

РОССИЙСКИЙ УНИВЕРСИТЕТ ДРУЖБЫ НАРОДОВ

Факультет физико-математических и естественных наук

Кафедра прикладной информатики и теории вероятностей

ОТЧЕТ

ПО ЛАБОРАТОРНОЙ РАБОТЕ № 7

дисциплина: Сетевые технологии

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Группа: НПИбд-02-20

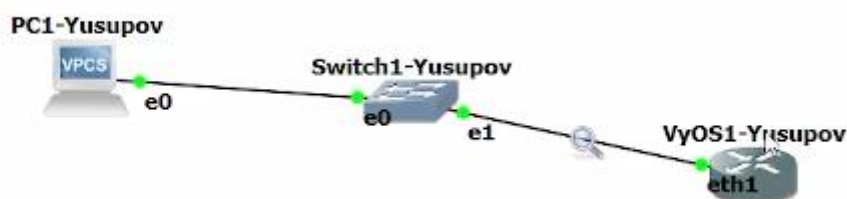
МОСКВА

2022 г.

Цель работы:

Получение навыков настройки службы DHCP на сетевом оборудовании для распределения адресов IPv4 и IPv6.

1. Строим топологию сети согласно указанной в методичке



2. Заходим в Vyos введя логин и пароль (Vyos)

```
vyos login: vyos
Password:
```

3. Прописываем команду «install image» и отвечаем на вопросы установки

```
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]: y
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]:
```

4. Настраиваем нужные параметры виртуальной машины через терминал

```
C:\Users\user>vboxmanage modifyvm "GNS3 VM" --nested-hw-virt on
```

5. Используя команду «Configure», заходим в настройки конфигурации и задаем необходимые настройки. Имя хоста, домена, задаем логин и пароль. И выходим из настроек конфигурации.

```

vyos@vyos:~$ configure
[edit]
vyos@vyos# set system host-name yusupov-gw-01
[edit]
vyos@vyos# set system domain-name yusupov.net
[edit]
vyos@vyos# set system login user yusupov
[edit]
vyos@vyos# set system login user yusupov authentication plaintext-password 10322
05329
[edit]
vyos@vyos# commit
[edit]
vyos@vyos# save
Saving configuration to '/config/config.boot'...
Done
[edit]
vyos@vyos# exit
exit
vyos@vyos:~$ exit
logout

```

6. Добавляем конфигурацию DHCP-сервера на маршрутизаторе

```

yusupov@yusupov-gw-01# set interfaces ethernet eth0 address 10.0.0.1/24
[edit]
yusupov@yusupov-gw-01# set service dhcp-server shared-network-name yusupov yusup
ov.net

Configuration path: service dhcp-server shared-network-name yusupov [yusupov.n
et] is not valid
Set failed

[edit]
yusupov@yusupov-gw-01# set service dhcp-server shared-networ-name yusupov name-s
erver 10.0.0.1

Configuration path: service dhcp-server [shared-networ-name] is not valid
Set failed

[edit]
yusupov@yusupov-gw-01# set service dhcp-server
[edit]
yusupov@yusupov-gw-01# set service dhcp-server shared-network-name yusupov subne
t 10.0.0.0/24 default-router 10.0.0.1
[edit]

```

```

yusupov@yusupov-gw-01#
[edit]
yusupov@yusupov-gw-01# set service dhcp-server shared-network-name yusupov domain-name yusupov.net
[edit]
yusupov@yusupov-gw-01# set service dhcp-server shared-network-name yusupov name-server 10.0.0.1
[edit]
yusupov@yusupov-gw-01# set service dhcp-server shared-network-name yusupov subnet 10.0.0.0/24 default-router 10.0.0.1
[edit]
yusupov@yusupov-gw-01# set service dhcp-server shared-network-name yusupov subnet 10.0.0.0/24 range hosts start 10.0.0.2
[edit]
yusupov@yusupov-gw-01# set service dhcp-server shared-network-name yusupov subnet 10.0.0.0/24 range hosts stop 10.0.0.253
[edit]
yusupov@yusupov-gw-01# commit
[edit]
yusupov@yusupov-gw-01# save
Saving configuration to '/config/config.boot'...
Done
[edit]
yusupov@yusupov-gw-01# exit
exit
yusupov@yusupov-gw-01:~$

```

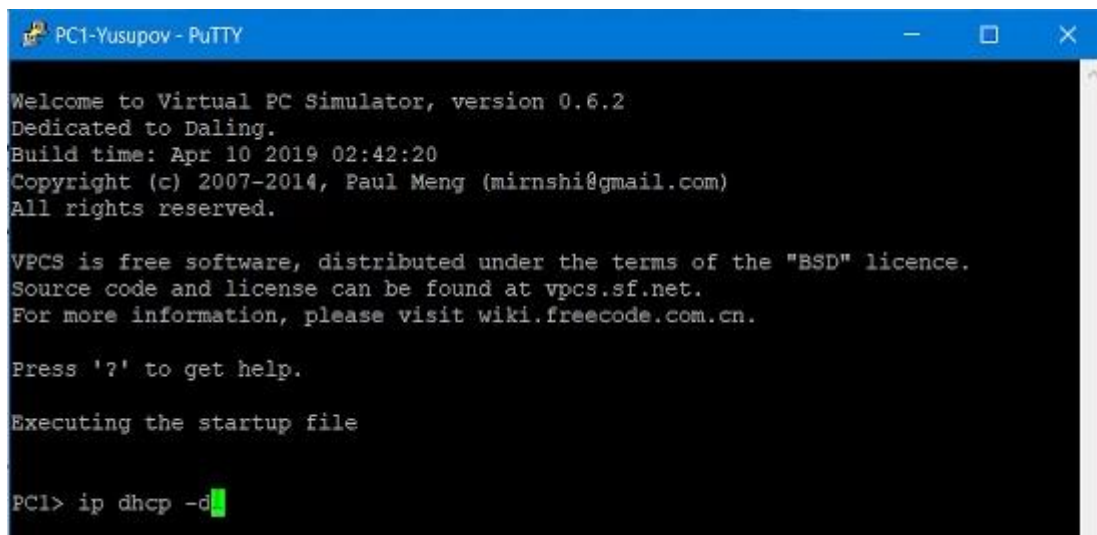
7. Смотрим статистику DHCP-сервера и выданных адресов

```

yusupov@yusupov-gw-01:~$ show dhcp server statistics
Pool      Size    Leases    Available    Usage
-----
yusupov    252      0         252    0%
yusupov@yusupov-gw-01:~$ show dhcp server leases
IP address    Hardware address    State    Lease start    Lease expiration
maining    Pool    Hostname
-----
yusupov@yusupov-gw-01:~$

```

8. Открываем консоль PC1 для настройки



```

PC1-Yusupov - PuTTY

Welcome to Virtual PC Simulator, version 0.6.2
Dedicated to Daling.
Build time: Apr 10 2019 02:42:20
Copyright (c) 2007-2014, Paul Meng (mirnshi@gmail.com)
All rights reserved.

VPCS is free software, distributed under the terms of the "BSD" licence.
Source code and license can be found at vpcs.sf.net.
For more information, please visit wiki.freecode.com.cn.

Press '?' to get help.

Executing the startup file

PC1> ip dhcp -d

```

9. Проверяем конфигурацию IPv4 на узле, пропингуем маршрутизатор:

```
PC1> show ip
NAME       : PC1[1]
IP/MASK    : 0.0.0.0/0
GATEWAY    : 0.0.0.0
DNS        :
MAC        : 00:50:79:66:68:00
LPORT     : 10003
RHOST:PORT : 127.0.0.1:10004
MTU        : 1500

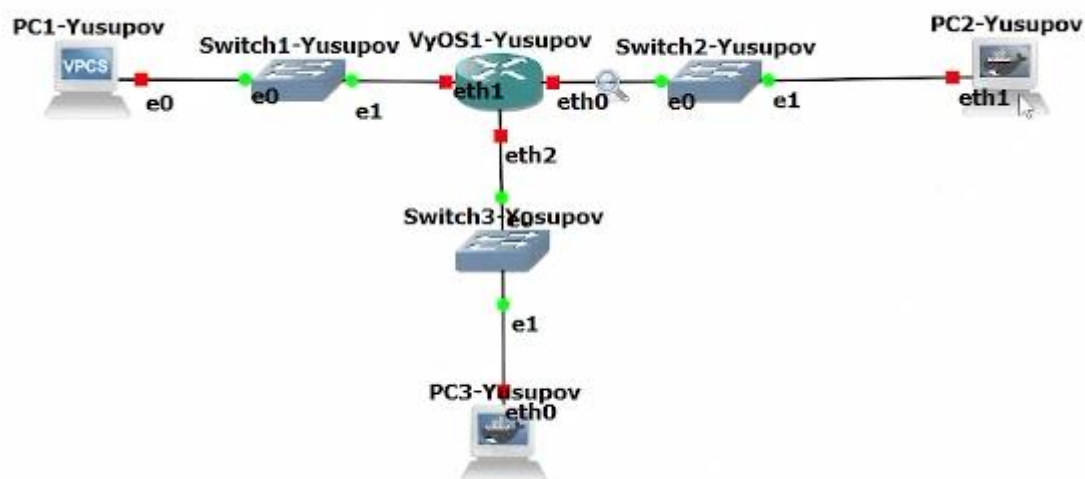
PC1> ping 10.0.0.1 -c 2
10.0.0.1 icmp_seq=1 timeout
10.0.0.1 icmp_seq=2 timeout

PC1>
```

10. Смотрим статистику маршрутизатора DHCP-сервера

```
-----
yusupov@yusupov-gw-01:~$ show dhcp server statistics
Pool      Size    Leases    Available    Usage
-----
yusupov   252      0          252         0%
yusupov@yusupov-gw-01:~$
```

11. Строим новую топологию сети



12. В консоли маршрутизатора настраиваем DHCPv6 без отслеживания состояния

```
yusupov@yusupov-gw-01# set interfaces ethernet eth1 address 2000::1/64
[edit]
yusupov@yusupov-gw-01#

yusupov@yusupov-gw-01# set interfaces ethernet eth2 address 2001::1/64
```

13. Настраиваем адресацию IPv6 на маршрутизаторе

```
[edit]
yusupov@yusupov-gw-01# set interfaces ethernet eth2 address 2001::1/64
[edit]
yusupov@yusupov-gw-01# show interfaces
```

14. Настраиваем маршрутизатор на ранее объявленном eth1

```

[edit]
yusupov@yusupov-gw-01# set service router-advert interface eth1 prefix 2000::/64
[edit]
yusupov@yusupov-gw-01# # set service router-advert yusupov@yusupov-gw-01# # set
service router-advert
[edit]
yusupov@yusupov-gw-01# set service router-advert interface eth1 prefix 2000::/64
[edit]
yusupov@yusupov-gw-01# # set service router-advert yusupov@yusupov-gw-01# # set
service router-advert
[edit]
yusupov@yusupov-gw-01# set service dhcpv6-server shared-network-name yusupov-sta
teless
[edit]
yusupov@yusupov-gw-01# set service dhcpv6-server shared-network-name yusupov-sta
teless subnet 2000::0/64
[edit]
yusupov@yusupov-gw-01# set service dhcpv6-server shared-network-name yusupov-sta
teless common-options name-server 2000::1
[edit]
yusupov@yusupov-gw-01# set service dhcpv6-server shared-network-name yusupov-sta
teless common-options domain-search yusupov.net
[edit]

```

15.Переходим в констоль PC2 для настройки сети

```

root@PC3-Yusupov:/# ifconfig

```

```

root@PC3-Yusupov:/# route -n -A inet6
Kernel IPv6 routing table

```

Destination	Next Hop	Flag	Met	Ref	Use	If
fe80::/64	::	U	256	1	0	eth0
fe80::/64	::	U	256	1	0	eth1
::/0	::	!n	-1	1	0	lo
::1/128	::	Un	0	2	0	lo
fe80::a435:94ff:fe74:d868/128	::	Un	0	2	0	eth0
fe80::f8d5:35ff:fe83:e7ec/128	::	Un	0	3	0	eth1
ff00::/8	::	U	256	3	0	eth0
ff00::/8	::	U	256	1	0	eth1
::/0	::	!n	-1	1	0	lo

```

root@PC3-Yusupov:/# ping 2000::1 -c 2
connect: Network is unreachable
root@PC3-Yusupov:/#

```

```

root@PC3-Yusupov:/# ping 2000::1 -c 2
connect: Network is unreachable
root@PC3-Yusupov:/# cat /etc/resolv.conf
root@PC3-Yusupov:/#

```

16.Аналогичную операцию проводим на PC3