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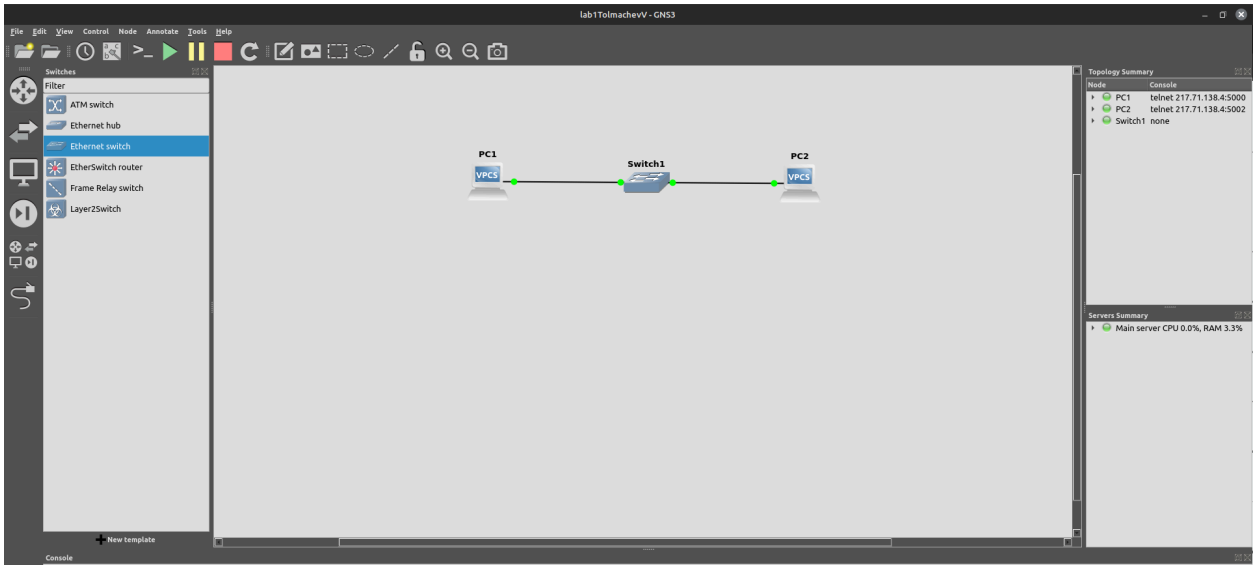
1 лабораторная работа, модуль 4

1)Установка (Linux Mint)

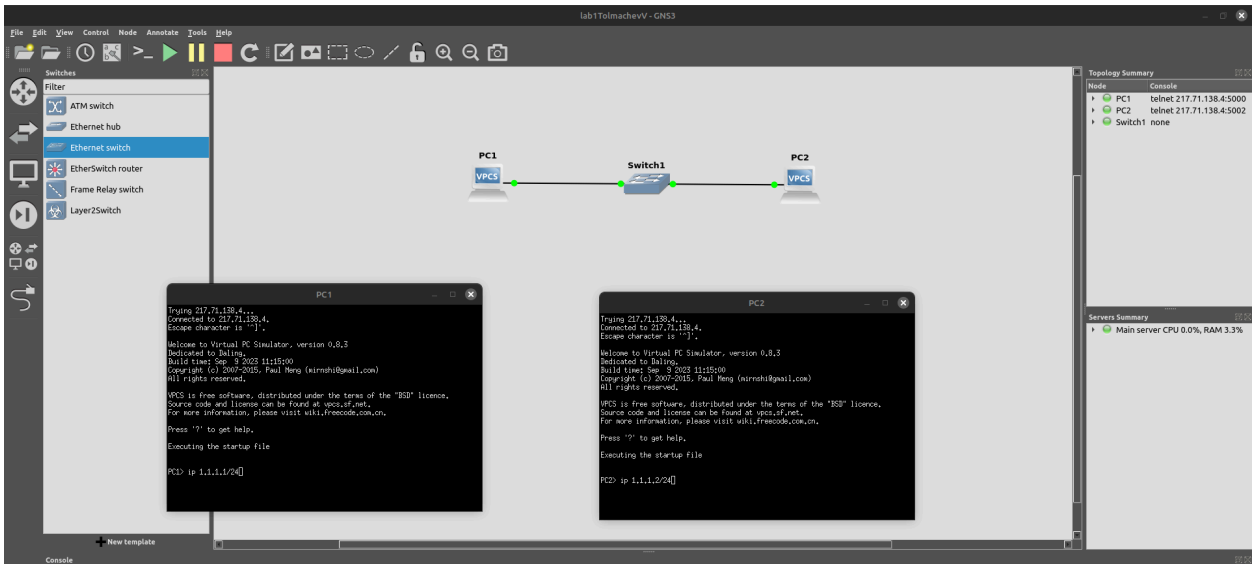
sudo add-apt-repository ppa:gns3/ppa
sudo apt update
sudo apt install gns3-gui gns3-server

Настройка gns3 была выполнена, исходя из инструкций.

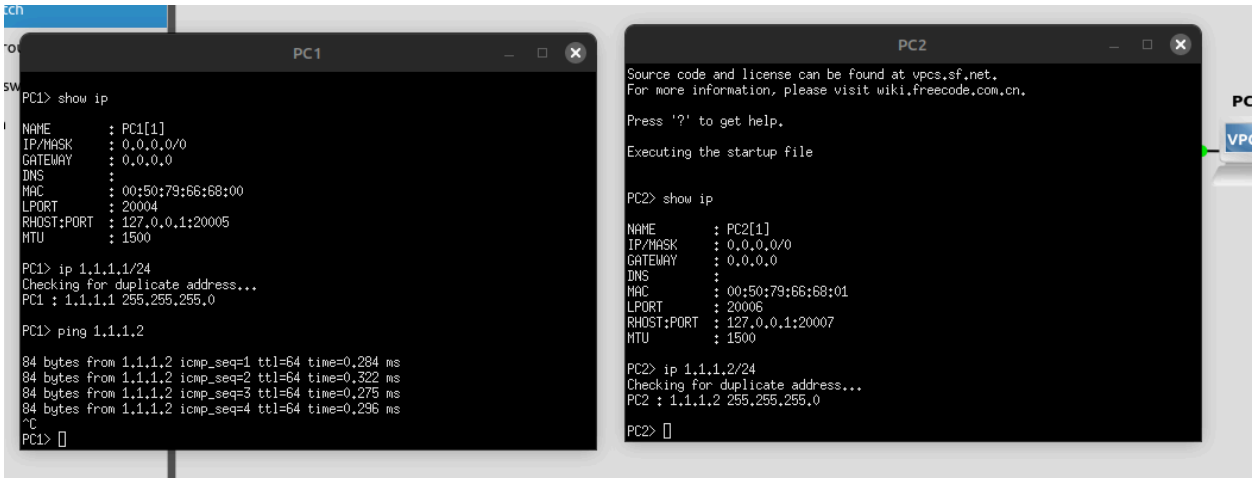
Добавление двух компьютеров и коммутаторов



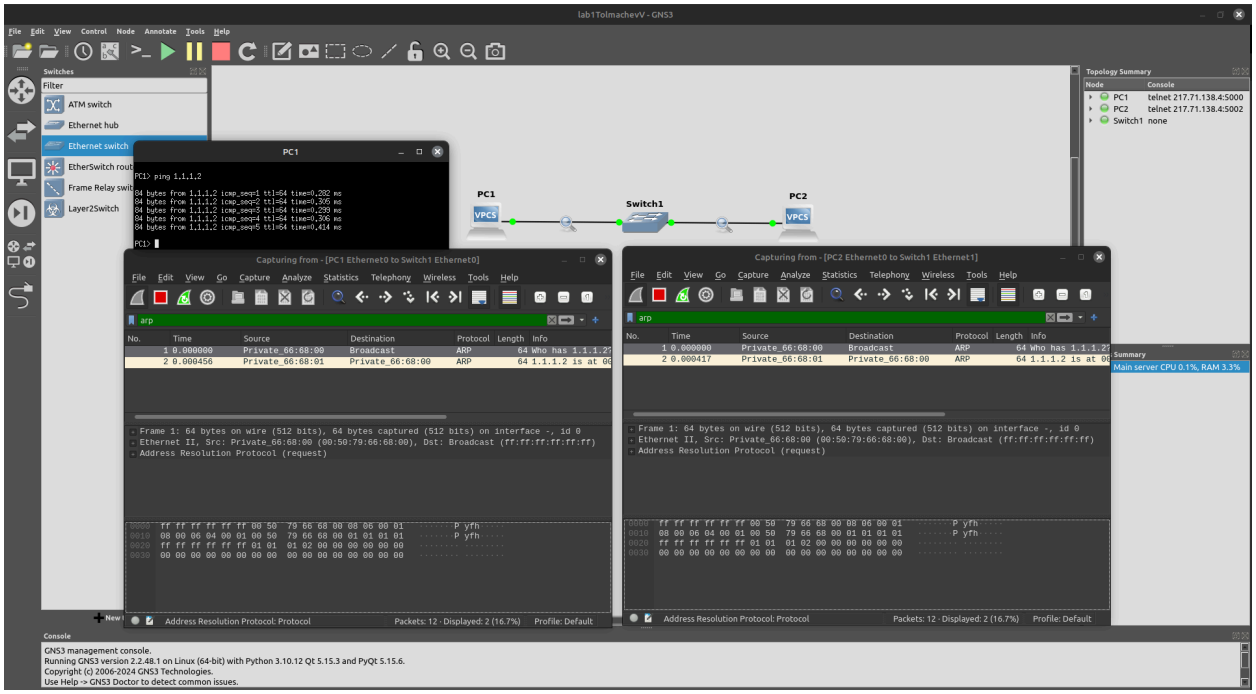
Смена IP адресов на 1.1.1.1 и 1.1.1.2 с маской 24



Команда ping 1.1.1.2 с PC1 (1.1.1.2 - IPv4 PC2)



Захват трафика протокола arp



Пакеты PC1:

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	Private_66:68:00	Broadcast	ARP	64	Who has 1.1.1.2? Tell 1.1.1.1

Frame 1: 64 bytes on wire (512 bits), 64 bytes captured (512 bits) on interface -, id 0
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)

No.	Time	Source	Destination	Protocol	Length	Info
2	0.000456	Private_66:68:01	Private_66:68:00	ARP	64	1.1.1.2 is at 00:50:79:66:68:01

Frame 2: 64 bytes on wire (512 bits), 64 bytes captured (512 bits) on interface -, id 0
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)

Frame 1 - запрос с PC1 (mac адрес 00:50:79:66:68:00) по широковещательному каналу, с целью узнать какому mac адресу соответствует IP 1.1.1.2 в локальной сети. Устройства чьи ip адреса не совпадают с отправленным, отбрасывают пакет, а то чей ip адрес совпал отвечает

Frame 2 - ответ от PC2 (так как его IP - 1.1.1.2), содержащий его mac адрес (00:50:79:66:68:01).

Пакеты PC2:

o. Time Source Destination Protocol Length Info
1 0.000000 Private_66:68:00 Broadcast ARP 64 Who has 1.1.1.2? Tell 1.1.1.1

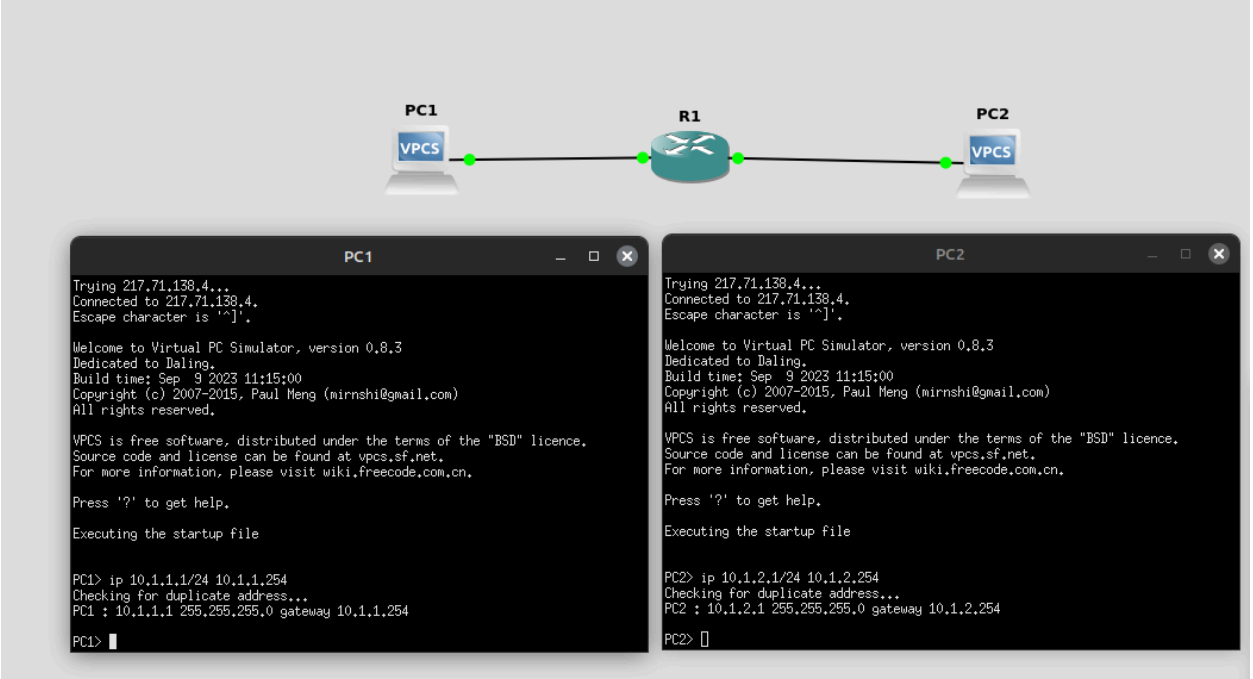
Frame 1: 64 bytes on wire (512 bits), 64 bytes captured (512 bits) on interface -, id 0
Ethernet II, Src: Private_66:68:00 (00:50:79:66:68:00), Dst: Broadcast (ff:ff:ff:ff:ff:ff)
Address Resolution Protocol (request)

No. Time Source Destination Protocol Length Info
2 0.000417 Private_66:68:01 Private_66:68:00 ARP 64 1.1.1.2 is at 00:50:79:66:68:01

Frame 2: 64 bytes on wire (512 bits), 64 bytes captured (512 bits) on interface -, id 0
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)

Frame 1: получение arp запроса с PC1.
Frame 2: отправка собственного mac адреса на PC1, так как ip адрес совпал с принятым в arp запросе.

Создание 2 ПК и маршрутизатора, назначение ПК ip, находящимся в разных сетях с помощью команды ip адрес/маска широковещательный адрес .

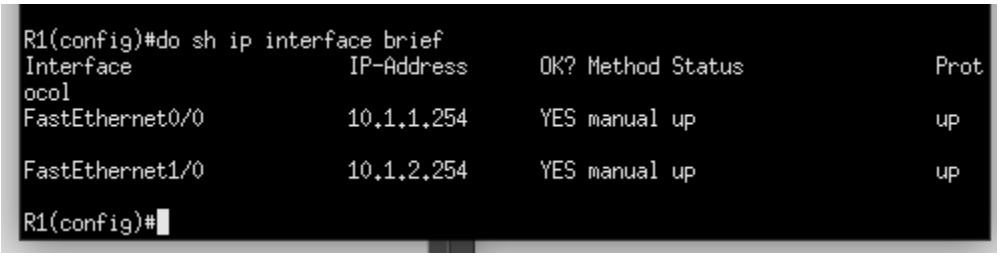


В консоли роутера изменяем конфигурацию:
config
interface FastEthernet 0/0 - выбираем интерфейс
Ip add 10.1.1.254 255.255.255.0 - добавляем широковещательный адрес PC1
no shut

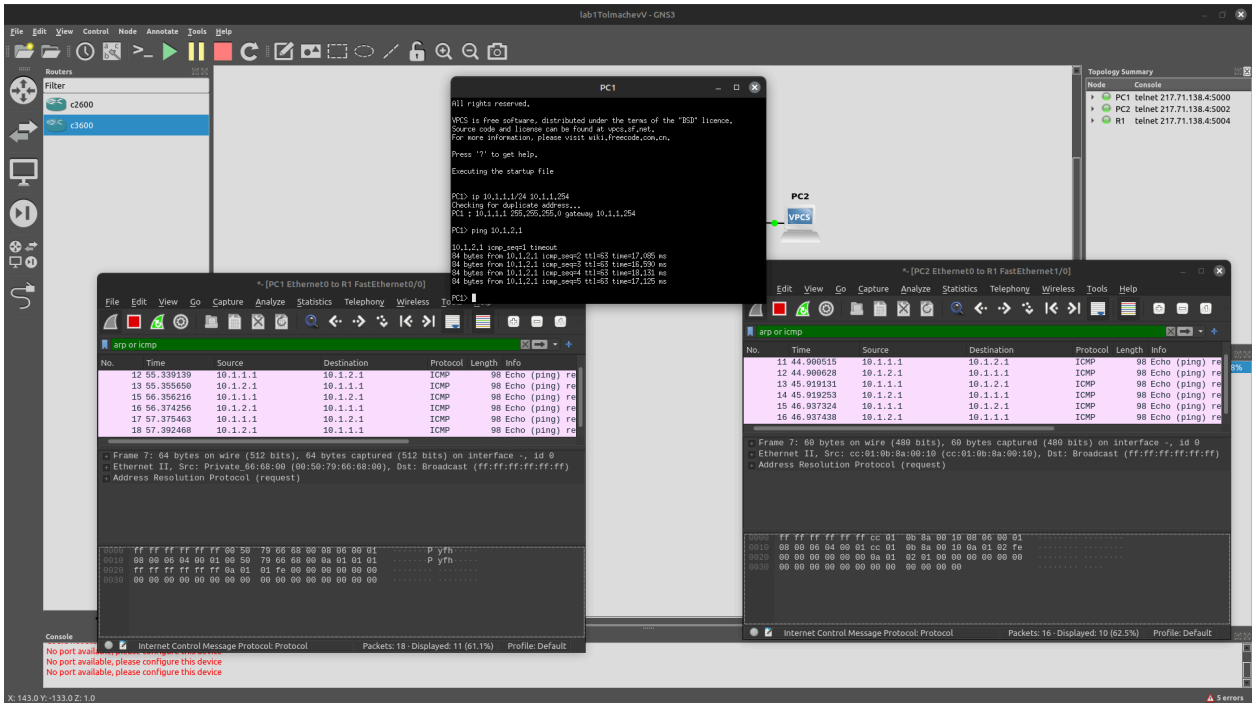
Тоже самое проделываем для другого интерфейса с широковещательным адресом PC2

config
interface FastEthernet 1/0 - выбираем интерфейс
Ip add 10.1.2.254 255.255.255.0 - добавляем широковещательный адрес PC2
no shut

Вводим команду do sh ip interface brief для просмотра того что сделали



Вводим команду ping 10.1.2.1 в консоли PC1 , предварительно запустив захват при помощи wireshark с фильтром arp or icmp для просмотра только arp и icmp пакетов



Пакеты PC1:

No. Time Source Destination Protocol Length Info
7 52.312071 Private_66:68:00 Broadcast ARP 64 Who has 10.1.1.254? Tell 10.1.1.1

Frame 7: 64 bytes on wire (512 bits), 64 bytes captured (512 bits) on interface -, id 0
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)

No. Time Source Destination Protocol Length Info
8 52.320115 cc:01:0b:8a:00:00 Private_66:68:00 ARP 60 10.1.1.254 is at cc:01:0b:8a:00:00

Арп запрос на широковещательный адрес PC1 от PC1

Frame 8: 60 bytes on wire (480 bits), 60 bytes captured (480 bits) on interface -, id 0
Ethernet II, Src: cc:01:0b:8a:00:00 (cc:01:0b:8a:00:00), Dst: Private_66:68:00 (00:50:79:66:68:00)
Address Resolution Protocol (reply)

No. Time Source Destination Protocol Length Info
9 52.320593 10.1.1.1 10.1.2.1 ICMP 98 Echo (ping) request id=0x2edd, seq=1/256, ttl=64 (no response found!)

Ответ на предыдущий запрос, содержащий mac адрес

Frame 9: 98 bytes on wire (784 bits), 98 bytes captured (784 bits) on interface -, id 0
Ethernet II, Src: Private_66:68:00 (00:50:79:66:68:00), Dst: cc:01:0b:8a:00:00 (cc:01:0b:8a:00:00)
Internet Protocol Version 4, Src: 10.1.1.1, Dst: 10.1.2.1
Internet Control Message Protocol

No. Time Source Destination Protocol Length Info
10 54.321068 10.1.1.1 10.1.2.1 ICMP 98 Echo (ping) request id=0x30dd, seq=2/512, ttl=64 (reply in 11)

Отправка запроса ping 10.1.2.1

Frame 10: 98 bytes on wire (784 bits), 98 bytes captured (784 bits) on interface -, id 0
Ethernet II, Src: Private_66:68:00 (00:50:79:66:68:00), Dst: cc:01:0b:8a:00:00 (cc:01:0b:8a:00:00)
Internet Protocol Version 4, Src: 10.1.1.1, Dst: 10.1.2.1
Internet Control Message Protocol

No. Time Source Destination Protocol Length Info
11 54.338031 10.1.2.1 10.1.1.1 ICMP 98 Echo (ping) reply id=0x30dd, seq=2/512, ttl=63 (request in 10)

Отправка запроса ping 10.1.2.1

Frame 11: 98 bytes on wire (784 bits), 98 bytes captured (784 bits) on interface -, id 0
Ethernet II, Src: cc:01:0b:8a:00:00 (cc:01:0b:8a:00:00), Dst: Private_66:68:00 (00:50:79:66:68:00)
Internet Protocol Version 4, Src: 10.1.2.1, Dst: 10.1.1.1
Internet Control Message Protocol

No. Time Source Destination Protocol Length Info
12 55.339139 10.1.1.1 10.1.2.1 ICMP 98 Echo (ping) request id=0x31dd, seq=3/768, ttl=64 (reply in 13)

Получение ответа от PC2 PC1

Frame 12: 98 bytes on wire (784 bits), 98 bytes captured (784 bits) on interface -, id 0

Ethernet II, Src: Private_66:68:00 (00:50:79:66:68:00), Dst: cc:01:0b:8a:00:00 (cc:01:0b:8a:00:00)
Internet Protocol Version 4, Src: 10.1.1.1, Dst: 10.1.2.1
Internet Control Message Protocol

No. Time Source Destination Protocol Length Info
13 55.355650 10.1.2.1 10.1.1.1 ICMP 98 Echo (ping) reply id=0x31dd, seq=3/768, ttl=63 (request in 12)

Отправка запроса ping 10.1.2.1

Frame 13: 98 bytes on wire (784 bits), 98 bytes captured (784 bits) on interface -, id 0
Ethernet II, Src: cc:01:0b:8a:00:00 (cc:01:0b:8a:00:00), Dst: Private_66:68:00 (00:50:79:66:68:00)
Internet Protocol Version 4, Src: 10.1.2.1, Dst: 10.1.1.1
Internet Control Message Protocol

No. Time Source Destination Protocol Length Info
15 56.356216 10.1.1.1 10.1.2.1 ICMP 98 Echo (ping) request id=0x32dd, seq=4/1024, ttl=64 (reply in 16)
Получение ответа от PC2 PC1

Frame 15: 98 bytes on wire (784 bits), 98 bytes captured (784 bits) on interface -, id 0
Ethernet II, Src: Private_66:68:00 (00:50:79:66:68:00), Dst: cc:01:0b:8a:00:00 (cc:01:0b:8a:00:00)
Internet Protocol Version 4, Src: 10.1.1.1, Dst: 10.1.2.1
Internet Control Message Protocol

No. Time Source Destination Protocol Length Info
16 56.374256 10.1.2.1 10.1.1.1 ICMP 98 Echo (ping) reply id=0x32dd, seq=4/1024, ttl=63 (request in 15)

Отправка запроса ping 10.1.2.1

Frame 16: 98 bytes on wire (784 bits), 98 bytes captured (784 bits) on interface -, id 0
Ethernet II, Src: cc:01:0b:8a:00:00 (cc:01:0b:8a:00:00), Dst: Private_66:68:00 (00:50:79:66:68:00)
Internet Protocol Version 4, Src: 10.1.2.1, Dst: 10.1.1.1
Internet Control Message Protocol

No. Time Source Destination Protocol Length Info

17 57.375463 10.1.1.1 10.1.2.1 ICMP 98 Echo (ping) request id=0x33dd, seq=5/1280, ttl=64 (reply in 18)

Получение ответа от PC2 PC1

Frame 17: 98 bytes on wire (784 bits), 98 bytes captured (784 bits) on interface -, id 0
Ethernet II, Src: Private_66:68:00 (00:50:79:66:68:00), Dst: cc:01:0b:8a:00:00 (cc:01:0b:8a:00:00)
Internet Protocol Version 4, Src: 10.1.1.1, Dst: 10.1.2.1
Internet Control Message Protocol

No. Time Source Destination Protocol Length Info
18 57.392468 10.1.2.1 10.1.1.1 ICMP 98 Echo (ping) reply id=0x33dd, seq=5/1280, ttl=63 (request in 17)

Frame 18: 98 bytes on wire (784 bits), 98 bytes captured (784 bits) on interface -, id 0
Ethernet II, Src: cc:01:0b:8a:00:00 (cc:01:0b:8a:00:00), Dst: Private_66:68:00 (00:50:79:66:68:00)
Internet Protocol Version 4, Src: 10.1.2.1, Dst: 10.1.1.1
Internet Control Message Protocol

Отправка запроса ping 10.1.2.1

Пакеты PC2:

No. Time Source Destination Protocol Length Info
7 41.885170 cc:01:0b:8a:00:10 Broadcast ARP 60 Who has 10.1.2.1? Tell 10.1.2.254

Frame 7: 60 bytes on wire (480 bits), 60 bytes captured (480 bits) on interface -, id 0
Ethernet II, Src: cc:01:0b:8a:00:10 (cc:01:0b:8a:00:10), Dst: Broadcast (ff:ff:ff:ff:ff:ff)
Address Resolution Protocol (request)

No. Time Source Destination Protocol Length Info
8 41.885257 Private_66:68:01 cc:01:0b:8a:00:10 ARP 60 10.1.2.1 is at 00:50:79:66:68:01

Запрос mac адреса PC2 от PC1

Frame 8: 60 bytes on wire (480 bits), 60 bytes captured (480 bits) on interface -, id 0
Ethernet II, Src: Private_66:68:01 (00:50:79:66:68:01), Dst: cc:01:0b:8a:00:10 (cc:01:0b:8a:00:10)
Address Resolution Protocol (reply)

No. Time Source Destination Protocol Length Info
9 43.882923 10.1.1.1 10.1.2.1 ICMP 98 Echo (ping) request id=0x30dd, seq=2/512, ttl=63 (reply in 10)

Ответ

Frame 9: 98 bytes on wire (784 bits), 98 bytes captured (784 bits) on interface -, id 0
Ethernet II, Src: cc:01:0b:8a:00:10 (cc:01:0b:8a:00:10), Dst: Private_66:68:01 (00:50:79:66:68:01)
Internet Protocol Version 4, Src: 10.1.1.1, Dst: 10.1.2.1
Internet Control Message Protocol

No. Time Source Destination Protocol Length Info
10 43.883046 10.1.2.1 10.1.1.1 ICMP 98 Echo (ping) reply id=0x30dd, seq=2/512, ttl=64 (request in 9)

Запрос ping 10.1.2.1 от PC1

Frame 10: 98 bytes on wire (784 bits), 98 bytes captured (784 bits) on interface -, id 0
Ethernet II, Src: Private_66:68:01 (00:50:79:66:68:01), Dst: cc:01:0b:8a:00:10 (cc:01:0b:8a:00:10)
Internet Protocol Version 4, Src: 10.1.2.1, Dst: 10.1.1.1
Internet Control Message Protocol

No. Time Source Destination Protocol Length Info
11 44.900515 10.1.1.1 10.1.2.1 ICMP 98 Echo (ping) request id=0x31dd, seq=3/768, ttl=63 (reply in 12)

Ответ

Frame 11: 98 bytes on wire (784 bits), 98 bytes captured (784 bits) on interface -, id 0
Ethernet II, Src: cc:01:0b:8a:00:10 (cc:01:0b:8a:00:10), Dst: Private_66:68:01 (00:50:79:66:68:01)
Internet Protocol Version 4, Src: 10.1.1.1, Dst: 10.1.2.1
Internet Control Message Protocol

No. Time Source Destination Protocol Length Info
12 44.900628 10.1.2.1 10.1.1.1 ICMP 98 Echo (ping) reply id=0x31dd, seq=3/768, ttl=64 (request in 11)

Запрос ping 10.1.2.1 от PC1

Frame 12: 98 bytes on wire (784 bits), 98 bytes captured (784 bits) on interface -, id 0

Ethernet II, Src: Private_66:68:01 (00:50:79:66:68:01), Dst: cc:01:0b:8a:00:10 (cc:01:0b:8a:00:10)
Internet Protocol Version 4, Src: 10.1.2.1, Dst: 10.1.1.1
Internet Control Message Protocol

No. Time Source Destination Protocol Length Info
13 45.919131 10.1.1.1 10.1.2.1 ICMP 98 Echo (ping) request id=0x32dd, seq=4/1024, ttl=63 (reply in 14)

Ответ

Frame 13: 98 bytes on wire (784 bits), 98 bytes captured (784 bits) on interface -, id 0
Ethernet II, Src: cc:01:0b:8a:00:10 (cc:01:0b:8a:00:10), Dst: Private_66:68:01 (00:50:79:66:68:01)
Internet Protocol Version 4, Src: 10.1.1.1, Dst: 10.1.2.1
Internet Control Message Protocol

No. Time Source Destination Protocol Length Info
14 45.919253 10.1.2.1 10.1.1.1 ICMP 98 Echo (ping) reply id=0x32dd, seq=4/1024, ttl=64 (request in 13)

Запрос ping 10.1.2.1 от PC1

Frame 14: 98 bytes on wire (784 bits), 98 bytes captured (784 bits) on interface -, id 0
Ethernet II, Src: Private_66:68:01 (00:50:79:66:68:01), Dst: cc:01:0b:8a:00:10 (cc:01:0b:8a:00:10)
Internet Protocol Version 4, Src: 10.1.2.1, Dst: 10.1.1.1
Internet Control Message Protocol

No. Time Source Destination Protocol Length Info
15 46.937324 10.1.1.1 10.1.2.1 ICMP 98 Echo (ping) request id=0x33dd, seq=5/1280, ttl=63 (reply in 16)

Ответ

Frame 15: 98 bytes on wire (784 bits), 98 bytes captured (784 bits) on interface -, id 0
Ethernet II, Src: cc:01:0b:8a:00:10 (cc:01:0b:8a:00:10), Dst: Private_66:68:01 (00:50:79:66:68:01)
Internet Protocol Version 4, Src: 10.1.1.1, Dst: 10.1.2.1
Internet Control Message Protocol

No. Time Source Destination Protocol Length Info
16 46.937438 10.1.2.1 10.1.1.1 ICMP 98 Echo (ping) reply id=0x33dd, seq=5/1280, ttl=64 (request in 15)

Запрос ping 10.1.2.1 от PC1

Frame 16: 98 bytes on wire (784 bits), 98 bytes captured (784 bits) on interface -, id 0
Ethernet II, Src: Private_66:68:01 (00:50:79:66:68:01), Dst: cc:01:0b:8a:00:10 (cc:01:0b:8a:00:10)
Internet Protocol Version 4, Src: 10.1.2.1, Dst: 10.1.1.1
Internet Control Message Protocol
Ответ