Applicable | IP address: Not Applicable | Subnet mask: Not Applicable | Link name: R1-TO-H3 |
| Interface: eth1 | Type: Copper Ethernet | MAC address: Not Applicable | IP address: Not Applicable | Subnet mask: Not Applicable | Link name: R2-TO-H3 |
| Interface: eth2 | Type: Copper Ethernet | MAC address: Not Applicable | IP address: Not Applicable | Subnet mask: Not Applicable | Link name: R3-TO-H3 |
| Interface: eth3 | Type: Copper Ethernet | MAC address: Not Applicable | IP address: Not Applicable | Subnet mask: Not Applicable | Link name: Not Connected |
| Interface: eth4 | Type: Copper Ethernet | MAC address: Not Applicable | IP address: Not Applicable | Subnet mask: Not Applicable | Link name: Not Connected |
| Name: H2 | Default gateway: Not Applicable |  |  |  |  |
| Interface: eth0 | Type: Copper Ethernet | MAC address: Not Applicable | IP address: Not Applicable | Subnet mask: Not Applicable | Link name: H2-TO-R2 |
| Interface: eth1 | Type: Copper Ethernet | MAC address: Not Applicable | IP address: Not Applicable | Subnet mask: Not Applicable | Link name: R7-TO-H2 |
| Interface: eth2 | Type: Copper Ethernet | MAC address: Not Applicable | IP address: Not Applicable | Subnet mask: Not Applicable | Link name: H2-TO-R5 |
| Interface: eth3 | Type: Copper Ethernet | MAC address: Not Applicable | IP address: Not Applicable | Subnet mask: Not Applicable | Link name: H2-TO-R3 |
| Interface: eth4 | Type: Copper Ethernet | MAC address: Not Applicable | IP address: Not Applicable | Subnet mask: Not Applicable | Link name: H2-TO-R4 |
| Name: H1 | Default gateway: Not Applicable |  |  |  |  |
| Interface: eth0 | Type: Copper Ethernet | MAC address: Not Applicable | IP address: Not Applicable | Subnet mask: Not Applicable | Link name: PC1-TO-H1 |
| Interface: eth1 | Type: Copper Ethernet | MAC address: Not Applicable | IP address: Not Applicable | Subnet mask: Not Applicable | Link name: PC2-TO-H1 |
| Interface: eth2 | Type: Copper Ethernet | MAC address: Not Applicable | IP address: Not Applicable | Subnet mask: Not Applicable | Link name: H1-TO-R1 |
| Interface: eth3 | Type: Copper Ethernet | MAC address: Not Applicable | IP address: Not Applicable | Subnet mask: Not Applicable | Link name: Not Connected |
| Interface: eth4 | Type: Copper Ethernet | MAC address: Not Applicable | IP address: Not Applicable | Subnet mask: Not Applicable | Link name: Not Connected |
| Name: PC4 | Default gateway: 172.168.2.101 |  |  |  |  |
| Interface: cua0 | Type: Console | MAC address: Not Applicable | IP address: Not Applicable | Subnet mask: Not Applicable | Link name: Not Connected |
| Interface: eth0 | Type: Copper Ethernet | MAC address: 77:60:A2:A7:77:6D | IP address: 172.168.2.100 | Subnet mask: 255.255.255.0 | Link name: H4-TO-PC4 |
| Name: PC3 | Default gateway: 172.168.1.101 |  |  |  |  |
| Interface: cua0 | Type: Console | MAC address: Not Applicable | IP address: Not Applicable | Subnet mask: Not Applicable | Link name: Not Connected |
| Interface: eth0 | Type: Copper Ethernet | MAC address: 80:87:AC:44:C2:17 | IP address: 172.168.1.100 | Subnet mask: 255.255.255.0 | Link name: PC3-TO-R7 |
| Name: PC2 | Default gateway: 172.168.0.102 |  |  |  |  |
| Interface: cua0 | Type: Console | MAC address: Not Applicable | IP address: Not Applicable | Subnet mask: Not Applicable | Link name: Not Connected |
| Interface: eth0 | Type: Copper Ethernet | MAC address: C1:C2:8E:7C:21:56 | IP address: 172.168.0.101 | Subnet mask: 255.255.255.0 | Link name: PC2-TO-H1 |
| Name: PC1 | Default gateway: 172.168.0.102 |  |  |  |  |
| Interface: cua0 | Type: Console | MAC address: Not Applicable | IP address: Not Applicable | Subnet mask: Not Applicable | Link name: Not Connected |
| Interface: eth0 | Type: Copper Ethernet | MAC address: 4C:29:3A:79:A1:B3 | IP address: 172.168.0.100 | Subnet mask: 255.255.255.0 | Link name: PC1-TO-H1 |

Таблица 1 – Данные настройки сети

1. На маршрутизаторах R2-R5 настроены таблицы маршрутизации:

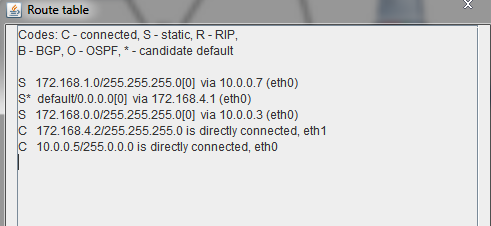


Рисунок 1 – Таблица настройки R5

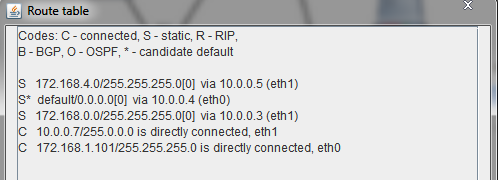


Рисунок 2 – Таблица настройки R7

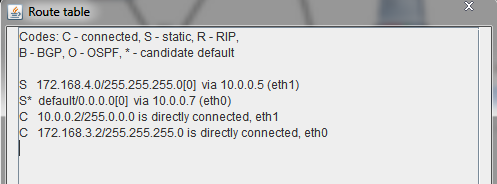


Рисунок 3 – Таблица настройки R2

1. Выполнены запросы в обе стороны для проверки работоспособности сети:

**Запрос с pc1 на pc2:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 06:27:06-732 | PC1 | Echo Request Packet | Network | Created Echo Request packet to 172.168.0.101 |
| 06:27:06-732 | PC1 | ARP Discovery Packet | DataLink | Created ARP discovery packet to source MAC address for IP 172.168.0.101 |
| 06:27:06-732 | PC1 | ARP\_packet | Network | Sending broadcast packet from ProtocolStack. |
| 06:27:06-732 | PC1 | Ethernet Packet | Link | Sending packet from interface 4C:29:3A:79:A1:B3 |
| 06:27:06-732 | R1 | Ethernet Packet | Link | Recieved and accepted packet at interface 4D:18:25:23:87:6E |
| 06:27:06-732 | R1 | ARP\_packet | Network | ProtocolStack received packet from local Interface. |
| 06:27:06-732 | PC2 | Ethernet Packet | Link | Recieved and accepted packet at interface C1:C2:8E:7C:21:56 |

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| --- | --- | --- | --- | --- |
| 06:27:06-732 | PC2 | Ethernet Packet | Link | Sending packet from interface C1:C2:8E:7C:21:56 |
| 06:27:06-732 | R1 | Ethernet Packet | Link | Recieved and dropped packet at interface 4D:18:25:23:87:6E |
| 06:27:06-732 | PC1 | Ethernet Packet | Link | Recieved and accepted packet at interface 4C:29:3A:79:A1:B3 |
| 06:27:06-732 | PC1 | ICMP\_packet | Network | ProtocolStack received packet from local Interface. |
| 06:27:06-732 | PC1 | ICMP\_packet | Network | Confirmed Packet is for this Network Layer Device. |
| 06:27:06-732 | PC1 | Echo Reply Packet | Network | Echo reply packet received from 172.168.0.101 |

**Запрос с pc2 на pc1:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 06:28:38-071 | PC2 | Echo Request Packet | Network | Created Echo Request packet to 172.168.0.100 |
| 06:28:38-071 | PC2 | ICMP\_packet | Network | Sending packet from ProtocolStack (to 172.168.0.100). |
| 06:28:38-071 | PC2 | Ethernet Packet | Link | Sending packet from interface C1:C2:8E:7C:21:56 |
| 06:28:38-071 | R1 | Ethernet Packet | Link | Recieved and dropped packet at interface 4D:18:25:23:87:6E |
| 06:28:38-071 | PC1 | Ethernet Packet | Link | Recieved and accepted packet at interface 4C:29:3A:79:A1:B3 |

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|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 06:28:38-071 | PC1 | Ethernet Packet | Link | Sending packet from interface 4C:29:3A:79:A1:B3 |
| 06:28:38-071 | R1 | Ethernet Packet | Link | Recieved and dropped packet at interface 4D:18:25:23:87:6E |
| 06:28:38-071 | PC2 | Ethernet Packet | Link | Recieved and accepted packet at interface C1:C2:8E:7C:21:56 |
| 06:28:38-071 | PC2 | ICMP\_packet | Network | ProtocolStack received packet from local Interface. |
| 06:28:38-071 | PC2 | ICMP\_packet | Network | Confirmed Packet is for this Network Layer Device. |
| 06:28:38-071 | PC2 | Echo Reply Packet | Network | Echo reply packet received from 172.168.0.100 |

**Запрос с pc1 на pc3:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 06:29:13-315 | PC1 | Echo Request Packet | Network | Created Echo Request packet to 172.168.1.100 |
| 06:29:13-315 | PC1 | ARP Discovery Packet | DataLink | Created ARP discovery packet to source MAC address for IP 172.168.0.102 |
| 06:29:13-315 | PC1 | ARP\_packet | Network | Sending broadcast packet from ProtocolStack. |
| 06:29:13-315 | PC1 | Ethernet Packet | Link | Sending packet from interface 4C:29:3A:79:A1:B3 |
| 06:29:13-315 | R1 | Ethernet Packet | Link | Recieved and accepted packet at interface 4D:18:25:23:87:6E |

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|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 06:29:13-316 | R1 | Ethernet Packet | Link | Sending packet from interface 4D:18:25:23:87:6E |
| 06:29:13-316 | PC2 | Ethernet Packet | Link | Recieved and dropped packet at interface C1:C2:8E:7C:21:56 |
| 06:29:13-316 | PC1 | Ethernet Packet | Link | Recieved and accepted packet at interface 4C:29:3A:79:A1:B3 |
| 06:29:13-316 | PC1 | ICMP\_packet | Network | ProtocolStack received packet from local Interface. |
| 06:29:13-317 | PC1 | ICMP\_packet | Network | Confirmed Packet is for this Network Layer Device. |
| 06:29:13-317 | PC1 | Echo Reply Packet | Network | Echo reply packet received from 172.168.1.100 |

**Запрос с pc3 на pc1:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 06:29:55-214 | PC3 | Echo Request Packet | Network | Created Echo Request packet to 172.168.0.100 |
| 06:29:55-214 | PC3 | ICMP\_packet | Network | Sending packet from ProtocolStack (to 172.168.1.101). |
| 06:29:55-214 | PC3 | Ethernet Packet | Link | Sending packet from interface 80:87:AC:44:C2:17 |
| 06:29:55-214 | R7 | Ethernet Packet | Link | Recieved and accepted packet at interface 5B:51:24:29:A6:4C |
| 06:29:55-214 | R7 | ICMP\_packet | Network | ProtocolStack received packet from local Interface. |
| 06:29:55-214 | R7 | ICMP\_packet | Network | Packet Received: Network Layer Device is Routable forwarding packet. |
| 06:29:55-214 | R7 | ICMP\_packet | Network | Forwarding packet from ProtocolStack(to 10.0.0.3). |

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| --- | --- | --- | --- | --- |
| 06:29:55-214 | R7 | Ethernet Packet | Link | Sending packet from interface 5B:51:24:29:A6:4C |
| 06:29:55-214 | PC3 | Ethernet Packet | Link | Recieved and accepted packet at interface 80:87:AC:44:C2:17 |
| 06:29:55-214 | PC3 | ICMP\_packet | Network | ProtocolStack received packet from local Interface. |
| 06:29:55-214 | PC3 | ICMP\_packet | Network | Confirmed Packet is for this Network Layer Device. |
| 06:29:55-214 | PC3 | Echo Reply Packet | Network | Echo reply packet received from 172.168.0.100 |

**Запрос с pc1 на pc4:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 06:30:42-691 | PC1 | Echo Request Packet | Network | Created Echo Request packet to 172.168.2.100 |
| 06:30:42-691 | PC1 | ICMP\_packet | Network | Sending packet from ProtocolStack (to 172.168.0.102). |
| 06:30:42-691 | PC1 | Ethernet Packet | Link | Sending packet from interface 4C:29:3A:79:A1:B3 |
| 06:30:42-691 | R1 | Ethernet Packet | Link | Recieved and accepted packet at interface 4D:18:25:23:87:6E |
| 06:30:42-691 | R1 | ICMP\_packet | Network | ProtocolStack received packet from local Interface. |
| 06:30:42-691 | R1 | ICMP\_packet | Network | Packet Received: Network Layer Device is Routable forwarding packet. |

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|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 06:30:42-692 | R1 | Ethernet Packet | Link | Sending packet from interface 4D:18:25:23:87:6E |
| 06:30:42-692 | PC2 | Ethernet Packet | Link | Recieved and dropped packet at interface C1:C2:8E:7C:21:56 |
| 06:30:42-692 | PC1 | Ethernet Packet | Link | Recieved and accepted packet at interface 4C:29:3A:79:A1:B3 |
| 06:30:42-692 | PC1 | ICMP\_packet | Network | ProtocolStack received packet from local Interface. |
| 06:30:42-692 | PC1 | ICMP\_packet | Network | Confirmed Packet is for this Network Layer Device. |
| 06:30:42-692 | PC1 | Echo Reply Packet | Network | Echo reply packet received from 172.168.2.100 |

**Запрос с pc4 на pc1:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 06:31:16-478 | PC4 | Echo Request Packet | Network | Created Echo Request packet to 172.168.0.100 |
| 06:31:16-478 | PC4 | ICMP\_packet | Network | Sending packet from ProtocolStack (to 172.168.2.101). |
| 06:31:16-478 | PC4 | Ethernet Packet | Link | Sending packet from interface 77:60:A2:A7:77:6D |
| 06:31:16-478 | R4 | Ethernet Packet | Link | Recieved and accepted packet at interface C7:98:88:48:4A:63 |
| 06:31:16-478 | R4 | ICMP\_packet | Network | ProtocolStack received packet from local Interface. |

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| --- | --- | --- | --- | --- |
| 06:31:16-480 | R4 | Ethernet Packet | Link | Sending packet from interface C7:98:88:48:4A:63 |
| 06:31:16-480 | PC4 | Ethernet Packet | Link | Recieved and accepted packet at interface 77:60:A2:A7:77:6D |
| 06:31:16-480 | PC4 | ICMP\_packet | Network | ProtocolStack received packet from local Interface. |
| 06:31:16-480 | PC4 | ICMP\_packet | Network | Confirmed Packet is for this Network Layer Device. |
| 06:31:16-480 | PC4 | Echo Reply Packet | Network | Echo reply packet received from 172.168.0.100 |

**Запрос с pc2 на pc3:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 06:32:04-468 | PC2 | Echo Request Packet | Network | Created Echo Request packet to 172.168.1.100 |
| 06:32:04-468 | PC2 | ARP Discovery Packet | DataLink | Created ARP discovery packet to source MAC address for IP 172.168.0.102 |
| 06:32:04-468 | PC2 | ARP\_packet | Network | Sending broadcast packet from ProtocolStack. |
| 06:32:04-468 | PC2 | Ethernet Packet | Link | Sending packet from interface C1:C2:8E:7C:21:56 |
| 06:32:04-468 | R1 | Ethernet Packet | Link | Recieved and accepted packet at interface 4D:18:25:23:87:6E |
| 06:32:04-468 | R1 | ARP\_packet | Network | ProtocolStack received packet from local Interface. |

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| --- | --- | --- | --- | --- |
| 06:32:04-469 | R1 | Ethernet Packet | Link | Sending packet from interface 4D:18:25:23:87:6E |
| 06:32:04-469 | PC2 | Ethernet Packet | Link | Recieved and accepted packet at interface C1:C2:8E:7C:21:56 |
| 06:32:04-469 | PC2 | ICMP\_packet | Network | ProtocolStack received packet from local Interface. |
| 06:32:04-469 | PC2 | ICMP\_packet | Network | Confirmed Packet is for this Network Layer Device. |
| 06:32:04-469 | PC2 | Echo Reply Packet | Network | Echo reply packet received from 172.168.1.100 |

**Запрос с pc3 на pc2:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 06:32:36-107 | PC3 | Echo Request Packet | Network | Created Echo Request packet to 172.168.0.101 |
| 06:32:36-107 | PC3 | ICMP\_packet | Network | Sending packet from ProtocolStack (to 172.168.1.101). |
| 06:32:36-107 | PC3 | Ethernet Packet | Link | Sending packet from interface 80:87:AC:44:C2:17 |
| 06:32:36-107 | R7 | Ethernet Packet | Link | Recieved and accepted packet at interface 5B:51:24:29:A6:4C |
| 06:32:36-107 | R7 | ICMP\_packet | Network | ProtocolStack received packet from local Interface. |

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| --- | --- | --- | --- | --- |
| 06:32:36-107 | R7 | Ethernet Packet | Link | Sending packet from interface 5B:51:24:29:A6:4C |
| 06:32:36-107 | PC3 | Ethernet Packet | Link | Recieved and accepted packet at interface 80:87:AC:44:C2:17 |
| 06:32:36-107 | PC3 | ICMP\_packet | Network | ProtocolStack received packet from local Interface. |
| 06:32:36-107 | PC3 | ICMP\_packet | Network | Confirmed Packet is for this Network Layer Device. |
| 06:32:36-107 | PC3 | Echo Reply Packet | Network | Echo reply packet received from 172.168.0.101 |

**Запрос с pc2 на pc4:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 06:33:11-737 | PC2 | Echo Request Packet | Network | Created Echo Request packet to 172.168.2.100 |
| 06:33:11-737 | PC2 | ICMP\_packet | Network | Sending packet from ProtocolStack (to 172.168.0.102). |
| 06:33:11-737 | PC2 | Ethernet Packet | Link | Sending packet from interface C1:C2:8E:7C:21:56 |
| 06:33:11-737 | R1 | Ethernet Packet | Link | Recieved and accepted packet at interface 4D:18:25:23:87:6E |
| 06:33:11-737 | R1 | ICMP\_packet | Network | ProtocolStack received packet from local Interface. |

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| --- | --- | --- | --- | --- |
| 06:33:11-738 | R1 | ICMP\_packet | Network | Forwarding packet from ProtocolStack(to 172.168.0.101). |
| 06:33:11-738 | R1 | Ethernet Packet | Link | Sending packet from interface 4D:18:25:23:87:6E |
| 06:33:11-738 | PC2 | Ethernet Packet | Link | Recieved and accepted packet at interface C1:C2:8E:7C:21:56 |
| 06:33:11-738 | PC2 | ICMP\_packet | Network | ProtocolStack received packet from local Interface. |
| 06:33:11-738 | PC2 | ICMP\_packet | Network | Confirmed Packet is for this Network Layer Device. |
| 06:33:11-738 | PC2 | Echo Reply Packet | Network | Echo reply packet received from 172.168.2.100 |

**Запрос с pc4 на pc2:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 06:33:48-694 | PC4 | Echo Request Packet | Network | Created Echo Request packet to 172.168.0.101 |
| 06:33:48-694 | PC4 | ICMP\_packet | Network | Sending packet from ProtocolStack (to 172.168.2.101). |
| 06:33:48-694 | PC4 | Ethernet Packet | Link | Sending packet from interface 77:60:A2:A7:77:6D |
| 06:33:48-694 | R4 | Ethernet Packet | Link | Recieved and accepted packet at interface C7:98:88:48:4A:63 |
| 06:33:48-694 | R4 | ICMP\_packet | Network | ProtocolStack received packet from local Interface. |

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| --- | --- | --- | --- | --- |
| 06:33:48-695 | R4 | Ethernet Packet | Link | Sending packet from interface C7:98:88:48:4A:63 |
| 06:33:48-695 | PC4 | Ethernet Packet | Link | Recieved and accepted packet at interface 77:60:A2:A7:77:6D |
| 06:33:48-695 | PC4 | ICMP\_packet | Network | ProtocolStack received packet from local Interface. |
| 06:33:48-695 | PC4 | ICMP\_packet | Network | Confirmed Packet is for this Network Layer Device. |
| 06:33:48-695 | PC4 | Echo Reply Packet | Network | Echo reply packet received from 172.168.0.101 |

**Запрос с pc3 на pc4:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 06:34:27-610 | PC3 | Echo Request Packet | Network | Created Echo Request packet to 172.168.2.100 |
| 06:34:27-610 | PC3 | ARP Discovery Packet | DataLink | Created ARP discovery packet to source MAC address for IP 172.168.1.101 |
| 06:34:27-610 | PC3 | ARP\_packet | Network | Sending broadcast packet from ProtocolStack. |
| 06:34:27-610 | PC3 | Ethernet Packet | Link | Sending packet from interface 80:87:AC:44:C2:17 |
| 06:34:27-610 | R7 | Ethernet Packet | Link | Recieved and accepted packet at interface 5B:51:24:29:A6:4C |
| 06:34:27-610 | R7 | ARP\_packet | Network | ProtocolStack received packet from local Interface. |

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| --- | --- | --- | --- | --- |
| 06:34:27-610 | R7 | Ethernet Packet | Link | Sending packet from interface 5B:51:24:29:A6:4C |
| 06:34:27-610 | PC3 | Ethernet Packet | Link | Recieved and accepted packet at interface 80:87:AC:44:C2:17 |
| 06:34:27-610 | PC3 | ICMP\_packet | Network | ProtocolStack received packet from local Interface. |
| 06:34:27-610 | PC3 | ICMP\_packet | Network | Confirmed Packet is for this Network Layer Device. |
| 06:34:27-610 | PC3 | Echo Reply Packet | Network | Echo reply packet received from 172.168.2.100 |

**Запрос с pc4 на pc3:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 06:35:04-225 | PC4 | Echo Request Packet | Network | Created Echo Request packet to 172.168.1.100 |
| 06:35:04-225 | PC4 | ICMP\_packet | Network | Sending packet from ProtocolStack (to 172.168.2.101). |
| 06:35:04-225 | PC4 | Ethernet Packet | Link | Sending packet from interface 77:60:A2:A7:77:6D |
| 06:35:04-225 | R4 | Ethernet Packet | Link | Recieved and accepted packet at interface C7:98:88:48:4A:63 |
| 06:35:04-225 | R4 | ICMP\_packet | Network | ProtocolStack received packet from local Interface. |

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| --- | --- | --- | --- | --- |
| 06:35:04-225 | R4 | Ethernet Packet | Link | Sending packet from interface C7:98:88:48:4A:63 |
| 06:35:04-225 | PC4 | Ethernet Packet | Link | Recieved and accepted packet at interface 77:60:A2:A7:77:6D |
| 06:35:04-225 | PC4 | ICMP\_packet | Network | ProtocolStack received packet from local Interface. |
| 06:35:04-225 | PC4 | ICMP\_packet | Network | Confirmed Packet is for this Network Layer Device. |
| 06:35:04-225 | PC4 | Echo Reply Packet | Network | Echo reply packet received from 172.168.1.100 |

**Выводы**

В процессе выполнения данной лабораторной работы были изучены принципы статической маршрутизации, заданы IP адреса, маски подсети, проверена правильность работы. Получены навыки управления таблицами маршрутизации на узлах сетевого уровня.