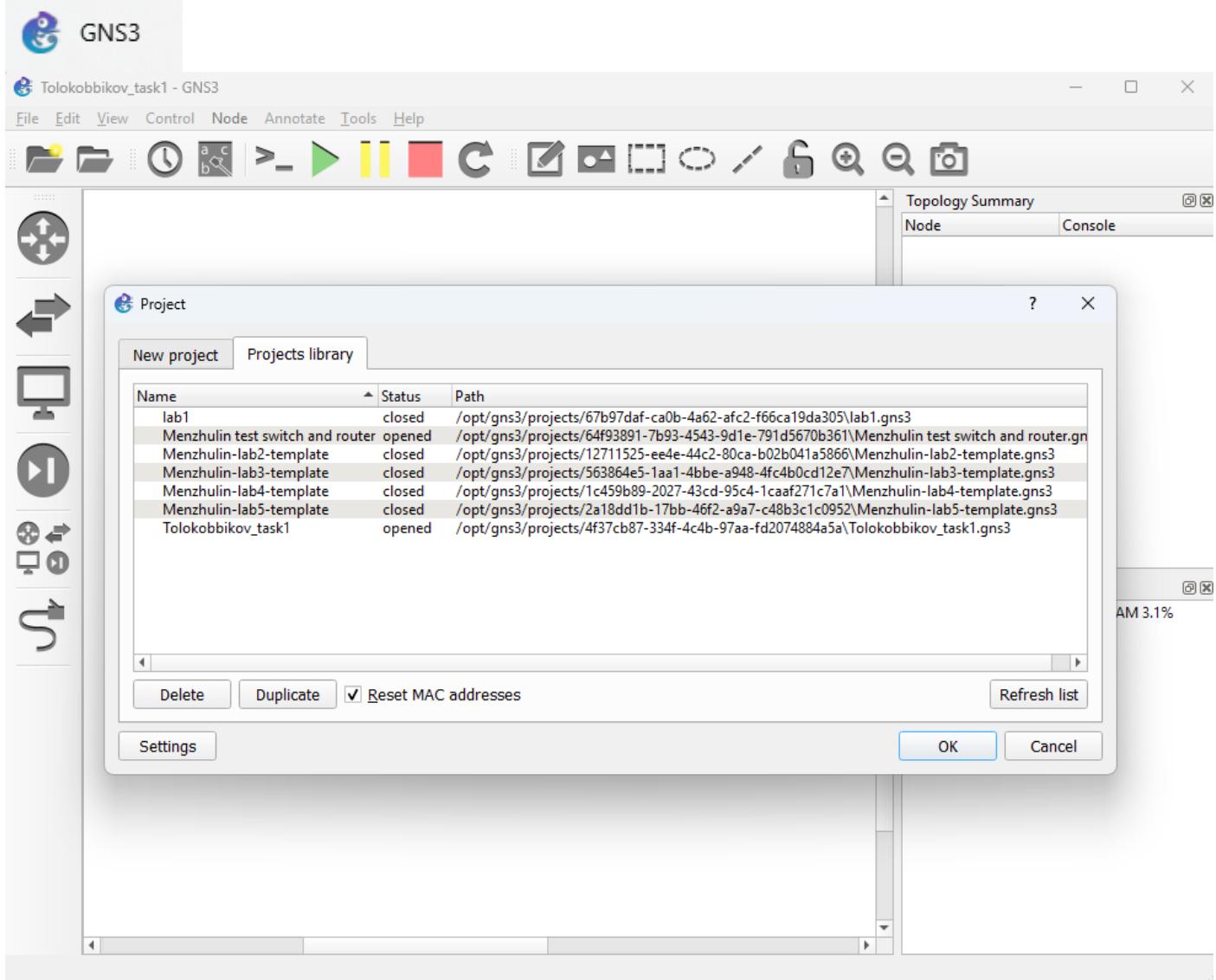
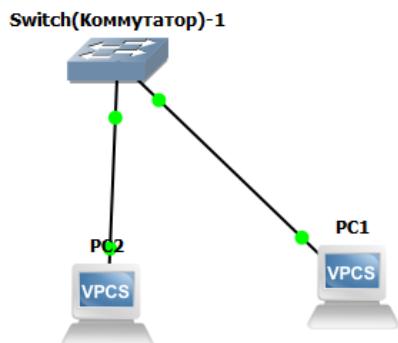


1) Установить и настроить эмулятор GNS3



2) Создать простейшую сеть, состоящую из 1 коммутатора и 2 компьютеров, назначить им произвольные ip адреса из одной сети

Ставим коммутатор, 2 VPSC, подключаем их между собой по Ethernet.



Жмём зелёную кнопку, начинаем симуляцию.

Присваиваем IP. Я перепутал компьютеры местами, поэтому получилось так:

PC1 – 192.168.1.2

PC2 – 192.168.1.1

Маска – 255.255.255.0

```

PC2 - PuTTY
Welcome to Virtual PC Simulator, version 0.8.3
Dedicated to Daling.
Build time: Sep 9 2023 11:15:00
Copyright (c) 2007-2015, Paul Meng (mirnshi@gmail.com)
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VPCS is free software, distributed under the terms of the "BSD" licence.
Source code and license can be found at vpcs.sf.net.
For more information, please visit wiki.freecode.com.cn.

Press '?' to get help.

Executing the startup file

PC2> ip 192.168.1.1 255.255.255.0
Checking for duplicate address...
PC2 : 192.168.1.1 255.255.255.0
PC2> [green square]

PC1 - PuTTY
Welcome to Virtual PC Simulator, version 0.8.3
Dedicated to Daling.
Build time: Sep 9 2023 11:15:00
Copyright (c) 2007-2015, Paul Meng (mirnshi@gmail.com)
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Source code and license can be found at vpcs.sf.net.
For more information, please visit wiki.freecode.com.cn.

Press '?' to get help.

Executing the startup file

PC1> ip 192.168.1.2 255.255.255.0
Checking for duplicate address...
PC1 : 192.168.1.2 255.255.255.0
PC1> [green square]

```

Причём я забыл маску вписать второму, так что по новой.

```

PC2 - PuTTY
Source code and license can be found at vpcs.sf.net.
For more information, please visit wiki.freecode.com.cn.

Press '?' to get help.

Executing the startup file

PC2> ip 192.168.1.1 255.255.255.0
Checking for duplicate address...
PC2 : 192.168.1.1 255.255.255.0
PC2> show ip

NAME      : PC2[1]
IP/MASK   : 192.168.1.1/24
GATEWAY   : 255.255.255.0
DNS       :
MAC       : 00:50:79:66:68:01
LPORT     : 20004
RHOST:PORT : 127.0.0.1:20007
MTU       : 1500
PC2> [green square]

PC1 - PuTTY
IP/MASK    : 192.168.1.2/24
GATEWAY   : 0.0.0.0
DNS       :
MAC       : 00:50:79:66:68:00
LPORT     : 20004
RHOST:PORT : 127.0.0.1:20005
MTU       : 1500

PC1> ip 192.168.1.2 255.255.255.0
Checking for duplicate address...
PC1 : 192.168.1.2 255.255.255.0
PC1> show ip

NAME      : PC1[1]
IP/MASK   : 192.168.1.2/24
GATEWAY   : 255.255.255.0
DNS       :
MAC       : 00:50:79:66:68:00
LPORT     : 20004
RHOST:PORT : 127.0.0.1:20005
MTU       : 1500
PC1> [green square]

```

КОМАНДЫ:

ip 192.168.1.2 255.255.255.0
ip 192.168.1.1 255.255.255.0

И немножко show ip

3) Запустить симуляцию, выполнить команду ping с одного из компьютеров, используя ip адрес второго компьютера

```

PC1 - PuTTY
PC1> ip 192.168.1.2 255.255.255.0
Checking for duplicate address...
PC1 : 192.168.1.2 255.255.255.0

PC1> show ip

NAME      : PC1[1]
IP/MASK   : 192.168.1.2/24
GATEWAY   : 255.255.255.0
DNS       :
MAC       : 00:50:79:66:68:00
LPORT     : 20004
RHOST:PORT : 127.0.0.1:20005
MTU       : 1500

PC1> ping 192.168.1.1

84 bytes from 192.168.1.1 icmp_seq=1 ttl=64 time=8.472 ms
84 bytes from 192.168.1.1 icmp_seq=2 ttl=64 time=0.551 ms
84 bytes from 192.168.1.1 icmp_seq=3 ttl=64 time=0.612 ms
84 bytes from 192.168.1.1 icmp_seq=4 ttl=64 time=0.617 ms
84 bytes from 192.168.1.1 icmp_seq=5 ttl=64 time=2.876 ms

PC1> [green square]

```

КОМАНДА:

ping 192.168.1.1

С первого компьютера с ip 192.168.1.2 пинганули второй с ip 192.168.1.1

4) Перехватить трафик протокола arp на всех линках(nb!), задокументировать и проанализировать заголовки пакетов в программе Wireshark, для фильтрации трафика, относящегося к указанному протоколу использовать фильтры Wireshark

ПКМ на линк, “start capture”, смотрим на пакеты

No.	Time	Source	Destination	Protocol	Length	Info
20	26.868889	0c:87:67:6a:00:00	0c:87:67:6a:00:00	LOOP	60	60 Reply 60 Conf. Root = 32768/1/0c:87:67:6a:00:00 Cost = 0 Port = 0x0000
21	27.995773	0c:87:67:6a:00:00	Nearest-Customer-BR_1- STP	60	60 Conf. Root = 32768/1/0c:87:67:6a:00:00 Cost = 0 Port = 0x0000	
22	29.995487	0c:87:67:6a:00:00	Nearest-Customer-BR_1- STP	60	60 Conf. Root = 32768/1/0c:87:67:6a:00:00 Cost = 0 Port = 0x0000	
23	31.995199	0c:87:67:6a:00:00	Nearest-Customer-BR_1- STP	60	60 Conf. Root = 32768/1/0c:87:67:6a:00:00 Cost = 0 Port = 0x0000	
24	33.994827	0c:87:67:6a:00:00	Nearest-Customer-BR_1- STP	60	60 Conf. Root = 32768/1/0c:87:67:6a:00:00 Cost = 0 Port = 0x0000	
25	35.994553	0c:87:67:6a:00:00	Nearest-Customer-BR_1- STP	60	60 Conf. Root = 32768/1/0c:87:67:6a:00:00 Cost = 0 Port = 0x0000	
26	36.859542	0c:87:67:6a:00:00	LOOP	60	60 Reply 60 Conf. Root = 32768/1/0c:87:67:6a:00:00 Cost = 0 Port = 0x0000	
27	37.994284	0c:87:67:6a:00:00	Nearest-Customer-BR_1- STP	60	60 Conf. Root = 32768/1/0c:87:67:6a:00:00 Cost = 0 Port = 0x0000	
28	38.994006	0c:87:67:6a:00:00	Nearest-Customer-BR_1- STP	60	60 Conf. Root = 32768/1/0c:87:67:6a:00:00 Cost = 0 Port = 0x0000	
29	40.993873	0c:87:67:6a:00:00	CDP/VT/DPF/PagP/UDL_BTP	60	60 Dynamic Trunk Protocol 60 Conf. Root = 32768/1/0c:87:67:6a:00:00 Cost = 0 Port = 0x0000	
30	40.893594	0c:87:67:6a:00:00	CDP/VT/DPF/PagP/UDL_BTP	60	60 Dynamic Trunk Protocol 60 Conf. Root = 32768/1/0c:87:67:6a:00:00 Cost = 0 Port = 0x0000	
31	41.993364	0c:87:67:6a:00:00	Nearest-Customer-BR_1- STP	60	60 Conf. Root = 32768/1/0c:87:67:6a:00:00 Cost = 0 Port = 0x0000	
32	43.993086	0c:87:67:6a:00:00	Nearest-Customer-BR_1- STP	60	60 Conf. Root = 32768/1/0c:87:67:6a:00:00 Cost = 0 Port = 0x0000	
33	45.993013	0c:87:67:6a:00:00	Nearest-Customer-BR_1- STP	60	60 Conf. Root = 32768/1/0c:87:67:6a:00:00 Cost = 0 Port = 0x0000	
34	46.857946	0c:87:67:6a:00:00	LOOP	60	60 Reply 60 Conf. Root = 32768/1/0c:87:67:6a:00:00 Cost = 0 Port = 0x0000	
35	47.992728	0c:87:67:6a:00:00	Nearest-Customer-BR_1- STP	60	60 Conf. Root = 32768/1/0c:87:67:6a:00:00 Cost = 0 Port = 0x0000	
36	48.894422	0c:87:67:6a:00:00	Nearest-Customer-BR_1- STP	60	60 Conf. Root = 32768/1/0c:87:67:6a:00:00 Cost = 0 Port = 0x0000	

Применим фильтр arp

No.	Time	Source	Destination	Protocol	Length	Info
Frame 34: Packet, 60 bytes on wire (480 bits), 60 bytes captured (480 bits) [id=0x00000020:0x00000020]	00:00:00:00:00:00 -> 00:00:00:00:00:00 [ethernet] [ethernet]	00:00:00:00:00:00	00:00:00:00:00:00 [ethernet]	ARP	60	00:00:00:00:00:00 <-> 00:00:00:00:00:00 [arp] [arp]
Frame 35: Packet, 60 bytes on wire (480 bits), 60 bytes captured (480 bits) [id=0x00000021:0x00000021]	00:00:00:00:00:00 -> 00:00:00:00:00:00 [ethernet] [ethernet]	00:00:00:00:00:00	00:00:00:00:00:00 [ethernet]	ARP	60	00:00:00:00:00:00 <-> 00:00:00:00:00:00 [arp] [arp]
Frame 36: Packet, 60 bytes on wire (480 bits), 60 bytes captured (480 bits) [id=0x00000022:0x00000022]	00:00:00:00:00:00 -> 00:00:00:00:00:00 [ethernet] [ethernet]	00:00:00:00:00:00	00:00:00:00:00:00 [ethernet]	ARP	60	00:00:00:00:00:00 <-> 00:00:00:00:00:00 [arp] [arp]
Frame 37: Packet, 60 bytes on wire (480 bits), 60 bytes captured (480 bits) [id=0x00000023:0x00000023]	00:00:00:00:00:00 -> 00:00:00:00:00:00 [ethernet] [ethernet]	00:00:00:00:00:00	00:00:00:00:00:00 [ethernet]	ARP	60	00:00:00:00:00:00 <-> 00:00:00:00:00:00 [arp] [arp]

Снова делаем ping

```
PC1> ping 192.168.1.1

84 bytes from 192.168.1.1 icmp_seq=1 ttl=64 time=0.409 ms
84 bytes from 192.168.1.1 icmp_seq=2 ttl=64 time=0.521 ms
84 bytes from 192.168.1.1 icmp_seq=3 ttl=64 time=1.533 ms
84 bytes from 192.168.1.1 icmp_seq=4 ttl=64 time=3.191 ms
84 bytes from 192.168.1.1 icmp_seq=5 ttl=64 time=7.726 ms
```

КОМАНДА:

ping 192.168.1.1

Снова

No.	Time	Source	Destination	Protocol	Length	Info
347	503.729743	Private_66:68:00	Broadcast	ARP	64	Who has 192.168.1.1? Tell 192.168.1.2
348	503.729816	Private_66:68:01	Private_66:68:00	ARP	64	192.168.1.1 is at 00:50:79:66:68:01

> Frame 347: Packet, 64 bytes on wire (512 bits), 64 bytes captured (512 bits) on interface
> Ethernet II, Src: Private_66:68:00 (00:50:79:66:68:00), Dst: Broadcast (ff:ff:ff:ff:ff:ff)
> Address Resolution Protocol (request)

0000 ff ff ff ff ff ff 00 50 79 66 68 00 08 06 00 01P yfh....
0010 08 00 06 04 00 01 00 50 79 66 68 00 c0 a8 01 02P yfh....
0020 ff ff ff ff ff ff c0 a8 01 01 00 00 00 00 00 00 00
0030 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

> Frame 346: Packet, 64 bytes on wire (512 bits), 64 bytes captured (512 bits) on interface
> Ethernet II, Src: Private_66:68:01 (00:50:79:66:68:01), Dst: Private_66:68:00 (00:50:79:66:68:00)
> Address Resolution Protocol (reply)

0000 00 50 79 66 68 00 00 50 79 66 68 01 08 06 00 01 .Pyfh..P yfh....
0010 08 00 06 04 00 02 00 50 79 66 68 01 c0 a8 01 01P yfh....
0020 00 50 79 66 68 00 c0 a8 01 02 00 00 00 00 00 00Pyfh....
0030 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

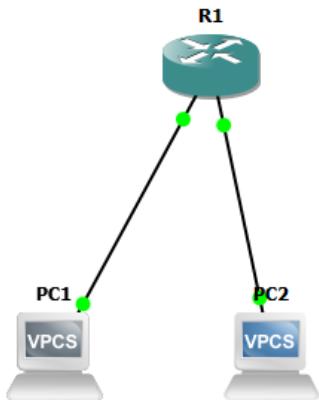
Теперь анализируем пакеты arp после ping:

На каждом линке два пакета. Первый - broadcast, то есть для всех. В инфо сказано "Who has 192.168.1.1"? Tell 192.168.1.2. Что прямым текстом говорит, что мы по всей сети ищем обладателя такого ip и просим нам ответить назад, оставив свой ip.

Так как 192.168.1.1 есть в сети, то он пакет получил и отправил уже приватный ответ для 192.168.1.2, не зачем бродкастом опять кричать. В ответ причём он сообщил свой MAC адрес. Мол «Я тут».

Заголовки рассмотрим, проанализируем и сравним в конце отчёта, чтобы было, что сравнивать

5) Создать простейшую сеть, состоящую из 1 маршрутизатора и 2 компьютеров, назначить им произвольные ip адреса из разных сетей



Настроим маршрутизатор

```
R1#configure
Configuring from terminal, memory, or network [terminal]? terminal
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#interface FastEthernet0/0
R1(config-if)#ip address 192.168.1.1 255.255.255.0
R1(config-if)#no shutdown
R1(config-if)#des
*Mar 1 00:04:01.967: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up
*Mar 1 00:04:02.967: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
R1(config-if)#description "To PC1"
R1(config-if)#exit
R1(config)#interface FastEthernet1/0
R1(config-if)#ip address 192.168.2.1 255.255.255.0
R1(config-if)#no shutdown
R1(config-if)#
*Mar 1 00:05:08.247: %LINK-3-UPDOWN: Interface FastEthernet1/0, changed state to up
*Mar 1 00:05:09.247: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet1/0, changed state to up
R1(config-if)#description "To PC2"
R1(config-if)#exit
R1(config)#exit
R1#
*Mar 1 00:05:55.131: %SYS-5-CONFIG_I: Configured from console by console
R1#show ip
% Incomplete command.

R1#show ip interface brief
Interface          IP-Address      OK? Method Status          Protocol
FastEthernet0/0    192.168.1.1    YES manual up           up
FastEthernet1/0    192.168.2.1    YES manual up           up
Ethernet2/0        unassigned     YES unset administratively down down
Ethernet2/1        unassigned     YES unset administratively down down
Ethernet2/2        unassigned     YES unset administratively down down
Ethernet2/3        unassigned     YES unset administratively down down
Serial3/0          unassigned     YES unset administratively down down
Serial3/1          unassigned     YES unset administratively down down
Serial3/2          unassigned     YES unset administratively down down
Serial3/3          unassigned     YES unset administratively down down
R1#
```

Ещё запишем конфигурацию

```
R1#write memory
Building configuration...
[OK]
R1#
```

На всякий

КОМАНДЫ:

```
configure
interface FastEthernet0/0
address 192.168.1.1 255.255.255.0
no shutdown
description "To PC1" - опционально
exit
interface FastEthernet1/0
address 192.168.2.1 255.255.255.0
no shutdown
description "To PC2" - опционально
exit
exit
show ip - тоже опционально
write memory
```

Теперь настроим компьютеры

```
PC1 - PuTTY
Dedicated to Daling.
Build time: Sep 9 2023 11:15:00
Copyright (c) 2007-2015, Paul Meng (mirnshi@gmail.com)
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Source code and license can be found at vpcs.sf.net.
For more information, please visit wiki.freecode.com.cn.

Press '?' to get help.

Executing the startup file

PC1> ip 192.168.1.1 255.255.255.0
Checking for duplicate address...
192.168.1.1 is being used by MAC cc:01:0e:5e:00:00
Address not changed

PC1> ip 192.168.1.2 255.255.255.0
Checking for duplicate address...
PC1 : 192.168.1.2 255.255.255.0

PC1> [redacted]

PC2 - PuTTY
Welcome to Virtual PC Simulator, version 0.8.3
Dedicated to Daling.
Build time: Sep 9 2023 11:15:00
Copyright (c) 2007-2015, Paul Meng (mirnshi@gmail.com)
All rights reserved.

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Source code and license can be found at vpcs.sf.net.
For more information, please visit wiki.freecode.com.cn.

Press '?' to get help.

Executing the startup file

PC2> ip 192.168.2.2 255.255.255.0
Checking for duplicate address...
PC2 : 192.168.2.2 255.255.255.0

PC2> [redacted]
```

PC1 теперь с логичным ему ip – 192.168.1.2

PC2 – 192.168.2.2

```
PC1 : 192.168.1.2 255.255.255.0

PC1> ping 192.168.2.2

host (255.255.255.0) not reachable

PC1> PC1 : 192.168.1.2 255.255.255.0
Bad command: "PC1 : 192.168.1.2 255.255.255.0". Use ? for help.

PC1> [redacted]
```

Оказалось, забыл шлюз указать. Исправляю:

```
PC1 - PuTTY
Executing the startup file

PC1> ip 192.168.1.1 255.255.255.0
Checking for duplicate address...
192.168.1.1 is being used by MAC cc:01:0e:5e:00:00
Address not changed

PC1> ip 192.168.1.2 255.255.255.0
Checking for duplicate address...
PC1 : 192.168.1.2 255.255.255.0

PC1> ping 192.168.2.2

host (255.255.255.0) not reachable

PC1> PC1 : 192.168.1.2 255.255.255.0
Bad command: "PC1 : 192.168.1.2 255.255.255.0". Use ? for help.

PC1> ip 192.168.1.2 255.255.255.0 192.168.1.1
Checking for duplicate address...
PC1 : 192.168.1.2 255.255.255.0 gateway 192.168.1.1

PC1> [redacted]

PC2 - PuTTY
Welcome to Virtual PC Simulator, version 0.8.3
Dedicated to Daling.
Build time: Sep 9 2023 11:15:00
Copyright (c) 2007-2015, Paul Meng (mirnshi@gmail.com)
All rights reserved.

VPCS is free software, distributed under the terms of the "BSD" licence.
Source code and license can be found at vpcs.sf.net.
For more information, please visit wiki.freecode.com.cn.

Press '?' to get help.

Executing the startup file

PC2> ip 192.168.2.2 255.255.255.0
Checking for duplicate address...
PC2 : 192.168.2.2 255.255.255.0

PC2> ip 192.168.2.2 255.255.255.0 192.168.2.1
Checking for duplicate address...
PC2 : 192.168.2.2 255.255.255.0 gateway 192.168.2.1

PC2> [redacted]
```

КОМАНДЫ:

ip 192.168.1.2 255.255.255.0 192.168.1.1

ip 192.168.2.2 255.255.255.0 192.168.2.1

6) Запустить симуляцию, выполнить команду ping с одного из компьютеров, используя ip адрес

второго компьютера

```
PC1> ping 192.168.2.2

192.168.2.2 icmp_seq=1 timeout
84 bytes from 192.168.2.2 icmp_seq=2 ttl=63 time=13.299 ms
84 bytes from 192.168.2.2 icmp_seq=3 ttl=63 time=16.335 ms
84 bytes from 192.168.2.2 icmp_seq=4 ttl=63 time=16.338 ms
84 bytes from 192.168.2.2 icmp_seq=5 ttl=63 time=16.039 ms

PC1> ping 192.168.2.2

84 bytes from 192.168.2.2 icmp_seq=1 ttl=63 time=19.489 ms
84 bytes from 192.168.2.2 icmp_seq=2 ttl=63 time=16.238 ms
84 bytes from 192.168.2.2 icmp_seq=3 ttl=63 time=15.655 ms
84 bytes from 192.168.2.2 icmp_seq=4 ttl=63 time=16.068 ms
84 bytes from 192.168.2.2 icmp_seq=5 ttl=63 time=15.347 ms

PC1> [redacted]
```

```
PC2> ping 192.168.1.2
```

```
84 bytes from 192.168.1.2 icmp_seq=1 ttl=63 time=10.476 ms
84 bytes from 192.168.1.2 icmp_seq=2 ttl=63 time=17.236 ms
84 bytes from 192.168.1.2 icmp_seq=3 ttl=63 time=16.506 ms
84 bytes from 192.168.1.2 icmp_seq=4 ttl=63 time=16.841 ms
84 bytes from 192.168.1.2 icmp_seq=5 ttl=63 time=16.921 ms
```

```
PC2> █
```

Куда первый подевался, не очень понятно. Но работает теперь КОМАНДЫ:

```
ping 192.168.2.2
```

```
ping 192.168.1.2
```

7) Перехватить трафик протокола arp и icmp на всех линках(nb!), задокументировать и проанализировать заголовки пакетов в программе Wireshark, для фильтрации трафика, относящегося к указанному протоколу использовать фильтры Wireshark

```
PC1> ping 192.168.2.2
```

```
84 bytes from 192.168.2.2 icmp_seq=1 ttl=63 time=29.769 ms
84 bytes from 192.168.2.2 icmp_seq=2 ttl=63 time=17.100 ms
84 bytes from 192.168.2.2 icmp_seq=3 ttl=63 time=15.973 ms
84 bytes from 192.168.2.2 icmp_seq=4 ttl=63 time=16.700 ms
84 bytes from 192.168.2.2 icmp_seq=5 ttl=63 time=16.690 ms
```

```
PC1> █
```

Захват с Standard input [PC1 Ethernet0 to R1 FastEthernet0/0]

Файл Правка Вид Запуск Захват Анализ Статистика Телефония Беспроводная связь Инструменты Справка

arp

No.	Time	Source	Destination	Protocol	Length	Info
11	92.747921	Private_66:68:00	Broadcast	ARP	64	who has 192.168.1.1? Tell 192.168.1.2
12	92.753776	cc:01:0e:5e:00:00	Private_66:68:00	ARP	60	192.168.1.1 is at cc:01:0e:5e:00:00

> Frame 11: Packet, 64 bytes on wire (512 bits), 64 bytes captured (512 bits) on interface
> Ethernet II, Src: Private_66:68:00 (00:50:79:66:68:00), Dst: Broadcast (ff:ff:ff:ff:ff:
> Address Resolution Protocol (request)

0000 ff ff ff ff ff ff 00 50 79 66 68 00 08 06 00 01 .Pyfh...
0010 08 00 06 04 00 01 00 50 79 66 68 00 c0 a8 01 02 ..Pyfh...
0020 ff ff ff ff ff ff c0 a8 01 01 00 00 00 00 00 00
0030 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

Address Resolution Protocol: Protocol

Захват с Standard input [PC2 Ethernet0 to R1 FastEthernet1/0]

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arp

No.	Time	Source	Destination	Protocol	Length	Info
12	92.753888	Private_66:68:01	Broadcast	ARP	64	who has 192.168.2.1? Tell 192.168.2.2
13	92.763834	cc:01:0e:5e:00:10	Private_66:68:01	ARP	60	192.168.2.1 is at cc:01:0e:5e:00:10

> Frame 13: Packet, 60 bytes on wire (480 bits), 60 bytes captured (480 bits) on interface
> Ethernet II, Src: cc:01:0e:5e:00:10 (cc:01:0e:5e:00:10), Dst: Private_66:68:01 (00:50:7
> Address Resolution Protocol (reply)

0000 00 50 79 66 68 01 cc 01 0e 5e 00 10 08 06 00 01 .Pyfh... ^.....
0010 08 00 06 04 00 02 cc 01 0e 5e 00 10 c0 a8 02 01 ..Pyfh... ..
0020 00 50 79 66 68 01 c0 a8 02 02 00 00 00 00 00 00 ..Pyfh... ..
0030 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

Ну, кстати, не так часто пакетами обмениваются на фоне прошлой структуры

Screenshot 1: Network traffic capture on interface R1 FastEthernet0/0

Frame 1: Packet, 60 bytes on wire (480 bits), 60 bytes captured (480 bits) on interface Ethernet II, Src: cc:01:0e:5e:00:00 (cc:01:0e:5e:00:00), Dst: cc:01:0e:5e:00:00 (cc:01:0e:5e:00:00) Configuration Test Protocol (loopback)
Data (48 bytes)

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	cc:01:0e:5e:00:00	cc:01:0e:5e:00:00	LOOP	60	Reply
2	10.425467	cc:01:0e:5e:00:00	cc:01:0e:5e:00:00	LOOP	60	Reply
3	14.262991	cc:01:0e:5e:00:00	cc:01:0e:5e:00:00	CDP/VT/PDTP/PAgP/UDL_CDP	347	Device ID: R1 Port ID: FastEthernet0/0
4	20.817268	cc:01:0e:5e:00:00	cc:01:0e:5e:00:00	LOOP	60	Reply

Screenshot 2: Network traffic capture on interface R1 FastEthernet1/0

Frame 1: Packet, 60 bytes on wire (480 bits), 60 bytes captured (480 bits) on interface Ethernet II, Src: cc:01:0e:5e:00:10 (cc:01:0e:5e:00:10), Dst: cc:01:0e:5e:00:10 (cc:01:0e:5e:00:10) Configuration Test Protocol (loopback)
Data (48 bytes)

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000056	cc:01:0e:5e:00:10	cc:01:0e:5e:00:10	LOOP	60	Reply
2	10.435556	cc:01:0e:5e:00:10	cc:01:0e:5e:00:10	LOOP	60	Reply
3	20.827359	cc:01:0e:5e:00:10	cc:01:0e:5e:00:10	LOOP	60	Reply
4	25.710618	cc:01:0e:5e:00:10	cc:01:0e:5e:00:10	CDP/VT/PDTP/PAgP/UDL_CDP	347	Device ID: R1 Port ID: FastEthernet1/0

Screenshot 3: Network traffic capture on interface R1 FastEthernet0/0 (ARP)

Frame 11: Packet, 64 bytes on wire (512 bits), 64 bytes captured (512 bits) on interface Ethernet II, Src: Private_66:68:00 (00:50:79:66:68:00), Dst: Broadcast (ff:ff:ff:ff:ff:ff)
Type: ARP (0x0806) [Stream index: 2]
Padding: 00000000000000000000000000000000
Frame check sequence: 0x00000000 [unverified]
[FCS Status: Unverified]
> Address Resolution Protocol (request)

No.	Time	Source	Destination	Protocol	Length	Info
11	92.747921	Private_66:68:00	Broadcast	ARP	64	Who has 192.168.1.1? Tell 192.168.1.2
12	92.753776	cc:01:0e:5e:00:00	Private_66:68:00	ARP	60	192.168.1.1 is at cc:01:0e:5e:00:00

Screenshot 4: Network traffic capture on interface R1 FastEthernet1/0 (ARP)

Frame 12: Packet, 64 bytes on wire (512 bits), 64 bytes captured (512 bits) on interface Ethernet II, Src: Private_66:68:01 (00:50:79:66:68:01), Dst: Broadcast (ff:ff:ff:ff:ff:ff)
Type: ARP (0x0806) [Stream index: 2]
Padding: 00000000000000000000000000000000
Frame check sequence: 0x00000000 [unverified]
[FCS Status: Unverified]
> Address Resolution Protocol (request)

No.	Time	Source	Destination	Protocol	Length	Info
12	92.753888	Private_66:68:01	Broadcast	ARP	64	Who has 192.168.2.1? Tell 192.168.2.2
13	92.763834	cc:01:0e:5e:00:10	Private_66:68:01	ARP	60	192.168.2.1 is at cc:01:0e:5e:00:10

Screenshot 5: Network traffic capture on interface R1 FastEthernet0/0 (ARP details)

Frame 13: Packet, 60 bytes on wire (480 bits), 60 bytes captured (480 bits) on interface Ethernet II, Src: cc:01:0e:5e:00:10 (cc:01:0e:5e:00:10), Dst: Private_66:68:01 (00:50:79:66:68:01)
Destination: Private_66:68:01 (00:50:79:66:68:01)
Source: cc:01:0e:5e:00:10 (cc:01:0e:5e:00:10)
Type: ARP (0x0806) [Stream index: 2]

No.	Time	Source	Destination	Protocol	Length	Info
13	92.763834	cc:01:0e:5e:00:10	Private_66:68:01	ARP	60	192.168.2.1 is at cc:01:0e:5e:00:10

Из прошлого сетапа:

The screenshots show two NetworkMiner captures. The top capture is titled 'Захват с Standard input [PC2 Ethernet0 to Switch(Коммутатор)-1 Ethernet0]' and the bottom one is 'Захват с Standard input [PC1 Ethernet0 to Switch(Коммутатор)-1 Ethernet1]'. Both captures show ARP traffic. In the top capture, frame 347 is a request from Private_66:68:00 to Broadcast (ff:ff:ff:ff:ff:ff) asking for the MAC address of 192.168.1.1. Frame 348 is a reply from Broadcast (ff:ff:ff:ff:ff:ff) telling Private_66:68:01 that 192.168.1.1 is at 00:50:79:66:68:01. In the bottom capture, frame 345 is a request from Private_66:68:01 to Broadcast (ff:ff:ff:ff:ff:ff) asking for the MAC address of 192.168.1.1. Frame 346 is a reply from Broadcast (ff:ff:ff:ff:ff:ff) telling Private_66:68:01 that 192.168.1.1 is at 00:50:79:66:68:00.

Отличия в заголовках в том, что маршрутизатор при пересылке меняет Source пакета, а коммутатор этого не делает.

С коммутатором:

Пакет шёл с source: private_66:68:00, через коммутатор так и прошёл, не изменился source.

Ответный пакет шёл с source: private_66:68:01, так и остался private_66:68:01

С маршрутизатором:

Пакет шёл с source: private_66:68:00, через маршрутизатор прошёл и стал source: private_66:68:01.

Мол, теперь это пакет, высенный маршрутизатором. Поменялся мак адрес отправителя.

И ответ теперь тоже маршрутизатору, destination: cc:01:0e:5e:00:10, но маршрутизатор меняет destination на private_66:68:00. PC1 успешно получает свой пакет через маршрутизатор.