Университет ИТМО

Факультет программной инженерии и компьютерной техники

# Лабораторная работа №2 по Администрированию систем и сетей «Создание взаимосвязанной IP-сети»

Работу выполнили студенты группы
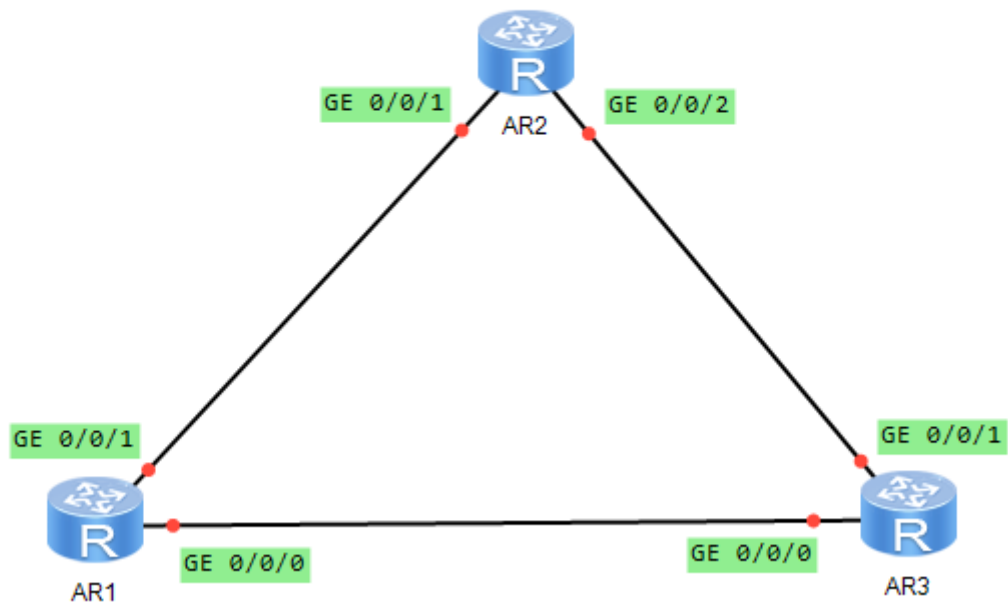Р34101:Патутин Владимир
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Желаемая оценка: 3

Санкт-Петербург

# Оглавление

## Топология:



## Настройте основные параметры устройств.
Задайте имена устройствам.

```
<Huawei>system-view
Enter system view, return user view with Ctrl+Z.
[Huawei]sysname AR1
[AR1]

<Huawei>system-view
Enter system view, return user view with Ctrl+Z.
[Huawei]sysname AR2
[AR2]

<Huawei>system-view
Enter system view, return user view with Ctrl+Z.
[Huawei]sysname AR3
[AR3]
```

## Выведите на экран IP-адрес текущего интерфейса и таблицу маршрутизации маршрутизатора.
Выведите на экран статус интерфейса на маршрутизаторе (в данном случае на примере AR1).

```
[AR1]display ip interface 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         up         down
GigabitEthernet0/0/2            unassigned         down       down
NULL0                          unassigned         up         up(s)
[AR1]
```

Выведите на экран таблицу маршрутизации на маршрутизаторе (в данном случае на примере AR1).

```
[AR1]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

[AR1]
```

## Настройте IP-адреса для физических интерфейсов.

Настройте IP-адреса для физических интерфейсов на основе следующей таблицы

```
[AR1]interface GigabitEthernet0/0/0
[AR1-GigabitEthernet0/0/0]ip address 10.0.13.1 24
Oct  4 2022 01:05:35-08:00 AR1 %%01IFNET/4/LINK_STATE(l)[2]:The line protocol
IP
 on the interface GigabitEthernet0/0/0 has entered the UP state.
[AR1-GigabitEthernet0/0/0]quit
[AR1]interface GigabitEthernet0/0/1
[AR1-GigabitEthernet0/0/1]ip address 10.0.12.1 24
Oct  4 2022 01:05:54-08:00 AR1 %%01IFNET/4/LINK_STATE(l)[3]:The line protocol
IP
 on the interface GigabitEthernet0/0/1 has entered the UP state.
[AR1-GigabitEthernet0/0/1]quit
[AR1]


[AR2]interface GigabitEthernet0/0/1
[AR2-GigabitEthernet0/0/1]ip address 10.0.12.2 24
[AR2-GigabitEthernet0/0/1]
Oct  4 2022 01:06:27-08:00 AR2 %%01IFNET/4/LINK_STATE(l)[0]:The line protocol
IP
 on the interface GigabitEthernet0/0/1 has entered the UP state.
[AR2-GigabitEthernet0/0/1]quit
[AR2]interface GigabitEthernet0/0/2
[AR2-GigabitEthernet0/0/2]ip address 10.0.23.2 24
Oct  4 2022 01:07:07-08:00 AR2 %%01IFNET/4/LINK_STATE(l)[1]:The line protocol
IP
 on the interface GigabitEthernet0/0/2 has entered the UP state.
[AR2-GigabitEthernet0/0/2]quit
[AR2]


[AR3]interface GigabitEthernet0/0/0
[AR3-GigabitEthernet0/0/0]ip address 10.0.13.3 24
```

```
Oct  4 2022 01:08:09-08:00 AR3 %%01IFNET/4/LINK_STATE(l)[0]:The line protocol
IP
 on the interface GigabitEthernet0/0/0 has entered the UP state.
[AR3-GigabitEthernet0/0/0]quit
[AR3]interface GigabitEthernet0/0/1
[AR3-GigabitEthernet0/0/1]ip address 10.0.23.3 24
Oct  4 2022 01:08:25-08:00 AR3 %%01IFNET/4/LINK_STATE(l)[1]:The line protocol
IP
 on the interface GigabitEthernet0/0/1 has entered the UP state.
[AR3-GigabitEthernet0/0/1]quit
[AR3]
```

Проверьте наличие связи с помощью инструмента ping.

```
[AR1]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=130 ms
    Reply from 10.0.12.2: bytes=56 Sequence=2 ttl=255 time=10 ms
    Reply from 10.0.12.2: bytes=56 Sequence=3 ttl=255 time=30 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=30 ms

  --- 10.0.12.2 ping statistics ---
    5 packet(s) transmitted
    5 packet(s) received
    0.00% packet loss
    round-trip min/avg/max = 10/44/130 ms

[AR1]

[AR1]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=130 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=30 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=40 ms

  --- 10.0.13.3 ping statistics ---
    5 packet(s) transmitted
    5 packet(s) received
    0.00% packet loss
    round-trip min/avg/max = 20/50/130 ms

[AR1]
```

Выведите на экран таблицу маршрутизации AR1.

```
[AR1]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
0/0/1
     10.0.12.1/32  Direct  0    0           D    127.0.0.1
GigabitEthernet
0/0/1
```

```
      10.0.12.255/32  Direct  0    0          D    127.0.0.1
GigabitEthernet
0/0/1
      10.0.13.0/24   Direct  0    0          D    10.0.13.1
GigabitEthernet
0/0/0
      10.0.13.1/32   Direct  0    0          D    127.0.0.1
GigabitEthernet
0/0/0
     10.0.13.255/32  Direct  0    0          D    127.0.0.1
GigabitEthernet
0/0/0
      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

[AR1]
```

## Создайте loopback-интерфейс.

Настройте loopback-интерфейс в соответствии со следующей таблицей

```
[AR1]interface LoopBack0
[AR1-LoopBack0]ip address 10.0.1.1 32
[AR1-LoopBack0]quit
[AR1]

[AR2]interface LoopBack0
[AR2-LoopBack0]ip address 10.0.1.2 32
[AR2-LoopBack0]quit
[AR2]

[AR3]interface LoopBack0
[AR3-LoopBack0]ip address 10.0.1.3 32
[AR3-LoopBack0]quit
[AR3]
```

Выведите на экран таблицу маршрутизации на маршрутизаторе (в данном случае на примере AR1).

```
[AR1]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
0/0/1
      10.0.12.1/32   Direct  0    0          D    127.0.0.1
GigabitEthernet
0/0/1
     10.0.12.255/32  Direct  0    0          D    127.0.0.1
GigabitEthernet
0/0/1
      10.0.13.0/24   Direct  0    0          D    10.0.13.1
GigabitEthernet
```

```
0/0/0
      10.0.13.1/32   Direct  0    0          D    127.0.0.1
GigabitEthernet
0/0/0
      10.0.13.255/32  Direct  0    0          D    127.0.0.1
GigabitEthernet
0/0/0
     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

[AR1]
```

Проверьте наличие связи между loopback-интерфейсами.

```
[AR1]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

[AR1]
```

## Настройте статические маршруты

На маршрутизаторе AR1 настройте маршрут к интерфейсам LoopBack0
маршрутизаторов AR2 и AR3.

```
[AR1]ip route-static 10.0.1.2 32 10.0.12.2
[AR1]ip route-static 10.0.1.3 32 10.0.13.3
# Выведите на экран таблицу маршрутизации R1.
[AR1]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
0/0/1
     10.0.1.3/32    Static  60   0          RD   10.0.13.3
GigabitEthernet
0/0/0
     10.0.12.0/24   Direct  0    0          D    10.0.12.1
GigabitEthernet
0/0/1
     10.0.12.1/32   Direct  0    0          D    127.0.0.1
GigabitEthernet
0/0/1
     10.0.12.255/32  Direct  0    0          D    127.0.0.1
GigabitEthernet
```

```
0/0/1
     10.0.13.0/24   Direct  0    0          D   10.0.13.1
GigabitEthernet
0/0/0
     10.0.13.1/32   Direct  0    0          D   127.0.0.1
GigabitEthernet
0/0/0
   10.0.13.255/32   Direct  0    0          D   127.0.0.1
GigabitEthernet
0/0/0
      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

[AR1]
```

Проверьте возможность установления связи.

```
[AR1]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

[AR1]
```
На AR2 добавьте маршрут к интерфейсу LoopBack0 маршрутизатора AR1.

```
[AR2]ip route-static 10.0.1.1 32 10.0.12.1
```
Проверьте возможность установления связи.

```
[AR1]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=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=30 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=40 ms

  --- 10.0.1.2 ping statistics ---
    5 packet(s) transmitted
    5 packet(s) received
    0.00% packet loss
    round-trip min/avg/max = 20/28/40 ms

[AR1]
```

Настройте другие необходимые маршруты.

```
[AR2]ip route-static 10.0.1.3 32 10.0.23.3
[AR3]ip route-static 10.0.1.1 32 10.0.13.1
[AR3]ip route-static 10.0.1.2 32 10.0.23.2
```

Проверьте возможность установления связи между интерфейсами LoopBack0
маршрутизаторов, следуя приведенной процедуре.

```
[AR1]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=30 ms
     Reply from 10.0.1.2: bytes=56 Sequence=3 ttl=255 time=30 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 = 20/26/30 ms

[AR1]
[AR1]ping -a 10.0.1.1 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=70 ms
     Reply from 10.0.1.3: bytes=56 Sequence=2 ttl=255 time=40 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=40 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 = 20/38/70 ms

[AR1]

[AR2]ping -a 10.0.1.2 10.0.1.1
   PING 10.0.1.1: 56  data bytes, press CTRL_C to break
     Reply from 10.0.1.1: bytes=56 Sequence=1 ttl=255 time=40 ms
     Reply from 10.0.1.1: bytes=56 Sequence=2 ttl=255 time=30 ms
     Reply from 10.0.1.1: bytes=56 Sequence=3 ttl=255 time=30 ms
     Reply from 10.0.1.1: bytes=56 Sequence=4 ttl=255 time=30 ms
     Reply from 10.0.1.1: bytes=56 Sequence=5 ttl=255 time=30 ms

   --- 10.0.1.1 ping statistics ---
     5 packet(s) transmitted
     5 packet(s) received
     0.00% packet loss
     round-trip min/avg/max = 30/32/40 ms

[AR2]
[AR2]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=70 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=30 ms
     Reply from 10.0.1.3: bytes=56 Sequence=4 ttl=255 time=40 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 = 20/38/70 ms

[AR2]

[AR3]ping -a 10.0.1.3 10.0.1.1
   PING 10.0.1.1: 56  data bytes, press CTRL_C to break
     Reply from 10.0.1.1: bytes=56 Sequence=1 ttl=255 time=40 ms
```

```
  Reply from 10.0.1.1: bytes=56 Sequence=2 ttl=255 time=20 ms
  Reply from 10.0.1.1: bytes=56 Sequence=3 ttl=255 time=20 ms
  Reply from 10.0.1.1: bytes=56 Sequence=4 ttl=255 time=30 ms
  Reply from 10.0.1.1: bytes=56 Sequence=5 ttl=255 time=20 ms

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

[AR3]
[AR3]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=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=30 ms
  Reply from 10.0.1.2: bytes=56 Sequence=4 ttl=255 time=40 ms
  Reply from 10.0.1.2: bytes=56 Sequence=5 ttl=255 time=30 ms

--- 10.0.1.2 ping statistics ---
  5 packet(s) transmitted
  5 packet(s) received
  0.00% packet loss
  round-trip min/avg/max = 20/28/40 ms

[AR3]
```

## Настройте маршрут от AR1 к AR2 через AR3 в качестве резервного маршрута от LoopBack0 AR1 к LoopBack0 AR2.

Настройте статические маршруты на AR1 и AR2.

```
[AR1]ip route-static 10.0.1.2 32 10.0.13.3 preference 100
[AR2]ip route-static 10.0.1.1 32 10.0.23.3 preference 100
```

Выведите на экран таблицы маршрутизации AR1 и AR2.

```
[AR1]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
0/0/1
      10.0.1.3/32   Static  60   0            RD  10.0.13.3
GigabitEthernet
0/0/0
      10.0.12.0/24  Direct  0    0            D   10.0.12.1
GigabitEthernet
0/0/1
      10.0.12.1/32  Direct  0    0            D   127.0.0.1
GigabitEthernet
0/0/1
      10.0.12.255/32 Direct 0    0            D   127.0.0.1
GigabitEthernet
0/0/1
```

```
      10.0.13.0/24  Direct  0    0           D   10.0.13.1
GigabitEthernet
0/0/0
      10.0.13.1/32  Direct  0    0           D   127.0.0.1
GigabitEthernet
0/0/0
    10.0.13.255/32  Direct  0    0           D   127.0.0.1
GigabitEthernet
0/0/0
      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


[AR2]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
0/0/1
      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
0/0/2
      10.0.12.0/24  Direct  0    0           D   10.0.12.2
GigabitEthernet
0/0/1
      10.0.12.2/32  Direct  0    0           D   127.0.0.1
GigabitEthernet
0/0/1
    10.0.12.255/32  Direct  0    0           D   127.0.0.1
GigabitEthernet
0/0/1
      10.0.23.0/24  Direct  0    0           D   10.0.23.2
GigabitEthernet
0/0/2
      10.0.23.2/32  Direct  0    0           D   127.0.0.1
GigabitEthernet
0/0/2
    10.0.23.255/32  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
```

Отключите интерфейс GigabitEthernet0/0/3 на маршрутизаторах AR1 и AR2, чтобы сделать недействительным маршрут с наивысшим приоритетом.

```
[AR1]interface GigabitEthernet0/0/1
[AR1-GigabitEthernet0/0/1]shutdown
Oct  4 2022 01:26:40-08:00 AR1 %%01IFPDT/4/IF_STATE(l)[4]:Interface
GigabitEther
net0/0/1 has turned into DOWN state.
[AR1-GigabitEthernet0/0/1]
[AR1-GigabitEthernet0/0/1]
```

```
Oct  4 2022 01:26:40-08:00 AR1 %%01IFNET/4/LINK_STATE(l)[5]:The line protocol
IP
 on the interface GigabitEthernet0/0/1 has entered the DOWN state.
[AR1-GigabitEthernet0/0/1]quit
```

Выведите на экран таблицы маршрутизации на R1 и R2. Из командного вывода видно, что маршруты с более низким приоритетом активируются, когда маршруты с более высоким приоритетом становятся недействительными.

```
[AR1]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
0/0/0
      10.0.1.3/32   Static  60   0           RD  10.0.13.3
GigabitEthernet
0/0/0
      10.0.13.0/24  Direct  0    0           D   10.0.13.1
GigabitEthernet
0/0/0
      10.0.13.1/32  Direct  0    0           D   127.0.0.1
GigabitEthernet
0/0/0
    10.0.13.255/32  Direct  0    0           D   127.0.0.1
GigabitEthernet
0/0/0
      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

[AR2]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
0/0/2
      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
0/0/2
      10.0.23.0/24  Direct  0    0           D   10.0.23.2
GigabitEthernet
0/0/2
      10.0.23.2/32  Direct  0    0           D   127.0.0.1
GigabitEthernet
0/0/2
    10.0.23.255/32  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
```

[AR2]
Проверьте возможность установления связи.

```
[AR1]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=40 ms
    Reply from 10.0.1.2: bytes=56 Sequence=2 ttl=254 time=50 ms
    Reply from 10.0.1.2: bytes=56 Sequence=3 ttl=254 time=30 ms
    Reply from 10.0.1.2: bytes=56 Sequence=4 ttl=254 time=40 ms
    Reply from 10.0.1.2: bytes=56 Sequence=5 ttl=254 time=30 ms

  --- 10.0.1.2 ping statistics ---
    5 packet(s) transmitted
    5 packet(s) received
    0.00% packet loss
    round-trip min/avg/max = 30/38/50 ms
```

Выполните трассировку маршрута, по которому передаются пакеты данных.

```
[AR1]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 40 ms   20 ms   30 ms

 2 10.0.23.2 30 ms   30 ms   30 ms
[AR1]
```

## Настройте маршруты по умолчанию для установления связи между интерфейсом LoopBack0 маршрутизатора AR1 и интерфейсом LoopBack0 маршрутизатора AR2.

Включите интерфейсы и удалите настроенные маршруты.

```
[AR1]interface GigabitEthernet0/0/1
[AR1-GigabitEthernet0/0/1]undo shutdown
[AR1-GigabitEthernet0/0/1]
Oct  4 2022 01:30:49-08:00 AR1 %%01IFPDT/4/IF_STATE(l)[6]:Interface
GigabitEther
net0/0/1 has turned into UP state.
[AR1-GigabitEthernet0/0/1]
Oct  4 2022 01:30:49-08:00 AR1 %%01IFNET/4/LINK_STATE(l)[7]:The line protocol
IP
 on the interface GigabitEthernet0/0/1 has entered the UP state.
[AR1-GigabitEthernet0/0/1]quit
[AR1]
[AR1]undo ip route-static 10.0.1.2 255.255.255.255 10.0.12.2
[R1]undo ip route-static 10.0.1.2 255.255.255.255 10.0.13.3 preference 100
# Выведите на экран таблицу маршрутизации R1.
[AR1]display ip routing-table
Route Flags: R - relay, D - download to fib
------------------------------------------------------------------------------
-
Routing Tables: Public
         Destinations : 12      Routes : 12
```

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

      10.0.1.1/32    Direct  0    0          D     127.0.0.1        LoopBack0
      10.0.1.3/32    Static  60   0          RD    10.0.13.3
GigabitEthernet
0/0/0
      10.0.12.0/24   Direct  0    0          D     10.0.12.1
GigabitEthernet
0/0/1
      10.0.12.1/32   Direct  0    0          D     127.0.0.1
GigabitEthernet
0/0/1
    10.0.12.255/32   Direct  0    0          D     127.0.0.1
GigabitEthernet
0/0/1
      10.0.13.0/24   Direct  0    0          D     10.0.13.1
GigabitEthernet
0/0/0
      10.0.13.1/32   Direct  0    0          D     127.0.0.1
GigabitEthernet
0/0/0
    10.0.13.255/32   Direct  0    0          D     127.0.0.1
GigabitEthernet
0/0/0
      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
```

Настройте маршрут по умолчанию на R1.

```
[AR1]ip route-static 0.0.0.0 0 10.0.12.2
```
Выведите на экран таблицу маршрутизации R1.

```
[AR1]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

       0.0.0.0/0     Static  60   0          RD    10.0.12.2
GigabitEthernet
0/0/1
      10.0.1.1/32    Direct  0    0          D     127.0.0.1        LoopBack0
      10.0.1.3/32    Static  60   0          RD    10.0.13.3
GigabitEthernet
0/0/0
      10.0.12.0/24   Direct  0    0          D     10.0.12.1
GigabitEthernet
0/0/1
      10.0.12.1/32   Direct  0    0          D     127.0.0.1
GigabitEthernet
0/0/1
    10.0.12.255/32   Direct  0    0          D     127.0.0.1
GigabitEthernet
0/0/1
      10.0.13.0/24   Direct  0    0          D     10.0.13.1
GigabitEthernet
0/0/0
```

```
       10.0.13.1/32    Direct  0    0           D    127.0.0.1
GigabitEthernet
0/0/0
       10.0.13.255/32  Direct  0    0           D    127.0.0.1
GigabitEthernet
0/0/0
      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

[AR1]
```

Проверьте наличие связи между LoopBack0 маршрутизатора R1 и LoopBack0 маршрутизатора AR2.

```
[AR1]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=70 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=30 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 = 20/34/70 ms

[AR1]
```

## Выводы:

Таким образом, мы получили базовые навыки работы с имитационным ПО Huawei eNSP и с маршрутизатором AR2220. А также проверили работоспособность сетей утилитами ping и tracert.