НИУ ИТМО
Факультет программной инженерии и компьютерных технологий

# Отчет по лабораторной работе №4
по дисциплине Администрирование систем и сетей

Студент группы № P34151 Шипулин Павел Андреевич

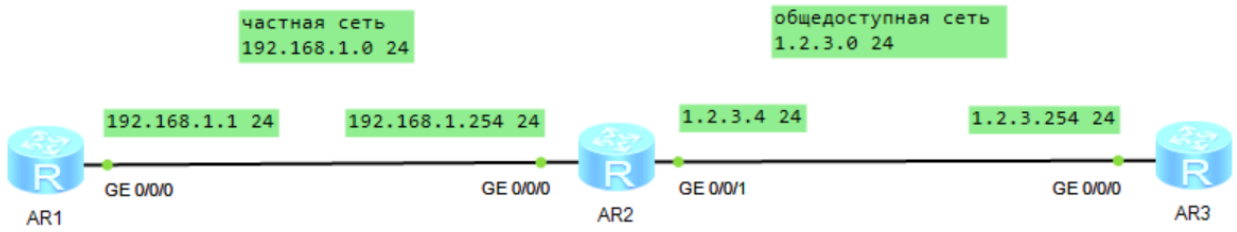
Желаемая оценка: 3

Преподаватель Афанасьев Дмитрий Борисович

Санкт-Петербург
2024

# Оглавление

# Топология


частная сеть
192.168.1.0 24
общедоступная сеть
1.2.3.0 24
192.168.1.1 24
192.168.1.254 24
1.2.3.4 24
1.2.3.254 24
GE 0/0/0
GE 0/0/0
GE 0/0/1
GE 0/0/0
AR1
AR2
AR3

# Конфигурация

## 1. Настройка основных параметров

### 1.1 IP-адреса и маршруты

```
[R1]inter G 0/0/0
[R1-GigabitEthernet0/0/0]ip addr 192.168.1.1 24
Oct 11 2024 17:39:25-08:00 R1 %%01IFNET/4/LINK_STATE(l)[0]:The line protocol IP
on the interface GigabitEthernet0/0/0 has entered the UP state.
[R1-GigabitEthernet0/0/0]quit
[R1]ip route-static 0.0.0.0 0 192.168.1.254
```

```
[R2]inter G 0/0/0
[R2-GigabitEthernet0/0/0]ip addr 192.168.1.254 24
Oct 11 2024 17:41:25-08:00 R2 %%01IFNET/4/LINK_STATE(l)[0]:The line protocol IP
on the interface GigabitEthernet0/0/0 has entered the UP state.
[R2-GigabitEthernet0/0/0]quit
[R2]inter G 0/0/1
[R2-GigabitEthernet0/0/1]ip addr 1.2.3.4 24
Oct 11 2024 17:41:44-08:00 R2 %%01IFNET/4/LINK_STATE(l)[1]:The line protocol IP
on the interface GigabitEthernet0/0/1 has entered the UP state.
[R2-GigabitEthernet0/0/1]quit
[R2]ip route-static 0.0.0.0 0 1.2.3.254
```

```
[R3]inter G 0/0/0
[R3-GigabitEthernet0/0/0]ip addr 1.2.3.254 24
Oct 11 2024 17:42:43-08:00 R3 %%01IFNET/4/LINK_STATE(l)[0]:The line protocol IP
on the interface GigabitEthernet0/0/0 has entered the UP state.
```

### 1.2 Настройка функции telnet на R1 и R3

```
[R1]user-interface vty 0 4
[R1-ui-vty0-4]auth
[R1-ui-vty0-4]authentication-mode aaa
[R1-ui-vty0-4]quit
[R1-aaa]local-user test password cipher Huawei@123
Info: Add a new user.
[R1-aaa]local-user test service-type telnet
[R1-aaa]local-user test privilege level 15
```

```
[R3]user-interface vty 0 4
[R3-ui-vty0-4]authentication-mode aaa
[R3-ui-vty0-4]quit
[R3]aaa
[R3-aaa]local-user test password cipher Huawei@123
Info: Add a new user.
[R3-aaa]local-user test service-type telnet
[R3-aaa]local-user test privilege level 15
```

### 1.3 Проверка связи

```
[R1]ping 1.2.3.254
  PING 1.2.3.254: 56  data bytes, press CTRL_C to break
    Request time out
    Request time out
    Request time out
    Request time out
    Request time out

  --- 1.2.3.254 ping statistics ---
    5 packet(s) transmitted
    0 packet(s) received
    100.00% packet loss


<R2>ping 1.2.3.254
  PING 1.2.3.254: 56  data bytes, press CTRL_C to break
    Reply from 1.2.3.254: bytes=56 Sequence=1 ttl=255 time=40 ms
    Reply from 1.2.3.254: bytes=56 Sequence=2 ttl=255 time=30 ms
    Reply from 1.2.3.254: bytes=56 Sequence=3 ttl=255 time=20 ms
    Reply from 1.2.3.254: bytes=56 Sequence=4 ttl=255 time=20 ms
    Reply from 1.2.3.254: bytes=56 Sequence=5 ttl=255 time=20 ms

  --- 1.2.3.254 ping statistics ---
    5 packet(s) transmitted
    5 packet(s) received
    0.00% packet loss
    round-trip min/avg/max = 20/26/40 ms
```

# 2. Настройка NAT

## 2.1 Настройка пула адресов NAT

```
[R2]nat address-group 1 1.2.3.10 1.2.3.20
```

## 2.2 Настройка ACL

```
[R2]acl 2000
[R2-acl-basic-2000]rule 5 permit source any
```

## 2.3 Настройка динамического NAT на GE 0/0/1 для R2

```
[R2]interface G 0/0/1
[R2-GigabitEthernet0/0/1]nat outbound 2000 address-group 1
```

## 2.4 Проверка связи

```
[R1]ping 1.2.3.254
  PING 1.2.3.254: 56  data bytes, press CTRL_C to break
    Reply from 1.2.3.254: bytes=56 Sequence=1 ttl=254 time=70 ms
    Reply from 1.2.3.254: bytes=56 Sequence=2 ttl=254 time=20 ms
    Reply from 1.2.3.254: bytes=56 Sequence=3 ttl=254 time=30 ms
    Reply from 1.2.3.254: bytes=56 Sequence=4 ttl=254 time=30 ms
    Reply from 1.2.3.254: bytes=56 Sequence=5 ttl=254 time=40 ms

  --- 1.2.3.254 ping statistics ---
    5 packet(s) transmitted
    5 packet(s) received
    0.00% packet loss
    round-trip min/avg/max = 20/38/70 ms
```

## 2.5 Вход с R1 на R3 через Telnet, для моделирования трафика TCP

```
<R1>telnet 1.2.3.254
  Press CTRL_] to quit telnet mode
  Trying 1.2.3.254 ...
  Connected to 1.2.3.254 ...

Login authentication

Username:test
Password:
<R3>
```

## 2.6 Таблица сеансов NAT на R2

```
[R2]dis nat session all
  NAT Session Table Information:

     Protocol          : TCP(6)
     SrcAddr  Port Vpn : 192.168.1.1     2246
     DestAddr Port Vpn : 1.2.3.254       5888
     NAT-Info
       New SrcAddr     : 1.2.3.16
       New SrcPort     : 10241
       New DestAddr    : ----
       New DestPort    : ----

  Total : 1
```

# 3. Настройка EasyIP

## 3.1 Удаление конфигурации, созданную на предыдущем шаге

```
[R2]interface G 0/0/1
[R2-GigabitEthernet0/0/1]undo nat outbound 2000 address-group 1
```

## 3.2 Настройка EasyIP

```
[R2-GigabitEthernet0/0/1]nat outbound 2000
```

## 3.3 Проверка между R1 и R3

```
[R1]ping 1.2.3.254
  PING 1.2.3.254: 56  data bytes, press CTRL_C to break
    Reply from 1.2.3.254: bytes=56 Sequence=1 ttl=254 time=40 ms
    Reply from 1.2.3.254: bytes=56 Sequence=2 ttl=254 time=30 ms
    Reply from 1.2.3.254: bytes=56 Sequence=3 ttl=254 time=30 ms
    Reply from 1.2.3.254: bytes=56 Sequence=4 ttl=254 time=30 ms
    Reply from 1.2.3.254: bytes=56 Sequence=5 ttl=254 time=20 ms

  --- 1.2.3.254 ping statistics ---
    5 packet(s) transmitted
    5 packet(s) received
    0.00% packet loss
    round-trip min/avg/max = 20/30/40 ms
```

## 3.4 Вход с R1 на R3 через Telnet, для моделирования трафика TCP

```
<R1>telnet 1.2.3.254
  Press CTRL_] to quit telnet mode
  Trying 1.2.3.254 ...
  Connected to 1.2.3.254 ...

Login authentication


Username:test
Password:
  ------------------------------------------------------------------------------

  User last login information:
  ------------------------------------------------------------------------------
  Access Type: Telnet
  IP-Address : 1.2.3.16
  Time       : 2024-10-11 17:56:38-08:00
  ------------------------------------------------------------------------------
<R3>
```

```
[R2]dis nat session all
  NAT Session Table Information:

     Protocol          : TCP(6)
     SrcAddr  Port Vpn : 192.168.1.1     11718
     DestAddr Port Vpn : 1.2.3.254       5888
     NAT-Info
       New SrcAddr     : 1.2.3.4
       New SrcPort     : 10241
       New DestAddr    : ----
       New DestPort    : ----

  Total : 1
```

# 4. Настройка NAT на исходящем интерфейсе R2

## 4.1 Настройка сервера NAT

```
[R2]inter G 0/0/1
[R2-GigabitEthernet0/0/1]nat server protocol tcp global current-interface 2323 i
nside 192.168.1.1 telnet
```

## 4.2 Вход с R3 на R1 через Telnet

```
<R3>telnet 1.2.3.4 2323
  Press CTRL_] to quit telnet mode
  Trying 1.2.3.4 ...
  Connected to 1.2.3.4 ...

Login authentication


Username:test
Password:
<R1>
```

## 4.3 Таблица сеансов NAT на R2

```
[R2]dis nat session all
  NAT Session Table Information:

     Protocol          : TCP(6)
     SrcAddr  Port Vpn : 192.168.1.1     11718
     DestAddr Port Vpn : 1.2.3.254       5888
     NAT-Info
       New SrcAddr     : 1.2.3.4
       New SrcPort     : 10241
       New DestAddr    : ----
       New DestPort    : ----

     Protocol          : TCP(6)
     SrcAddr  Port Vpn : 1.2.3.254       10688
     DestAddr Port Vpn : 1.2.3.4         4873
     NAT-Info
       New SrcAddr     : ----
       New SrcPort     : ----
       New DestAddr    : 192.168.1.1
       New DestPort    : 5888

  Total : 2
```