

РОССИЙСКИЙ УНИВЕРСИТЕТ ДРУЖБЫ НАРОДОВ

Факультет физико-математических и естественных наук

Кафедра прикладной информатики и теории вероятностей

ОТЧЕТ

ПО ЛАБОРАТОРНОЙ РАБОТЕ № 6

дисциплина: *Сетевые технологии*

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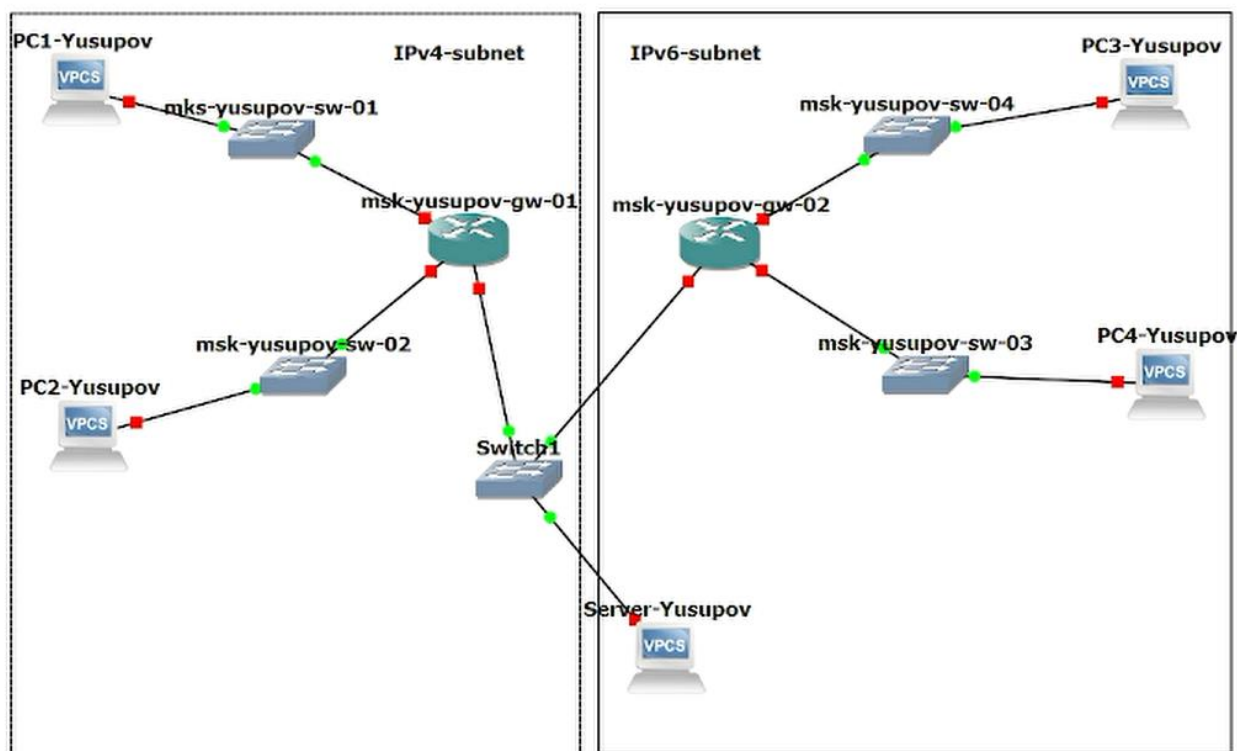
МОСКВА

2022 г.

Цель работы:

Изучение принципов распределения и настройки адресного пространства на устройствах сети

1. Запускаем GNS3 в GNS3VM, создаем проект и реализуем топологию как в методичке



2. Настраиваем IPv4-адресацию для интерфейсов узлов PC1 и PC2 и Сервера

```
PC1-Yusupov> ip 172.16.20.10/25 172.16.20.1
Checking for duplicate address...
PC1-Yusupov : 172.16.20.10 255.255.255.128 gateway 172.16.20.1

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

PC1-Yusupov>
```

```
PC2-Yusupov>
PC2-Yusupov>
PC2-Yusupov> ip 172.16.20.138/25 172.16.20.129
Checking for duplicate address...
PC2-Yusupov : 172.16.20.138 255.255.255.128 gateway 172.16.20.129

PC2-Yusupov> save
```

```

VPCS> ip 64.100.1.10/24 64.100.1.1
Checking for duplicate address...
VPCS : 64.100.1.10 255.255.255.0 gateway 64.100.1.1

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

```

3. Проверяем конфигурацию ipv4 и ipv6 на PC1 и PC2

```

PC1-Yusupov> show ip
NAME       : PC1-Yusupov[1]
IP/MASK    : 172.16.20.10/25
GATEWAY    : 172.16.20.1
DNS        :
MAC        : 00:50:79:66:68:00
LPORT      : 20032
RHOST:PORT : 127.0.0.1:20033
MTU        : 1500

PC1-Yusupov> show ipv6

```

```

PC2-Yusupov> show ip
NAME       : PC2-Yusupov[1]
IP/MASK    : 172.16.20.138/25
GATEWAY    : 172.16.20.129
DNS        :
MAC        : 00:50:79:66:68:01
LPORT      : 20034
RHOST:PORT : 127.0.0.1:20035
MTU        : 1500

PC2-Yusupov> show ipv6
NAME       : PC2-Yusupov[1]
LINK-LOCAL SCOPE : fe80::250:79ff:fe66
GLOBAL SCOPE    :
DNS             :
ROUTER LINK-LAYER :
MAC            : 00:50:79:66:68:01
LPORT          : 20034
RHOST:PORT     : 127.0.0.1:20035
MTU            : 1500

PC2-Yusupov>

```

4. Настраиваем IPv4 адресацию для интерфейсов локальной сети маршрутизатора FRR

```
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# configure terminal
msk-yusupov-gw-01(config)# interface eth0
msk-yusupov-gw-01(config-if)# ip address 172.16.20.1/25
msk-yusupov-gw-01(config-if)# no shutdown
msk-yusupov-gw-01(config-if)# exit
msk-yusupov-gw-01(config)# interface eth1
msk-yusupov-gw-01(config-if)# ip address 172.16.20.129/25
msk-yusupov-gw-01(config-if)# no shutdown
msk-yusupov-gw-01(config-if)# exit
msk-yusupov-gw-01(config)# interface eth2
msk-yusupov-gw-01(config-if)# ip address 64.100.1.1/24
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# wri
```

5. Проверяем конфигурацию маршрутизатора и настройки IPv4 адресации

```
msk-yusupov-gw-01#
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 172.16.20.1/25
exit
!
interface eth1
 ip address 172.16.20.129/25
exit
!
interface eth2
 ip address 64.100.1.1/24
exit
!
end
msk-yusupov-gw-01#
```

```
msk-yusupov-gw-01#
interface eth1
 ip address 172.16.20.129/25
exit
!
interface eth2
 ip address 64.100.1.1/24
exit
!
end
msk-yusupov-gw-01# show interface brief
Interface      Status VRF      Addresses
-----
eth0           up     default  172.16.20.1/25
eth1           up     default  172.16.20.129/25
eth2           up     default  64.100.1.1/24
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#
```

6. Проверяем подключение с помощью команд ping и trace


```

MTU:                : 1500

PC1-Yusupov> ping 172.16.20.129

84 bytes from 172.16.20.129 icmp_seq=1 ttl=64 time=0.452 ms
84 bytes from 172.16.20.129 icmp_seq=2 ttl=64 time=1.349 ms
84 bytes from 172.16.20.129 icmp_seq=3 ttl=64 time=0.672 ms
84 bytes from 172.16.20.129 icmp_seq=4 ttl=64 time=0.632 ms
84 bytes from 172.16.20.129 icmp_seq=5 ttl=64 time=1.289 ms

PC1-Yusupov> ping 64.100.1.1

84 bytes from 64.100.1.1 icmp_seq=1 ttl=64 time=1.161 ms
84 bytes from 64.100.1.1 icmp_seq=2 ttl=64 time=0.622 ms
84 bytes from 64.100.1.1 icmp_seq=3 ttl=64 time=0.634 ms
84 bytes from 64.100.1.1 icmp_seq=4 ttl=64 time=0.592 ms
84 bytes from 64.100.1.1 icmp_seq=5 ttl=64 time=0.615 ms

PC1-Yusupov> trace 172.16.20.129
trace to 172.16.20.129, 8 hops max, press Ctrl+C to stop
 1  *172.16.20.129    0.603 ms (ICMP type:3, code:3, Destination port unreachab
e)

PC1-Yusupov>

```

7. Настраиваем IPv6 адресацию для интерфейсов узлов PC3 и PC4 и Сервера

```

PC3-Yusupov> ip 2001:db8:c0de:12::a/64
PC1 : 2001:db8:c0de:12::a/64

PC3-Yusupov> save
Saving startup configuration to startup.vpc
. done

PC3-Yusupov>

```

```

PC4-Yusupov>
PC4-Yusupov>
PC4-Yusupov> ip 2001:db8:c0de:13::aa/64
PC1 : 2001:db8:c0de:13::aa/64

PC4-Yusupov> save
Saving startup configuration to startup.vpc
. done

PC4-Yusupov>
PC4-Yusupov>

```

```

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

VPCS> ip 2001:db8:c0de:11::a/64
PC1 : 2001:db8:c0de:11::a/64

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

VPCS>

```

8. Смотрим адреса на PC3 и PC4

```

PC3-Yusupov> show ip
NAME       : PC3-Yusupov[1]
IP/MASK    : 0.0.0.0/0
GATEWAY    : 0.0.0.0
DNS        :
MAC        : 00:50:79:66:68:02
LPORT      : 20052
RHOST:PORT : 127.0.0.1:20053
MTU        : 1500

PC3-Yusupov> show ipv6
NAME       : PC3-Yusupov[1]
LINK-LOCAL SCOPE : fe80::250:79ff:fe66:6802/64
GLOBAL SCOPE    : 2001:db8:c0de:12::a/64
DNS            :
ROUTER LINK-LAYER :
MAC           : 00:50:79:66:68:02
LPORT        : 20052
RHOST:PORT    : 127.0.0.1:20053
MTU          : 1500

PC3-Yusupov>

```

```

PC4-Yusupov> show ip
NAME       : PC4-Yusupov[1]
IP/MASK    : 0.0.0.0/0
GATEWAY    : 0.0.0.0
DNS        :
MAC        : 00:50:79:66:68:03
LPORT      : 20060
RHOST:PORT : 127.0.0.1:20061
MTU        : 1500

PC4-Yusupov> show ipv6
NAME       : PC4-Yusupov[1]
LINK-LOCAL SCOPE : fe80::250:79ff:fe66:6803
GLOBAL SCOPE    : 2001:db8:c0de:13::aa/64
DNS            :
ROUTER LINK-LAYER :
MAC           : 00:50:79:66:68:03
LPORT        : 20060
RHOST:PORT    : 127.0.0.1:20061
MTU          : 1500

PC4-Yusupov>

```

9. Устанавливаем систему на маршрутизатор Vyos

```

/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]: ye

```

10. Назначаем IPv6-адреса маршрутизатору, меняем имя хоста и другие настройки из методички

```
vyos@msk-yusupov-gw-02:~$ configure
[edit]
vyos@msk-yusupov-gw-02# set interfaces ethernet eth0 address 2001:db8:c0de:12::1/64
[edit]
vyos@msk-yusupov-gw-02# set service router-advert interface eth0 prefix 2001:db8:c0de:12::/64
[edit]
vyos@msk-yusupov-gw-02# set interfaces ethernet eth1 address 2001:db8:c0de:13::1/64
[edit]
vyos@msk-yusupov-gw-02# set service router-advert interface eth1 prefix 2001:db8:c0de:13::/64
[edit]
vyos@msk-yusupov-gw-02# set interfaces ethernet eth2 address 2001:db8:c0de:11::1/64
[edit]
vyos@msk-yusupov-gw-02# address 2001:db8:c0de:11::1/64 eth2 prefix 2001:db8:c0de:11::/64

Invalid command: [address]

[edit]
```

```
[edit]
vyos@msk-yusupov-gw-02# commit
[edit]
vyos@msk-yusupov-gw-02# save
Saving configuration to '/config/config.boot'...
Done
[edit]
vyos@msk-yusupov-gw-02# show interfaces
  ethernet eth0 {
    address 2001:db8:c0de:12::1/64
    hw-id 0c:43:9a:58:00:00
  }
  ethernet eth1 {
    address 2001:db8:c0de:13::1/64
    hw-id 0c:43:9a:58:00:01
  }
  ethernet eth2 {
    address 2001:db8:c0de:11::1/64
    hw-id 0c:43:9a:58:00:02
  }
  loopback lo {
  }
[edit]
vyos@msk-yusupov-gw-02#
```