МИНОБРНАУКИ РОССИИ
САНКТ-ПЕТЕРБУРГСКИЙ ГОСУДАРСТВЕННЫЙ
ЭЛЕКТРОТЕХНИЧЕСКИЙ УНИВЕРСИТЕТ
«ЛЭТИ» ИМ. В.И. УЛЬЯНОВА (ЛЕНИНА)
Кафедра МО ЭВМ

ОТЧЕТ

по лабораторной работе №1
по дисциплине «Сети и телекоммуникации»
Тема: IP-адресация
Вариант 12

Студентка гр. 1381 _____ Рымарь М.И.

Преподаватель _____ Фирсов М.А.

Санкт-Петербург
2023

Цель работы.

Изучить и освоить на практике основы адресации, разрешения физических адресов и простейшей маршрутизации в IP-сетях.

Задание.

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 К1 к К2 и Echo-ответа обратно. Обосновать свои установки.

3. Выполнить Echo-запрос с К1 на К2. Посмотреть вывод программы.

4. Добавить статическую запись ARP для К3 на К1 (или для ближайшего к К1 маршрутизатора, находящегося между К3 и К1). Подождать устаревания ARP-таблиц и выполнить Echo-запрос с К1 на К3. Объяснить результат.

5. Выполнить Echo-запрос на IP-адрес 200.100.0.1 с К1. Объяснить вывод программы.

6. Выполнить Echo-запросы с К1 и К2 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.

Данные для 12 варианта: 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-C-M 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: К1 – Manager3, К2 – Service, К3 – Chief. Схема сети представлена на рисунке 1.

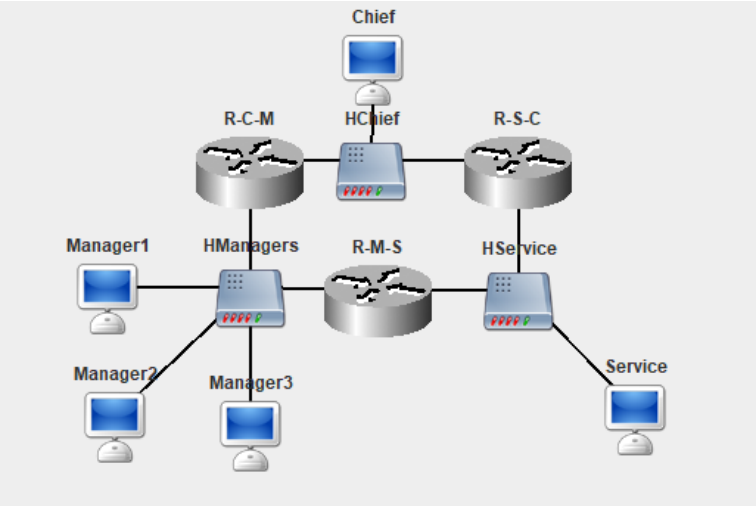

Рисунок 1 – Схема сети

Выполнение работы.

1. Исправление структуры сети не требуется.
2. Применяем следующие конфигурации для исправления сети:

- R-C-M:

eth0:

IP Address: 172.168.128.1

Subnet Mask: 255.255.255.0

eth1:

IP Address: 172.168.1.1

Subnet Mask: 255.255.255.0

Default Gateway: 172.168.1.2

- R-S-C:

eth0:

IP Address: 172.168.0.64

Subnet Mask: 255.255.255.0

eth1:

IP Address: 172.168.128.2

Subnet Mask: 255.255.255.0

Default Gateway: 172.168.0.65

- R-M-S:

eth0:

IP Address: 172.168.1.2

Subnet Mask: 255.255.255.0

eth1:

IP Address: 172.168.0.65

Subnet Mask: 255.255.255.0

Default Gateway: 172.168.0.64

- Chief (K3):

eth0:

IP Address: 172.168.128.5

Subnet Mask: 255.255.255.0

Default Gateway: 172.168.128.1

- Manager1:

eth0:

IP Address: 172.168.1.10

Subnet Mask: 255.255.255.0

Default Gateway: 172.168.1.2

- Manager2:

eth0:

IP Address: 172.168.1.11

Subnet Mask: 255.255.255.0

Default Gateway: 172.168.1.2

- Manager3 (K1):

eth0:

IP Address: 172.168.1.13

Subnet Mask: 255.255.255.0

Default Gateway: 172.168.1.2

- Service (K2):

eth0:

IP Address: 172.168.0.76

Subnet Mask: 255.255.255.0

Default Gateway: 172.168.0.64

Для ПК Manager1-Manager3 (172.168.1.0): 172.168.1.10, 172.168.1.11, 172.168.1.12, соответственно. Как видно, сети К1, К2, К3 при использовании стандартной маски подсети для класса В были бы эквивалентными, поэтому используем маску подсети для класса С, т.е. 255.255.255.0. Так как все ПК находятся в одной подсети, тогда у всех будет одна маска 255.255.255.0.

Для маршрутизатора R-C-M на интерфейсе eth0 зададим адрес 172.168.128.1, так как находится в этой подсети, и маску подсети соответственно 255.255.255.0. На интерфейсе eth1 установим адрес 172.168.1.1, так как принадлежит подсети 172.168.1.0 и маску подсети 255.255.255.0.

Для маршрутизатора R-S-C на интерфейсе eth0 зададим адрес 172.168.0.64, так как находится в этой подсети, и маску подсети соответственно 255.255.255.0. На интерфейсе eth1 установим адрес 172.168.128.2, так как принадлежит подсети 172.168.128.0 и маску подсети 255.255.255.0.

Для маршрутизатора R-M-S на интерфейсе eth0 зададим адрес 172.168.1.2, так как находится в этой подсети. И маску подсети соответственно 255.255.255.0. На интерфейсе eth1 установим адрес 172.168.1.13, так как принадлежит подсети 172.168.1.0 и маску подсети 255.255.255.0.

Чтобы направить пакеты из подсети 10.1.0.0 в подсеть 10.0.32.0 установим значения шлюзов по умолчанию для R-C-M: 10.0.32.1 (адрес маршрутизатора R-M-S), а для R-M-S: 10.0.32.2 (адрес маршрутизатора R-C-M). Чтобы направить пакеты из подсети 10.0.32.0 в подсеть 10.0.0.0 установим значения шлюзов по умолчанию для R-M-S: 10.0.32.2 (адрес маршрутизатора R-S-C), а для R-S-C: 10.0.0.2 (адрес маршрутизатора R-M-S).

Чтобы направить пакеты из подсети 172.168.1.0 в подсеть 172.168.0.0 установим значения шлюзов по умолчанию для R-C-M: 172.168.1.2 (адрес маршрутизатора R-M-S), а для R-M-S: 172.168.0.64 (адрес маршрутизатора R-C-M). Чтобы направить пакеты из подсети 172.168.1.0 в подсеть 172.168.128.0

установим значения шлюзов по умолчанию для R-C-M: 172.168.1.2 (адрес маршрутизатора R-M-S).

3. Выполнение Echo-запроса с K1 (Manager3) на K2 (Service). На рисунке 2 представлено само выполнение запроса, на рисунке 3 – данные из консоли (начало), на рисунке 4 – данные из консоли (конец). Логи при отправке запроса представлены в приложении А.

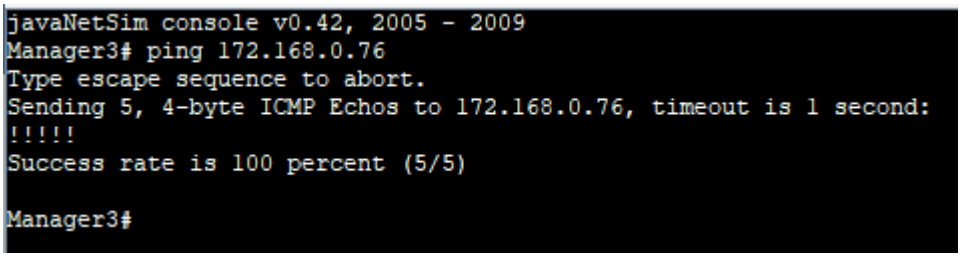

Рисунок 2 – Выполнение запроса

17:33:52-645	Manager3	Echo Request Packet	Network	Created Echo Request packet to 172.168.0.76
17:33:52-645	Manager3	ARP Discovery Packet	DataLink	Created ARP discovery packet to source MAC address for IP 172.168.1
17:33:52-645	Manager3	ARP_packet	Network	Sending broadcast packet from ProtocolStack.
17:33:52-645	Manager3	Ethernet Packet	Link	Sending packet from interface A2:1C:87:B0:BA:AC
17:33:52-645	Manager2	Ethernet Packet	Link	Recieved and accepted packet at interface 99:A6:AE:41:80:B2
17:33:52-645	Manager2	ARP_packet	Network	ProtocolStack received packet from local Interface.
17:33:52-645	Manager1	Ethernet Packet	Link	Recieved and accepted packet at interface 55:B8:28:68:BA:5F
17:33:52-645	Manager1	ARP_packet	Network	ProtocolStack received packet from local Interface.
17:33:52-645	R-M-S	Ethernet Packet	Link	Recieved and accepted packet at interface 45:A9:54:72:93:61
17:33:52-645	R-M-S	ARP_packet	Network	ProtocolStack received packet from local Interface.
17:33:52-645	R-M-S	ARP_packet	Network	Confirmed Packet is for this Network Layer Device.

Рисунок 3 – Данные из консоли (начало)

17:44:33-131	Manager3	ICMP_packet	Network	ProtocolStack received packet from local Interface.
17:44:33-131	Manager3	ICMP_packet	Network	Confirmed Packet is for this Network Layer Device.
17:44:33-131	Manager3	Echo Reply Packet	Network	Echo reply packet received from 172.168.0.76
17:44:33-132	Manager2	Ethernet Packet	Link	Recieved and dropped packet at interface 99:A6:AE:41:80:B2
17:44:33-132	Manager1	Ethernet Packet	Link	Recieved and dropped packet at interface 55:B8:28:68:BA:5F
17:44:33-132	R-C-M	Ethernet Packet	Link	Recieved and dropped packet at interface 1A:42:6D:9E:AD:BA
17:44:33-132	R-M-S	Ethernet Packet	Link	Recieved and dropped packet at interface 30:AF:B1:7D:67:AE
17:44:33-132	R-S-C	Ethernet Packet	Link	Recieved and dropped packet at interface 1A:B8:79:4F:9C:AA
17:44:33-132	R-C-M	Ethernet Packet	Link	Recieved and dropped packet at interface 1A:42:6D:9E:AD:BA

Рисунок 4 - Данные из консоли (конец)

4. Добавлю статистическую запись MAC адреса R-M-S сетевого интерфейса eth0 в ARP таблицу K1 (Manager3): IP адрес – 172.168.1.2, MAC адрес 45:A9:54:72:93:61 (представлено на рисунке 5). При выполнении Echo-запроса к узлу K3 (Chief) не будет выполнять поиск MAC адреса R-M-S, так как его адрес уже известен в ARP таблице. Начало и конец Echo-запроса представлен на рисунках 6-7. Логи при отправке запроса представлены в приложении Б.

ARP entries for :Manager3

Internet Address	Physical Address	Type
172.168.1.2	45:A9:54:72:93:61	Static
172.168.1.1	1A:42:6D:9E:AD:BA	Dynamic

Рисунок 5 – ARP-таблица

14:25:15-856	Manager3	Echo Request Packet	Network	Created Echo Request packet to 172.168.128.5
14:25:15-856	Manager3	ICMP_packet	Network	Sending packet from ProtocolStack (to 172.168.1.2).
14:25:15-856	Manager3	Ethernet Packet	Link	Sending packet from interface A2:1C:87:B0:BA:AC
14:25:15-857	Manager2	Ethernet Packet	Link	Recieved and dropped packet at interface 99:A6:AE:41:80:B2
14:25:15-857	Manager1	Ethernet Packet	Link	Recieved and dropped packet at interface 55:B8:28:68:BA:5F
14:25:15-857	R-M-S	Ethernet Packet	Link	Recieved and accepted packet at interface 45:A9:54:72:93:61
14:25:15-857	R-M-S	ICMP_packet	Network	ProtocolStack received packet from local Interface.
14:25:15-857	R-M-S	ICMP_packet	Network	Packet Received: Network Layer Device is Routable forwarding packet.
14:25:15-857	R-M-S	ARP Discovery Packet	DataLink	Created ARP discovery packet to source MAC address for IP 172.168.0.64
14:25:15-857	R-M-S	ARP_packet	Network	Sending broadcast packet from ProtocolStack.

Рисунок 6 – Echo-запрос с К1 (Manager3) на К3 (Chief) (начало)

14:25:15-865	R-C-M	Ethernet Packet	Link	Sending packet from interface 1A:42:6D:9E:AD:BA
14:25:15-865	Manager3	Ethernet Packet	Link	Recieved and accepted packet at interface A2:1C:87:B0:BA:AC
14:25:15-865	Manager3	ICMP_packet	Network	ProtocolStack received packet from local Interface.
14:25:15-865	Manager3	ICMP_packet	Network	Confirmed Packet is for this Network Layer Device.
14:25:15-865	Manager3	Echo Reply Packet	Network	Echo reply packet received from 172.168.128.5
14:25:15-865	Manager2	Ethernet Packet	Link	Recieved and dropped packet at interface 99:A6:AE:41:80:B2
14:25:15-865	Manager1	Ethernet Packet	Link	Recieved and dropped packet at interface 55:B8:28:68:BA:5F
14:25:15-866	R-M-S	Ethernet Packet	Link	Recieved and dropped packet at interface 45:A9:54:72:93:61
14:25:15-866	R-C-M	Ethernet Packet	Link	Recieved and dropped packet at interface 1A:42:6D:9E:AD:BA

Рисунок 7 – Echo-запрос с К1 (Manager3) на К3 (Chief) (конец)

5. Выполню Echo-запрос на IP-адрес 200.100.0.1 с К1 (Manager3). Формируется Echo-запрос пакет и отправляется на шлюз по умолчанию – R-M-S. Далее, так как у R-M-S нет соответствующих подсетей, запрос отправляется к R-S-C, где происходит аналогичная ситуация. Таким образом происходит зацикливание, которое прекратится тогда, когда закончится время жизни пакета и узлу-источнику этого запроса будет доставлено ICMP-уведомление об этом: Received ICMP Time Exceeded from 172.168.1.2. Данные вывода в консоль и терминал неуспешно выполненного запроса представлены на рисунках 8, 9, 10 и 11.

00:20:36-518	Manager3	Echo Request Packet	Network	Created Echo Request packet to 200.100.0.1
00:20:36-518	Manager3	ARP Discovery Packet	DataLink	Created ARP discovery packet to source MAC address for IP 172.168.1.2
00:20:36-519	Manager3	ARP_packet	Network	Sending broadcast packet from ProtocolStack.
00:20:36-519	Manager3	Ethernet Packet	Link	Sending packet from interface A2:1C:87:B0:BA:AC
00:20:36-519	Manager2	Ethernet Packet	Link	Recieved and accepted packet at interface 99:A6:AE:41:80:B2
00:20:36-519	Manager2	ARP_packet	Network	ProtocolStack received packet from local Interface.
00:20:36-519	Manager1	Ethernet Packet	Link	Recieved and accepted packet at interface 55:B8:28:68:BA:5F
00:20:36-519	Manager1	ARP_packet	Network	ProtocolStack received packet from local Interface.
00:20:36-519	R-M-S	Ethernet Packet	Link	Recieved and accepted packet at interface 45:A9:54:72:93:61

Рисунок 8 – Echo-запрос с К1 (Manager3) на IP 200.100.0.1 (начало)

13:44:01-867	R-M-S	ICMP_packet	Network	ProtocolStack received packet from local Interface.
13:44:01-867	R-M-S	ICMP_packet	Network	Packet Received: Network Layer Device is Routable forwarding packet.
13:44:01-867	R-M-S	ICMP_packet	Network	Forwarding packet from ProtocolStack(to 172.168.0.64).
13:44:01-867	R-M-S	Ethernet Packet	Link	Sending packet from interface 30:AF:B1:7D:67:AE
13:44:01-867	Service	Ethernet Packet	Link	Recieved and dropped packet at interface 9D:39:A7:9B:B9:B9
13:44:01-867	R-S-C	Ethernet Packet	Link	Recieved and accepted packet at interface 1A:B8:79:4F:9C:AA
13:44:01-867	R-S-C	ICMP_packet	Network	ProtocolStack received packet from local Interface.
13:44:01-867	R-S-C	ICMP_packet	Network	Packet Received: Network Layer Device is Routable forwarding packet.
13:44:01-867	R-S-C	ICMP_packet	Network	Forwarding packet from ProtocolStack(to 172.168.0.65).
13:44:01-867	R-S-C	Ethernet Packet	Link	Sending packet from interface 1A:B8:79:4F:9C:AA
13:44:01-867	Service	Ethernet Packet	Link	Recieved and dropped packet at interface 9D:39:A7:9B:B9:B9
13:44:01-867	R-M-S	Ethernet Packet	Link	Recieved and accepted packet at interface 30:AF:B1:7D:67:AE
13:44:01-867	R-M-S	ICMP_packet	Network	ProtocolStack received packet from local Interface.
13:44:01-867	R-M-S	ICMP_packet	Network	Packet Received: Network Layer Device is Routable forwarding packet.
13:44:01-867	R-M-S	ICMP_packet	Network	Forwarding packet from ProtocolStack(to 172.168.0.64).

Рисунок 9 - Echo-запрос с К1 (Manager3) на IP 200.100.0.1 (зацикливание)

00:20:36-624	Manager3	ICMP_packet	Network	ProtocolStack received packet from local Interface.
00:20:36-624	Manager3	ICMP_packet	Network	Confirmed Packet is for this Network Layer Device.
00:20:36-624	Manager3	ICMP Time Exceeded	Network	Recieved ICMP Time Exceeded from 172.168.1.2
00:20:36-624	Manager2	Ethernet Packet	Link	Recieved and dropped packet at interface 99:A6:AE:41:80:B2
00:20:36-624	Manager1	Ethernet Packet	Link	Recieved and dropped packet at interface 55:B8:28:68:BA:5F
00:20:36-624	R-C-M	Ethernet Packet	Link	Recieved and dropped packet at interface 1A:42:6D:9E:AD:BA
00:20:36-624	R-C-M	Ethernet Packet	Link	Recieved and dropped packet at interface 1A:42:6D:9E:AD:BA

Рисунок 10 – Echo-запрос с К1 (Manager3) на IP 200.100.0.1 (конец)

```
javaNetSim console v0.42, 2005 - 2009
Manager3# ping 200.100.0.1
Type escape sequence to abort.
Sending 5, 4-byte ICMP Echos to 200.100.0.1, timeout is 1 second:
TTTTT
Success rate is 0 percent (0/5)

Manager3#
```

Рисунок 11 - Echo-запрос с К1 (Manager3) на IP 200.100.0.1 (терминал)

6. Проведу Echo-запросы с К1 (Manager3) и К2 (Service) на все другие узлы сети. Рисунки Echo-запросов с К1 (Manager3) представлены на рисунке 12. Рисунки Echo-запросов с К2 (Service) представлены на рисунке 13.

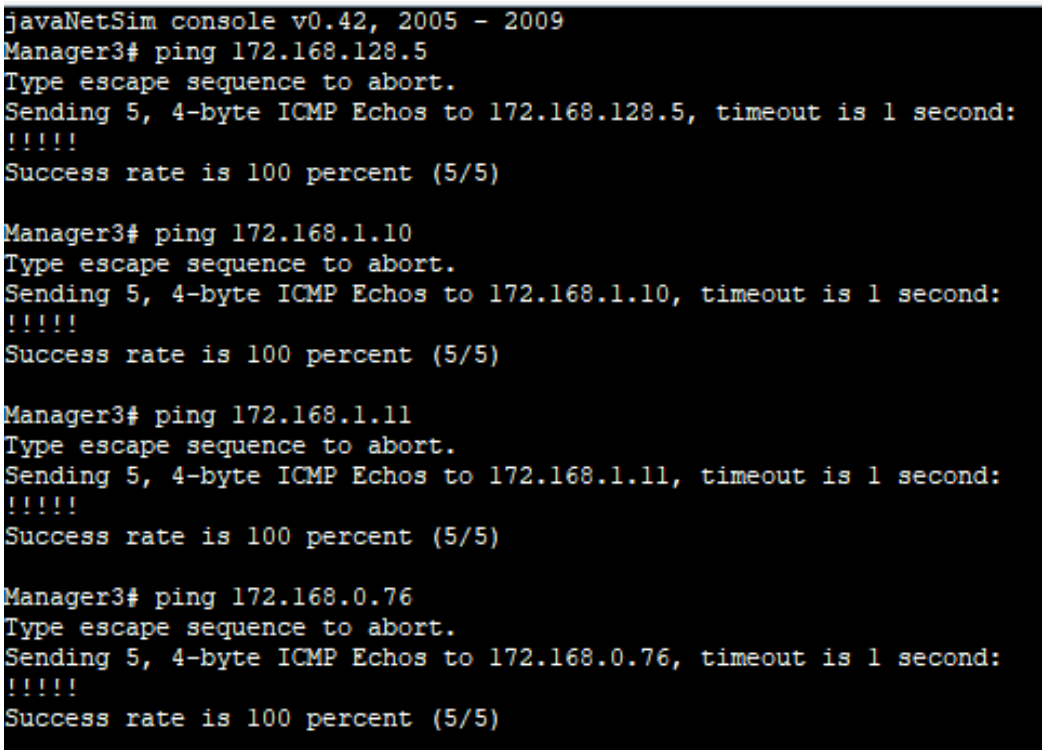

Рисунок 12 – Echo-запрос с К1 (Manager3)

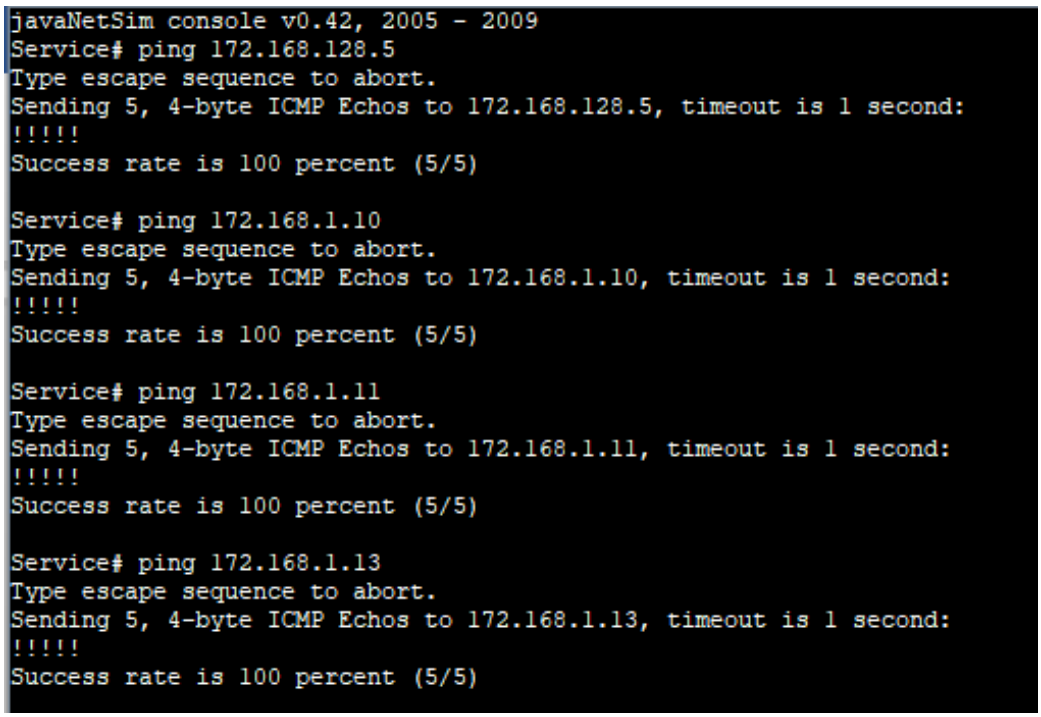

Рисунок 13 – Echo-запрос с К2 (Service)

Выводы.

В ходе выполнения лабораторной работы изучены и освоены на практике основы адресации, разрешения физических адресов и простейшей

маршрутизации в IP-сетях. Настроена IP-сеть, состоящая из нескольких подсетей. Каждая из подсетей была сконфигурирована путем назначения узлам IP-адресов и масок подсетей. Правильность конфигурации сети была проверена путем отправки Echo-запросов на все узлы данной сети.

ПРИЛОЖЕНИЕ А

ЛОГИ ПРИ ОТПРАВКЕ ECHO-ЗАПРОСА С К1 (MANAGER 3) НА К2 (SERVICE)

13:58:03-323	*Manager3*	*Echo Request Packet*	*Network*	*Created Echo Request packet to 172.168.0.76*
13:58:03-323	*Manager3*	*ARP Discovery Packet*	*DataLink*	*Created ARP discovery packet to source MAC address for IP 172.168.1.2*
13:58:03-323	*Manager3*	*ARP_packet*	*Network*	*Sending broadcast packet from ProtocolStack.*
13:58:03-323	*Manager3*	*Ethernet Packet*	*Link*	*Sending packet from interface A2:1C:87:B0:BA:AC*
13:58:03-323	*Manager2*	*Ethernet Packet*	*Link*	*Recieved and accepted packet at interface 99:A6:AE:41:80:B2*
13:58:03-323	*Manager2*	*ARP_packet*	*Network*	*ProtocolStack received packet from local Interface.*
13:58:03-323	*Manager1*	*Ethernet Packet*	*Link*	*Recieved and accepted packet at interface 55:B8:28:68:BA:5F*
13:58:03-323	*Manager1*	*ARP_packet*	*Network*	*ProtocolStack received packet from local Interface.*
13:58:03-323	*R-M-S*	*Ethernet Packet*	*Link*	*Recieved and accepted packet at interface 45:A9:54:72:93:61*
13:58:03-323	*R-M-S*	*ARP_packet*	*Network*	*ProtocolStack received packet from local Interface.*
13:58:03-323	*R-M-S*	*ARP_packet*	*Network*	*Confirmed Packet is for this Network Layer Device.*
13:58:03-323	*R-M-S*	*ARP Response Packet*	*DataLink*	*Created ARP Response packet to 172.168.1.13*
13:58:03-323	*R-M-S*	*ARP_packet*	*Network*	*Sending packet from ProtocolStack (to 172.168.1.13).*
13:58:03-323	*R-M-S*	*Ethernet Packet*	*Link*	*Sending packet from interface 45:A9:54:72:93:61*
13:58:03-323	*Manager3*	*Ethernet Packet*	*Link*	*Recieved and accepted packet at interface A2:1C:87:B0:BA:AC*
13:58:03-323	*Manager3*	*ARP_packet*	*Network*	*ProtocolStack received packet from local Interface.*
13:58:03-323	*Manager3*	*ARP_packet*	*Network*	*Confirmed Packet is for this Network Layer Device.*
13:58:03-323	*Manager2*	*Ethernet Packet*	*Link*	*Recieved and dropped packet at interface 99:A6:AE:41:80:B2*
13:58:03-323	*Manager1*	*Ethernet Packet*	*Link*	*Recieved and dropped packet at interface 55:B8:28:68:BA:5F*
13:58:03-323	*R-C-M*	*Ethernet Packet*	*Link*	*Recieved and dropped packet at interface 1A:42:6D:9E:AD:BA*
13:58:03-323	*R-C-M*	*Ethernet Packet*	*Link*	*Recieved and accepted packet at interface 1A:42:6D:9E:AD:BA*
13:58:03-323	*R-C-M*	*ARP_packet*	*Network*	*ProtocolStack received packet from local Interface.*
13:58:03-323	*Manager3*	*ICMP_packet*	*Network*	*Sending packet from ProtocolStack (to 172.168.1.2).*
13:58:03-323	*Manager3*	*Ethernet Packet*	*Link*	*Sending packet from interface A2:1C:87:B0:BA:AC*
13:58:03-	*Manager2*	*Ethernet Packet*	*Link*	*Recieved and dropped packet at interface 99:A6:AE:41:80:B2*

323				
13:58:03-323	*Manager1*	*Ethernet Packet*	*Link*	*Recieved and dropped packet at interface 55:B8:28:68:BA:5F*
13:58:03-323	*R-M-S*	*Ethernet Packet*	*Link*	*Recieved and accepted packet at interface 45:A9:54:72:93:61*
13:58:03-323	*R-M-S*	*ICMP_packet*	*Network*	*ProtocolStack received packet from local Interface.*
13:58:03-323	*R-M-S*	*ICMP_packet*	*Network*	*Packet Received: Network Layer Device is Routable forwarding packet.*
13:58:03-323	*R-M-S*	*ARP Discovery Packet*	*DataLink*	*Created ARP discovery packet to source MAC address for IP 172.168.0.76*
13:58:03-323	*R-M-S*	*ARP_packet*	*Network*	*Sending broadcast packet from ProtocolStack.*
13:58:03-323	*R-M-S*	*Ethernet Packet*	*Link*	*Sending packet from interface 30:AF:B1:7D:67:AE*
13:58:03-323	*Service*	*Ethernet Packet*	*Link*	*Recieved and accepted packet at interface 9D:39:A7:9B:B9:B9*
13:58:03-323	*Service*	*ARP_packet*	*Network*	*ProtocolStack received packet from local Interface.*
13:58:03-323	*Service*	*ARP_packet*	*Network*	*Confirmed Packet is for this Network Layer Device.*
13:58:03-323	*Service*	*ARP Response Packet*	*DataLink*	*Created ARP Response packet to 172.168.0.65*
13:58:03-323	*Service*	*ARP_packet*	*Network*	*Sending packet from ProtocolStack (to 172.168.0.65).*
13:58:03-323	*Service*	*Ethernet Packet*	*Link*	*Sending packet from interface 9D:39:A7:9B:B9:B9*
13:58:03-323	*R-S-C*	*Ethernet Packet*	*Link*	*Recieved and dropped packet at interface 1A:B8:79:4F:9C:AA*
13:58:03-323	*R-M-S*	*Ethernet Packet*	*Link*	*Recieved and accepted packet at interface 30:AF:B1:7D:67:AE*
13:58:03-323	*R-M-S*	*ARP_packet*	*Network*	*ProtocolStack received packet from local Interface.*
13:58:03-323	*R-M-S*	*ARP_packet*	*Network*	*Confirmed Packet is for this Network Layer Device.*
13:58:03-323	*R-S-C*	*Ethernet Packet*	*Link*	*Recieved and accepted packet at interface 1A:B8:79:4F:9C:AA*
13:58:03-323	*R-S-C*	*ARP_packet*	*Network*	*ProtocolStack received packet from local Interface.*
13:58:03-323	*R-M-S*	*ICMP_packet*	*Network*	*Forwarding packet from ProtocolStack(to 172.168.0.76).*
13:58:03-323	*R-M-S*	*Ethernet Packet*	*Link*	*Sending packet from interface 30:AF:B1:7D:67:AE*
13:58:03-323	*Service*	*Ethernet Packet*	*Link*	*Recieved and accepted packet at interface 9D:39:A7:9B:B9:B9*
13:58:03-323	*Service*	*ICMP_packet*	*Network*	*ProtocolStack received packet from local Interface.*
13:58:03-323	*Service*	*ICMP_packet*	*Network*	*Confirmed Packet is for this Network Layer Device.*
13:58:03-323	*Service*	*Echo Reply Packet*	*Network*	*Created Echo Reply packet to 172.168.1.13*
13:58:03-323	*Service*	*ARP Discovery Packet*	*DataLink*	*Created ARP discovery packet to source MAC address for IP 172.168.0.64*
13:58:03-323	*Service*	*ARP_packet*	*Network*	*Sending broadcast packet from ProtocolStack.*

13:58:03-323	*Service*	*Ethernet Packet*	*Link*	*Sending packet from interface 9D:39:A7:9B:B9:B9*
13:58:03-323	*R-S-C*	*Ethernet Packet*	*Link*	*Recieved and accepted packet at interface 1A:B8:79:4F:9C:AA*
13:58:03-323	*R-S-C*	*ARP_packet*	*Network*	*ProtocolStack received packet from local Interface.*
13:58:03-323	*R-S-C*	*ARP_packet*	*Network*	*Confirmed Packet is for this Network Layer Device.*
13:58:03-323	*R-S-C*	*ARP Response Packet*	*DataLink*	*Created ARP Response packet to 172.168.0.76*
13:58:03-323	*R-S-C*	*ARP_packet*	*Network*	*Sending packet from ProtocolStack (to 172.168.0.76).*
13:58:03-323	*R-S-C*	*Ethernet Packet*	*Link*	*Sending packet from interface 1A:B8:79:4F:9C:AA*
13:58:03-323	*Service*	*Ethernet Packet*	*Link*	*Recieved and accepted packet at interface 9D:39:A7:9B:B9:B9*
13:58:03-323	*Service*	*ARP_packet*	*Network*	*ProtocolStack received packet from local Interface.*
13:58:03-323	*Service*	*ARP_packet*	*Network*	*Confirmed Packet is for this Network Layer Device.*
13:58:03-325	*R-M-S*	*Ethernet Packet*	*Link*	*Recieved and dropped packet at interface 30:AF:B1:7D:67:AE*
13:58:03-325	*R-M-S*	*Ethernet Packet*	*Link*	*Recieved and accepted packet at interface 30:AF:B1:7D:67:AE*
13:58:03-325	*R-M-S*	*ARP_packet*	*Network*	*ProtocolStack received packet from local Interface.*
13:58:03-325	*Service*	*ICMP_packet*	*Network*	*Sending packet from ProtocolStack (to 172.168.0.64).*
13:58:03-325	*Service*	*Ethernet Packet*	*Link*	*Sending packet from interface 9D:39:A7:9B:B9:B9*
13:58:03-325	*R-S-C*	*Ethernet Packet*	*Link*	*Recieved and accepted packet at interface 1A:B8:79:4F:9C:AA*
13:58:03-325	*R-S-C*	*ICMP_packet*	*Network*	*ProtocolStack received packet from local Interface.*
13:58:03-325	*R-S-C*	*ICMP_packet*	*Network*	*Packet Received: Network Layer Device is Routable forwarding packet.*
13:58:03-325	*R-S-C*	*ARP Discovery Packet*	*DataLink*	*Created ARP discovery packet to source MAC address for IP 172.168.0.65*
13:58:03-325	*R-S-C*	*ARP_packet*	*Network*	*Sending broadcast packet from ProtocolStack.*
13:58:03-325	*R-S-C*	*Ethernet Packet*	*Link*	*Sending packet from interface 1A:B8:79:4F:9C:AA*
13:58:03-325	*Service*	*Ethernet Packet*	*Link*	*Recieved and accepted packet at interface 9D:39:A7:9B:B9:B9*
13:58:03-325	*Service*	*ARP_packet*	*Network*	*ProtocolStack received packet from local Interface.*
13:58:03-325	*R-M-S*	*Ethernet Packet*	*Link*	*Recieved and accepted packet at interface 30:AF:B1:7D:67:AE*
13:58:03-325	*R-M-S*	*ARP_packet*	*Network*	*ProtocolStack received packet from local Interface.*
13:58:03-325	*R-M-S*	*ARP_packet*	*Network*	*Confirmed Packet is for this Network Layer Device.*
13:58:03-325	*R-M-S*	*ARP Response Packet*	*DataLink*	*Created ARP Response packet to 172.168.0.64*
13:58:03-	*R-M-S*	*ARP_packet*	*Network*	*Sending packet from ProtocolStack (to 172.168.0.64).*

325				
13:58:03-325	*R-M-S*	*Ethernet Packet*	*Link*	*Sending packet from interface 30:AF:B1:7D:67:AE*
13:58:03-325	*Service*	*Ethernet Packet*	*Link*	*Recieved and dropped packet at interface 9D:39:A7:9B:B9:B9*
13:58:03-325	*R-S-C*	*Ethernet Packet*	*Link*	*Recieved and accepted packet at interface 1A:B8:79:4F:9C:AA*
13:58:03-325	*R-S-C*	*ARP_packet*	*Network*	*ProtocolStack received packet from local Interface.*
13:58:03-325	*R-S-C*	*ARP_packet*	*Network*	*Confirmed Packet is for this Network Layer Device.*
13:58:03-325	*R-S-C*	*ICMP_packet*	*Network*	*Forwarding packet from ProtocolStack(to 172.168.0.65).*
13:58:03-325	*R-S-C*	*Ethernet Packet*	*Link*	*Sending packet from interface 1A:B8:79:4F:9C:AA*
13:58:03-325	*Service*	*Ethernet Packet*	*Link*	*Recieved and dropped packet at interface 9D:39:A7:9B:B9:B9*
13:58:03-325	*R-M-S*	*Ethernet Packet*	*Link*	*Recieved and accepted packet at interface 30:AF:B1:7D:67:AE*
13:58:03-325	*R-M-S*	*ICMP_packet*	*Network*	*ProtocolStack received packet from local Interface.*
13:58:03-325	*R-M-S*	*ICMP_packet*	*Network*	*Packet Received: Network Layer Device is Routable forwarding packet.*
13:58:03-325	*R-M-S*	*ICMP_packet*	*Network*	*Forwarding packet from ProtocolStack(to 172.168.1.13).*
13:58:03-325	*R-M-S*	*Ethernet Packet*	*Link*	*Sending packet from interface 45:A9:54:72:93:61*
13:58:03-325	*Manager3*	*Ethernet Packet*	*Link*	*Recieved and accepted packet at interface A2:1C:87:B0:BA:AC*
13:58:03-325	*Manager3*	*ICMP_packet*	*Network*	*ProtocolStack received packet from local Interface.*
13:58:03-325	*Manager3*	*ICMP_packet*	*Network*	*Confirmed Packet is for this Network Layer Device.*
13:58:03-325	*Manager3*	*Echo Reply Packet*	*Network*	*Echo reply packet received from 172.168.0.76*
13:58:03-325	*Manager2*	*Ethernet Packet*	*Link*	*Recieved and dropped packet at interface 99:A6:AE:41:80:B2*
13:58:03-325	*Manager1*	*Ethernet Packet*	*Link*	*Recieved and dropped packet at interface 55:B8:28:68:BA:5F*
13:58:03-325	*R-C-M*	*Ethernet Packet*	*Link*	*Recieved and dropped packet at interface 1A:42:6D:9E:AD:BA*

ПРИЛОЖЕНИЕ Б

ЛОГИ ПРИ ОТПРАВКЕ ECHO-ЗАПРОСА С К1 (MANAGER3) НА К3 (CHIEF)

12:39:39-004	*Manager3*	*Echo Request Packet*	*Network*	*Created Echo Request packet to 172.168.128.5*
12:39:39-004	*Manager3*	*ICMP_packet*	*Network*	*Sending packet from ProtocolStack (to 172.168.1.2).*
12:39:39-004	*Manager3*	*Ethernet Packet*	*Link*	*Sending packet from interface A2:1C:87:B0:BA:AC*
12:39:39-004	*Manager2*	*Ethernet Packet*	*Link*	*Recieved and dropped packet at interface 99:A6:AE:41:80:B2*
12:39:39-004	*Manager1*	*Ethernet Packet*	*Link*	*Recieved and dropped packet at interface 55:B8:28:68:BA:5F*
12:39:39-004	*R-M-S*	*Ethernet Packet*	*Link*	*Recieved and accepted packet at interface 45:A9:54:72:93:61*
12:39:39-004	*R-M-S*	*ICMP_packet*	*Network*	*ProtocolStack received packet from local Interface.*
12:39:39-005	*R-M-S*	*ICMP_packet*	*Network*	*Packet Received: Network Layer Device is Routable forwarding packet.*
12:39:39-005	*R-M-S*	*ARP Discovery Packet*	*DataLink*	*Created ARP discovery packet to source MAC address for IP 172.168.0.64*
12:39:39-005	*R-M-S*	*ARP_packet*	*Network*	*Sending broadcast packet from ProtocolStack.*
12:39:39-005	*R-M-S*	*Ethernet Packet*	*Link*	*Sending packet from interface 30:AF:B1:7D:67:AE*
12:39:39-005	*Service*	*Ethernet Packet*	*Link*	*Recieved and accepted packet at interface 9D:39:A7:9B:B9:B9*
12:39:39-005	*Service*	*ARP_packet*	*Network*	*ProtocolStack received packet from local Interface.*
12:39:39-005	*R-S-C*	*Ethernet Packet*	*Link*	*Recieved and accepted packet at interface 1A:B8:79:4F:9C:AA*
12:39:39-005	*R-S-C*	*ARP_packet*	*Network*	*ProtocolStack received packet from local Interface.*
12:39:39-005	*R-S-C*	*ARP_packet*	*Network*	*Confirmed Packet is for this Network Layer Device.*
12:39:39-005	*R-S-C*	*ARP Response Packet*	*DataLink*	*Created ARP Response packet to 172.168.0.65*
12:39:39-005	*R-S-C*	*ARP_packet*	*Network*	*Sending packet from ProtocolStack (to 172.168.0.65).*
12:39:39-006	*R-S-C*	*Ethernet Packet*	*Link*	*Sending packet from interface 1A:B8:79:4F:9C:AA*
12:39:39-006	*Service*	*Ethernet Packet*	*Link*	*Recieved and dropped packet at interface 9D:39:A7:9B:B9:B9*
12:39:39-006	*R-M-S*	*Ethernet Packet*	*Link*	*Recieved and accepted packet at interface 30:AF:B1:7D:67:AE*
12:39:39-006	*R-M-S*	*ARP_packet*	*Network*	*ProtocolStack received packet from local Interface.*
12:39:39-006	*R-M-S*	*ARP_packet*	*Network*	*Confirmed Packet is for this Network Layer Device.*
12:39:39-006	*R-M-S*	*ICMP_packet*	*Network*	*Forwarding packet from ProtocolStack(to 172.168.0.64).*
12:39:39-	*R-M-S*	*Ethernet Packet*	*Link*	*Sending packet from interface 30:AF:B1:7D:67:AE*

006				
12:39:39-006	*Service*	*Ethernet Packet*	*Link*	*Recieved and dropped packet at interface 9D:39:A7:9B:B9:B9*
12:39:39-006	*R-S-C*	*Ethernet Packet*	*Link*	*Recieved and accepted packet at interface 1A:B8:79:4F:9C:AA*
12:39:39-006	*R-S-C*	*ICMP_packet*	*Network*	*ProtocolStack received packet from local Interface.*
12:39:39-006	*R-S-C*	*ICMP_packet*	*Network*	*Packet Received: Network Layer Device is Routable forwarding packet.*
12:39:39-006	*R-S-C*	*ARP Discovery Packet*	*DataLink*	*Created ARP discovery packet to source MAC address for IP 172.168.128.5*
12:39:39-006	*R-S-C*	*ARP_packet*	*Network*	*Sending broadcast packet from ProtocolStack.*
12:39:39-007	*R-S-C*	*Ethernet Packet*	*Link*	*Sending packet from interface 52:32:41:3E:2C:13*
12:39:39-007	*R-C-M*	*Ethernet Packet*	*Link*	*Recieved and accepted packet at interface 5A:6A:90:46:1B:5F*
12:39:39-007	*R-C-M*	*ARP_packet*	*Network*	*ProtocolStack received packet from local Interface.*
12:39:39-007	*Chief*	*Ethernet Packet*	*Link*	*Recieved and accepted packet at interface 2A:39:55:4F:86:59*
12:39:39-007	*Chief*	*ARP_packet*	*Network*	*ProtocolStack received packet from local Interface.*
12:39:39-007	*Chief*	*ARP_packet*	*Network*	*Confirmed Packet is for this Network Layer Device.*
12:39:39-007	*Chief*	*ARP Response Packet*	*DataLink*	*Created ARP Response packet to 172.168.128.2*
12:39:39-007	*Chief*	*ARP_packet*	*Network*	*Sending packet from ProtocolStack (to 172.168.128.2).*
12:39:39-007	*Chief*	*Ethernet Packet*	*Link*	*Sending packet from interface 2A:39:55:4F:86:59*
12:39:39-007	*R-S-C*	*Ethernet Packet*	*Link*	*Recieved and accepted packet at interface 52:32:41:3E:2C:13*
12:39:39-007	*R-S-C*	*ARP_packet*	*Network*	*ProtocolStack received packet from local Interface.*
12:39:39-007	*R-S-C*	*ARP_packet*	*Network*	*Confirmed Packet is for this Network Layer Device.*
12:39:39-008	*R-C-M*	*Ethernet Packet*	*Link*	*Recieved and dropped packet at interface 5A:6A:90:46:1B:5F*
12:39:39-008	*R-S-C*	*ICMP_packet*	*Network*	*Forwarding packet from ProtocolStack(to 172.168.128.5).*
12:39:39-008	*R-S-C*	*Ethernet Packet*	*Link*	*Sending packet from interface 52:32:41:3E:2C:13*
12:39:39-008	*R-C-M*	*Ethernet Packet*	*Link*	*Recieved and dropped packet at interface 5A:6A:90:46:1B:5F*
12:39:39-008	*Chief*	*Ethernet Packet*	*Link*	*Recieved and accepted packet at interface 2A:39:55:4F:86:59*
12:39:39-008	*Chief*	*ICMP_packet*	*Network*	*ProtocolStack received packet from local Interface.*
12:39:39-008	*Chief*	*ICMP_packet*	*Network*	*Confirmed Packet is for this Network Layer Device.*
12:39:39-008	*Chief*	*Echo Reply Packet*	*Network*	*Created Echo Reply packet to 172.168.1.13*
12:39:39-008	*Chief*	*ARP Discovery Packet*	*DataLink*	*Created ARP discovery packet to source MAC address for IP 172.168.128.1*

12:39:39-008	*Chief*	*ARP_packet*	*Network*	*Sending broadcast packet from ProtocolStack.*
12:39:39-009	*Chief*	*Ethernet Packet*	*Link*	*Sending packet from interface 2A:39:55:4F:86:59*
12:39:39-009	*R-S-C*	*Ethernet Packet*	*Link*	*Recieved and accepted packet at interface 52:32:41:3E:2C:13*
12:39:39-009	*R-S-C*	*ARP_packet*	*Network*	*ProtocolStack received packet from local Interface.*
12:39:39-009	*R-C-M*	*Ethernet Packet*	*Link*	*Recieved and accepted packet at interface 5A:6A:90:46:1B:5F*
12:39:39-009	*R-C-M*	*ARP_packet*	*Network*	*ProtocolStack received packet from local Interface.*
12:39:39-009	*R-C-M*	*ARP_packet*	*Network*	*Confirmed Packet is for this Network Layer Device.*
12:39:39-009	*R-C-M*	*ARP Response Packet*	*DataLink*	*Created ARP Response packet to 172.168.128.5*
12:39:39-009	*R-C-M*	*ARP_packet*	*Network*	*Sending packet from ProtocolStack (to 172.168.128.5).*
12:39:39-009	*R-C-M*	*Ethernet Packet*	*Link*	*Sending packet from interface 5A:6A:90:46:1B:5F*
12:39:39-010	*R-S-C*	*Ethernet Packet*	*Link*	*Recieved and dropped packet at interface 52:32:41:3E:2C:13*
12:39:39-010	*Chief*	*Ethernet Packet*	*Link*	*Recieved and accepted packet at interface 2A:39:55:4F:86:59*
12:39:39-010	*Chief*	*ARP_packet*	*Network*	*ProtocolStack received packet from local Interface.*
12:39:39-010	*Chief*	*ARP_packet*	*Network*	*Confirmed Packet is for this Network Layer Device.*
12:39:39-010	*Chief*	*ICMP_packet*	*Network*	*Sending packet from ProtocolStack (to 172.168.128.1).*
12:39:39-010	*Chief*	*Ethernet Packet*	*Link*	*Sending packet from interface 2A:39:55:4F:86:59*
12:39:39-010	*R-S-C*	*Ethernet Packet*	*Link*	*Recieved and dropped packet at interface 52:32:41:3E:2C:13*
12:39:39-010	*R-C-M*	*Ethernet Packet*	*Link*	*Recieved and accepted packet at interface 5A:6A:90:46:1B:5F*
12:39:39-010	*R-C-M*	*ICMP_packet*	*Network*	*ProtocolStack received packet from local Interface.*
12:39:39-010	*R-C-M*	*ICMP_packet*	*Network*	*Packet Received: Network Layer Device is Routable forwarding packet.*
12:39:39-010	*R-C-M*	*ARP Discovery Packet*	*DataLink*	*Created ARP discovery packet to source MAC address for IP 172.168.1.13*
12:39:39-010	*R-C-M*	*ARP_packet*	*Network*	*Sending broadcast packet from ProtocolStack.*
12:39:39-010	*R-C-M*	*Ethernet Packet*	*Link*	*Sending packet from interface 1A:42:6D:9E:AD:BA*
12:39:39-011	*Manager3*	*Ethernet Packet*	*Link*	*Recieved and accepted packet at interface A2:1C:87:B0:BA:AC*
12:39:39-011	*Manager3*	*ARP_packet*	*Network*	*ProtocolStack received packet from local Interface.*
12:39:39-011	*Manager3*	*ARP_packet*	*Network*	*Confirmed Packet is for this Network Layer Device.*
12:39:39-011	*Manager3*	*ARP Response Packet*	*DataLink*	*Created ARP Response packet to 172.168.1.1*
12:39:39-	*Manager3*	*ARP_packet*	*Network*	*Sending packet from ProtocolStack (to 172.168.1.1).*

011				
12:39:39-011	*Manager3*	*Ethernet Packet*	*Link*	*Sending packet from interface A2:1C:87:B0:BA:AC*
12:39:39-011	*Manager2*	*Ethernet Packet*	*Link*	*Recieved and dropped packet at interface 99:A6:AE:41:80:B2*
12:39:39-011	*Manager1*	*Ethernet Packet*	*Link*	*Recieved and dropped packet at interface 55:B8:28:68:BA:5F*
12:39:39-011	*R-M-S*	*Ethernet Packet*	*Link*	*Recieved and dropped packet at interface 45:A9:54:72:93:61*
12:39:39-011	*R-C-M*	*Ethernet Packet*	*Link*	*Recieved and accepted packet at interface 1A:42:6D:9E:AD:BA*
12:39:39-011	*R-C-M*	*ARP_packet*	*Network*	*ProtocolStack received packet from local Interface.*
12:39:39-011	*R-C-M*	*ARP_packet*	*Network*	*Confirmed Packet is for this Network Layer Device.*
12:39:39-011	*Manager2*	*Ethernet Packet*	*Link*	*Recieved and accepted packet at interface 99:A6:AE:41:80:B2*
12:39:39-012	*Manager2*	*ARP_packet*	*Network*	*ProtocolStack received packet from local Interface.*
12:39:39-012	*Manager1*	*Ethernet Packet*	*Link*	*Recieved and accepted packet at interface 55:B8:28:68:BA:5F*
12:39:39-012	*Manager1*	*ARP_packet*	*Network*	*ProtocolStack received packet from local Interface.*
12:39:39-012	*R-M-S*	*Ethernet Packet*	*Link*	*Recieved and accepted packet at interface 45:A9:54:72:93:61*
12:39:39-012	*R-M-S*	*ARP_packet*	*Network*	*ProtocolStack received packet from local Interface.*
12:39:39-012	*R-C-M*	*ICMP_packet*	*Network*	*Forwarding packet from ProtocolStack(to 172.168.1.13).*
12:39:39-012	*R-C-M*	*Ethernet Packet*	*Link*	*Sending packet from interface 1A:42:6D:9E:AD:BA*
12:39:39-012	*Manager3*	*Ethernet Packet*	*Link*	*Recieved and accepted packet at interface A2:1C:87:B0:BA:AC*
12:39:39-012	*Manager3*	*ICMP_packet*	*Network*	*ProtocolStack received packet from local Interface.*
12:39:39-012	*Manager3*	*ICMP_packet*	*Network*	*Confirmed Packet is for this Network Layer Device.*
12:39:39-012	*Manager3*	*Echo Reply Packet*	*Network*	*Echo reply packet received from 172.168.128.5*
12:39:39-012	*Manager2*	*Ethernet Packet*	*Link*	*Recieved and dropped packet at interface 99:A6:AE:41:80:B2*
12:39:39-012	*Manager1*	*Ethernet Packet*	*Link*	*Recieved and dropped packet at interface 55:B8:28:68:BA:5F*
12:39:39-012	*R-M-S*	*Ethernet Packet*	*Link*	*Recieved and dropped packet at interface 45:A9:54:72:93:61*
12:39:39-013	*R-C-M*	*Ethernet Packet*	*Link*	*Recieved and dropped packet at interface 1A:42:6D:9E:AD:BA*