МИНИСТЕРСТВО ОБРАЗОВАНИЯ И НАУКИ РФ

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Лабораторная работа №2

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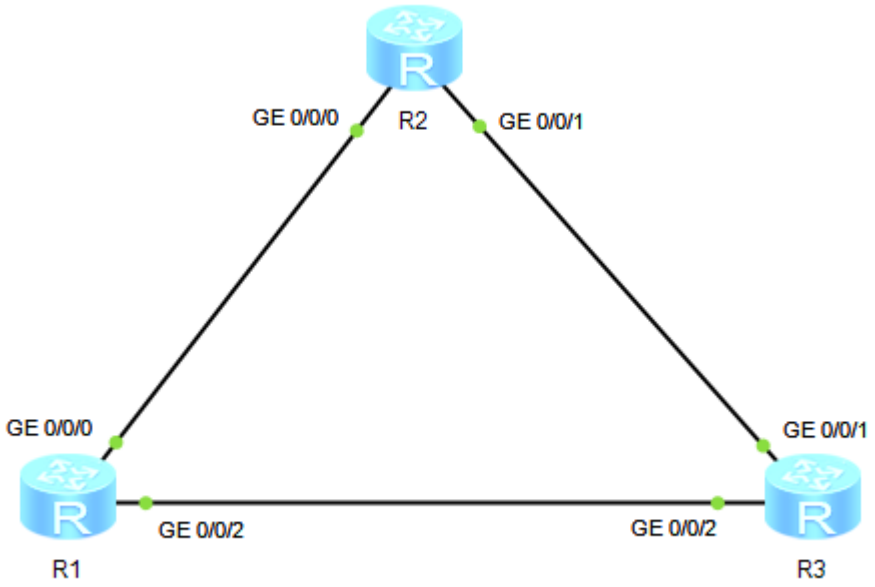
Цель работы

Получить практические в следующих темах:

- Процедура настройки IPv4-адреса на интерфейсе
- Функции и значение loopback-интерфейсов
- Принципы генерирования прямых маршрутов
- Процедура настройки статических маршрутов и условия, при которых используются статические маршруты
- Процедура проверки возможности установления соединения сетевого уровня с помощью инструмента ping
- Процедура настройки статических маршрутов и сценарии их применения

Топология сети



План работы

- Настроить IP-адресов для интерфейсов на маршрутизаторах
- Настройка статических маршрутов для установления связи между маршрутизаторами

Конфигурация оборудования

Вывод IP-адреса текущего интерфейса и таблицы маршрутизации маршрутизатора

```
<r1>system-view
Enter system view, return user view with Ctrl+Z.
[r1]display ip int brief
*down: administratively down
^down: standby
(l): loopback
(s): spoofing
The number of interface that is UP in Physical is 3
The number of interface that is DOWN in Physical is 1
The number of interface that is UP in Protocol is 1
The number of interface that is DOWN in Protocol is 3

Interface                         IP Address/Mask      Physical   Protocol
GigabitEthernet0/0/0              unassigned           up         down
GigabitEthernet0/0/1              unassigned           down       down
GigabitEthernet0/0/2              unassigned           up         down
NULL0                             unassigned           up         up(s)
```

Вывод таблицы маршрутизации для маршрутизатора r1

```
[r1]display ip routing-table
Route Flags: R - relay, D - download to fib
------------------------------------------------------------------------------
Routing Tables: Public
         Destinations : 4        Routes : 4

Destination/Mask    Proto   Pre  Cost      Flags NextHop         Interface

      127.0.0.0/8   Direct  0    0           D   127.0.0.1       InLoopBack0
      127.0.0.1/32  Direct  0    0           D   127.0.0.1       InLoopBack0
127.255.255.255/32  Direct  0    0           D   127.0.0.1       InLoopBack0
255.255.255.255/32  Direct  0    0           D   127.0.0.1       InLoopBack0
```

Настройка IP-адресов для физических интерфейсов

Маршрутизатор	Интерфейс	IP-адрес/маска
R1	GigabitEthernet0/0/2	10.0.13.1/24
	GigabitEthernet0/0/0	10.0.12.1/24
R2	GigabitEthernet0/0/0	10.0.12.2/24
	GigabitEthernet0/0/1	10.0.23.2/24
R3	GigabitEthernet0/0/2	10.0.13.3/24
	GigabitEthernet0/0/1	10.0.23.3/24

Процесс конфигурации оборудования

r1

```
<r1>system-view
Enter system view, return user view with Ctrl+Z.
[r1]int g0/0/2
[r1-GigabitEthernet0/0/2]ip address 10.0.13.1 24
Oct 28 2024 03:35:01-08:00 r1 %%01IFNET/4/LINK_STATE(l)[6]:The line protocol IP
on the interface GigabitEthernet0/0/2 has entered the UP state.
[r1-GigabitEthernet0/0/2]int g0/0/0
[r1-GigabitEthernet0/0/0]ip address 10.0.12.1 24
[r1-GigabitEthernet0/0/0]
Oct 28 2024 03:36:08-08:00 r1 %%01IFNET/4/LINK_STATE(l)[7]:The line protocol IP
on the interface GigabitEthernet0/0/0 has entered the UP state.
[r1-GigabitEthernet0/0/0]quit
```

r2

```
<r2>system-view
Enter system view, return user view with Ctrl+Z.
[r2]int g0/0/0
[r2-GigabitEthernet0/0/0]ip address 10.0.12.2 24
Oct 28 2024 03:37:51-08:00 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]int g0/0/1
[r2-GigabitEthernet0/0/1]ip address 10.0.23.2 24
Oct 28 2024 03:38:41-08:00 r2 %%01IFNET/4/LINK_STATE(l)[1]:The line protocol IP
on the interface GigabitEthernet0/0/1 has entered the UP state.
```

r3

```
<r3>system-view
Enter system view, return user view with Ctrl+Z.
[r3]int g0/0/2
[r3-GigabitEthernet0/0/2]ip address 10.0.13.3 24
Oct 28 2024 03:40:14-08:00 r3 %%01IFNET/4/LINK_STATE(l)[0]:The line protocol IP
on the interface GigabitEthernet0/0/2 has entered the UP state.
[r3-GigabitEthernet0/0/2]int g0/0/1
[r3-GigabitEthernet0/0/1]ip address 10.0.23.3 24
Oct 28 2024 03:40:35-08:00 r3 %%01IFNET/4/LINK_STATE(l)[1]:The line protocol IP
on the interface GigabitEthernet0/0/1 has entered the UP state.
```

Проверка наличия связи

r1-r2

```
<r1>ping 10.0.12.2
  PING 10.0.12.2: 56  data bytes, press CTRL_C to break
    Reply from 10.0.12.2: bytes=56 Sequence=1 ttl=255 time=80 ms
    Reply from 10.0.12.2: bytes=56 Sequence=2 ttl=255 time=20 ms
    Reply from 10.0.12.2: bytes=56 Sequence=3 ttl=255 time=10 ms
    Reply from 10.0.12.2: bytes=56 Sequence=4 ttl=255 time=20 ms
    Reply from 10.0.12.2: bytes=56 Sequence=5 ttl=255 time=20 ms

  --- 10.0.12.2 ping statistics ---
    5 packet(s) transmitted
    5 packet(s) received
    0.00% packet loss
    round-trip min/avg/max = 10/30/80 ms
```

r1-r3

```
<r1>ping 10.0.13.3
  PING 10.0.13.3: 56  data bytes, press CTRL_C to break
    Reply from 10.0.13.3: bytes=56 Sequence=1 ttl=255 time=50 ms
    Reply from 10.0.13.3: bytes=56 Sequence=2 ttl=255 time=30 ms
    Reply from 10.0.13.3: bytes=56 Sequence=3 ttl=255 time=20 ms
    Reply from 10.0.13.3: bytes=56 Sequence=4 ttl=255 time=20 ms
    Reply from 10.0.13.3: bytes=56 Sequence=5 ttl=255 time=10 ms

  --- 10.0.13.3 ping statistics ---
    5 packet(s) transmitted
    5 packet(s) received
    0.00% packet loss
    round-trip min/avg/max = 10/26/50 ms
```

Таблица маршрутизации

```
<r1>display ip routing-table
Route Flags: R - relay, D - download to fib
------------------------------------------------------------------------------
Routing Tables: Public
         Destinations : 10       Routes : 10

Destination/Mask    Proto   Pre  Cost      Flags NextHop         Interface

      10.0.12.0/24  Direct  0    0           D   10.0.12.1       GigabitEthernet
0/0/0
      10.0.12.1/32  Direct  0    0           D   127.0.0.1       GigabitEthernet
0/0/0
    10.0.12.255/32  Direct  0    0           D   127.0.0.1       GigabitEthernet
0/0/0
```

```
      10.0.13.0/24  Direct  0    0           D   10.0.13.1       GigabitEthernet
0/0/2
      10.0.13.1/32  Direct  0    0           D   127.0.0.1       GigabitEthernet
0/0/2
    10.0.13.255/32  Direct  0    0           D   127.0.0.1       GigabitEthernet
0/0/2
      127.0.0.0/8   Direct  0    0           D   127.0.0.1       InLoopBack0
      127.0.0.1/32  Direct  0    0           D   127.0.0.1       InLoopBack0
127.255.255.255/32  Direct  0    0           D   127.0.0.1       InLoopBack0
255.255.255.255/32  Direct  0    0           D   127.0.0.1       InLoopBack0
```

Создание loopback-интерфейсов

Маршрутизатор	Интерфейс	IP-адрес/маска
R1	LoopBack0	10.0.1.1/32
R2	LoopBack0	10.0.1.2/32
R3	LoopBack0	10.0.1.3/32

r1

```
<r1>system-view
Enter system view, return user view with Ctrl+Z.
[r1]int LoopBack0
[r1-LoopBack0]ip address 10.0.1.1 32
```

r2

```
<r2>system-view
Enter system view, return user view with Ctrl+Z.
[r2]int LoopBack0
[r2-LoopBack0]ip address 10.0.1.2 32
```

r3

```
<r3>system-view
Enter system view, return user view with Ctrl+Z.
[r3]int LoopBack0
[r3-LoopBack0]ip address 10.0.1.3 32
```

Таблица маршрутизации для r1

```
<r1>display ip routing-table
Route Flags: R - relay, D - download to fib
```

```
------------------------------------------------------------------------------
Routing Tables: Public
         Destinations : 11       Routes : 11

Destination/Mask    Proto   Pre  Cost      Flags NextHop         Interface

       10.0.1.1/32  Direct  0    0           D   127.0.0.1       LoopBack0
      10.0.12.0/24  Direct  0    0           D   10.0.12.1       GigabitEthernet
0/0/0
      10.0.12.1/32  Direct  0    0           D   127.0.0.1       GigabitEthernet
0/0/0
    10.0.12.255/32  Direct  0    0           D   127.0.0.1       GigabitEthernet
0/0/0
      10.0.13.0/24  Direct  0    0           D   10.0.13.1       GigabitEthernet
0/0/2
      10.0.13.1/32  Direct  0    0           D   127.0.0.1       GigabitEthernet
0/0/2
    10.0.13.255/32  Direct  0    0           D   127.0.0.1       GigabitEthernet
0/0/2
      127.0.0.0/8   Direct  0    0           D   127.0.0.1       InLoopBack0
      127.0.0.1/32  Direct  0    0           D   127.0.0.1       InLoopBack0
127.255.255.255/32  Direct  0    0           D   127.0.0.1       InLoopBack0
255.255.255.255/32  Direct  0    0           D   127.0.0.1       InLoopBack0

<r1>ping -a 10.0.1.1 10.0.1.2
  PING 10.0.1.2: 56  data bytes, press CTRL_C to break
    Request time out
    Request time out
    Request time out
    Request time out
    Request time out

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

Настройка статических маршрутов

```
<r1>system-view
Enter system view, return user view with Ctrl+Z.
[r1]ip route-static 10.0.1.2 32 10.0.12.2
[r1]ip route-static 10.0.1.3 32 10.0.13.3
[r1]display ip routing-table
Route Flags: R - relay, D - download to fib
------------------------------------------------------------------------------
Routing Tables: Public
         Destinations : 13       Routes : 13

Destination/Mask    Proto   Pre  Cost      Flags NextHop         Interface
```

```
       10.0.1.1/32  Direct  0    0           D   127.0.0.1       LoopBack0
       10.0.1.2/32  Static  60   0          RD   10.0.12.2       GigabitEthernet
0/0/0
       10.0.1.3/32  Static  60   0          RD   10.0.13.3       GigabitEthernet
0/0/2
      10.0.12.0/24  Direct  0    0           D   10.0.12.1       GigabitEthernet
0/0/0
      10.0.12.1/32  Direct  0    0           D   127.0.0.1       GigabitEthernet
0/0/0
    10.0.12.255/32  Direct  0    0           D   127.0.0.1       GigabitEthernet
0/0/0
      10.0.13.0/24  Direct  0    0           D   10.0.13.1       GigabitEthernet
0/0/2
      10.0.13.1/32  Direct  0    0           D   127.0.0.1       GigabitEthernet
0/0/2
    10.0.13.255/32  Direct  0    0           D   127.0.0.1       GigabitEthernet
0/0/2
      127.0.0.0/8   Direct  0    0           D   127.0.0.1       InLoopBack0
      127.0.0.1/32  Direct  0    0           D   127.0.0.1       InLoopBack0
127.255.255.255/32  Direct  0    0           D   127.0.0.1       InLoopBack0
255.255.255.255/32  Direct  0    0           D   127.0.0.1       InLoopBack0

[r1]ping -a 10.0.1.1 10.0.1.2
  PING 10.0.1.2: 56  data bytes, press CTRL_C to break
    Request time out
    Request time out
    Request time out
    Request time out
    Request time out

  --- 10.0.1.2 ping statistics ---
    5 packet(s) transmitted
    0 packet(s) received
    100.00% packet loss
r2
[r2]ip route-static 10.0.1.1 32 10.0.12.1

r1
[r1]ping -a 10.0.1.1 10.0.1.2
  PING 10.0.1.2: 56  data bytes, press CTRL_C to break
    Request time out
    Request time out
    Request time out
    Request time out
    Request time out

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

```
[r1]ping -a 10.0.1.1 10.0.1.2
  PING 10.0.1.2: 56  data bytes, press CTRL_C to break
    Reply from 10.0.1.2: bytes=56 Sequence=1 ttl=255 time=20 ms
    Reply from 10.0.1.2: bytes=56 Sequence=2 ttl=255 time=20 ms
    Reply from 10.0.1.2: bytes=56 Sequence=3 ttl=255 time=20 ms
    Reply from 10.0.1.2: bytes=56 Sequence=4 ttl=255 time=20 ms
    Reply from 10.0.1.2: bytes=56 Sequence=5 ttl=255 time=20 ms

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

r2
[r2]ip route-static 10.0.1.1 32 10.0.12.1
[r2]ip route-static 10.0.1.3 32 10.0.23.3

r3
[r3]ip route-static 10.0.1.1 32 10.0.13.1
[r3]ip route-static 10.0.1.2 32 10.0.23.2

r2
[r2]ping -a 10.0.1.2 10.0.1.3
  PING 10.0.1.3: 56  data bytes, press CTRL_C to break
    Reply from 10.0.1.3: bytes=56 Sequence=1 ttl=255 time=20 ms
    Reply from 10.0.1.3: bytes=56 Sequence=2 ttl=255 time=30 ms
    Reply from 10.0.1.3: bytes=56 Sequence=3 ttl=255 time=20 ms
    Reply from 10.0.1.3: bytes=56 Sequence=4 ttl=255 time=20 ms
    Reply from 10.0.1.3: bytes=56 Sequence=5 ttl=255 time=20 ms

  --- 10.0.1.3 ping statistics ---
    5 packet(s) transmitted
    5 packet(s) received
    0.00% packet loss
    round-trip min/avg/max = 20/22/30 ms

r3
[r3]ping -a 10.0.1.3 10.0.1.2
  PING 10.0.1.2: 56  data bytes, press CTRL_C to break
    Reply from 10.0.1.2: bytes=56 Sequence=1 ttl=255 time=30 ms
    Reply from 10.0.1.2: bytes=56 Sequence=2 ttl=255 time=20 ms
    Reply from 10.0.1.2: bytes=56 Sequence=3 ttl=255 time=20 ms
    Reply from 10.0.1.2: bytes=56 Sequence=4 ttl=255 time=20 ms
    Reply from 10.0.1.2: bytes=56 Sequence=5 ttl=255 time=20 ms

  --- 10.0.1.2 ping statistics ---
    5 packet(s) transmitted
    5 packet(s) received
    0.00% packet loss
```

```
    round-trip min/avg/max = 20/22/30 ms
```

Создание резервных маршрутов

```
r1
[r1]ip route-static 10.0.1.2 32 10.0.13.3 preference 100

r2
[r2]ip route-static 10.0.1.1 32 10.0.23.3 preference 100

r1
[r1]display ip routing-table
Route Flags: R - relay, D - download to fib
------------------------------------------------------------------------------
Routing Tables: Public
         Destinations : 13       Routes : 13

Destination/Mask    Proto   Pre  Cost      Flags NextHop         Interface

       10.0.1.1/32  Direct  0    0           D   127.0.0.1       LoopBack0
       10.0.1.2/32  Static  60   0          RD   10.0.12.2       GigabitEthernet
0/0/0
       10.0.1.3/32  Static  60   0          RD   10.0.13.3       GigabitEthernet
0/0/2
      10.0.12.0/24  Direct  0    0           D   10.0.12.1       GigabitEthernet
0/0/0
      10.0.12.1/32  Direct  0    0           D   127.0.0.1       GigabitEthernet
0/0/0
    10.0.12.255/32  Direct  0    0           D   127.0.0.1       GigabitEthernet
0/0/0
      10.0.13.0/24  Direct  0    0           D   10.0.13.1       GigabitEthernet
0/0/2
      10.0.13.1/32  Direct  0    0           D   127.0.0.1       GigabitEthernet
0/0/2
    10.0.13.255/32  Direct  0    0           D   127.0.0.1       GigabitEthernet
0/0/2
      127.0.0.0/8   Direct  0    0           D   127.0.0.1       InLoopBack0
      127.0.0.1/32  Direct  0    0           D   127.0.0.1       InLoopBack0
127.255.255.255/32  Direct  0    0           D   127.0.0.1       InLoopBack0
255.255.255.255/32  Direct  0    0           D   127.0.0.1       InLoopBack0

r2
[r2]display ip routing-table
Route Flags: R - relay, D - download to fib
------------------------------------------------------------------------------
Routing Tables: Public
         Destinations : 13       Routes : 13

Destination/Mask    Proto   Pre  Cost      Flags NextHop         Interface

       10.0.1.1/32  Static  60   0          RD   10.0.12.1       GigabitEthernet
```

```
0/0/0
       10.0.1.2/32  Direct  0    0           D   127.0.0.1       LoopBack0
       10.0.1.3/32  Static  60   0          RD   10.0.23.3       GigabitEthernet
0/0/1
      10.0.12.0/24  Direct  0    0           D   10.0.12.2       GigabitEthernet
0/0/0
      10.0.12.2/32  Direct  0    0           D   127.0.0.1       GigabitEthernet
0/0/0
    10.0.12.255/32  Direct  0    0           D   127.0.0.1       GigabitEthernet
0/0/0
      10.0.23.0/24  Direct  0    0           D   10.0.23.2       GigabitEthernet
0/0/1
      10.0.23.2/32  Direct  0    0           D   127.0.0.1       GigabitEthernet
0/0/1
    10.0.23.255/32  Direct  0    0           D   127.0.0.1       GigabitEthernet
0/0/1
      127.0.0.0/8   Direct  0    0           D   127.0.0.1       InLoopBack0
      127.0.0.1/32  Direct  0    0           D   127.0.0.1       InLoopBack0
127.255.255.255/32  Direct  0    0           D   127.0.0.1       InLoopBack0
255.255.255.255/32  Direct  0    0           D   127.0.0.1       InLoopBack0
```

Выключение интерфейса для активации резервного маршрута

```
r1
[r1]int g0/0/0
[r1-GigabitEthernet0/0/0]shutdown
Oct 28 2024 04:07:54-08:00 r1 %%01IFPDT/4/IF_STATE(l)[0]:Interface GigabitEthern
et0/0/0 has turned into DOWN state.

[r1]display ip routing-table
Route Flags: R - relay, D - download to fib
------------------------------------------------------------------------------
Routing Tables: Public
         Destinations : 10       Routes : 10

Destination/Mask    Proto   Pre  Cost      Flags NextHop         Interface

       10.0.1.1/32  Direct  0    0           D   127.0.0.1       LoopBack0
       10.0.1.2/32  Static  100  0          RD   10.0.13.3       GigabitEthernet
0/0/2
       10.0.1.3/32  Static  60   0          RD   10.0.13.3       GigabitEthernet
0/0/2
      10.0.13.0/24  Direct  0    0           D   10.0.13.1       GigabitEthernet
0/0/2
      10.0.13.1/32  Direct  0    0           D   127.0.0.1       GigabitEthernet
0/0/2
    10.0.13.255/32  Direct  0    0           D   127.0.0.1       GigabitEthernet
0/0/2
      127.0.0.0/8   Direct  0    0           D   127.0.0.1       InLoopBack0
      127.0.0.1/32  Direct  0    0           D   127.0.0.1       InLoopBack0
127.255.255.255/32  Direct  0    0           D   127.0.0.1       InLoopBack0
```

```
255.255.255.255/32  Direct  0    0           D   127.0.0.1       InLoopBack0

r2
[r2]display ip routing-table
Route Flags: R - relay, D - download to fib
------------------------------------------------------------------------------
Routing Tables: Public
         Destinations : 10       Routes : 10

Destination/Mask    Proto   Pre  Cost      Flags NextHop         Interface

       10.0.1.1/32  Static  100  0          RD   10.0.23.3       GigabitEthernet
0/0/1
       10.0.1.2/32  Direct  0    0           D   127.0.0.1       LoopBack0
       10.0.1.3/32  Static  60   0          RD   10.0.23.3       GigabitEthernet
0/0/1
      10.0.23.0/24  Direct  0    0           D   10.0.23.2       GigabitEthernet
0/0/1
      10.0.23.2/32  Direct  0    0           D   127.0.0.1       GigabitEthernet
0/0/1
    10.0.23.255/32  Direct  0    0           D   127.0.0.1       GigabitEthernet
0/0/1
      127.0.0.0/8   Direct  0    0           D   127.0.0.1       InLoopBack0
      127.0.0.1/32  Direct  0    0           D   127.0.0.1       InLoopBack0
127.255.255.255/32  Direct  0    0           D   127.0.0.1       InLoopBack0
255.255.255.255/32  Direct  0    0           D   127.0.0.1       InLoopBack0

r1
[r1]ping -a 10.0.1.1 10.0.1.2
  PING 10.0.1.2: 56  data bytes, press CTRL_C to break
    Reply from 10.0.1.2: bytes=56 Sequence=1 ttl=254 time=20 ms
    Reply from 10.0.1.2: bytes=56 Sequence=2 ttl=254 time=20 ms
    Reply from 10.0.1.2: bytes=56 Sequence=3 ttl=254 time=20 ms
    Reply from 10.0.1.2: bytes=56 Sequence=4 ttl=254 time=20 ms
    Reply from 10.0.1.2: bytes=56 Sequence=5 ttl=254 time=20 ms

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

[r1]tracert -a 10.0.1.1 10.0.1.2

 traceroute to  10.0.1.2(10.0.1.2), max hops: 30 ,packet length: 40,press CTRL_C
 to break

 1 10.0.13.3 30 ms  20 ms  20 ms

 2 10.0.23.2 30 ms  30 ms  20 ms
```

Включение интерфейса и удаление настроенных маршрутов

```
r1
[r1]int g0/0/0
[r1-GigabitEthernet0/0/0]undo shutdown
[r1-GigabitEthernet0/0/0]
Oct 28 2024 04:11:32-08:00 r1 %%01IFPDT/4/IF_STATE(l)[2]:Interface GigabitEthern
et0/0/0 has turned into UP state.
[r1]display ip routing-table
Route Flags: R - relay, D - download to fib
------------------------------------------------------------------------------
Routing Tables: Public
         Destinations : 13       Routes : 13

Destination/Mask    Proto   Pre  Cost      Flags NextHop         Interface

       10.0.1.1/32  Direct  0    0           D   127.0.0.1       LoopBack0
       10.0.1.2/32  Static  60   0          RD   10.0.12.2       GigabitEthernet
0/0/0
       10.0.1.3/32  Static  60   0          RD   10.0.13.3       GigabitEthernet
0/0/2
      10.0.12.0/24  Direct  0    0           D   10.0.12.1       GigabitEthernet
0/0/0
      10.0.12.1/32  Direct  0    0           D   127.0.0.1       GigabitEthernet
0/0/0
    10.0.12.255/32  Direct  0    0           D   127.0.0.1       GigabitEthernet
0/0/0
      10.0.13.0/24  Direct  0    0           D   10.0.13.1       GigabitEthernet
0/0/2
      10.0.13.1/32  Direct  0    0           D   127.0.0.1       GigabitEthernet
0/0/2
    10.0.13.255/32  Direct  0    0           D   127.0.0.1       GigabitEthernet
0/0/2
      127.0.0.0/8   Direct  0    0           D   127.0.0.1       InLoopBack0
      127.0.0.1/32  Direct  0    0           D   127.0.0.1       InLoopBack0
127.255.255.255/32  Direct  0    0           D   127.0.0.1       InLoopBack0
255.255.255.255/32  Direct  0    0           D   127.0.0.1       InLoopBack0
```

Настройка маршрута по умолчанию

```
r1
[r1]ip route-static 0.0.0.0 0 10.0.12.2
[r1]display ip routing-table
Route Flags: R - relay, D - download to fib
------------------------------------------------------------------------------
Routing Tables: Public
         Destinations : 14       Routes : 14

Destination/Mask    Proto   Pre  Cost      Flags NextHop         Interface

        0.0.0.0/0   Static  60   0          RD   10.0.12.2       GigabitEthernet
0/0/0
```

```
       10.0.1.1/32  Direct  0    0           D   127.0.0.1       LoopBack0
       10.0.1.2/32  Static  60   0          RD   10.0.12.2       GigabitEthernet
0/0/0
       10.0.1.3/32  Static  60   0          RD   10.0.13.3       GigabitEthernet
0/0/2
      10.0.12.0/24  Direct  0    0           D   10.0.12.1       GigabitEthernet
0/0/0
      10.0.12.1/32  Direct  0    0           D   127.0.0.1       GigabitEthernet
0/0/0
    10.0.12.255/32  Direct  0    0           D   127.0.0.1       GigabitEthernet
0/0/0
      10.0.13.0/24  Direct  0    0           D   10.0.13.1       GigabitEthernet
0/0/2
      10.0.13.1/32  Direct  0    0           D   127.0.0.1       GigabitEthernet
0/0/2
    10.0.13.255/32  Direct  0    0           D   127.0.0.1       GigabitEthernet
0/0/2
      127.0.0.0/8   Direct  0    0           D   127.0.0.1       InLoopBack0
      127.0.0.1/32  Direct  0    0           D   127.0.0.1       InLoopBack0
127.255.255.255/32  Direct  0    0           D   127.0.0.1       InLoopBack0
255.255.255.255/32  Direct  0    0           D   127.0.0.1       InLoopBack0
[r1]ping -a 10.0.1.1 10.0.1.2
  PING 10.0.1.2: 56  data bytes, press CTRL_C to break
    Reply from 10.0.1.2: bytes=56 Sequence=1 ttl=255 time=40 ms
    Reply from 10.0.1.2: bytes=56 Sequence=2 ttl=255 time=20 ms
    Reply from 10.0.1.2: bytes=56 Sequence=3 ttl=255 time=20 ms
    Reply from 10.0.1.2: bytes=56 Sequence=4 ttl=255 time=30 ms
    Reply from 10.0.1.2: bytes=56 Sequence=5 ttl=255 time=20 ms

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

Конфигурационные файлы

r1

```
interface GigabitEthernet0/0/0
ip address 10.0.12.1 255.255.255.0
#
interface GigabitEthernet0/0/1
#
interface GigabitEthernet0/0/2
ip address 10.0.13.1 255.255.255.0
#
interface NULL0
#
```

```
interface LoopBack0
ip address 10.0.1.1 255.255.255.255
#
ip route-static 0.0.0.0 0.0.0.0 10.0.12.2
ip route-static 10.0.1.3 255.255.255.255 10.0.13.3
#
user-interface con 0
authentication-mode password
user-interface vty 0 4
user-interface vty 16 20
#
wlan ac
#
return
```

r2

```
interface GigabitEthernet0/0/0
ip address 10.0.12.2 255.255.255.0
#
interface GigabitEthernet0/0/1
ip address 10.0.23.2 255.255.255.0
#
interface GigabitEthernet0/0/2
#
interface NULL0
#
interface LoopBack0
ip address 10.0.1.2 255.255.255.255
#
ip route-static 10.0.1.1 255.255.255.255 10.0.12.1
ip route-static 10.0.1.1 255.255.255.255 10.0.23.3 preference 100
18
ip route-static 10.0.1.3 255.255.255.255 10.0.23.3
#
user-interface con 0
authentication-mode password
user-interface vty 0 4
user-interface vty 16 20
#
wlan ac
#
return
```

r3

```
interface GigabitEthernet0/0/0
#
interface GigabitEthernet0/0/1
ip address 10.0.23.3 255.255.255.0
#
```

```
interface GigabitEthernet0/0/2
ip address 10.0.13.3 255.255.255.0
#
interface NULL0
#
interface LoopBack0
ip address 10.0.1.3 255.255.255.255
#
ip route-static 10.0.1.1 255.255.255.255 10.0.13.1
ip route-static 10.0.1.2 255.255.255.255 10.0.23.2
#
user-interface con 0
authentication-mode password
user-interface vty 0 4
user-interface vty 16 20
#
wlan ac
#
return
```

Вывод

Во время выполнения лабораторной работы мы познакомились с работой в симуляторе eNSP и с его помощью настроили IPv4 адреса на интерфейсах, loopback адреса, статические маршруты и резервные маршруты.