

РОССИЙСКИЙ УНИВЕРСИТЕТ ДРУЖБЫ НАРОДОВ

Факультет физико-математических и естественных наук

Кафедра прикладной информатики и теории вероятностей

ОТЧЕТ ПО ЛАБОРАТОРНОЙ РАБОТЕ № 5

дисциплина: Сетевые Технологии

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Группа: НПИбд-02-20

МОСКВА

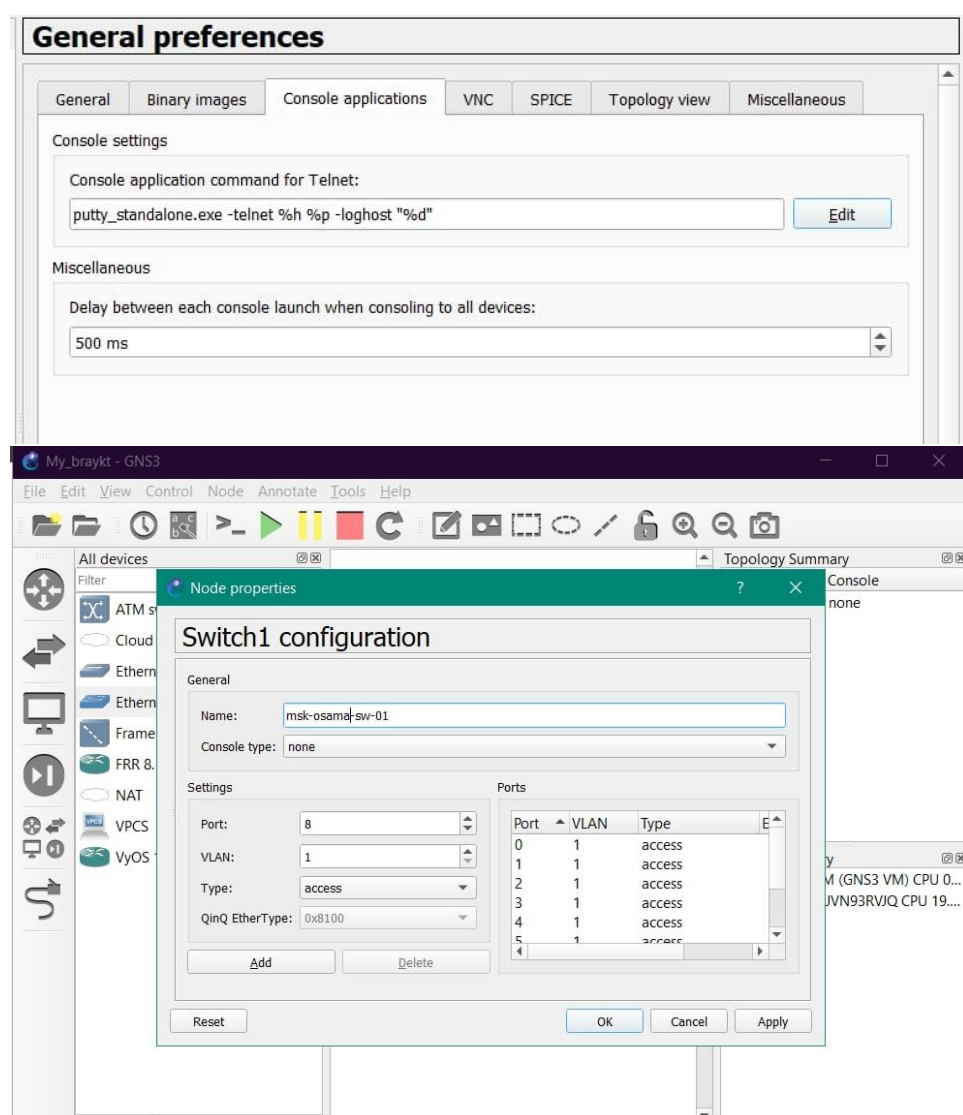
2022 г

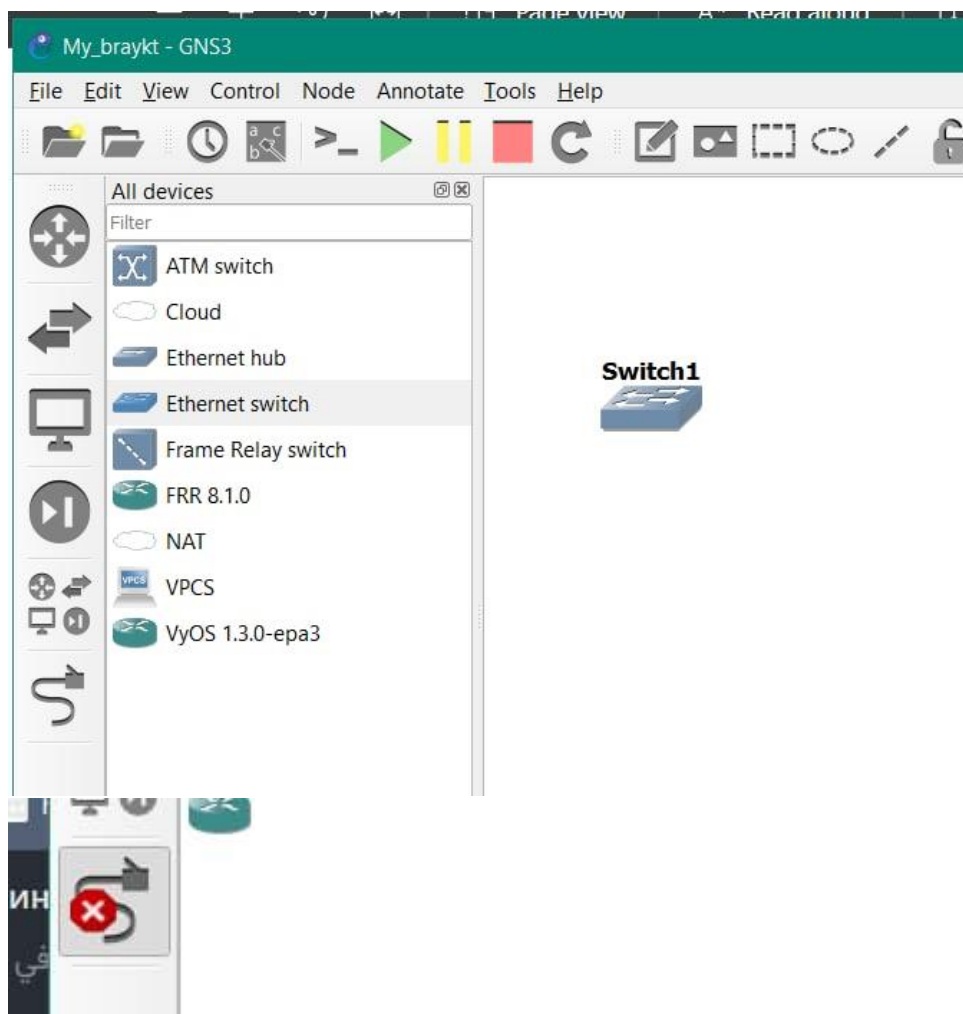
Цель работы

Построение простейших моделей сети на базе коммутатора и маршрутизаторов FRR и VyOS в GNS3, анализ трафика посредством Wireshark.

Постановка задачи

1. Построить в GNS3 топологию сети, состоящей из коммутатора Ethernet и двух оконечных устройств (персональных компьютеров). 2. Задать оконечным устройствам IP-адреса в сети 192.168.1.0/24. Проверить связь

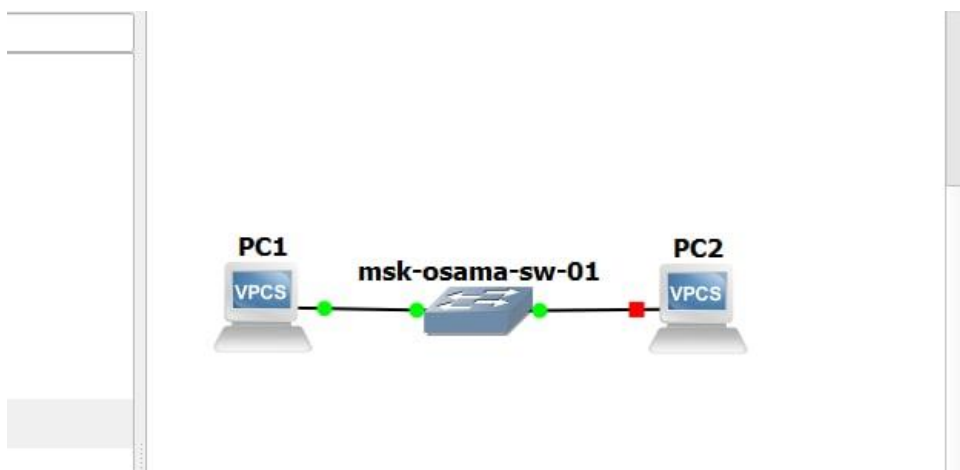
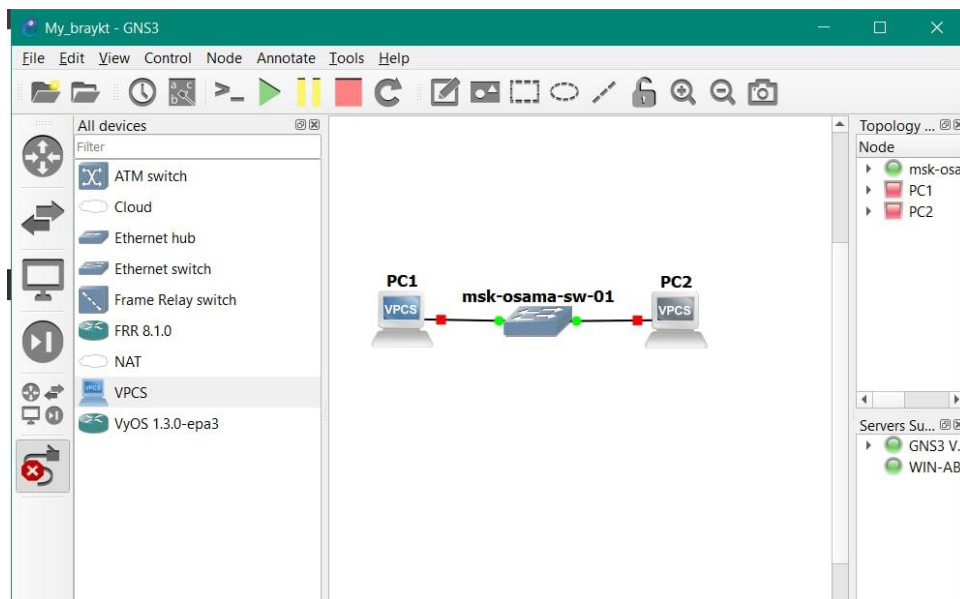




5.3.1.2. Порядок выполнения работы

1. Запустите GNS3 VM и GNS3. Создайте новый проект.

2. В рабочей области GNS3 разместите коммутатор Ethernet и два VPCS. Щёлкнув на устройстве правой кнопкой мыши выберите в меню **Configure**. Измените название устройства, включив в имя устройства имя учётной записи выполняющего работу студента. Коммутатору присвойте название **msk-user-sw-01**, где вместо **user** укажите имя вашей учётной записи. Соедините VPCS с коммутатором. Отобразите обозначение интерфейсов соединения



. Задайте IP-адреса VPCS. Для этого с помощью меню, вызываемого правой кнопкой мыши, запустите Start , например, PC-1, затем вызовите его терминал Console . Для просмотра синтаксиса возможных для ввода команд наберите /?

```
PC1 - PuTTY
version          Shortcut for: show version

To get command syntax help, please enter '?' as an argument of the command.

PC1> ip /?

ip ARG ... [OPTION]
  Configure the current VPC's IP settings
  ARG ...:
    address [mask] [gateway]
    address [gateway] [mask]
    Set the VPC's ip, default gateway ip and network mask
    Default IPv4 mask is /24, IPv6 is /64. Example:
    ip 10.1.1.70/26 10.1.1.65 set the VPC's ip to 10.1.1.70,
    the gateway to 10.1.1.65, the netmask to 255.255.255.192.
    In tap mode, the ip of the tapx is the maximum host ID
    of the subnet. In the example above the tapx ip would be
    10.1.1.126
    mask may be written as /26, 26 or 255.255.255.192
  auto
  dhcp [OPTION] Attempt to obtain IPv4 address, mask and gateway using SLAAC
    -d          Show DHCP packet decode
    -r          Renew DHCP lease
    -x          Release DHCP lease
  dns ip       Set DNS server ip, delete if ip is '0'
  dns6 ipv6    Set DNS server ipv6, delete if ipv6 is '0'
  domain NAME  Set local domain name to NAME

PC1>
```

```
PC1 - PuTTY

PC1> ahow ip
Bad command: "ahow ip". Use ? for help.

PC1> show ip

NAME       : PC1[1]
IP/MASK    : 192.168.1.11/24
GATEWAY    : 192.168.1.1
DNS        :
MAC        : 00:50:79:66:68:00
LPORT     : 20004
RHOST:PORT : 127.0.0.1:20005
MTU        : 1500

PC1>
```

```
PC1> ip 192.168.1.11/24 192.168.1.1
Checking for duplicate address...
PC1 : 192.168.1.11 255.255.255.0 gateway 192.168.1.1

PC1> save
Saving startup configuration to startup.vpc
. done

PC1>
```

```
PC2> show ip

NAME           : PC2[1]
IP/MASK         : 0.0.0.0/0
GATEWAY         : 0.0.0.0
DNS            :
MAC            : 00:50:79:66:68:01
LPORT          : 20006
RHOST:PORT      : 127.0.0.1:20007
MTU            : 1500

PC2>
```

```
PC1> ip 192.168.1.11/24 192.168.1.1
Checking for duplicate address...
PC1 : 192.168.1.11 255.255.255.0 gateway 192.168.1.1

PC1>
```

```
PC1> ip 192.168.1.11/24 192.168.1.1
Checking for duplicate address...
PC1 : 192.168.1.11 255.255.255.0 gateway 192.168.1.1

PC1>
```

```
PC2> ip 192.168.1.11/24 192.168.1.1
Checking for duplicate address...
192.168.1.11 is being used by MAC 00:50:79:66:68:00
Address not changed

PC2> save
Saving startup configuration to startup.vpc
. done

PC2>
```

PC1 - PuTTY

PC1> show ip

NAME : PC1[1]
IP/MASK : 192.168.1.11/24
GATEWAY : 192.168.1.1
DNS :
MAC : 00:50:79:66:68:00
LPORT : 20004
RHOST:PORT : 127.0.0.1:20005
MTU : 1500

PC1> ping 192.168.1.12

host (192.168.1.12) not reachable

PC1> ping 192.168.1.11

192.168.1.11 icmp_seq=1 ttl=64 time=0.001 ms
192.168.1.11 icmp_seq=2 ttl=64 time=0.001 ms
192.168.1.11 icmp_seq=3 ttl=64 time=0.001 ms
192.168.1.11 icmp_seq=4 ttl=64 time=0.001 ms
192.168.1.11 icmp_seq=5 ttl=64 time=0.001 ms

PC1>

```
PC2 - PuTTY
PC2> save
Saving startup configuration to startup.vpc
. done

PC2> show ip

NAME       : PC2[1]
IP/MASK     : 0.0.0.0/0
GATEWAY     : 0.0.0.0
DNS         :
MAC        : 00:50:79:66:68:01
LPORT      : 20006
RHOST:PORT  : 127.0.0.1:20007
MTU        : 1500

PC2> ping 192.168.1.11

192.168.1.11 icmp_seq=1 timeout
192.168.1.11 icmp_seq=2 timeout
192.168.1.11 icmp_seq=3 timeout
192.168.1.11 icmp_seq=4 timeout
192.168.1.11 icmp_seq=5 timeout

PC2> █
```

Аналогичным образом задайте IP-адрес 192.168.1.12 для

4. Проверьте работоспособность соединения между PC-1 и PC-2 с помощью команды ping. 5. Остановите в проекте все узлы (меню GNS3 Control Stop all nodes).

Анализ трафика в GNS3 посредством Wireshark

5.3.2.1. Постановка задачи

1. С помощью Wireshark захватить и проанализировать ARP-сообщения.
2. С помощью Wireshark захватить и проанализировать ICMP-сообщения.

5.3.2.2. Порядок выполнения работы

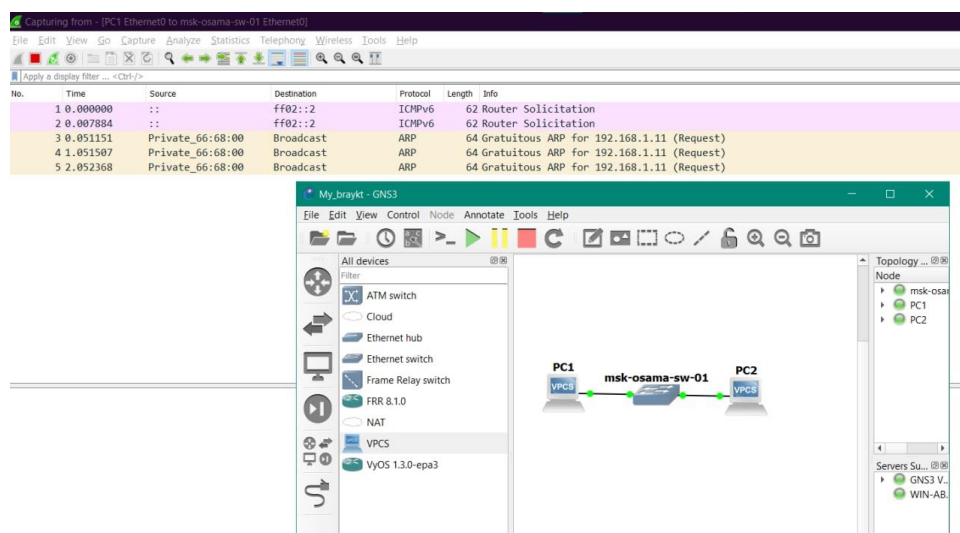
1. Запустите на соединении между PC-1 и коммутатором анализатор трафика. Для этого щёлкните правой кнопкой мыши на соединении, выберите в меню Start capture , при необходимости можете скорректировать название DUMP-файла. Запустится Wireshark, а в проекте GNS3 на соединении появится значок лупы.

2. В проекте GNS3 стартуйте все узлы (меню GNS3 Control Start/Resume all nodes). В окне Wireshark (рис. 5.4) отобразится информация по протоколу ARP. Проанализируйте полученную информацию, дайте пояснения в отчёте.

3. В терминале PC-2 посмотрите информацию по опциям команды ping, введя ping /?. Затем сделайте один эхо-запрос в ICMP-моду к узлу PC-1. В окне Wireshark (рис. 5.4) проанализируйте полученную информацию, дайте пояснения в отчёте.

4. Сделайте один эхо-запрос в UDP-моду к узлу PC-1. В окне Wireshark (рис. 5.4) проанализируйте полученную информацию, дайте пояснения в отчёте.

5. Сделайте один эхо-запрос в TCP-моду к узлу PC-1. В окне Wireshark (рис. 5.4) проанализируйте полученную информацию, дайте пояснения в отчёте. 6. Остановите захват пакетов в Wireshark.



```
PC2> ping 192.168.1.11

192.168.1.11 icmp_seq=1 timeout
192.168.1.11 icmp_seq=2 timeout
192.168.1.11 icmp_seq=3 timeout
192.168.1.11 icmp_seq=4 timeout
192.168.1.11 icmp_seq=5 timeout

PC2> █
```

PC2 - PuTTY

```
PC2> sgow ip
Bad command: "sgow ip". Use ? for help.

PC2> show ip
NAME      : PC2[1]
IP/MASK   : 0.0.0.0/0
GATEWAY   : 0.0.0.0
DNS       :
MAC       : 00:50:79:66:68:01
EPORT     : 20006
RHOST:PORT : 127.0.0.1:20007
MTU       : 1500

PC2> ping 192.168.1.11
192.168.1.11 icmp_seq=1 timeout
192.168.1.11 icmp_seq=2 timeout
192.168.1.11 icmp_seq=3 timeout
192.168.1.11 icmp_seq=4 timeout
192.168.1.11 icmp_seq=5 timeout

PC2>
```

آل آمین
آل مافی شی اید

Capturing from - [PC1 Ethernet0 to msk-osama-sw-01 Ethernet0]

File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

Apply a display filter -- <Ctrl>F

No.	Time	Source	Destination	Protocol	Length	Info
8	486.605970	0.0.0.0	192.168.1.11	ICMP	98	Echo (ping) request id=0x2811, seq=1
9	486.606093	Private_66:68:00	Broadcast	ARP	64	Who has 192.168.1.1? Tell 192.168.1.11
10	487.606707	Private_66:68:00	Broadcast	ARP	64	Who has 192.168.1.1? Tell 192.168.1.11
11	488.606855	Private_66:68:00	Broadcast	ARP	64	Who has 192.168.1.1? Tell 192.168.1.11
12	488.607268	0.0.0.0	192.168.1.11	ICMP	98	Echo (ping) request id=0x2a11, seq=2
13	489.607545	192.168.1.11	0.0.0.0	ICMP	98	Echo (ping) reply id=0x2811, seq=1
14	489.607619	Private_66:68:00	Broadcast	ARP	64	Who has 192.168.1.1? Tell 192.168.1.11
15	490.607902	0.0.0.0	192.168.1.11	ICMP	98	Echo (ping) request id=0x2c11, seq=3
16	490.607955	Private_66:68:00	Broadcast	ARP	64	Who has 192.168.1.1? Tell 192.168.1.11
17	491.608822	Private_66:68:00	Broadcast	ARP	64	Who has 192.168.1.1? Tell 192.168.1.11
18	492.609976	0.0.0.0	192.168.1.11	ICMP	98	Echo (ping) request id=0x2e11, seq=4
19	492.610016	192.168.1.11	0.0.0.0	ICMP	98	Echo (ping) reply id=0x2a11, seq=2
20	492.610094	Private_66:68:00	Broadcast	ARP	64	Who has 192.168.1.1? Tell 192.168.1.11
21	493.610404	Private_66:68:00	Broadcast	ARP	64	Who has 192.168.1.1? Tell 192.168.1.11
22	494.610632	0.0.0.0	192.168.1.11	ICMP	98	Echo (ping) request id=0x3011, seq=5
23	494.611591	Private_66:68:00	Broadcast	ARP	64	Who has 192.168.1.1? Tell 192.168.1.11
24	495.613365	192.168.1.11	0.0.0.0	ICMP	98	Echo (ping) reply id=0x2c11, seq=3
25	495.613413	Private_66:68:00	Broadcast	ARP	64	Who has 192.168.1.1? Tell 192.168.1.11
26	496.615938	Private_66:68:00	Broadcast	ARP	64	Who has 192.168.1.1? Tell 192.168.1.11
27	497.618621	Private_66:68:00	Broadcast	ARP	64	Who has 192.168.1.1? Tell 192.168.1.11
28	498.619334	192.168.1.11	0.0.0.0	ICMP	98	Echo (ping) reply id=0x2e11, seq=4
29	498.619423	Private_66:68:00	Broadcast	ARP	64	Who has 192.168.1.1? Tell 192.168.1.11
30	499.619754	Private_66:68:00	Broadcast	ARP	64	Who has 192.168.1.1? Tell 192.168.1.11
31	500.619956	Private_66:68:00	Broadcast	ARP	64	Who has 192.168.1.1? Tell 192.168.1.11
32	501.620498	192.168.1.11	0.0.0.0	ICMP	98	Echo (ping) reply id=0x3011, seq=5

< Frame 3: 64 bytes on wire (512 bits), 64 bytes captured (512 bits) on interface -, id 0

Ready to load or capture

Packets: 32 · Displayed: 32 (100.0%) Profile: Default

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	::	ff02::2	ICMPv6	62	Router Solicitation
2	0.007884	::	ff02::2	ICMPv6	62	Router Solicitation
3	0.051151	Private_66:68:00	Broadcast	ARP	64	Gratuitous ARP for 192.168.1.11 (Request)
4	1.051507	Private_66:68:00	Broadcast	ARP	64	Gratuitous ARP for 192.168.1.11 (Request)
5	2.052368	Private_66:68:00	Broadcast	ARP	64	Gratuitous ARP for 192.168.1.11 (Request)

> Frame 3: 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)
 > Destination: Broadcast (ff:ff:ff:ff:ff:ff)
 > Source: Private_66:68:00 (00:50:79:66:68:00)
 Type: ARP (0x0806)
 Padding: 00000000000000000000000000000000
 Frame check sequence: 0x00000000 [unverified]
 [FCS Status: Unverified]
▼ Address Resolution Protocol (request/gratuitous ARP)
 Hardware type: Ethernet (1)
 Protocol type: IPv4 (0x0800)
 Hardware size: 6
 Protocol size: 4
 Opcode: request (1)
 [Is gratuitous: True]
 Sender MAC address: Private_66:68:00 (00:50:79:66:68:00)
 Sender IP address: 192.168.1.11
 Target MAC address: Broadcast (ff:ff:ff:ff:ff:ff)
 Target IP address: 192.168.1.11

84	1103.559318	192.168.1.11	0.0.0.0	ICMP	98	Echo (ping) reply id=0x8a13, seq=5/1280, ttl=64 (request)
85	1148.816062	0.0.0.0	192.168.1.11	ECHO	98	Request
86	1148.816580	Private_66:68:00	Broadcast	ARP	64	Who has 192.168.1.1? Tell 192.168.1.11
87	1149.816825	Private_66:68:00	Broadcast	ARP	64	Who has 192.168.1.1? Tell 192.168.1.11
88	1150.817303	Private_66:68:00	Broadcast	ARP	64	Who has 192.168.1.1? Tell 192.168.1.11
89	1151.817614	192.168.1.11	0.0.0.0	ECHO	98	Response

Capturing from - [PC1 Ethernet0 to msk-osama-sw-01 Ethernet0]

File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

tcpdump(wa)

No.	Time	Source	Destination	Protocol	Length	Info
267	6601.561177	Private_66:68:00	Broadcast	ARP	64	Gratuitous ARP for 192.168.1.11 (Request)
268	6602.562128	Private_66:68:00	Broadcast	ARP	64	Gratuitous ARP for 192.168.1.11 (Request)
269	6603.563189	Private_66:68:00	Broadcast	ARP	64	Gratuitous ARP for 192.168.1.11 (Request)
270	6631.956359	Private_66:68:01	Broadcast	ARP	64	Who has 192.168.1.11? Tell 0.0.0.0
271	6631.956640	Private_66:68:00	Private_66:68:01	ARP	64	192.168.1.11 is at 00:50:79:66:68:00
272	6631.958134	0.0.0.0	192.168.1.11	ECHO	98	Request
273	6631.958360	Private_66:68:00	Broadcast	ARP	64	Who has 192.168.1.1? Tell 192.168.1.11
274	6632.959620	Private_66:68:00	Broadcast	ARP	64	Who has 192.168.1.1? Tell 192.168.1.11
275	6633.959916	Private_66:68:00	Broadcast	ARP	64	Who has 192.168.1.1? Tell 192.168.1.11
276	6634.960130	192.168.1.11	0.0.0.0	ECHO	98	Response
277	6643.947137	0.0.0.0	192.168.1.11	TCP	74	29916 → 7 [SYN] Seq=0 Win=2920 Len=0 MSS=1460 TSval=1665145
278	6643.947692	Private_66:68:00	Broadcast	ARP	64	Who has 192.168.1.1? Tell 192.168.1.11
279	6644.947914	Private_66:68:00	Broadcast	ARP	64	Who has 192.168.1.1? Tell 192.168.1.11
280	6644.947966	0.0.0.0	192.168.1.11	TCP	74	[TCP Port numbers reused] 29916 → 7 [SYN] Seq=0 Win=2920 L
281	6645.948232	Private_66:68:00	Broadcast	ARP	64	Who has 192.168.1.1? Tell 192.168.1.11
282	6645.948266	0.0.0.0	192.168.1.11	TCP	74	[TCP Port numbers reused] 29916 → 7 [SYN] Seq=0 Win=2920 L
283	6646.948356	192.168.1.11	0.0.0.0	TCP	54	[TCP ACKed unseen segment] 7 → 29916 [SYN, ACK] Seq=0 Ack=
284	6646.950501	Private_66:68:00	Broadcast	ARP	64	Who has 192.168.1.1? Tell 192.168.1.11
285	6647.951516	Private_66:68:00	Broadcast	ARP	64	Who has 192.168.1.1? Tell 192.168.1.11
286	6648.952131	Private_66:68:00	Broadcast	ARP	64	Who has 192.168.1.1? Tell 192.168.1.11
287	6649.952192	192.168.1.11	0.0.0.0	TCP	54	[TCP ACKed unseen segment] [TCP Previous segment not captur
288	6649.952232	Private_66:68:00	Broadcast	ARP	64	Who has 192.168.1.1? Tell 192.168.1.11
289	6650.954172	Private_66:68:00	Broadcast	ARP	64	Who has 192.168.1.1? Tell 192.168.1.11
290	6651.955508	Private_66:68:00	Broadcast	ARP	64	Who has 192.168.1.1? Tell 192.168.1.11
291	6652.955903	192.168.1.11	0.0.0.0	TCP	54	[TCP Retransmission] [TCP Port numbers reused] 7 → 29916 [S

Type: ARP (0x0806)

"I" was unexpected in this context.

Packets: 291 · Displayed: 291 (100.0%) Profile: Default

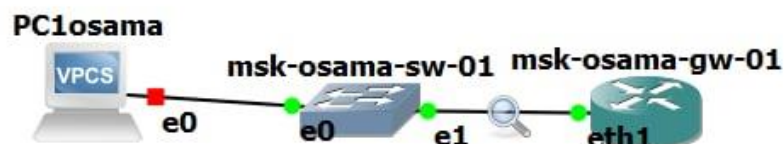
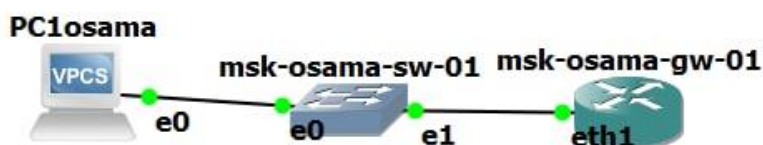
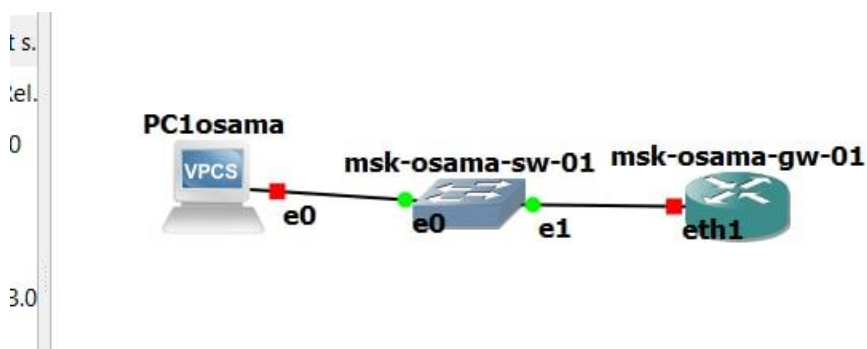
Моделирование простейшей сети на базе маршрутизатора FRR в GNS3

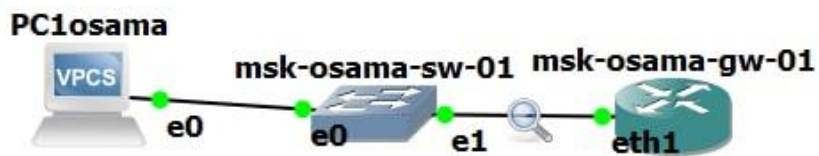
5.3.3.1. Постановка задачи

1. Построить в GNS3 топологию сети, состоящей из маршрутизатора FRR, коммутатора Ethernet и оконечного устройства.
2. Задать оконечному устройству IP-адрес в сети 192.168.1.0/24.
3. Присвоить интерфейсу маршрутизатора адрес 192.168.1.1/24
4. Проверить связь.

5.3.3.2. Порядок выполнения работы

1. Запустите GNS3 VM и GNS3. Создайте новый проект.
2. В рабочей области GNS3 разместите VPCS, коммутатор Ethernet и маршрутизатор FRR





```
PClosama> ip 192.168.1.10/24 192.168.1.1
Checking for duplicate address...
PClosama : 192.168.1.10 255.255.255.0 gateway 192.168.1.1

PClosama> save
Saving startup configuration to startup.vpc
. done

PClosama> show ip

NAME       : PClosama[1]
IP/MASK    : 192.168.1.10/24
GATEWAY    : 192.168.1.1
DNS        :
MAC        : 00:50:79:66:68:00
LPORT      : 20004
RHOST:PORT : 127.0.0.1:20005
MTU        : 1500

PClosama>
```

7. Настройте IP-адресацию для интерфейса локальной сети маршрутизатора:

```
PC1-osama> ip 192.168.1.10/24 192.168.1.1
Checking for duplicate address...
PC1-osama : 192.168.1.10 255.255.255.0 gateway 192.168.1.1

PC1-osama> save
Saving startup configuration to startup.vpc
. done

PC1-osama> show ip

NAME          : PC1-osama[1]
IP/MASK        : 192.168.1.10/24
GATEWAY        : 192.168.1.1
DNS            :
MAC            : 00:50:79:66:68:00
LPORT         : 20004
RHOST:PORT     : 127.0.0.1:20005
MTU            : 1500

PC1-osama> █
```

```
% UNKNOWN COMMAND: hostname msk-osama-gw-01
frr(config)# hostname msk-osama-gw-01
msk-osama-gw-01(config)# █
```

```
frr(config)# hostname msk-osama-gw-01
msk-osama-gw-01(config)# exit
msk-osama-gw-01# write memory
Note: this version of vtysh never writes vtysh.conf
Building Configuration...
Integrated configuration saved to /etc/frr/frr.conf
[OK]
msk-osama-gw-01# configure terminal
msk-osama-gw-01(config)# █
```

```
msk-osama-gw-01(config-if)# exit
msk-osama-gw-01(config)# exit
msk-osama-gw-01# write memory
Note: this version of vtysh never writes vtysh.conf
Building Configuration...
Integrated configuration saved to /etc/frr/frr.conf
[OK]
msk-osama-gw-01# █
```



```
msk-osama-gw-01# show running-config
Building configuration...

Current configuration:
!
frr version 8.1
frr defaults traditional
hostname frr
hostname msk-osama-gw-01
service integrated-vtysh-config
!
end
msk-osama-gw-01#
```

5.3.4.2. Порядок выполнения работы

1. Запустите GNS3 VM и GNS3. Создайте новый проект.
2. В рабочей области GNS3 разместите VPCS, коммутатор Ethernet и маршрутизатор VyOS



```
Welcome to VyOS - vyos ttyS0

vyos login: vyos
Password:
Linux vyos 5.4.156-amd64-vyos #1 SMP Thu Oct 28 18:19:14 UTC 2021 x86_64
Welcome to VyOS!

Check out project news at https://blog.vyos.io
and feel free to report bugs at https://phabricator.vyos.net

Visit https://support.vyos.io to create a support ticket.

You can change this banner using "set system login banner post-login" command.

VyOS is a free software distribution that includes multiple components,
you can check individual component licenses under /usr/share/doc/*/copyright
Use of this pre-built image is governed by the EULA you can find at
/usr/share/vyos/EULA
vyos@vyos:~$
```

```
PC1-osama> ip 192.168.1.10/24 192.168.1.1
Checking for duplicate address...
PC1-osama : 192.168.1.10 255.255.255.0 gateway 192.168.1.1

PC1-osama> save
Saving startup configuration to startup.vpc
. done

PC1-osama> show ip

NAME           : PC1-osama[1]
IP/MASK        : 192.168.1.10/24
GATEWAY        : 192.168.1.1
DNS            :
MAC            : 00:50:79:66:68:00
LPORT          : 20004
RHOST:PORT     : 127.0.0.1:20005
MTU            : 1500

PC1-osama>
```

```
/usr/share/vyos/EULA
vyos@vyos:~$ install image
Welcome to the VyOS install program. This script
will walk you through the process of installing the
VyOS image to a local hard drive.
Would you like to continue? (Yes/No) [Yes]:
Probing drives: OK
Looking for pre-existing RAID groups...none found.
The VyOS image will require a minimum 2000MB root.
Would you like me to try to partition a drive automatically
or would you rather partition it manually with parted? If
you have already setup your partitions, you may skip this step

Partition (Auto/Parted/Skip) [Auto]:

I found the following drives on your system:
sda      8589MB
sdb       1MB

Install the image on? [sda]:
```

```
Install the image on? [sda]:

This will destroy all data on /dev/sda.
Continue? (Yes/No) [No]:
Ok then.  Exiting...
vyos@vyos:~$
```

```
Ok then.  Exiting...
vyos@vyos:~$ configure
WARNING: You are currently configuring a live-ISO environment, changes will not
persist until installed
[edit]
```



```
vyos@vyos# set interfaces ethernet eth0 address 192.168.1.1/24
```

```
Invalid Ethernet interface name  
Value validation failed  
Set failed
```

```
[edit]
```

```
vyos@vyos# compare
```

```
[edit system]
```

```
>host-name msk-osama-gw-01
```

```
[edit]
```

```
vyos@vyos# commit
```

```
[edit]
```

```
vyos@vyos#
```

```
vyos@vyos# show interfaces
```

```
 ethernet eth0 {  
     hw-id 0c:06:5d:3e:00:00  
 }
```

```
 ethernet eth1 {  
     hw-id 0c:06:5d:3e:00:01  
 }
```

```
 ethernet eth2 {  
     hw-id 0c:06:5d:3e:00:02  
 }
```

```
 loopback lo {  
 }
```

```
[edit]
```

```
vyos@vyos#
```

Capturing from - [msk-osama-gw-01 Ethernet2 to msk-osama-gw-01 eth1]

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	Private_66:68:00	Broadcast	ARP	64	Gratuitous ARP for 192.168.1.10 (Request)
2	0.999460	Private_66:68:00	Broadcast	ARP	64	Gratuitous ARP for 192.168.1.10 (Request)
3	1.999854	Private_66:68:00	Broadcast	ARP	64	Gratuitous ARP for 192.168.1.10 (Request)
4	58.329287	::	ff02::2	ICMPv6	62	Router Solicitation
5	58.379513	Private_66:68:00	Broadcast	ARP	64	Gratuitous ARP for 192.168.1.10 (Request)
6	59.380363	Private_66:68:00	Broadcast	ARP	64	Gratuitous ARP for 192.168.1.10 (Request)
7	60.380698	Private_66:68:00	Broadcast	ARP	64	Gratuitous ARP for 192.168.1.10 (Request)
8	98.111324	Private_66:68:00	Broadcast	ARP	64	Gratuitous ARP for 192.168.1.10 (Request)
9	99.111626	Private_66:68:00	Broadcast	ARP	64	Gratuitous ARP for 192.168.1.10 (Request)
10	100.114923	Private_66:68:00	Broadcast	ARP	64	Gratuitous ARP for 192.168.1.10 (Request)
11	386.348126	::	ff02::16	ICMPv6	130	Multicast Listener Report Message v2
12	386.673043	::	ff02::1:ff3e:1	ICMPv6	86	Neighbor Solicitation for fe80::e06:5dff:fe3e:1
13	386.817038	::	ff02::16	ICMPv6	130	Multicast Listener Report Message v2
14	387.742913	fe80::e06:5dff:fe3e::	ff02::16	ICMPv6	150	Multicast Listener Report Message v2
15	387.745019	fe80::e06:5dff:fe3e::	ff02::16	ICMPv6	90	Multicast Listener Report Message v2
16	388.225017	fe80::e06:5dff:fe3e::	ff02::16	ICMPv6	90	Multicast Listener Report Message v2
17	388.377136	fe80::e06:5dff:fe3e::	ff02::16	ICMPv6	150	Multicast Listener Report Message v2
18	1060.647786	Private_66:68:00	Broadcast	ARP	64	Gratuitous ARP for 192.168.1.10 (Request)
19	1061.649262	Private_66:68:00	Broadcast	ARP	64	Gratuitous ARP for 192.168.1.10 (Request)
20	1062.650984	Private_66:68:00	Broadcast	ARP	64	Gratuitous ARP for 192.168.1.10 (Request)
21	3223.288138	Private_66:68:00	Broadcast	ARP	64	Who has 192.168.1.1? Tell 192.168.1.10
22	3224.289877	Private_66:68:00	Broadcast	ARP	64	Who has 192.168.1.1? Tell 192.168.1.10
23	3225.291423	Private_66:68:00	Broadcast	ARP	64	Who has 192.168.1.1? Tell 192.168.1.10
24	3248.148204	Private_66:68:00	Broadcast	ARP	64	Who has 192.168.1.1? Tell 192.168.1.10
25	3249.148536	Private_66:68:00	Broadcast	ARP	64	Who has 192.168.1.1? Tell 192.168.1.10
26	3250.149885	Private_66:68:00	Broadcast	ARP	64	Who has 192.168.1.1? Tell 192.168.1.10

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

Ready to load or capture Packets: 26 · Displayed: 26 (100.0%) Profile: Default

Вывод

Построил простейшие модели сети на базе коммутатора и маршрутизаторов FRR и VyOS в GNS3 и проанализировала трафик посредством Wireshark