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.

Порядок выполнения работы.

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 узлов сети, чтобы обеспечить корректную доставку Echo-запроса от K1 к K2 и Echo-ответа обратно. Обосновать свои установки.

3. Выполнить Echo-запрос с K1 на K2. Посмотреть вывод программы.

4. Добавить статическую запись ARP для K3 на K1 (или для ближайшего к K1 маршрутизатора, находящегося между K3 и K1). Подождать устаревания ARP-таблиц и выполнить Echo-запрос с K1 на K3. Объяснить результат.

5. Выполнить Echo-запрос на IP-адрес 200.100.0.1 с K1. Объяснить вывод программы.

6. Выполнить Echo-запросы с K1 и K2 на все узлы сети. Убедиться, что Echo-ответы приходят. В отчет необходимо включить схему сети, настройки протокола TCP/IP для всех узлов сети и результаты вывода программы, полученные при выполнении Echo-запросов.

Вариант 12. Файл со схемой сети: lab1_var12.jfst. Сеть между маршрутизаторами R-C-M и R-S-C: 172.168.128.0. Сеть между маршрутизаторами R-CM и R-M-S: 172.168.1.0. Сеть между маршрутизаторами R-M-S и R-S-C: 172.168.0.64. Компьютер Chief имеет IP-адрес 172.168.128.5. Компьютер Manager3 имеет IP-адрес 172.168.1.13. Компьютер Service имеет IP-адрес: 172.168.0.76. Обозначения в задании: K1 – Manager3, K2 – Service, K3 – Chief.
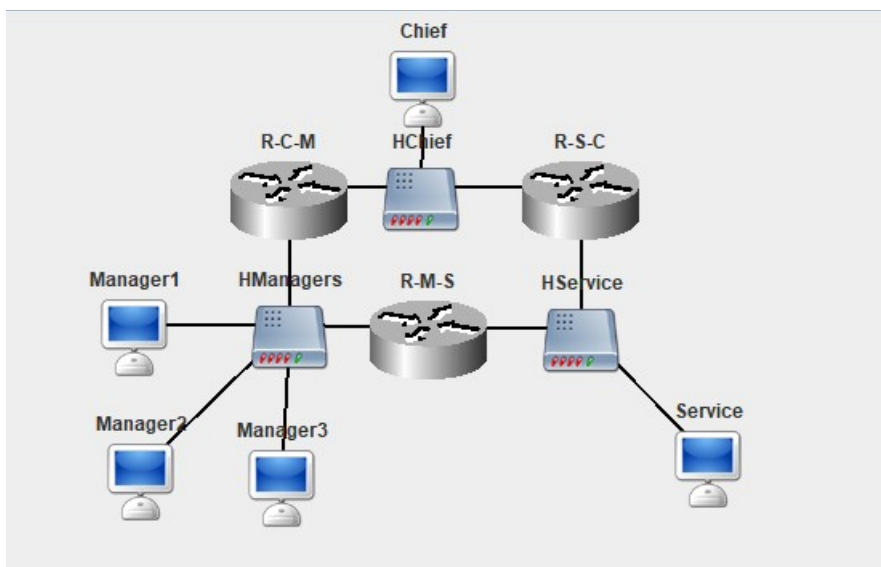
Рисунок 20. Схема представленной сети

Выполнение работы.

1. Структура сети не требует исправлений, доставка кадров корректна на физическом уровне (схема представлена на рисунке под номером 20).

2.

Устройство	Шлюз по умолчанию	MAC-адрес	Сетевой интерфейс	IP-адрес	Маска подсети
Chief	172.168.128.1	75:2E:9F:1E:63:86	eth0	172.168.128.5	255.255.255.0
Service	172.168.0.65	4A:29:40:39:A8:85	eth0	172.168.0.76	255.255.255.192
Manager1	172.168.1.10	81:3B:55:42:44:63	eth0	172.168.1.11	255.255.255.0
Manager2	172.168.1.10	41:19:53:BA:65:25	eth0	172.168.1.12	255.255.255.0
Manager3	172.168.1.10	6F:68:23:54:69:78	eth0	172.168.1.13	255.255.255.0
R-C-M	172.168.1.10	56:C2:99:21:B1:8A	eth0	172.168.128.1	255.255.255.0

		BF:38:84:23:98:35	eth1	172.168.1.9	255.255.255.0
R-M-S	172.168.0.65	84:4A:34:75:79:4D	eth0	172.168.1.10	255.255.255.0
		A5:BC:7D:1C:64:9E	eth1	172.168.0.66	255.255.255.192
R-S-C	172.168.128.1	26:20:C3:9F:B7:7E	eth0	172.168.0.65	255.255.255.192
		6E:6C:73:BF:41:37	eth1	172.168.128.2	255.255.255.0

Обоснования:

1) Chief:

*Шлюз — выходит на маршрутизатор R-C-M;

*IP – дан по условию;

*Маска — выбрана такая, чтобы составить сеть с адресом 172.168.128.0;

2) Service:

*Шлюз — выходит на маршрутизатор R-S-C;

*IP – дан по условию;

*Маска — выбрана такая, чтобы составить сеть с адресом 172.168.0.64;

3) Manager1:

*Шлюз — выходит на маршрутизатор R-M-S;

*IP – выбран согласно локальной сети (172.168.1.0 — сеть);

*Маска — выбрана такая, чтобы составить сеть с адресом 172.168.1.0;

4) Manager2:

*Шлюз — выходит на маршрутизатор R-M-S;

*IP – выбран согласно локальной сети (172.168.1.0 — сеть);

*Маска — выбрана такая, чтобы составить сеть с адресом 172.168.1.0;

5) Manager3:

*Шлюз — выходит на маршрутизатор R-M-S;

*IP – дан по условию;

*Маска — выбрана такая, чтобы составить сеть с адресом 172.168.1.0;

6) R-C-M:

*Шлюз — выходит на маршрутизатор R-M-S;

*IP – выбраны согласно подключенным к его сетевым интерфейсам сетям (сети: 172.168.128.0 и 172.168.1.0);

*Маска — выбраны такие, чтобы составить сети с адресами 172.168.128.0 и 172.168.1.0;

7) R-M-S:

*Шлюз — выходит на маршрутизатор R-S-C;

*IP – выбраны согласно подключенным к его сетевым интерфейсам сетям (сети: 172.168.1.0 и 172.168.0.64);

*Маска — выбраны такие, чтобы составить сети с адресами 172.168.1.0 и 172.168.0.64;

8) R-S-C:

*Шлюз — выходит на маршрутизатор R-C-M;

*IP – выбраны согласно подключенным к его сетевым интерфейсам сетям (сети: 172.168.128.0 и 172.168.0.64);

3. Был выполнен Echo-запрос с K1 на K2. Результат приведен ниже на скриншотах:

17:46:39-849	Manager3	Echo Request Packet	Network	Created Echo Request packet to 172.168.0.76
17:46:39-849	Manager3	ARP Discovery Packet	DataLink	Created ARP discovery packet to source MAC address for IP 172.168.1.10
17:46:39-849	Manager3	ARP_packet	Network	Sending broadcast packet from ProtocolStack.
17:46:39-849	Manager3	Ethernet Packet	Link	Sending packet from interface 6F:68:23:54:69:78
17:46:39-849	Manager2	Ethernet Packet	Link	Recieved and accepted packet at interface 41:19:53:BA:65:25
17:46:39-849	Manager2	ARP_packet	Network	ProtocolStack received packet from local Interface.
17:46:39-849	Manager1	Ethernet Packet	Link	Recieved and accepted packet at interface 81:3B:55:42:44:63
17:46:39-849	Manager1	ARP_packet	Network	ProtocolStack received packet from local Interface.
17:46:39-849	R-M-S	Ethernet Packet	Link	Recieved and accepted packet at interface 84:4A:34:75:79:4D
17:46:39-849	R-M-S	ARP_packet	Network	ProtocolStack received packet from local Interface.
17:46:39-849	R-M-S	ARP_packet	Network	Confirmed Packet is for this Network Layer Device.
17:46:39-849	R-M-S	ARP Response Packet	DataLink	Created ARP Response packet to 172.168.1.13
17:46:39-849	R-M-S	ARP_packet	Network	Sending packet from ProtocolStack (to 172.168.1.13).
17:46:39-849	R-M-S	Ethernet Packet	Link	Sending packet from interface 84:4A:34:75:79:4D
17:46:39-849	Manager3	Ethernet Packet	Link	Recieved and accepted packet at interface 6F:68:23:54:69:78
17:46:39-849	Manager3	ARP_packet	Network	ProtocolStack received packet from local Interface.
17:46:39-849	Manager3	ARP_packet	Network	Confirmed Packet is for this Network Layer Device.
17:46:39-849	Manager2	Ethernet Packet	Link	Recieved and dropped packet at interface 41:19:53:BA:65:25
17:46:39-849	Manager1	Ethernet Packet	Link	Recieved and dropped packet at interface 81:3B:55:42:44:63
17:46:39-849	R-C-M	Ethernet Packet	Link	Recieved and dropped packet at interface BF:38:84:23:98:35
17:46:39-849	R-C-M	Ethernet Packet	Link	Recieved and accepted packet at interface BF:38:84:23:98:35
17:46:39-849	R-C-M	ARP_packet	Network	ProtocolStack received packet from local Interface.
17:46:39-849	Manager3	ICMP_packet	Network	Sending packet from ProtocolStack (to 172.168.1.10).
17:46:39-849	Manager3	Ethernet Packet	Link	Sending packet from interface 6F:68:23:54:69:78
17:46:39-849	Manager2	Ethernet Packet	Link	Recieved and dropped packet at interface 41:19:53:BA:65:25
17:46:39-849	Manager1	Ethernet Packet	Link	Recieved and dropped packet at interface 81:3B:55:42:44:63
17:46:39-849	R-M-S	Ethernet Packet	Link	Recieved and accepted packet at interface 84:4A:34:75:79:4D
17:46:39-849	R-M-S	ICMP_packet	Network	ProtocolStack received packet from local Interface.
17:46:39-849	R-M-S	ICMP_packet	Network	Packet Received: Network Layer Device is Routable forwarding packet.
17:46:39-849	R-M-S	ARP Discovery Packet	DataLink	Created ARP discovery packet to source MAC address for IP 172.168.0.76
17:46:39-849	R-M-S	ARP_packet	Network	Sending broadcast packet from ProtocolStack.
17:46:39-849	R-M-S	Ethernet Packet	Link	Sending packet from interface A5:BC:7D:1C:64:9E
17:46:39-849	Service	Ethernet Packet	Link	Recieved and accepted packet at interface 4A:29:40:39:A8:85
17:46:39-849	Service	ARP_packet	Network	ProtocolStack received packet from local Interface.
17:46:39-849	Service	ARP_packet	Network	Confirmed Packet is for this Network Layer Device.
17:46:39-849	Service	ARP Response Packet	DataLink	Created ARP Response packet to 172.168.0.66
17:46:39-849	Service	ARP_packet	Network	Sending packet from ProtocolStack (to 172.168.0.66).
17:46:39-849	Service	Ethernet Packet	Link	Sending packet from interface 4A:29:40:39:A8:85
17:46:39-849	R-S-C	Ethernet Packet	Link	Recieved and dropped packet at interface 26:20:C3:9F:B7:7E
17:46:39-849	R-M-S	Ethernet Packet	Link	Recieved and accepted packet at interface A5:BC:7D:1C:64:9E
17:46:39-849	R-M-S	ARP_packet	Network	ProtocolStack received packet from local Interface.
17:46:39-849	R-M-S	ARP_packet	Network	Confirmed Packet is for this Network Layer Device.
17:46:39-849	R-S-C	Ethernet Packet	Link	Recieved and accepted packet at interface 26:20:C3:9F:B7:7E
17:46:39-849	R-S-C	ARP_packet	Network	ProtocolStack received packet from local Interface.
17:46:39-849	R-M-S	ICMP_packet	Network	Forwarding packet from ProtocolStack(to 172.168.0.76).
17:46:39-849	R-M-S	Ethernet Packet	Link	Sending packet from interface A5:BC:7D:1C:64:9E
17:46:39-849	Service	Ethernet Packet	Link	Recieved and accepted packet at interface 4A:29:40:39:A8:85
17:46:39-849	Service	ICMP_packet	Network	ProtocolStack received packet from local Interface.
17:46:39-849	Service	ICMP_packet	Network	Confirmed Packet is for this Network Layer Device.
17:46:39-849	Service	Echo Reply Packet	Network	Created Echo Reply packet to 172.168.1.13
17:46:39-849	Service	ARP Discovery Packet	DataLink	Created ARP discovery packet to source MAC address for IP 172.168.0.65
17:46:39-849	Service	ARP_packet	Network	Sending broadcast packet from ProtocolStack.
17:46:39-849	Service	Ethernet Packet	Link	Sending packet from interface 4A:29:40:39:A8:85

Рисунок 1. Демонстрация выполнения Echo-запроса с К1 на К2

17:46:39-849	R-S-C	Ethernet Packet	Link	Recieved and accepted packet at interface 26:20:C3:9F:B7:7E
17:46:39-849	R-S-C	ARP_packet	Network	ProtocolStack received packet from local Interface.
17:46:39-849	R-S-C	ARP_packet	Network	Confirmed Packet is for this Network Layer Device.
17:46:39-849	R-S-C	ARP Response Packet	DataLink	Created ARP Response packet to 172.168.0.76
17:46:39-849	R-S-C	ARP_packet	Network	Sending packet from ProtocolStack (to 172.168.0.76).
17:46:39-849	R-S-C	Ethernet Packet	Link	Sending packet from interface 26:20:C3:9F:B7:7E
17:46:39-849	Service	Ethernet Packet	Link	Recieved and accepted packet at interface 4A:29:40:39:A8:85
17:46:39-849	Service	ARP_packet	Network	ProtocolStack received packet from local Interface.
17:46:39-849	Service	ARP_packet	Network	Confirmed Packet is for this Network Layer Device.
17:46:39-849	R-M-S	Ethernet Packet	Link	Recieved and dropped packet at interface A5:BC:7D:1C:64:9E
17:46:39-849	R-M-S	Ethernet Packet	Link	Recieved and accepted packet at interface A5:BC:7D:1C:64:9E
17:46:39-849	R-M-S	ARP_packet	Network	ProtocolStack received packet from local Interface.
17:46:39-849	Service	ICMP_packet	Network	Sending packet from ProtocolStack (to 172.168.0.65).
17:46:39-849	Service	Ethernet Packet	Link	Sending packet from interface 4A:29:40:39:A8:85
17:46:39-849	R-S-C	Ethernet Packet	Link	Recieved and accepted packet at interface 26:20:C3:9F:B7:7E
17:46:39-849	R-S-C	ICMP_packet	Network	ProtocolStack received packet from local Interface.
17:46:39-849	R-S-C	ICMP_packet	Network	Packet Received: Network Layer Device is Routable forwarding packet.
17:46:39-849	R-S-C	ARP Discovery Packet	DataLink	Created ARP discovery packet to source MAC address for IP 172.168.128.1
17:46:39-849	R-S-C	ARP_packet	Network	Sending broadcast packet from ProtocolStack.
17:46:39-849	R-S-C	Ethernet Packet	Link	Sending packet from interface 6E:6C:73:BF:41:37
17:46:39-849	R-C-M	Ethernet Packet	Link	Recieved and accepted packet at interface 56:C2:99:21:B1:8A
17:46:39-849	R-C-M	ARP_packet	Network	ProtocolStack received packet from local Interface.
17:46:39-849	R-C-M	ARP_packet	Network	Confirmed Packet is for this Network Layer Device.
17:46:39-849	R-C-M	ARP Response Packet	DataLink	Created ARP Response packet to 172.168.128.2
17:46:39-849	R-C-M	ARP_packet	Network	Sending packet from ProtocolStack (to 172.168.128.2).
17:46:39-849	R-C-M	Ethernet Packet	Link	Sending packet from interface 56:C2:99:21:B1:8A
17:46:39-849	R-S-C	Ethernet Packet	Link	Recieved and accepted packet at interface 6E:6C:73:BF:41:37
17:46:39-849	R-S-C	ARP_packet	Network	ProtocolStack received packet from local Interface.
17:46:39-849	R-S-C	ARP_packet	Network	Confirmed Packet is for this Network Layer Device.
17:46:39-849	Chief	Ethernet Packet	Link	Recieved and dropped packet at interface 75:2E:9F:1E:63:86
17:46:39-849	Chief	Ethernet Packet	Link	Recieved and accepted packet at interface 75:2E:9F:1E:63:86
17:46:39-849	Chief	ARP_packet	Network	ProtocolStack received packet from local Interface.
17:46:39-849	R-S-C	ICMP_packet	Network	Forwarding packet from ProtocolStack(to 172.168.128.1).
17:46:39-849	R-S-C	Ethernet Packet	Link	Sending packet from interface 6E:6C:73:BF:41:37
17:46:39-849	R-C-M	Ethernet Packet	Link	Recieved and accepted packet at interface 56:C2:99:21:B1:8A
17:46:39-849	R-C-M	ICMP_packet	Network	ProtocolStack received packet from local Interface.
17:46:39-849	R-C-M	ICMP_packet	Network	Packet Received: Network Layer Device is Routable forwarding packet.
17:46:39-849	R-C-M	ARP Discovery Packet	DataLink	Created ARP discovery packet to source MAC address for IP 172.168.1.13
17:46:39-849	R-C-M	ARP_packet	Network	Sending broadcast packet from ProtocolStack.
17:46:39-849	R-C-M	Ethernet Packet	Link	Sending packet from interface BF:38:84:23:98:35
17:46:39-849	Manager3	Ethernet Packet	Link	Recieved and accepted packet at interface 6F:68:23:54:69:78
17:46:39-849	Manager3	ARP_packet	Network	ProtocolStack received packet from local Interface.
17:46:39-849	Manager3	ARP_packet	Network	Confirmed Packet is for this Network Layer Device.
17:46:39-849	Manager3	ARP Response Packet	DataLink	Created ARP Response packet to 172.168.1.9
17:46:39-849	Manager3	ARP_packet	Network	Sending packet from ProtocolStack (to 172.168.1.9).
17:46:39-849	Manager3	Ethernet Packet	Link	Sending packet from interface 6F:68:23:54:69:78
17:46:39-849	Manager2	Ethernet Packet	Link	Recieved and dropped packet at interface 41:19:53:BA:65:25
17:46:39-849	Manager1	Ethernet Packet	Link	Recieved and dropped packet at interface 81:3B:55:42:44:63
17:46:39-849	R-M-S	Ethernet Packet	Link	Recieved and dropped packet at interface 84:4A:34:75:79:4D
17:46:39-849	R-C-M	Ethernet Packet	Link	Recieved and accepted packet at interface BF:38:84:23:98:35
17:46:39-849	R-C-M	ARP_packet	Network	ProtocolStack received packet from local Interface.
17:46:39-849	R-C-M	ARP_packet	Network	Confirmed Packet is for this Network Layer Device.
17:46:39-849	Manager2	Ethernet Packet	Link	Recieved and accepted packet at interface 41:19:53:BA:65:25

Рисунок 2. Демонстрация выполнения Echo-запроса с K1 на K2

(продолжение)

Time	Node	Packet	Layer	
17:46:39-849	Manager2	ARP_packet	Network	ProtocolStack received packet from local Interface.
17:46:39-849	Manager1	Ethernet Packet	Link	Recieved and accepted packet at interface 81:3B:55:42:44:63
17:46:39-849	Manager1	ARP_packet	Network	ProtocolStack received packet from local Interface.
17:46:39-849	R-M-S	Ethernet Packet	Link	Recieved and accepted packet at interface 84:4A:34:75:79:4D
17:46:39-849	R-M-S	ARP_packet	Network	ProtocolStack received packet from local Interface.
17:46:39-849	R-C-M	ICMP_packet	Network	Forwarding packet from ProtocolStack(to 172.168.1.13).
17:46:39-849	R-C-M	Ethernet Packet	Link	Sending packet from interface BF:38:84:23:98:35
17:46:39-849	Manager3	Ethernet Packet	Link	Recieved and accepted packet at interface 6F:68:23:54:69:78
17:46:39-849	Manager3	ICMP_packet	Network	ProtocolStack received packet from local Interface.
17:46:39-849	Manager3	ICMP_packet	Network	Confirmed Packet is for this Network Layer Device.
17:46:39-849	Manager3	Echo Reply Packet	Network	Echo reply packet received from 172.168.0.76
17:46:39-849	Manager2	Ethernet Packet	Link	Recieved and dropped packet at interface 41:19:53:BA:65:25
17:46:39-849	Manager1	Ethernet Packet	Link	Recieved and dropped packet at interface 81:3B:55:42:44:63
17:46:39-849	R-M-S	Ethernet Packet	Link	Recieved and dropped packet at interface 84:4A:34:75:79:4D
17:46:39-849	Chief	Ethernet Packet	Link	Recieved and dropped packet at interface 75:2E:9F:1E:63:86
17:46:39-849	R-M-S	Ethernet Packet	Link	Recieved and dropped packet at interface A5:BC:7D:1C:64:9E
17:46:39-849	R-S-C	Ethernet Packet	Link	Recieved and dropped packet at interface 26:20:C3:9F:B7:7E
17:46:39-849	R-C-M	Ethernet Packet	Link	Recieved and dropped packet at interface BF:38:84:23:98:35

Рисунок 3. Демонстрация выполнения Echo-запроса с К1 на К2

(продолжение)

4. а) производится Echo-запрос с К1 на К3 (без добавления записи в ARP-таблицу).

Time	Node	Packet	Layer	
18:56:12-570	Manager3	Echo Request Packet	Network	Created Echo Request packet to 172.168.128.5
18:56:12-570	Manager3	ARP Discovery Packet	DataLink	Created ARP discovery packet to source MAC address for IP 172.168.1.10
18:56:12-570	Manager3	ARP_packet	Network	Sending broadcast packet from ProtocolStack.
18:56:12-570	Manager3	Ethernet Packet	Link	Sending packet from interface 6F:68:23:54:69:78
18:56:12-570	Manager2	Ethernet Packet	Link	Recieved and accepted packet at interface 41:19:53:BA:65:25
18:56:12-570	Manager2	ARP_packet	Network	ProtocolStack received packet from local Interface.
18:56:12-570	Manager1	Ethernet Packet	Link	Recieved and accepted packet at interface 81:3B:55:42:44:63
18:56:12-570	Manager1	ARP_packet	Network	ProtocolStack received packet from local Interface.
18:56:12-570	R-M-S	Ethernet Packet	Link	Recieved and accepted packet at interface 84:4A:34:75:79:4D
18:56:12-570	R-M-S	ARP_packet	Network	ProtocolStack received packet from local Interface.
18:56:12-570	R-M-S	ARP_packet	Network	Confirmed Packet is for this Network Layer Device.
18:56:12-570	R-M-S	ARP Response Packet	DataLink	Created ARP Response packet to 172.168.1.13
18:56:12-570	R-M-S	ARP_packet	Network	Sending packet from ProtocolStack (to 172.168.1.13).
18:56:12-570	R-M-S	Ethernet Packet	Link	Sending packet from interface 84:4A:34:75:79:4D
18:56:12-570	Manager3	Ethernet Packet	Link	Recieved and accepted packet at interface 6F:68:23:54:69:78
18:56:12-570	Manager3	ARP_packet	Network	ProtocolStack received packet from local Interface.
18:56:12-570	Manager3	ARP_packet	Network	Confirmed Packet is for this Network Layer Device.
18:56:12-570	Manager2	Ethernet Packet	Link	Recieved and dropped packet at interface 41:19:53:BA:65:25
18:56:12-570	Manager1	Ethernet Packet	Link	Recieved and dropped packet at interface 81:3B:55:42:44:63
18:56:12-570	R-C-M	Ethernet Packet	Link	Recieved and dropped packet at interface BF:38:84:23:98:35
18:56:12-570	R-C-M	Ethernet Packet	Link	Recieved and accepted packet at interface BF:38:84:23:98:35
18:56:12-570	R-C-M	ARP_packet	Network	ProtocolStack received packet from local Interface.
18:56:12-570	Manager3	ICMP_packet	Network	Sending packet from ProtocolStack (to 172.168.1.10).
18:56:12-570	Manager3	Ethernet Packet	Link	Sending packet from interface 6F:68:23:54:69:78
18:56:12-570	Manager2	Ethernet Packet	Link	Recieved and dropped packet at interface 41:19:53:BA:65:25
18:56:12-570	Manager1	Ethernet Packet	Link	Recieved and dropped packet at interface 81:3B:55:42:44:63
18:56:12-570	R-M-S	Ethernet Packet	Link	Recieved and accepted packet at interface 84:4A:34:75:79:4D
18:56:12-570	R-M-S	ICMP_packet	Network	ProtocolStack received packet from local Interface.
18:56:12-570	R-M-S	ICMP_packet	Network	Packet Received: Network Layer Device is Routable forwarding packet.
18:56:12-570	R-M-S	ARP Discovery Packet	DataLink	Created ARP discovery packet to source MAC address for IP 172.168.0.65
18:56:12-570	R-M-S	ARP_packet	Network	Sending broadcast packet from ProtocolStack.
18:56:12-570	R-M-S	Ethernet Packet	Link	Sending packet from interface A5:BC:7D:1C:64:9E
18:56:12-570	Service	Ethernet Packet	Link	Recieved and accepted packet at interface 4A:29:40:39:A8:85
18:56:12-570	Service	ARP_packet	Network	ProtocolStack received packet from local Interface.
18:56:12-570	R-S-C	Ethernet Packet	Link	Recieved and accepted packet at interface 26:20:C3:9F:B7:7E
18:56:12-570	R-S-C	ARP_packet	Network	ProtocolStack received packet from local Interface.
18:56:12-570	R-S-C	ARP_packet	Network	Confirmed Packet is for this Network Layer Device.
18:56:12-570	R-S-C	ARP Response Packet	DataLink	Created ARP Response packet to 172.168.0.66
18:56:12-570	R-S-C	ARP_packet	Network	Sending packet from ProtocolStack (to 172.168.0.66).
18:56:12-570	R-S-C	Ethernet Packet	Link	Sending packet from interface 26:20:C3:9F:B7:7E
18:56:12-570	Service	Ethernet Packet	Link	Recieved and dropped packet at interface 4A:29:40:39:A8:85
18:56:12-570	R-M-S	Ethernet Packet	Link	Recieved and accepted packet at interface A5:BC:7D:1C:64:9E
18:56:12-570	R-M-S	ARP_packet	Network	ProtocolStack received packet from local Interface.
18:56:12-570	R-M-S	ARP_packet	Network	Confirmed Packet is for this Network Layer Device.
18:56:12-570	R-M-S	ICMP_packet	Network	Forwarding packet from ProtocolStack(to 172.168.0.65).
18:56:12-570	R-M-S	Ethernet Packet	Link	Sending packet from interface A5:BC:7D:1C:64:9E
18:56:12-570	Service	Ethernet Packet	Link	Recieved and dropped packet at interface 4A:29:40:39:A8:85
18:56:12-570	R-S-C	Ethernet Packet	Link	Recieved and accepted packet at interface 26:20:C3:9F:B7:7E
18:56:12-570	R-S-C	ICMP_packet	Network	ProtocolStack received packet from local Interface.
18:56:12-570	R-S-C	ICMP_packet	Network	Packet Received: Network Layer Device is Routable forwarding packet.
18:56:12-570	R-S-C	ARP Discovery Packet	DataLink	Created ARP discovery packet to source MAC address for IP 172.168.128.5
18:56:12-570	R-S-C	ARP_packet	Network	Sending broadcast packet from ProtocolStack.
18:56:12-570	R-S-C	Ethernet Packet	Link	Sending packet from interface 6E:6C:73:BF:41:37

Рисунок 4. Демонстрация выполнения Echo-запроса с К1 на К3

18:56:12-570	R-C-M	Ethernet Packet	Link	Recieved and accepted packet at interface 56:C2:99:21:B1:8A
18:56:12-570	R-C-M	ARP_packet	Network	ProtocolStack received packet from local Interface.
18:56:12-570	Chief	Ethernet Packet	Link	Recieved and accepted packet at interface 75:2E:9F:1E:63:86
18:56:12-570	Chief	ARP_packet	Network	ProtocolStack received packet from local Interface.
18:56:12-570	Chief	ARP_packet	Network	Confirmed Packet is for this Network Layer Device.
18:56:12-570	Chief	ARP Response Packet	DataLink	Created ARP Response packet to 172.168.128.2
18:56:12-570	Chief	ARP_packet	Network	Sending packet from ProtocolStack (to 172.168.128.2).
18:56:12-570	Chief	Ethernet Packet	Link	Sending packet from interface 75:2E:9F:1E:63:86
18:56:12-570	R-S-C	Ethernet Packet	Link	Recieved and accepted packet at interface 6E:6C:73:BF:41:37
18:56:12-570	R-S-C	ARP_packet	Network	ProtocolStack received packet from local Interface.
18:56:12-570	R-S-C	ARP_packet	Network	Confirmed Packet is for this Network Layer Device.
18:56:12-570	R-C-M	Ethernet Packet	Link	Recieved and dropped packet at interface 56:C2:99:21:B1:8A
18:56:12-570	R-S-C	ICMP_packet	Network	Forwarding packet from ProtocolStack(to 172.168.128.5).
18:56:12-570	R-S-C	Ethernet Packet	Link	Sending packet from interface 6E:6C:73:BF:41:37
18:56:12-570	R-C-M	Ethernet Packet	Link	Recieved and dropped packet at interface 56:C2:99:21:B1:8A
18:56:12-570	Chief	Ethernet Packet	Link	Recieved and accepted packet at interface 75:2E:9F:1E:63:86
18:56:12-570	Chief	ICMP_packet	Network	ProtocolStack received packet from local Interface.
18:56:12-570	Chief	ICMP_packet	Network	Confirmed Packet is for this Network Layer Device.
18:56:12-570	Chief	Echo Reply Packet	Network	Created Echo Reply packet to 172.168.1.13
18:56:12-570	Chief	ARP Discovery Packet	DataLink	Created ARP discovery packet to source MAC address for IP 172.168.128.1
18:56:12-570	Chief	ARP_packet	Network	Sending broadcast packet from ProtocolStack.
18:56:12-570	Chief	Ethernet Packet	Link	Sending packet from interface 75:2E:9F:1E:63:86
18:56:12-570	R-S-C	Ethernet Packet	Link	Recieved and accepted packet at interface 6E:6C:73:BF:41:37
18:56:12-570	R-S-C	ARP_packet	Network	ProtocolStack received packet from local Interface.
18:56:12-570	R-C-M	Ethernet Packet	Link	Recieved and accepted packet at interface 56:C2:99:21:B1:8A
18:56:12-570	R-C-M	ARP_packet	Network	ProtocolStack received packet from local Interface.
18:56:12-570	R-C-M	ARP_packet	Network	Confirmed Packet is for this Network Layer Device.
18:56:12-570	R-C-M	ARP Response Packet	DataLink	Created ARP Response packet to 172.168.128.5
18:56:12-570	R-C-M	ARP_packet	Network	Sending packet from ProtocolStack (to 172.168.128.5).
18:56:12-570	R-C-M	Ethernet Packet	Link	Sending packet from interface 56:C2:99:21:B1:8A
18:56:12-570	R-S-C	Ethernet Packet	Link	Recieved and dropped packet at interface 6E:6C:73:BF:41:37
18:56:12-570	Chief	Ethernet Packet	Link	Recieved and accepted packet at interface 75:2E:9F:1E:63:86
18:56:12-570	Chief	ARP_packet	Network	ProtocolStack received packet from local Interface.
18:56:12-570	Chief	ARP_packet	Network	Confirmed Packet is for this Network Layer Device.
18:56:12-570	Chief	ICMP_packet	Network	Sending packet from ProtocolStack (to 172.168.128.1).
18:56:12-570	Chief	Ethernet Packet	Link	Sending packet from interface 75:2E:9F:1E:63:86
18:56:12-570	R-S-C	Ethernet Packet	Link	Recieved and dropped packet at interface 6E:6C:73:BF:41:37
18:56:12-570	R-C-M	Ethernet Packet	Link	Recieved and accepted packet at interface 56:C2:99:21:B1:8A
18:56:12-570	R-C-M	ICMP_packet	Network	ProtocolStack received packet from local Interface.
18:56:12-570	R-C-M	ICMP_packet	Network	Packet Received: Network Layer Device is Routable forwarding packet.
18:56:12-570	R-C-M	ARP Discovery Packet	DataLink	Created ARP discovery packet to source MAC address for IP 172.168.1.13
18:56:12-570	R-C-M	ARP_packet	Network	Sending broadcast packet from ProtocolStack.
18:56:12-570	R-C-M	Ethernet Packet	Link	Sending packet from interface BF:38:84:23:98:35
18:56:12-570	Manager3	Ethernet Packet	Link	Recieved and accepted packet at interface 6F:68:23:54:69:78
18:56:12-570	Manager3	ARP_packet	Network	ProtocolStack received packet from local Interface.
18:56:12-570	Manager3	ARP_packet	Network	Confirmed Packet is for this Network Layer Device.
18:56:12-570	Manager3	ARP Response Packet	DataLink	Created ARP Response packet to 172.168.1.9
18:56:12-570	Manager3	ARP_packet	Network	Sending packet from ProtocolStack (to 172.168.1.9).
18:56:12-570	Manager3	Ethernet Packet	Link	Sending packet from interface 6F:68:23:54:69:78
18:56:12-570	Manager2	Ethernet Packet	Link	Recieved and dropped packet at interface 41:19:53:BA:65:25
18:56:12-570	Manager1	Ethernet Packet	Link	Recieved and dropped packet at interface 81:3B:55:42:44:63
18:56:12-570	R-M-S	Ethernet Packet	Link	Recieved and dropped packet at interface 84:4A:34:75:79:4D
18:56:12-570	R-C-M	Ethernet Packet	Link	Recieved and accepted packet at interface BF:38:84:23:98:35

Рисунок 5. Демонстрация выполнения Echo-запроса с K1 на K3 (продолжение)

18:56:12-570	R-C-M	ARP_packet	Network	ProtocolStack received packet from local Interface.
18:56:12-570	R-C-M	ARP_packet	Network	Confirmed Packet is for this Network Layer Device.
18:56:12-570	Manager2	Ethernet Packet	Link	Recieved and accepted packet at interface 41:19:53:BA:65:25
18:56:12-570	Manager2	ARP_packet	Network	ProtocolStack received packet from local Interface.
18:56:12-570	Manager1	Ethernet Packet	Link	Recieved and accepted packet at interface 81:3B:55:42:44:63
18:56:12-571	Manager1	ARP_packet	Network	ProtocolStack received packet from local Interface.
18:56:12-571	R-M-S	Ethernet Packet	Link	Recieved and accepted packet at interface 84:4A:34:75:79:4D
18:56:12-571	R-M-S	ARP_packet	Network	ProtocolStack received packet from local Interface.
18:56:12-571	R-C-M	ICMP_packet	Network	Forwarding packet from ProtocolStack(to 172.168.1.13).
18:56:12-571	R-C-M	Ethernet Packet	Link	Sending packet from interface BF:38:84:23:98:35
18:56:12-571	Manager3	Ethernet Packet	Link	Recieved and accepted packet at interface 6F:68:23:54:69:78
18:56:12-571	Manager3	ICMP_packet	Network	ProtocolStack received packet from local Interface.
18:56:12-571	Manager3	ICMP_packet	Network	Confirmed Packet is for this Network Layer Device.
18:56:12-571	Manager3	Echo Reply Packet	Network	Echo reply packet received from 172.168.128.5
18:56:12-571	Manager2	Ethernet Packet	Link	Recieved and dropped packet at interface 41:19:53:BA:65:25
18:56:12-571	Manager1	Ethernet Packet	Link	Recieved and dropped packet at interface 81:3B:55:42:44:63
18:56:12-571	R-M-S	Ethernet Packet	Link	Recieved and dropped packet at interface 84:4A:34:75:79:4D
18:56:12-571	R-C-M	Ethernet Packet	Link	Recieved and dropped packet at interface BF:38:84:23:98:35

Рисунок 6. Демонстрация выполнения Echo-запроса с K1 на K3

(продолжение)

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б) производится Echo-запрос с K1 на K3 (с добавлением записи в ARP-таблицу). K1 и K3 находятся в разных подсетях, потому в ARP-таблицу для K1 заносится MAC-адрес и IP-адрес близлежащего маршрутизатора, на который у K1 есть шлюз по умолчанию — R-M-S. MAC-адрес и IP-адрес приведены ниже на скриншотах.
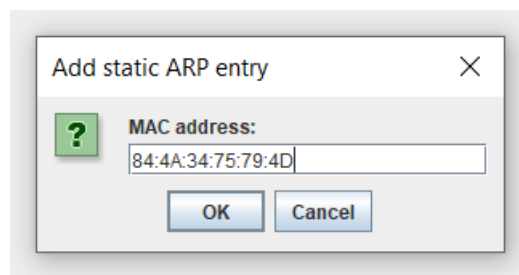
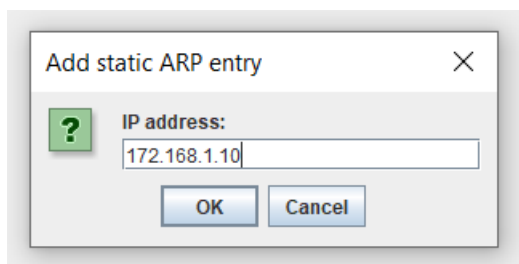Рисунок 7. Добавление MAC-адреса R-M-S в ARP-таблицу для K1

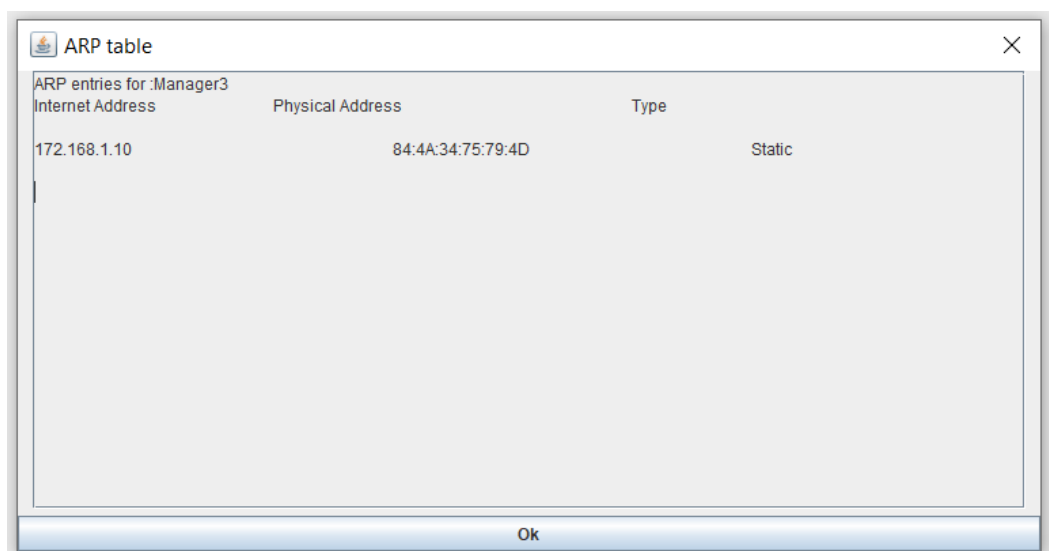Рисунок 8. Добавление IP-адреса R-M-S в ARP-таблицу для K1

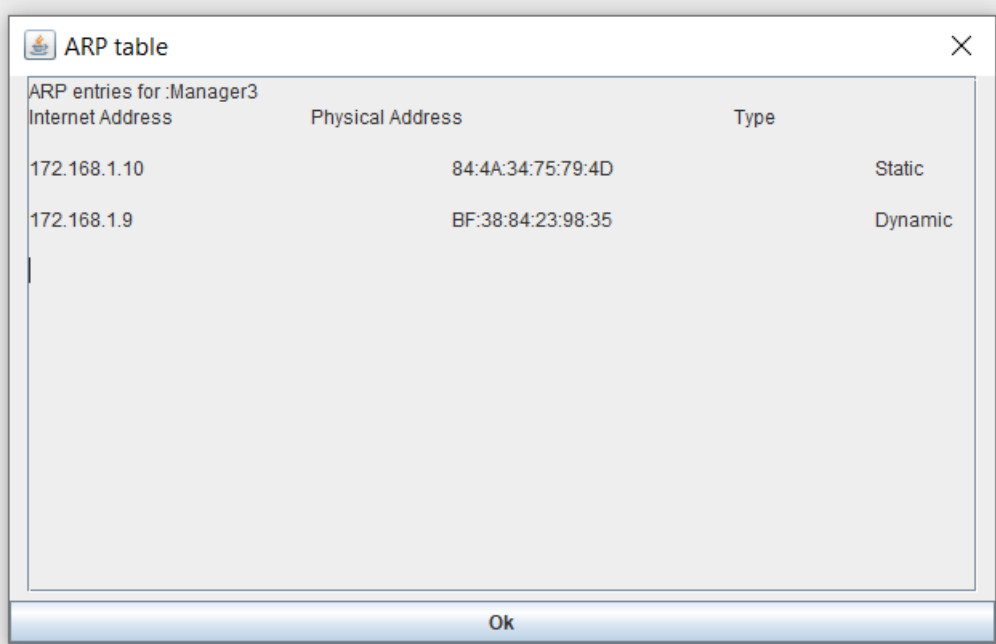Рисунок 9. Демонстрация ARP-таблицы для K1 после добавления записи

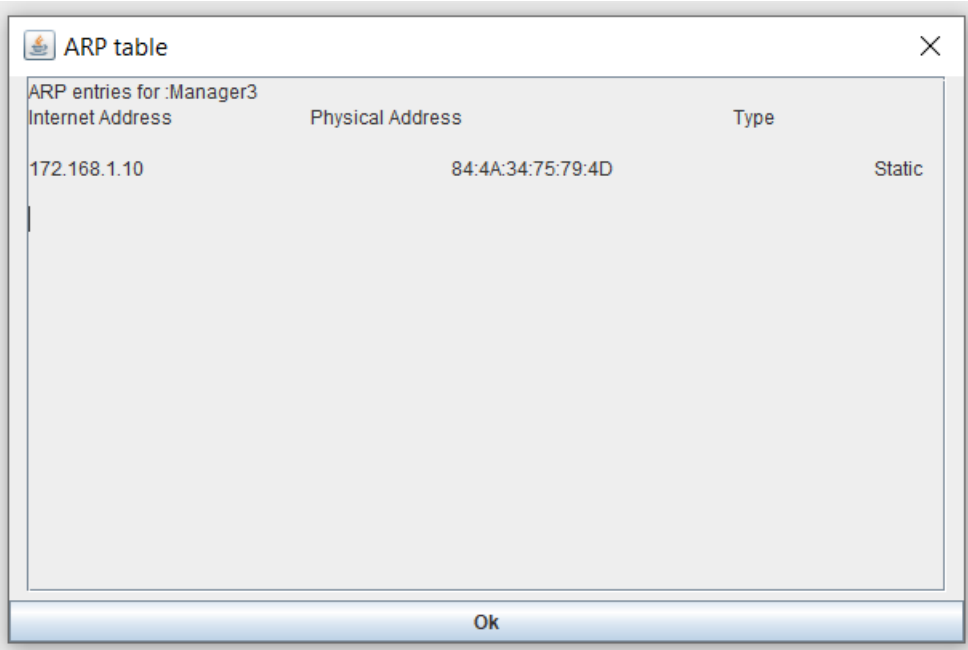Рисунок 10. Демонстрация ARP-таблицы для K1 после добавления записи и сразу после Echo-запроса на K3

Рисунок 11. Демонстрация ARP-таблицы для K1 после добавления записи и спустя некоторое время после Echo-запроса на K3

Time	Node	Packet	Layer	
19:16:54-690	Manager3	Echo Request Packet	Network	Created Echo Request packet to 172.168.128.5
19:16:54-690	Manager3	ICMP_packet	Network	Sending packet from ProtocolStack (to 172.168.1.10).
19:16:54-690	Manager3	Ethernet Packet	Link	Sending packet from interface 6F:68:23:54:69:78
19:16:54-690	Manager2	Ethernet Packet	Link	Recieved and dropped packet at interface 41:19:53:BA:65:25
19:16:54-690	Manager1	Ethernet Packet	Link	Recieved and dropped packet at interface 81:3B:55:42:44:63
19:16:54-690	R-M-S	Ethernet Packet	Link	Recieved and accepted packet at interface 84:4A:34:75:79:4D
19:16:54-690	R-M-S	ICMP_packet	Network	ProtocolStack received packet from local Interface.
19:16:54-690	R-M-S	ICMP_packet	Network	Packet Received: Network Layer Device is Routable forwarding packet.
19:16:54-690	R-M-S	ARP Discovery Packet	DataLink	Created ARP discovery packet to source MAC address for IP 172.168.0.65
19:16:54-690	R-M-S	ARP_packet	Network	Sending broadcast packet from ProtocolStack.
19:16:54-690	R-M-S	Ethernet Packet	Link	Sending packet from interface A5:BC:7D:1C:64:9E
19:16:54-690	Service	Ethernet Packet	Link	Recieved and accepted packet at interface 4A:29:40:39:A8:85
19:16:54-690	Service	ARP_packet	Network	ProtocolStack received packet from local Interface.
19:16:54-690	R-S-C	Ethernet Packet	Link	Recieved and accepted packet at interface 26:20:C3:9F:B7:7E
19:16:54-690	R-S-C	ARP_packet	Network	ProtocolStack received packet from local Interface.
19:16:54-690	R-S-C	ARP_packet	Network	Confirmed Packet is for this Network Layer Device.
19:16:54-690	R-S-C	ARP Response Packet	DataLink	Created ARP Response packet to 172.168.0.66
19:16:54-690	R-S-C	ARP_packet	Network	Sending packet from ProtocolStack (to 172.168.0.66).
19:16:54-690	R-S-C	Ethernet Packet	Link	Sending packet from interface 26:20:C3:9F:B7:7E
19:16:54-690	Service	Ethernet Packet	Link	Recieved and dropped packet at interface 4A:29:40:39:A8:85
19:16:54-690	R-M-S	Ethernet Packet	Link	Recieved and accepted packet at interface A5:BC:7D:1C:64:9E
19:16:54-690	R-M-S	ARP_packet	Network	ProtocolStack received packet from local Interface.
19:16:54-690	R-M-S	ARP_packet	Network	Confirmed Packet is for this Network Layer Device.
19:16:54-690	R-M-S	ICMP_packet	Network	Forwarding packet from ProtocolStack(to 172.168.0.65).
19:16:54-690	R-M-S	Ethernet Packet	Link	Sending packet from interface A5:BC:7D:1C:64:9E
19:16:54-690	Service	Ethernet Packet	Link	Recieved and dropped packet at interface 4A:29:40:39:A8:85
19:16:54-690	R-S-C	Ethernet Packet	Link	Recieved and accepted packet at interface 26:20:C3:9F:B7:7E
19:16:54-690	R-S-C	ICMP_packet	Network	ProtocolStack received packet from local Interface.
19:16:54-690	R-S-C	ICMP_packet	Network	Packet Received: Network Layer Device is Routable forwarding packet.
19:16:54-690	R-S-C	ARP Discovery Packet	DataLink	Created ARP discovery packet to source MAC address for IP 172.168.128.5
19:16:54-690	R-S-C	ARP_packet	Network	Sending broadcast packet from ProtocolStack.
19:16:54-690	R-S-C	Ethernet Packet	Link	Sending packet from interface 6E:6C:73:BF:41:37
19:16:54-690	R-C-M	Ethernet Packet	Link	Recieved and accepted packet at interface 56:C2:99:21:B1:8A
19:16:54-690	R-C-M	ARP_packet	Network	ProtocolStack received packet from local Interface.
19:16:54-690	Chief	Ethernet Packet	Link	Recieved and accepted packet at interface 75:2E:9F:1E:63:86
19:16:54-690	Chief	ARP_packet	Network	ProtocolStack received packet from local Interface.
19:16:54-690	Chief	ARP_packet	Network	Confirmed Packet is for this Network Layer Device.
19:16:54-690	Chief	ARP Response Packet	DataLink	Created ARP Response packet to 172.168.128.2
19:16:54-690	Chief	ARP_packet	Network	Sending packet from ProtocolStack (to 172.168.128.2).
19:16:54-690	Chief	Ethernet Packet	Link	Sending packet from interface 75:2E:9F:1E:63:86
19:16:54-690	R-S-C	Ethernet Packet	Link	Recieved and accepted packet at interface 6E:6C:73:BF:41:37
19:16:54-690	R-S-C	ARP_packet	Network	ProtocolStack received packet from local Interface.
19:16:54-690	R-S-C	ARP_packet	Network	Confirmed Packet is for this Network Layer Device.
19:16:54-690	R-C-M	Ethernet Packet	Link	Recieved and dropped packet at interface 56:C2:99:21:B1:8A
19:16:54-690	R-S-C	ICMP_packet	Network	Forwarding packet from ProtocolStack(to 172.168.128.5).
19:16:54-690	R-S-C	Ethernet Packet	Link	Sending packet from interface 6E:6C:73:BF:41:37
19:16:54-690	R-C-M	Ethernet Packet	Link	Recieved and dropped packet at interface 56:C2:99:21:B1:8A
19:16:54-690	Chief	Ethernet Packet	Link	Recieved and accepted packet at interface 75:2E:9F:1E:63:86
19:16:54-690	Chief	ICMP_packet	Network	ProtocolStack received packet from local Interface.
19:16:54-690	Chief	ICMP_packet	Network	Confirmed Packet is for this Network Layer Device.
19:16:54-690	Chief	Echo Reply Packet	Network	Created Echo Reply packet to 172.168.1.13
19:16:54-690	Chief	ARP Discovery Packet	DataLink	Created ARP discovery packet to source MAC address for IP 172.168.128.1
19:16:54-690	Chief	ARP_packet	Network	Sending broadcast packet from ProtocolStack.

Рисунок 12. Демонстрация выполнения Echo-запроса с К1 на К3 с добавлением записи в ARP-таблицу для К1

Time	Device	Packet Type	Layer	Description
19:16:54-690	Chief	Ethernet Packet	Link	Sending packet from interface 75:2E:9F:1E:63:86
19:16:54-690	R-S-C	Ethernet Packet	Link	Recieved and accepted packet at interface 6E:6C:73:BF:41:37
19:16:54-690	R-S-C	ARP_packet	Network	ProtocolStack received packet from local Interface.
19:16:54-690	R-C-M	Ethernet Packet	Link	Recieved and accepted packet at interface 56:C2:99:21:B1:8A
19:16:54-690	R-C-M	ARP_packet	Network	ProtocolStack received packet from local Interface.
19:16:54-690	R-C-M	ARP_packet	Network	Confirmed Packet is for this Network Layer Device.
19:16:54-690	R-C-M	ARP Response Packet	DataLink	Created ARP Response packet to 172.168.128.5
19:16:54-690	R-C-M	ARP_packet	Network	Sending packet from ProtocolStack (to 172.168.128.5).
19:16:54-690	R-C-M	Ethernet Packet	Link	Sending packet from interface 56:C2:99:21:B1:8A
19:16:54-690	R-S-C	Ethernet Packet	Link	Recieved and dropped packet at interface 6E:6C:73:BF:41:37
19:16:54-690	Chief	Ethernet Packet	Link	Recieved and accepted packet at interface 75:2E:9F:1E:63:86
19:16:54-690	Chief	ARP_packet	Network	ProtocolStack received packet from local Interface.
19:16:54-690	Chief	ARP_packet	Network	Confirmed Packet is for this Network Layer Device.
19:16:54-690	Chief	ICMP_packet	Network	Sending packet from ProtocolStack (to 172.168.128.1).
19:16:54-690	Chief	Ethernet Packet	Link	Sending packet from interface 75:2E:9F:1E:63:86
19:16:54-690	R-S-C	Ethernet Packet	Link	Recieved and dropped packet at interface 6E:6C:73:BF:41:37
19:16:54-690	R-C-M	Ethernet Packet	Link	Recieved and accepted packet at interface 56:C2:99:21:B1:8A
19:16:54-690	R-C-M	ICMP_packet	Network	ProtocolStack received packet from local Interface.
19:16:54-690	R-C-M	ICMP_packet	Network	Packet Received: Network Layer Device is Routable forwarding packet.
19:16:54-690	R-C-M	ARP Discovery Packet	DataLink	Created ARP discovery packet to source MAC address for IP 172.168.1.13
19:16:54-690	R-C-M	ARP_packet	Network	Sending broadcast packet from ProtocolStack.
19:16:54-690	R-C-M	Ethernet Packet	Link	Sending packet from interface BF:38:84:23:98:35
19:16:54-690	Manager3	Ethernet Packet	Link	Recieved and accepted packet at interface 6F:68:23:54:69:78
19:16:54-690	Manager3	ARP_packet	Network	ProtocolStack received packet from local Interface.
19:16:54-690	Manager3	ARP_packet	Network	Confirmed Packet is for this Network Layer Device.
19:16:54-690	Manager3	ARP Response Packet	DataLink	Created ARP Response packet to 172.168.1.9
19:16:54-690	Manager3	ARP_packet	Network	Sending packet from ProtocolStack (to 172.168.1.9).
19:16:54-690	Manager3	Ethernet Packet	Link	Sending packet from interface 6F:68:23:54:69:78
19:16:54-690	Manager2	Ethernet Packet	Link	Recieved and dropped packet at interface 41:19:53:BA:65:25
19:16:54-690	Manager1	Ethernet Packet	Link	Recieved and dropped packet at interface 81:3B:55:42:44:63
19:16:54-690	R-M-S	Ethernet Packet	Link	Recieved and dropped packet at interface 84:4A:34:75:79:4D
19:16:54-690	R-C-M	Ethernet Packet	Link	Recieved and accepted packet at interface BF:38:84:23:98:35
19:16:54-690	R-C-M	ARP_packet	Network	ProtocolStack received packet from local Interface.
19:16:54-690	R-C-M	ARP_packet	Network	Confirmed Packet is for this Network Layer Device.
19:16:54-690	Manager2	Ethernet Packet	Link	Recieved and accepted packet at interface 41:19:53:BA:65:25
19:16:54-690	Manager2	ARP_packet	Network	ProtocolStack received packet from local Interface.
19:16:54-690	Manager1	Ethernet Packet	Link	Recieved and accepted packet at interface 81:3B:55:42:44:63
19:16:54-690	Manager1	ARP_packet	Network	ProtocolStack received packet from local Interface.
19:16:54-690	R-M-S	Ethernet Packet	Link	Recieved and accepted packet at interface 84:4A:34:75:79:4D
19:16:54-690	R-M-S	ARP_packet	Network	ProtocolStack received packet from local Interface.
19:16:54-690	R-C-M	ICMP_packet	Network	Forwarding packet from ProtocolStack(to 172.168.1.13).
19:16:54-690	R-C-M	Ethernet Packet	Link	Sending packet from interface BF:38:84:23:98:35
19:16:54-690	Manager3	Ethernet Packet	Link	Recieved and accepted packet at interface 6F:68:23:54:69:78
19:16:54-690	Manager3	ICMP_packet	Network	ProtocolStack received packet from local Interface.
19:16:54-690	Manager3	ICMP_packet	Network	Confirmed Packet is for this Network Layer Device.
19:16:54-690	Manager3	Echo Reply Packet	Network	Echo reply packet received from 172.168.128.5
19:16:54-690	Manager2	Ethernet Packet	Link	Recieved and dropped packet at interface 41:19:53:BA:65:25
19:16:54-690	Manager1	Ethernet Packet	Link	Recieved and dropped packet at interface 81:3B:55:42:44:63
19:16:54-690	R-M-S	Ethernet Packet	Link	Recieved and dropped packet at interface 84:4A:34:75:79:4D
19:16:54-690	R-C-M	Ethernet Packet	Link	Recieved and dropped packet at interface BF:38:84:23:98:35

Рисунок 13. Демонстрация выполнения Echo-запроса с K1 на K3 с добавлением записи в ARP-таблицу для K1 (продолжение)

Объяснение: во втором случае (когда вручную добавляется запись в ARP-таблицу для K1) отсутствует ARP-запрос и ARP-ответ между K1 и R-M-S – его нет, потому что в ARP-таблице K1 уже есть результат, который получается при ARP-запросе и ARP-ответе (K1 не посылает сообщение о том, чтобы узнать, где находится устройство с IP, соответствующее его шлюзу по умолчанию — оно сразу посылает Echo-запрос на это устройство на основе уже имеющейся записи в своей ARP-таблицы. К тому же, можно заметить, что запись,

занесенная в ARP-таблицу вручную, не пропадает со временем, в отличие от динамических записей в ходе работы ARP-протокола.

5. После Echo-запроса на 200.100.0.1 с K1 происходит довольно долгое (относительно других Echo-запросов, сделанных в этой лабораторной) «блуждание» пакета по всей данной сети: K1 передает пакет на свой шлюз по умолчанию (т. к. требуемый IP не находится в его подсети), в свою очередь маршрутизатор, на который передается этот пакет, замечает, что в его другая подсеть (в данной лабораторной каждый маршрутизатор подключен к двум подсетям) тоже не содержит этого IP, поэтому он передает пакет на свой шлюз по умолчанию, а там все написанное повторяется, и повторяется по «кругу», пока не истечет время жизни пакета (Time To Live) (лог «смерти» пакета приведен на рисунке 21).

«Зацикливание» пакета:

14:43:58-909	Manager3	Echo Request Packet	Network	Created Echo Request packet to 200.100.0.1
14:43:58-909	Manager3	ARP Discovery Packet	DataLink	Created ARP discovery packet to source MAC address for IP 172.168.1.10
14:43:58-909	Manager3	ARP_packet	Network	Sending broadcast packet from ProtocolStack.
14:43:58-909	Manager3	Ethernet Packet	Link	Sending packet from interface 6F:68:23:54:69:78
14:43:58-909	Manager2	Ethernet Packet	Link	Recieved and accepted packet at interface 41:19:53:BA:65:25
14:43:58-909	Manager2	ARP_packet	Network	ProtocolStack received packet from local Interface.
14:43:58-909	Manager1	Ethernet Packet	Link	Recieved and accepted packet at interface 81:3B:55:42:44:63
14:43:58-909	Manager1	ARP_packet	Network	ProtocolStack received packet from local Interface.
14:43:58-910	R-M-S	Ethernet Packet	Link	Recieved and accepted packet at interface 84:4A:34:75:79:4D
14:43:58-910	R-M-S	ARP_packet	Network	ProtocolStack received packet from local Interface.
14:43:58-910	R-M-S	ARP_packet	Network	Confirmed Packet is for this Network Layer Device.
14:43:58-910	R-M-S	ARP Response Packet	DataLink	Created ARP Response packet to 172.168.1.13
14:43:58-910	R-M-S	ARP_packet	Network	Sending packet from ProtocolStack (to 172.168.1.13).
14:43:58-910	R-M-S	Ethernet Packet	Link	Sending packet from interface 84:4A:34:75:79:4D
14:43:58-910	Manager3	Ethernet Packet	Link	Recieved and accepted packet at interface 6F:68:23:54:69:78
14:43:58-910	Manager3	ARP_packet	Network	ProtocolStack received packet from local Interface.
14:43:58-910	Manager3	ARP_packet	Network	Confirmed Packet is for this Network Layer Device.

14:43:58-910	Manager2	Ethernet Packet	Link	Recieved and dropped packet at interface 41:19:53:BA:65:25
14:43:58-910	Manager1	Ethernet Packet	Link	Recieved and dropped packet at interface 81:3B:55:42:44:63
14:43:58-910	R-C-M	Ethernet Packet	Link	Recieved and dropped packet at interface BF:38:84:23:98:35
14:43:58-910	R-C-M	Ethernet Packet	Link	Recieved and accepted packet at interface BF:38:84:23:98:35
14:43:58-910	R-C-M	ARP_packet	Network	ProtocolStack received packet from local Interface.
14:43:58-910	Manager3	ICMP_packet	Network	Sending packet from ProtocolStack (to 172.168.1.10).
14:43:58-910	Manager3	Ethernet Packet	Link	Sending packet from interface 6F:68:23:54:69:78
14:43:58-910	Manager2	Ethernet Packet	Link	Recieved and dropped packet at interface 41:19:53:BA:65:25
14:43:58-910	Manager1	Ethernet Packet	Link	Recieved and dropped packet at interface 81:3B:55:42:44:63
14:43:58-910	R-M-S	Ethernet Packet	Link	Recieved and accepted packet at interface 84:4A:34:75:79:4D
14:43:58-910	R-M-S	ICMP_packet	Network	ProtocolStack received packet from local Interface.
14:43:58-910	R-M-S	ICMP_packet	Network	Packet Received: Network Layer Device is Routable forwarding packet.
14:43:58-910	R-M-S	ARP Discovery Packet	DataLink	Created ARP discovery packet to source MAC address for IP 172.168.0.65
14:43:58-910	R-M-S	ARP_packet	Network	Sending broadcast packet from ProtocolStack.
14:43:58-910	R-M-S	Ethernet Packet	Link	Sending packet from interface A5:BC:7D:1C:64:9E
14:43:58-910	Service	Ethernet Packet	Link	Recieved and accepted packet at interface 4A:29:40:39:A8:85
14:43:58-910	Service	ARP_packet	Network	ProtocolStack received packet from local Interface.
14:43:58-910	R-S-C	Ethernet Packet	Link	Recieved and accepted packet at interface 26:20:C3:9F:B7:7E
14:43:58-910	R-S-C	ARP_packet	Network	ProtocolStack received packet from local Interface.
14:43:58-910	R-S-C	ARP_packet	Network	Confirmed Packet is for this Network Layer Device.
14:43:58-910	R-S-C	ARP Response Packet	DataLink	Created ARP Response packet to 172.168.0.66
14:43:58-910	R-S-C	ARP_packet	Network	Sending packet from ProtocolStack (to 172.168.0.66).
14:43:58-910	R-S-C	Ethernet Packet	Link	Sending packet from interface 26:20:C3:9F:B7:7E
14:43:58-910	Service	Ethernet Packet	Link	Recieved and dropped packet at interface 4A:29:40:39:A8:85
14:43:58-910	R-M-S	Ethernet Packet	Link	Recieved and accepted packet at interface A5:BC:7D:1C:64:9E
14:43:58-910	R-M-S	ARP_packet	Network	ProtocolStack received packet from local Interface.
14:43:58-910	R-M-S	ARP_packet	Network	Confirmed Packet is for this Network Layer Device.
14:43:58-910	R-M-S	ICMP_packet	Network	Forwarding packet from ProtocolStack(to 172.168.0.65).
14:43:58-910	R-M-S	Ethernet Packet	Link	Sending packet from interface A5:BC:7D:1C:64:9E
14:43:58-910	Service	Ethernet Packet	Link	Recieved and dropped packet at interface 4A:29:40:39:A8:85
14:43:58-910	R-S-C	Ethernet Packet	Link	Recieved and accepted packet at interface 26:20:C3:9F:B7:7E
14:43:58-910	R-S-C	ICMP_packet	Network	ProtocolStack received packet from local Interface.
14:43:58-910	R-S-C	ICMP_packet	Network	Packet Received: Network Layer Device is Routable forwarding packet.
14:43:58-910	R-S-C	ARP Discovery Packet	DataLink	Created ARP discovery packet to source MAC address for IP 172.168.128.1
14:43:58-910	R-S-C	ARP_packet	Network	Sending broadcast packet from ProtocolStack.

14:43:58-910	R-S-C	Ethernet Packet	Link	Sending packet from interface 6E:6C:73:BF:41:37
14:43:58-910	R-C-M	Ethernet Packet	Link	Recieved and accepted packet at interface 56:C2:99:21:B1:8A
14:43:58-910	R-C-M	ARP_packet	Network	ProtocolStack received packet from local Interface.
14:43:58-910	R-C-M	ARP_packet	Network	Confirmed Packet is for this Network Layer Device.
14:43:58-910	R-C-M	ARP Response Packet	DataLink	Created ARP Response packet to 172.168.128.2
14:43:58-910	R-C-M	ARP_packet	Network	Sending packet from ProtocolStack (to 172.168.128.2).
14:43:58-910	R-C-M	Ethernet Packet	Link	Sending packet from interface 56:C2:99:21:B1:8A
14:43:58-910	R-S-C	Ethernet Packet	Link	Recieved and accepted packet at interface 6E:6C:73:BF:41:37
14:43:58-910	R-S-C	ARP_packet	Network	ProtocolStack received packet from local Interface.
14:43:58-910	R-S-C	ARP_packet	Network	Confirmed Packet is for this Network Layer Device.
14:43:58-910	Chief	Ethernet Packet	Link	Recieved and dropped packet at interface 75:2E:9F:1E:63:86
14:43:58-910	Chief	Ethernet Packet	Link	Recieved and accepted packet at interface 75:2E:9F:1E:63:86
14:43:58-910	Chief	ARP_packet	Network	ProtocolStack received packet from local Interface.
14:43:58-910	R-S-C	ICMP_packet	Network	Forwarding packet from ProtocolStack(to 172.168.128.1).
14:43:58-910	R-S-C	Ethernet Packet	Link	Sending packet from interface 6E:6C:73:BF:41:37
14:43:58-910	R-C-M	Ethernet Packet	Link	Recieved and accepted packet at interface 56:C2:99:21:B1:8A
14:43:58-910	R-C-M	ICMP_packet	Network	ProtocolStack received packet from local Interface.
14:43:58-910	R-C-M	ICMP_packet	Network	Packet Received: Network Layer Device is Routable forwarding packet.
14:43:58-910	R-C-M	ARP Discovery Packet	DataLink	Created ARP discovery packet to source MAC address for IP 172.168.1.10
14:43:58-910	R-C-M	ARP_packet	Network	Sending broadcast packet from ProtocolStack.
14:43:58-910	R-C-M	Ethernet Packet	Link	Sending packet from interface BF:38:84:23:98:35
14:43:58-910	Manager3	Ethernet Packet	Link	Recieved and accepted packet at interface 6F:68:23:54:69:78
14:43:58-910	Manager3	ARP_packet	Network	ProtocolStack received packet from local Interface.
14:43:58-910	Manager2	Ethernet Packet	Link	Recieved and accepted packet at interface 41:19:53:BA:65:25
14:43:58-910	Manager2	ARP_packet	Network	ProtocolStack received packet from local Interface.
14:43:58-910	Manager1	Ethernet Packet	Link	Recieved and accepted packet at interface 81:3B:55:42:44:63
14:43:58-910	Manager1	ARP_packet	Network	ProtocolStack received packet from local Interface.
14:43:58-910	R-M-S	Ethernet Packet	Link	Recieved and accepted packet at interface 84:4A:34:75:79:4D
14:43:58-910	R-M-S	ARP_packet	Network	ProtocolStack received packet from local Interface.
14:43:58-910	R-M-S	ARP_packet	Network	Confirmed Packet is for this Network Layer Device.
14:43:58-910	R-M-S	ARP Response Packet	DataLink	Created ARP Response packet to 172.168.1.9
14:43:58-910	R-M-S	ARP_packet	Network	Sending packet from ProtocolStack (to 172.168.1.9).
14:43:58-910	R-M-S	Ethernet Packet	Link	Sending packet from interface 84:4A:34:75:79:4D
14:43:58-910	Manager3	Ethernet Packet	Link	Recieved and dropped packet at interface 6F:68:23:54:69:78
14:43:58-910	Manager2	Ethernet Packet	Link	Recieved and dropped packet at interface 41:19:53:BA:65:25
14:43:58-910	Manager1	Ethernet Packet	Link	Recieved and dropped packet at interface 81:3B:55:42:44:63

14:43:58-910	R-C-M	Ethernet Packet	Link	Recieved and accepted packet at interface BF:38:84:23:98:35
14:43:58-910	R-C-M	ARP_packet	Network	ProtocolStack received packet from local Interface.
14:43:58-910	R-C-M	ARP_packet	Network	Confirmed Packet is for this Network Layer Device.
14:43:58-910	R-C-M	ICMP_packet	Network	Forwarding packet from ProtocolStack(to 172.168.1.10).
14:43:58-910	R-C-M	Ethernet Packet	Link	Sending packet from interface BF:38:84:23:98:35
14:43:58-910	Manager3	Ethernet Packet	Link	Recieved and dropped packet at interface 6F:68:23:54:69:78
14:43:58-910	Manager2	Ethernet Packet	Link	Recieved and dropped packet at interface 41:19:53:BA:65:25
14:43:58-910	Manager1	Ethernet Packet	Link	Recieved and dropped packet at interface 81:3B:55:42:44:63
14:43:58-910	R-M-S	Ethernet Packet	Link	Recieved and accepted packet at interface 84:4A:34:75:79:4D
14:43:58-910	R-M-S	ICMP_packet	Network	ProtocolStack received packet from local Interface.
14:43:58-910	R-M-S	ICMP_packet	Network	Packet Received: Network Layer Device is Routable forwarding packet.
14:43:58-910	R-M-S	ICMP_packet	Network	Forwarding packet from ProtocolStack(to 172.168.0.65).
14:43:58-910	R-M-S	Ethernet Packet	Link	Sending packet from interface A5:BC:7D:1C:64:9E
14:43:58-910	Service	Ethernet Packet	Link	Recieved and dropped packet at interface 4A:29:40:39:A8:85
14:43:58-910	R-S-C	Ethernet Packet	Link	Recieved and accepted packet at interface 26:20:C3:9F:B7:7E
14:43:58-910	R-S-C	ICMP_packet	Network	ProtocolStack received packet from local Interface.
14:43:58-910	R-S-C	ICMP_packet	Network	Packet Received: Network Layer Device is Routable forwarding packet.
14:43:58-910	R-S-C	ICMP_packet	Network	Forwarding packet from ProtocolStack(to 172.168.128.1).
14:43:58-910	R-S-C	Ethernet Packet	Link	Sending packet from interface 6E:6C:73:BF:41:37
14:43:58-910	R-C-M	Ethernet Packet	Link	Recieved and accepted packet at interface 56:C2:99:21:B1:8A
14:43:58-910	R-C-M	ICMP_packet	Network	ProtocolStack received packet from local Interface.
14:43:58-910	R-C-M	ICMP_packet	Network	Packet Received: Network Layer Device is Routable forwarding packet.
14:43:58-910	R-C-M	ICMP_packet	Network	Forwarding packet from ProtocolStack(to 172.168.1.10).
14:43:58-910	R-C-M	Ethernet Packet	Link	Sending packet from interface BF:38:84:23:98:35
14:43:58-910	Manager3	Ethernet Packet	Link	Recieved and dropped packet at interface 6F:68:23:54:69:78
14:43:58-910	Manager2	Ethernet Packet	Link	Recieved and dropped packet at interface 41:19:53:BA:65:25
14:43:58-910	Manager1	Ethernet Packet	Link	Recieved and dropped packet at interface 81:3B:55:42:44:63
14:43:58-910	R-M-S	Ethernet Packet	Link	Recieved and accepted packet at interface 84:4A:34:75:79:4D
14:43:58-910	R-M-S	ICMP_packet	Network	ProtocolStack received packet from local Interface.
14:43:58-910	R-M-S	ICMP_packet	Network	Packet Received: Network Layer Device is Routable forwarding packet.
14:43:58-910	R-M-S	ICMP_packet	Network	Forwarding packet from ProtocolStack(to 172.168.0.65).
14:43:58-910	R-M-S	Ethernet Packet	Link	Sending packet from interface A5:BC:7D:1C:64:9E
14:43:58-910	Service	Ethernet Packet	Link	Recieved and dropped packet at interface 4A:29:40:39:A8:85
14:43:58-910	R-S-C	Ethernet Packet	Link	Recieved and accepted packet at interface 26:20:C3:9F:B7:7E

14:43:58-910	R-S-C	ICMP_packet	Network	ProtocolStack received packet from local Interface.
14:43:58-910	R-S-C	ICMP_packet	Network	Packet Received: Network Layer Device is Routable forwarding packet.
14:43:58-910	R-S-C	ICMP_packet	Network	Forwarding packet from ProtocolStack(to 172.168.128.1).
14:43:58-910	R-S-C	Ethernet Packet	Link	Sending packet from interface 6E:6C:73:BF:41:37
14:43:58-910	R-C-M	Ethernet Packet	Link	Recieved and accepted packet at interface 56:C2:99:21:B1:8A
14:43:58-910	R-C-M	ICMP_packet	Network	ProtocolStack received packet from local Interface.
14:43:58-910	R-C-M	ICMP_packet	Network	Packet Received: Network Layer Device is Routable forwarding packet.
14:43:58-910	R-C-M	ICMP_packet	Network	Forwarding packet from ProtocolStack(to 172.168.1.10).
14:43:58-910	R-C-M	Ethernet Packet	Link	Sending packet from interface BF:38:84:23:98:35
14:43:58-910	Manager3	Ethernet Packet	Link	Recieved and dropped packet at interface 6F:68:23:54:69:78
14:43:58-910	Manager2	Ethernet Packet	Link	Recieved and dropped packet at interface 41:19:53:BA:65:25
14:43:58-910	Manager1	Ethernet Packet	Link	Recieved and dropped packet at interface 81:3B:55:42:44:63
14:43:58-910	R-M-S	Ethernet Packet	Link	Recieved and accepted packet at interface 84:4A:34:75:79:4D
14:43:58-910	R-M-S	ICMP_packet	Network	ProtocolStack received packet from local Interface.
14:43:58-910	R-M-S	ICMP_packet	Network	Packet Received: Network Layer Device is Routable forwarding packet.
14:43:58-910	R-M-S	ICMP_packet	Network	Forwarding packet from ProtocolStack(to 172.168.0.65).

«Смерть» пакета:

14:43:58-918	Manager3	ICMP_packet	Network	ProtocolStack received packet from local Interface.
14:43:58-918	Manager3	ICMP_packet	Network	Confirmed Packet is for this Network Layer Device.
14:43:58-918	Manager3	ICMP Time Exceeded	Network	Recieved ICMP Time Exceeded from 172.168.1.9

6.

a) С K1:

1) Manager 1:

21:04:51-129	Manager3	Echo Request Packet	Network	Created Echo Request packet to 172.168.1.11
21:04:51-132	Manager3	ARP Discovery Packet	DataLink	Created ARP discovery packet to source MAC address for IP 172.168.1.11
21:04:51-132	Manager3	ARP_packet	Network	Sending broadcast packet from ProtocolStack.
21:04:51-132	Manager3	ICMP_packet	Network	ProtocolStack received packet from local Interface.
21:04:51-132	Manager3	ICMP_packet	Network	Confirmed Packet is for this Network Layer Device.
21:04:51-132	Manager3	Echo Reply Packet	Network	Echo reply packet received from 172.168.1.11

Рисунок 14. Echo-запрос K1-Manager1

2) Manager 2:

21:07:36-794	Manager3	Echo Request Packet	Network	Created Echo Request packet to 172.168.1.12
21:07:36-794	Manager3	ARP Discovery Packet	DataLink	Created ARP discovery packet to source MAC address for IP 172.168.1.12
21:07:36-794	Manager3	ARP_packet	Network	Sending broadcast packet from ProtocolStack.

21:07:36-795	Manager3	ICMP_packet	Network	ProtocolStack received packet from local Interface.
21:07:36-795	Manager3	ICMP_packet	Network	Confirmed Packet is for this Network Layer Device.
21:07:36-795	Manager3	Echo Reply Packet	Network	Echo reply packet received from 172.168.1.12

Рисунок 15. Echo-запрос K1-Manager2

3) K2 – производился в пункте 3.

4) K3 – производился в пункте 4.

б) с K2:

1) Manager1:

21:11:29-193	Service	Echo Request Packet	Network	Created Echo Request packet to 172.168.1.11
21:11:29-194	Service	ARP Discovery Packet	DataLink	Created ARP discovery packet to source MAC address for IP 172.168.0.65
21:11:29-194	Service	ARP_packet	Network	Sending broadcast packet from ProtocolStack.

21:11:29-195	Service	ICMP_packet	Network	ProtocolStack received packet from local Interface.
21:11:29-195	Service	ICMP_packet	Network	Confirmed Packet is for this Network Layer Device.
21:11:29-195	Service	Echo Reply Packet	Network	Echo reply packet received from 172.168.1.11

Рисунок 16. Echo-запрос K2-Manager1

2) Manager2:

21:13:58-571	Service	Echo Request Packet	Network	Created Echo Request packet to 172.168.1.12
21:13:58-571	Service	ARP Discovery Packet	DataLink	Created ARP discovery packet to source MAC address for IP 172.168.0.65
21:13:58-571	Service	ARP_packet	Network	Sending broadcast packet from ProtocolStack.
21:13:58-571	Service	ICMP_packet	Network	ProtocolStack received packet from local Interface.
21:13:58-571	Service	ICMP_packet	Network	Confirmed Packet is for this Network Layer Device.
21:13:58-571	Service	Echo Reply Packet	Network	Echo reply packet received from 172.168.1.12

Рисунок 17. Echo-запрос K2-Manager2

3) K1:

21:18:59-735	Service	Echo Request Packet	Network	Created Echo Request packet to 172.168.1.13
21:18:59-735	Service	ARP Discovery Packet	DataLink	Created ARP discovery packet to source MAC address for IP 172.168.0.65
21:18:59-735	Service	ARP_packet	Network	Sending broadcast packet from ProtocolStack.

21:18:59-743	Service	ICMP_packet	Network	ProtocolStack received packet from local Interface.
21:18:59-743	Service	ICMP_packet	Network	Confirmed Packet is for this Network Layer Device.
21:18:59-743	Service	Echo Reply Packet	Network	Echo reply packet received from 172.168.1.13

Рисунок 18. Echo-запрос K2-K1

4) K3:

21:21:30-083	Service	Echo Request Packet	Network	Created Echo Request packet to 172.168.128.5
21:21:30-083	Service	ARP Discovery Packet	DataLink	Created ARP discovery packet to source MAC address for IP 172.168.0.65
21:21:30-083	Service	ARP_packet	Network	Sending broadcast packet from ProtocolStack.

21:21:30-091	Service	ICMP_packet	Network	ProtocolStack received packet from local Interface.
21:21:30-091	Service	ICMP_packet	Network	Confirmed Packet is for this Network Layer Device.
21:21:30-092	Service	Echo Reply Packet	Network	Echo reply packet received from 172.168.128.5

Рисунок 19. Echo-запрос K2-K3

Вывод.

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