



Российский университет
дружбы народов

1

Лабораторная работа №5

ПРОСТЫЕ СЕТИ В GNS3. АНАЛИЗ ТРАФИКА





- > Титульная страница
- > Структура
- > Представление выступающего
- > Прагматика
- > Цель выполнения лаб. работы
- > Задача выполнения лаб. работы
- > Результат выполнения лаб. работы





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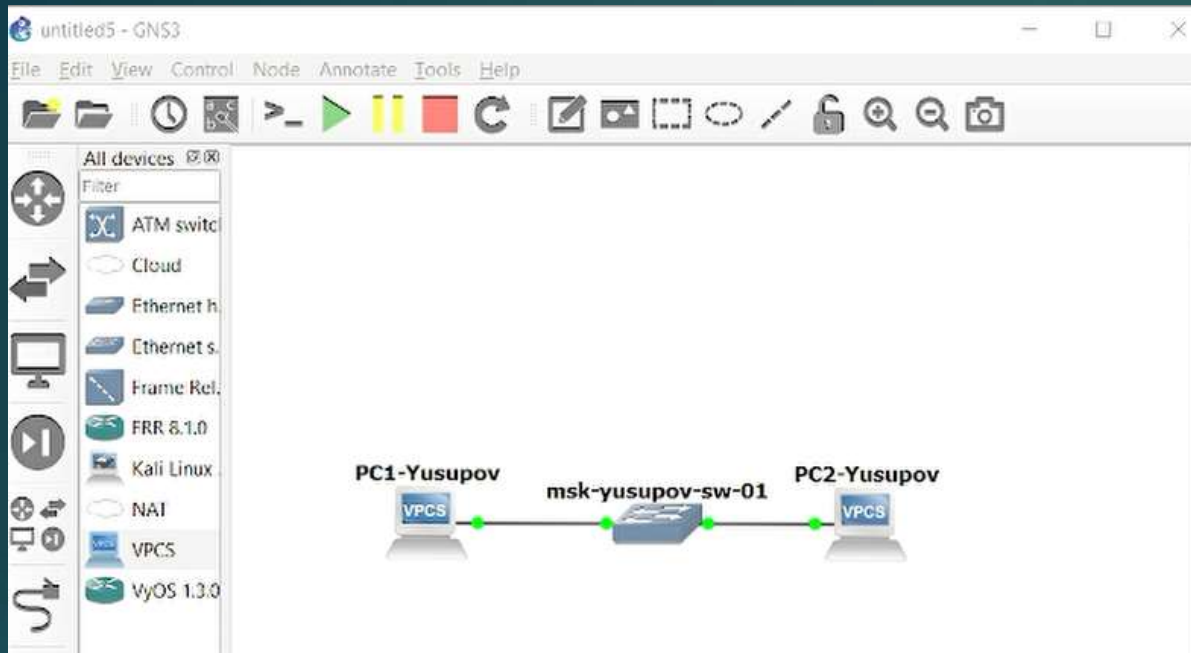




Цель:

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





```
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> █
```

```

PC1> ping 192.168.1.12

84 bytes from 192.168.1.12 icmp_seq=1 ttl=64 time=0.091 ms
84 bytes from 192.168.1.12 icmp_seq=2 ttl=64 time=0.195 ms
84 bytes from 192.168.1.12 icmp_seq=3 ttl=64 time=0.207 ms
84 bytes from 192.168.1.12 icmp_seq=4 ttl=64 time=0.210 ms
84 bytes from 192.168.1.12 icmp_seq=5 ttl=64 time=0.144 ms

PC1>

```



| No. | Time | Source | Destination | Protocol | Length | Info |
|-----|----------|------------------|-------------|----------|--------|---|
| 1 | 0.000000 | :: | ff02::2 | ICMPv6 | 62 | Router Solicitation |
| 2 | 0.002131 | :: | ff02::2 | ICMPv6 | 62 | Router Solicitation |
| 3 | 0.050179 | Private_66:68:01 | Broadcast | ARP | 64 | Gratuitous ARP for 192.168.1.12 (Request) |
| 4 | 0.052265 | Private_66:68:00 | Broadcast | ARP | 64 | Gratuitous ARP for 192.168.1.11 (Request) |
| 5 | 1.051048 | Private_66:68:01 | Broadcast | ARP | 64 | Gratuitous ARP for 192.168.1.12 (Request) |
| 6 | 1.053128 | Private_66:68:00 | Broadcast | ARP | 64 | Gratuitous ARP for 192.168.1.11 (Request) |
| 7 | 2.051660 | Private_66:68:01 | Broadcast | ARP | 64 | Gratuitous ARP for 192.168.1.12 (Request) |
| 8 | 2.053928 | 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
  ▼ Interface id: 0 (-)
    Interface name: -
    Encapsulation type: Ethernet (1)
    Arrival Time: Nov 11, 2022 22:14:58.501937000 RTZ 2 (зима)
    [Time shift for this packet: 0.000000000 seconds]
    Epoch Time: 1668194098.501937000 seconds
    [Time delta from previous captured frame: 0.048048000 seconds]
    [Time delta from previous displayed frame: 0.048048000 seconds]
    [Time since reference or first frame: 0.050179000 seconds]
    Frame Number: 3
    Frame length: 64 bytes (512 bits)
    Capture length: 64 bytes (512 bits)
    [Frame is marked: False]
```

```
PC2> ping 192.168.1.11 -1
```

```
84 bytes from 192.168.1.11 icmp_seq=1 ttl=64 time=0.066 ms
84 bytes from 192.168.1.11 icmp_seq=2 ttl=64 time=0.169 ms
84 bytes from 192.168.1.11 icmp_seq=3 ttl=64 time=0.180 ms
84 bytes from 192.168.1.11 icmp_seq=4 ttl=64 time=0.147 ms
```

| No. | Time | Source | Destination | Protocol | Length | Info |
|-----|------------|------------------|------------------|----------|--------|---|
| 1 | 0.000000 | :: | ff02::2 | ICMPv6 | 62 | Router Solicitation |
| 2 | 0.002131 | :: | ff02::2 | ICMPv6 | 62 | Router Solicitation |
| 3 | 0.050179 | Private_66:68:01 | Broadcast | ARP | 64 | Gratuitous ARP for 192.168.1.12 (Request) |
| 4 | 0.052265 | Private_66:68:00 | Broadcast | ARP | 64 | Gratuitous ARP for 192.168.1.11 (Request) |
| 5 | 1.051048 | Private_66:68:01 | Broadcast | ARP | 64 | Gratuitous ARP for 192.168.1.12 (Request) |
| 6 | 1.053128 | Private_66:68:00 | Broadcast | ARP | 64 | Gratuitous ARP for 192.168.1.11 (Request) |
| 7 | 2.051660 | Private_66:68:01 | Broadcast | ARP | 64 | Gratuitous ARP for 192.168.1.12 (Request) |
| 8 | 2.053928 | Private_66:68:00 | Broadcast | ARP | 64 | Gratuitous ARP for 192.168.1.11 (Request) |
| 9 | 174.322892 | Private_66:68:01 | Broadcast | ARP | 64 | Who has 192.168.1.11? Tell 192.168.1.12 |
| 10 | 174.322967 | Private_66:68:00 | Private_66:68:01 | ARP | 64 | 192.168.1.11 is at 00:50:79:66:68:00 |

Frame 1: 62 bytes on wire (496 bits), 62 bytes captured (496 bits) on interface -, id 0

> Interface id: 0 (-)

Encapsulation type: Ethernet (1)

Arrival time: Nov 11, 2022 22:14:58.451758000 RIZ 2 (зима)

[Time shift for this packet: 0.000000000 seconds]

Epoch Time: 1668194098.451758000 seconds

[Time delta from previous captured frame: 0.000000000 seconds]

[Time delta from previous displayed frame: 0.000000000 seconds]

[Time since reference or first frame: 0.000000000 seconds]

Frame Number: 1

Frame Length: 62 bytes (496 bits)

Capture Length: 62 bytes (496 bits)

[Frame is marked: False]

[Frame is ignored: False]

[Protocols in frame: eth:ethertype:ipv6:icmpv6]


```
PC2> ping 192.168.1.11 -3
```

```
Connect 7@192.168.1.11 seq=1 ttl=64 time=1.067 ms
SendData 7@192.168.1.11 seq=1 ttl=64 time=1.068 ms
Close 7@192.168.1.11 seq=1 ttl=64 time=2.187 ms
Connect 7@192.168.1.11 seq=2 ttl=64 time=1.048 ms
SendData 7@192.168.1.11 seq=2 ttl=64 time=1.053 ms
Close 7@192.168.1.11 seq=2 ttl=64 time=2.126 ms
Connect 7@192.168.1.11 seq=3 ttl=64 time=1.070 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=2.126 ms
Connect 7@192.168.1.11 seq=4 ttl=64 time=1.032 ms
SendData 7@192.168.1.11 seq=4 ttl=64 time=1.081 ms
Close 7@192.168.1.11 seq=4 ttl=64 time=2.899 ms
Connect 7@192.168.1.11 seq=5 ttl=64 time=1.073 ms
SendData 7@192.168.1.11 seq=5 ttl=64 time=1.709 ms
Close 7@192.168.1.11 seq=5 ttl=64 time=2.765 ms
```

| No. | Time | Source | Destination | Protocol | Length | Info |
|-----|------------|--------------|--------------|----------|--------|-----------------------------|
| 43 | 306.820858 | 192.168.1.11 | 192.168.1.12 | TCP | 54 | 7 → 18497 [SYN, ACK] Seq=6 |
| 44 | 306.821770 | 192.168.1.12 | 192.168.1.11 | TCP | 66 | 18497 → 7 [ACK] Seq=1 Ack= |
| 45 | 306.821828 | 192.168.1.12 | 192.168.1.11 | ECHO | 122 | Request |
| 46 | 306.821858 | 192.168.1.11 | 192.168.1.12 | TCP | 54 | 7 → 18497 [ACK] Seq=1 Ack= |
| 47 | 306.822945 | 192.168.1.12 | 192.168.1.11 | TCP | 66 | 18497 → 7 [FIN, PSH, ACK] |
| 48 | 306.822979 | 192.168.1.11 | 192.168.1.12 | TCP | 54 | 7 → 18497 [ACK] Seq=1 Ack= |
| 49 | 306.822985 | 192.168.1.11 | 192.168.1.12 | TCP | 54 | 7 → 18497 [FIN, ACK] Seq=1 |
| 50 | 306.825077 | 192.168.1.12 | 192.168.1.11 | TCP | 66 | 18497 → 7 [ACK] Seq=58 Ack= |
| 51 | 307.825164 | 192.168.1.12 | 192.168.1.11 | TCP | 74 | [TCP Port numbers reused] |
| 52 | 307.825229 | 192.168.1.11 | 192.168.1.12 | TCP | 54 | 7 → 18497 [SYN, ACK] Seq=6 |
| 53 | 307.826195 | 192.168.1.12 | 192.168.1.11 | TCP | 66 | 18497 → 7 [ACK] Seq=1 Ack= |
| 54 | 307.826254 | 192.168.1.12 | 192.168.1.11 | ECHO | 122 | Request |
| 55 | 307.826280 | 192.168.1.11 | 192.168.1.12 | TCP | 54 | 7 → 18497 [ACK] Seq=1 Ack= |
| 56 | 307.827384 | 192.168.1.12 | 192.168.1.11 | TCP | 66 | 18497 → 7 [FIN, PSH, ACK] |

```

Frame 51: 74 bytes on wire (592 bits), 74 bytes captured (592 bits) on interface -, id 0
> Interface id: 0 (-)
  Encapsulation type: Ethernet (1)
  Arrival Time: Nov 11, 2022 22:20:06.276922000 RTZ 2 (зима)
  [Time shift for this packet: 0.000000000 seconds]
  Epoch Time: 1668194406.276922000 seconds
  [Time delta from previous captured frame: 1.000087000 seconds]
  [Time delta from previous displayed frame: 1.000087000 seconds]
  [Time since reference or first frame: 307.825164000 seconds]
  Frame Number: 51
  Frame Length: 74 bytes (592 bits)
  Capture Length: 74 bytes (592 bits)
  [Frame is marked: False]
  [Frame is ignored: False]
  IP Protocol: 6 (TCP)

```



```

PC1> show ip
NAME       : PC1[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>

```



```
frr#  
frr#  
frr# ^C  
frr# configure terminal  
frr(config)# hostname msk-yusupov-gw-01  
msk-yusupov-gw-01(config)# exit  
msk-yusupov-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-yusupov-gw-01#  
msk-yusupov-gw-01# configure terminal  
msk-yusupov-gw-01(config)# interface eth0  
msk-yusupov-gw-01(config-if)# ip address 192.168.1.1/24  
msk-yusupov-gw-01(config-if)# no shutdown  
msk-yusupov-gw-01(config-if)# exit  
msk-yusupov-gw-01(config)# exit  
msk-yusupov-gw-01# msk-yusupov-gw-01#  
% Unknown command: msk-yusupov-gw-01#  
msk-yusupov-gw-01# msk-yusupov-gw-01#  
% Unknown command: msk-yusupov-gw-01#  
msk-yusupov-gw-01# write memory
```

```
[OK]  
msk-yusupov-gw-01# show running-config  
Building configuration...  
  
Current configuration:  
!  
frr version 8.1  
frr defaults traditional  
hostname frr  
hostname msk-yusupov-gw-01  
service integrated-vtysh-config  
!  
interface eth0  
    ip address 192.168.1.1/24  
exit  
!  
end  
msk-yusupov-gw-01#
```

```
end
msk-yusupov-gw-01# show interface brief
Interface      Status VRF      Addresses
-----
eth0           up    default  192.168.1.1/24
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-yusupov-gw-01#
```

```
PC1> ping 192.168.1.1

84 bytes from 192.168.1.1 icmp_seq=1 ttl=64 time=2.501 ms
84 bytes from 192.168.1.1 icmp_seq=2 ttl=64 time=1.626 ms
84 bytes from 192.168.1.1 icmp_seq=3 ttl=64 time=0.697 ms
84 bytes from 192.168.1.1 icmp_seq=4 ttl=64 time=0.889 ms
```



```
PC1> ping 192.168.1.1

84 bytes from 192.168.1.1 icmp_seq=1 ttl=64 time=2.501 ms
84 bytes from 192.168.1.1 icmp_seq=2 ttl=64 time=1.626 ms
84 bytes from 192.168.1.1 icmp_seq=3 ttl=64 time=0.697 ms
84 bytes from 192.168.1.1 icmp_seq=4 ttl=64 time=0.889 ms
```

```
> Frame 5: 130 bytes on wire (1040 bits), 130 bytes captured (1040 bits) on interface -, id 0
▼ Ethernet II, Src: 0c:27:a2:91:00:00 (0c:27:a2:91:00:00), Dst: IPv6mcast_16 (33:33:00:00:00:16)
  > Destination: IPv6mcast_16 (33:33:00:00:00:16)
  > Source: 0c:27:a2:91:00:00 (0c:27:a2:91:00:00)
    Type: IPv6 (0x86dd)
> Internet Protocol Version 6, Src: ::, Dst: ff02::16
> Internet Control Message Protocol v6
```



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

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

PC1-Yusupov> show ip

NAME          : PC1-Yusupov[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-Yusupov> █
```

```
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!
```

```
vyos@vyos:~$ configure
WARNING: You are currently configuring a live-ISO environment, changes will not
persist until installed
[edit]
vyos@vyos# system host-name msk-yusupov-gw-01

Invalid command: [system]

[edit]
vyos@vyos#
```

```
[edit]
vyos@vyos# set system host-name msk-yusupov-gw-01
[edit]
vyos@vyos# set interfaces ethernet eth0 address 192.168.1.1/24
[edit]
vyos@vyos# compare
[edit interfaces ethernet eth0]
+address 192.168.1.1/24
[edit system]
>host-name msk-yusupov-gw-01
[edit]
vyos@vyos# commit
[edit]
vyos@vyos# save
Saving configuration to '/config/config.boot'...
Done
[edit]
vyos@vyos#
```

```
[edit]
vyos@vyos# show interfaces
  ethernet eth0 {
    address 192.168.1.1/24
    hw-id 0c:85:a3:b6:00:00
  }
  ethernet eth1 {
    hw-id 0c:85:a3:b6:00:01
  }
  ethernet eth2 {
    hw-id 0c:85:a3:b6:00:02
  }
  loopback lo {
  }
[edit]
vyos@vyos#
```