

ПРЕЗЕНТАЦИЯ ЛАБОРАТОРНОЙ РАБОТЫ №5

Сетевые технологии

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Цель работы

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

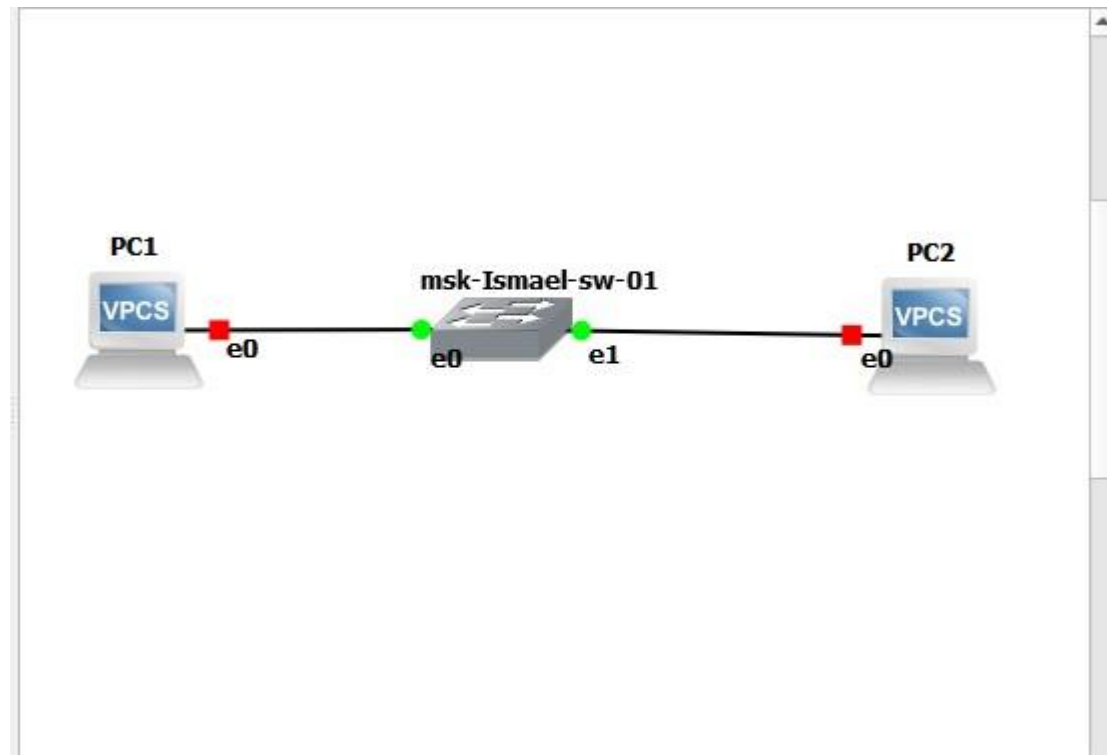
Задача

Моделирование простейшей сети на базе коммутатора в GNS3

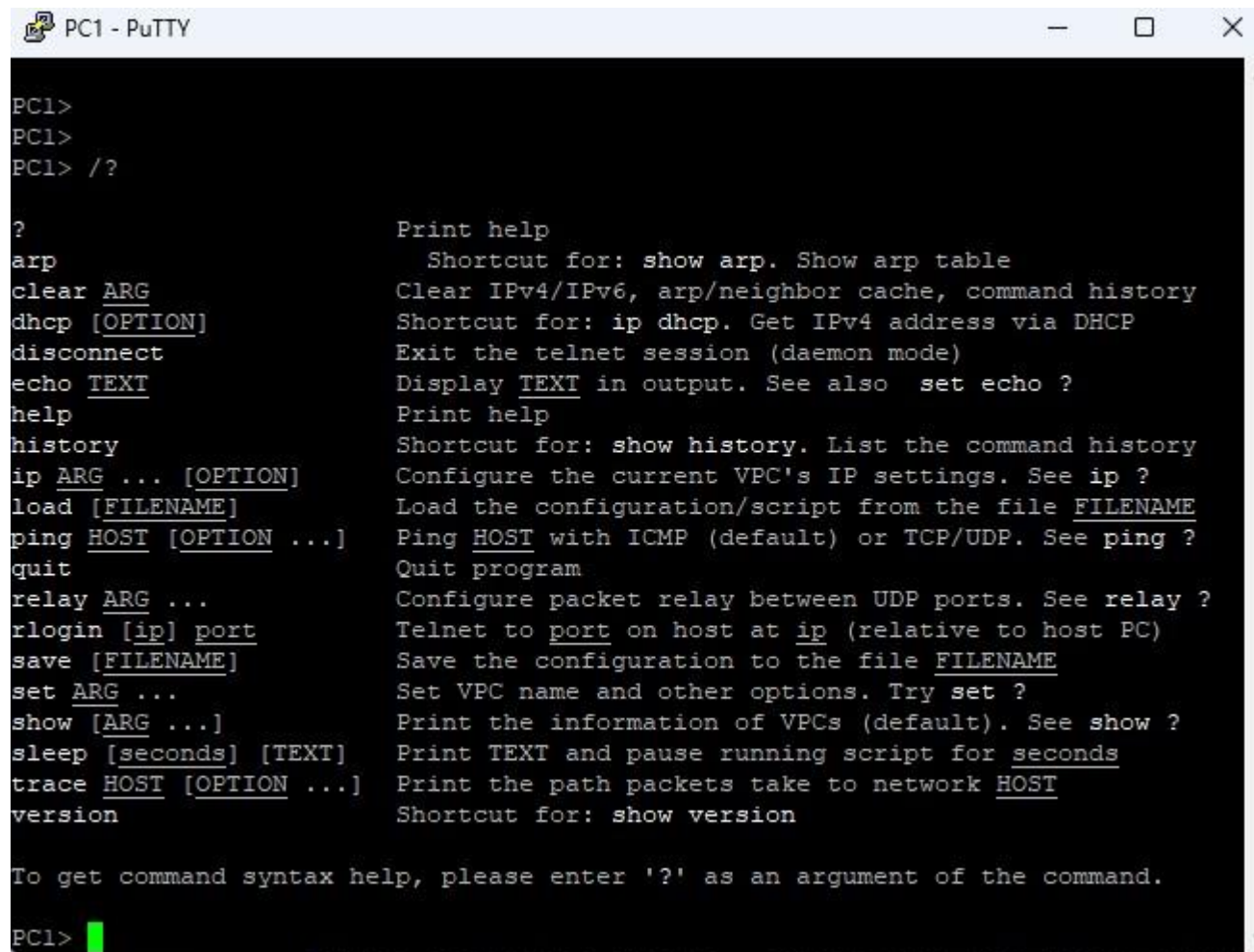
Моделирование простейшей сети на базе маршрутизатора FRR в GNS3

Моделирование простейшей сети на базе маршрутизатора VyOS в GNS3

Ход выполнения работы



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>
PC1>
PC1> /?

?          Print help
arp        Shortcut for: show arp. Show arp table
clear ARG  Clear IPv4/IPv6, arp/neighbor cache, command history
dhcp [OPTION] Shortcut for: ip dhcp. Get IPv4 address via DHCP
disconnect Exit the telnet session (daemon mode)
echo TEXT  Display TEXT in output. See also set echo ?
help       Print help
history     Shortcut for: show history. List the command history
ip ARG ... [OPTION] Configure the current VPC's IP settings. See ip ?
load [FILENAME] Load the configuration/script from the file FILENAME
ping HOST [OPTION ...] Ping HOST with ICMP (default) or TCP/UDP. See ping ?
quit       Quit program
relay ARG ... Configure packet relay between UDP ports. See relay ?
rlogin [ip] port Telnet to port on host at ip (relative to host PC)
save [FILENAME] Save the configuration to the file FILENAME
set ARG ... Set VPC name and other options. Try set ?
show [ARG ...] Print the information of VPCs (default). See show ?
sleep [seconds] [TEXT] Print TEXT and pause running script for seconds
trace HOST [OPTION ...] Print the path packets take to network HOST
version     Shortcut for: show version

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

PC1>
```

```
PC2> ip 192.168.1.12/24 192.168.1.1
Checking for duplicate address...
PC2 : 192.168.1.12 255.255.255.0 gateway 192.168.1.1

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

PC2> show ip

NAME          : PC2[1]
IP/MASK       : 192.168.1.12/24
GATEWAY       : 192.168.1.1
DNS           :
MAC           : 00:50:79:66:68:01
LPORT        : 20006
RHOST:PORT    : 127.0.0.1:20007
MTU           : 1500

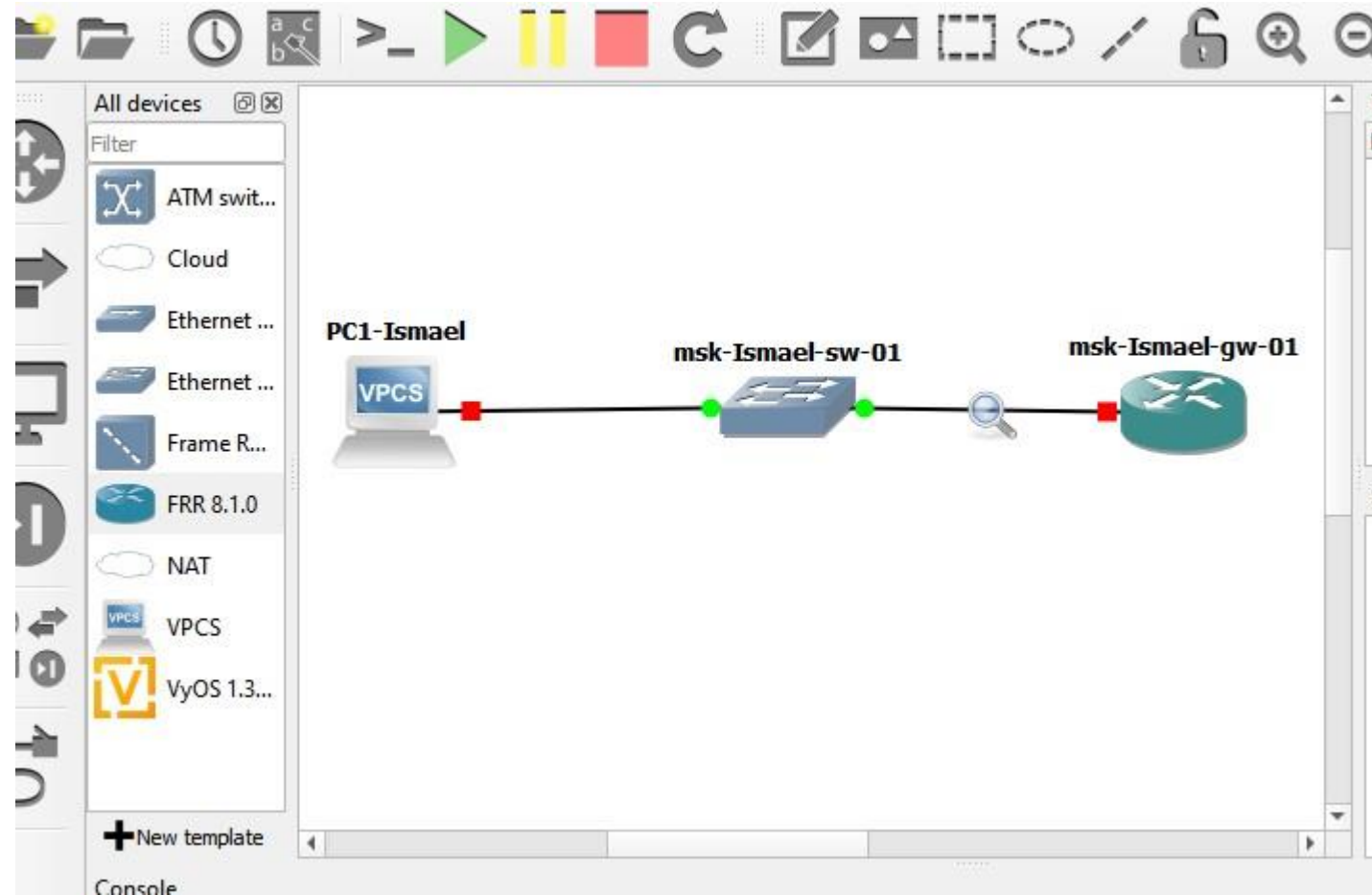
PC2> █
```

```
PC2> ping 192.168.1.12

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

PC2> █
```


Моделирование простейшей сети на базе маршрутизатора FRR в GNS3



Capturing from - [PC1 Ethernet0 to msk-Ismael-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
74	1495.556809	192.168.1.11	192.168.1.12	TCP	54	7 → 43175 [FIN, ACK] Seq=
75	1495.558748	192.168.1.12	192.168.1.11	TCP	66	43175 → 7 [ACK] Seq=58 Ac
76	1496.558896	192.168.1.12	192.168.1.11	TCP	74	[TCP Port numbers reused]
77	1496.559048	192.168.1.11	192.168.1.12	TCP	54	7 → 43175 [SYN, ACK] Seq=
78	1496.559961	192.168.1.12	192.168.1.11	TCP	66	43175 → 7 [ACK] Seq=1 Ack
79	1496.560115	192.168.1.12	192.168.1.11	ECHO	122	Request
80	1496.560197	192.168.1.11	192.168.1.12	TCP	54	7 → 43175 [ACK] Seq=1 Ack
81	1496.561526	192.168.1.12	192.168.1.11	TCP	66	43175 → 7 [FIN, PSH, ACK]
82	1496.561694	192.168.1.11	192.168.1.12	TCP	54	7 → 43175 [ACK] Seq=1 Ack
83	1496.561712	192.168.1.11	192.168.1.12	TCP	54	7 → 43175 [FIN, ACK] Seq=
84	1496.563575	192.168.1.12	192.168.1.11	TCP	66	43175 → 7 [ACK] Seq=58 Ac

> Frame 1: 62 bytes on wire (496 bits), 62 bytes captured (496 bits) on interface -, id 0
> Ethernet II, Src: Private_66:68:01 (00:50:79:66:68:01), Dst: IPv6mcast_02 (33:33:00:00:00:02)
> Internet Protocol Version 6, Src: ::, Dst: ff02::2
> Internet Control Message Protocol v6

0000 33 33 00 00 00 02 00 50 79 66 68 01 86 dd 60 00 33.....P yfh....
0010 00 00 00 08 3a ff 00 00 00 00 00 00 00 00 00 00:.....
0020 00 00 00 00 00 00 ff 02 00 00 00 00 00 00 00 00
0030 00 00 00 00 00 02 85 00 7b b8 00 00 00 00 00 00{.....

Ready to load or capture

Packets: 84 · Displayed: 84 (100.0%) Profile: Default

Control Node Annotate Tools Help

PC2 - PuTTY

84 bytes from 192.168.1.11 udp_seq=2 ttl=64 time=0.444 ms
84 bytes from 192.168.1.11 udp_seq=3 ttl=64 time=0.422 ms
84 bytes from 192.168.1.11 udp_seq=4 ttl=64 time=0.470 ms
84 bytes from 192.168.1.11 udp_seq=5 ttl=64 time=0.410 ms
PC2> ping 192.168.1.11 -3
Connect 7@192.168.1.11 seq=1 ttl=64 time=1.045 ms
SendData 7@192.168.1.11 seq=1 ttl=64 time=1.110 ms
Close 7@192.168.1.11 seq=1 ttl=64 time=2.133 ms
Connect 7@192.168.1.11 seq=2 ttl=64 time=1.075 ms
SendData 7@192.168.1.11 seq=2 ttl=64 time=1.360 ms
Close 7@192.168.1.11 seq=2 ttl=64 time=2.157 ms
Connect 7@192.168.1.11 seq=3 ttl=64 time=1.078 ms
SendData 7@192.168.1.11 seq=3 ttl=64 time=1.064 ms
Close 7@192.168.1.11 seq=3 ttl=64 time=2.630 ms
Connect 7@192.168.1.11 seq=4 ttl=64 time=1.066 ms
SendData 7@192.168.1.11 seq=4 ttl=64 time=1.165 ms
Close 7@192.168.1.11 seq=4 ttl=64 time=2.144 ms
Connect 7@192.168.1.11 seq=5 ttl=64 time=1.104 ms
SendData 7@192.168.1.11 seq=5 ttl=64 time=1.097 ms
Close 7@192.168.1.11 seq=5 ttl=64 time=2.145 ms
PC2>

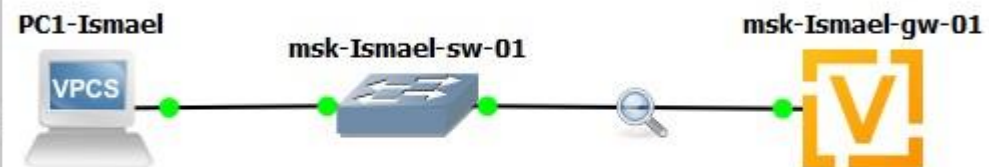
Настройте IP-адресацию для интерфейса локальной сети маршрутизатора:

Router# configure terminal

```
frr(config)# hostname msk-Ismael-gw-01
msk-Ismael-gw-01(config)# exit
msk-Ismael-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-Ismael-gw-01#
```

```
msk-Ismael-gw-01# show interface brief
Interface      Status VRF      Addresses
-----
eth0            up    default  192.168.1.1/2
eth1            down  default
eth2            down  default
eth3            down  default
eth4            down  default
eth5            down  default
eth6            down  default
eth7            down  default
lo              up    default
pimreg          up    default
msk-Ismael-gw-01#
```

Моделирование простейшей сети на базе маршрутизатора VyOS в GNS3



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

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

PC1-Ismael> show ip

NAME       : PC1-Ismael[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-Ismael>
```

Посмотрите информацию об интерфейсах маршрутизатора:

vyos@vyos# show interfaces

– Выйдете из режима конфигурирования:

vyos@vyos# exit

vyos@vyos\$

```
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:~$
```

```
vyos@vyos# show interfaces
  ethernet eth0 {
    address 192.168.1.1/24
    hw-id 0c:ec:97:16:00:00
  }
  ethernet eth1 {
    hw-id 0c:ec:97:16:00:01
  }
  ethernet eth2 {
    hw-id 0c:ec:97:16:00:02
  }
  loopback lo {
  }
[edit]
vyos@vyos# exit
exit
vyos@vyos:~$
```



ВЫВОД:

Я изучил как построить простые сетевые модели на основе коммутатора и маршрутизаторов FRR и VyOS в GNS3, анализ трафика посредством Wireshark.