ФЕДЕРАЛЬНОЕ ГОСУДАРСТВЕННОЕ АВТОНОМНОЕ ОБРАЗОВАТЕЛЬНОЕ УЧРЕЖДЕНИЕ ВЫСШЕГО ОБРАЗОВАНИЯ САНКТ-ПЕТЕРБУРГСКИЙ НАЦИОНАЛЬНЫЙ ИССЛЕДОВАТЕЛЬСКИЙ УНИВЕРСИТЕТ ИНФОРМАЦИОННЫХ ТЕХНОЛОГИЙ, МЕХАНИКИ И ОПТИКИ

Факультет программной инженерии и компьютерной техники

Кафедра вычислительной техники

ЛАБОРАТОРНАЯ РАБОТА №2

ПО ДИСЦИПЛИНЕ

«АДМИНИСТРИРОВАНИЕ ВЫЧИСЛИТЕЛЬНЫХ СИСТЕМ»

ВАРИАНТ 6

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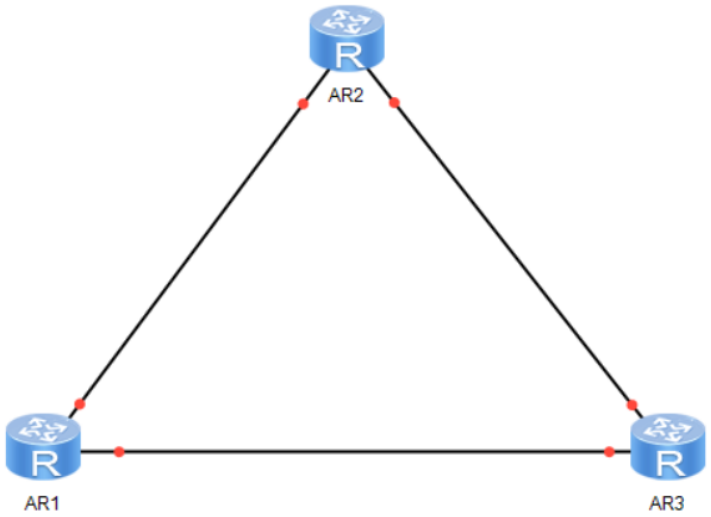
2019

1. Configuring Static Routes and Default Routes



Результаты конфигурации IP-адресов:

R1:

```
Interface                         IP Address/Mask      Physical   Protocol
GigabitEthernet0/0/0              10.0.13.1/24         up         up
GigabitEthernet0/0/1              10.0.12.1/24         up         up
GigabitEthernet0/0/2              unassigned           down       down
LoopBack0                         10.0.1.1/24          up         up(s)
```

R2:

```
Interface                         IP Address/Mask      Physical   Protocol
GigabitEthernet0/0/0              unassigned           down       down
GigabitEthernet0/0/1              10.0.12.2/24         up         up
GigabitEthernet0/0/2              10.0.23.2/24         up         up
LoopBack0                         10.0.2.2/24          up         up(s)
```

R3:

```
Interface                         IP Address/Mask      Physical   Protocol
GigabitEthernet0/0/0              10.0.13.3/24         up         up
GigabitEthernet0/0/1              unassigned           down       down
GigabitEthernet0/0/2              10.0.23.3/24         up         up
LoopBack0                         10.0.3.3/24          up         up(s)
```

```
<R1>ping 10.0.12.2
 --- 10.0.12.2 ping statistics ---
    0.00% packet loss

<R2>ping 10.0.3.3
  --- 10.0.3.3 ping statistics ---
    100.00% packet loss

[R2]display ip routing-table
Route Flags: R - relay, D - download to fib
------------------------------------------------------------------------------
Routing Tables: Public
         Destinations : 15        Routes : 15

Destination/Mask    Proto   Pre  Cost      Flags NextHop         Interface
10.0.3.0/24  Static  60   0           RD   10.0.23.3       GigabitEthernet0/0/2
10.0.13.0/24  Static  60   0           RD   10.0.23.3       GigabitEthernet0/0/2
```

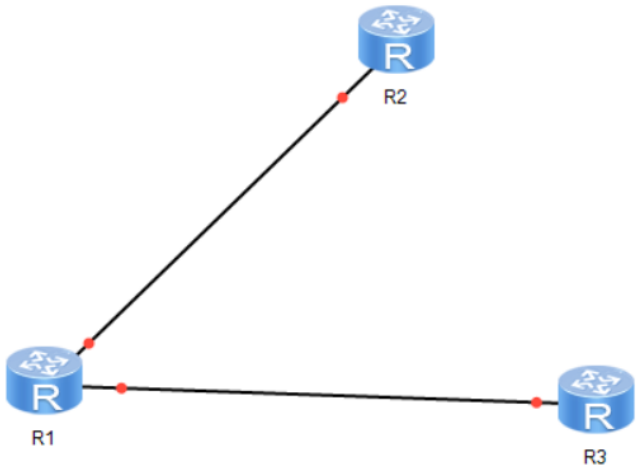
После установки static-routes на R2:

```
<R2>ping 10.0.13.3
  --- 10.0.13.3 ping statistics ---
    0.00% packet loss

<R2>ping 10.0.3.3
  --- 10.0.3.3 ping statistics ---
      0.00% packet loss

<R2>tracert 10.0.13.3
 1 10.0.23.3 20 ms  20 ms  20 ms

<R2>tracert 10.0.3.3
 1 10.0.23.3 20 ms  20 ms  20 ms
```

Результат установки backup static-routes на R2:

```
<R2>display  ip routing-table
10.0.3.0/24  Static  80   0          RD   10.0.12.1       GigabitEthernet 0/0/1
10.0.13.0/24  Static  80   0          RD   10.0.12.1       GigabitEthernet0/0/1

<R2>ping 10.0.3.3
  --- 10.0.3.3 ping statistics ---
    0.00% packet loss

<R2>ping 10.0.13.3
  --- 10.0.13.3 ping statistics ---
    0.00% packet loss

<R2>tracert 10.0.13.3
 1 10.0.12.1 30 ms  20 ms  30 ms
 2 10.0.13.3 30 ms  20 ms  20 ms

<R2>tracert 10.0.3.3
 1 10.0.12.1 30 ms  20 ms  30 ms
 2 10.0.13.3 20 ms  20 ms  20 ms

[R1]ping 10.0.23.3
  --- 10.0.23.3 ping statistics ---
    100.00% packet loss

[R1]ip route-static 0.0.0.0 0.0.0.0 10.0.13.3
<R1>ping 10.0.23.3
  --- 10.0.23.3 ping statistics ---
    0.00% packet loss

<R1>display ip routing-table
0.0.0.0/0   Static  60   0          RD   10.0.13.3       GigabitEthernet

<R1>display current-configuration
interface GigabitEthernet0/0/0
 shutdown
 ip address 10.0.13.1 255.255.255.0
interface GigabitEthernet0/0/1
 ip address 10.0.12.1 255.255.255.0
interface GigabitEthernet0/0/2
interface NULL0
interface LoopBack0
 ip address 10.0.1.1 255.255.255.0
ip route-static 0.0.0.0 0.0.0.0 10.0.13.3
ip route-static 0.0.0.0 0.0.0.0 10.0.12.2 preference 80
ip route-static 10.0.3.0 255.255.255.0 10.0.13.3
ip route-static 10.0.12.0 255.255.255.0 10.0.23.2 preference 80
```

2. OSPF Single-Area Configuration



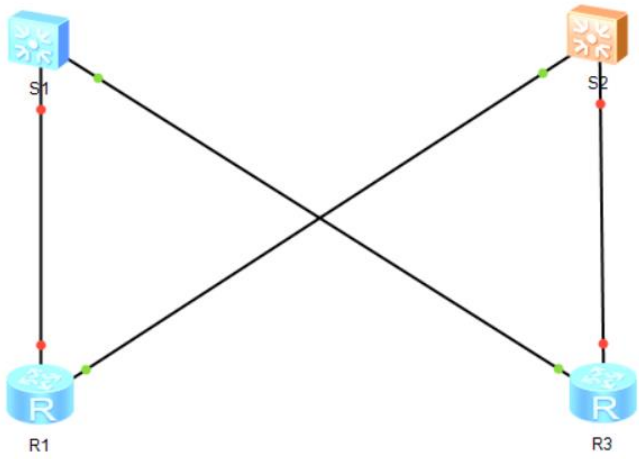

```
[R2]ospf 1 router-id 10.0.2.2
[R2-ospf-1-area-0.0.0.0]network 10.0.2.0 0.0.0.255
[R2-ospf-1-area-0.0.0.0]network 10.0.12.0 0.0.0.255
[R2-ospf-1-area-0.0.0.0]
Oct  5 2019 16:39:53-08:00 R2 %%01OSPF/4/NBR_CHANGE_E(l)[7]:Neighbor changes eve
nt: neighbor status changed. (ProcessId=256, NeighborAddress=1.12.0.10, Neighbor
Event=LoadingDone, NeighborPreviousState=Loading, NeighborCurrentState=Full)

[R3]ospf 1 router-id 10.0.3.3
[R3-ospf-1]area 0
[R3-ospf-1-area-0.0.0.0]network 10.0.3.0 0.0.0.255
[R3-ospf-1-area-0.0.0.0]network 10.0.13.0 0.0.0.255
[R3-ospf-1-area-0.0.0.0]
Oct  5 2019 16:41:36-08:00 R3 %%01OSPF/4/NBR_CHANGE_E(l)[7]:Neighbor changes eve
nt: neighbor status changed. (ProcessId=256, NeighborAddress=1.13.0.10, Neighbor
Event=LoadingDone, NeighborPreviousState=Loading, NeighborCurrentState=Full)

<R1>display ip routing-table
10.0.2.2/32  OSPF    10   1           D   10.0.12.2       GigabitEthernet 0/0/1
10.0.3.3/32  OSPF    10   1           D   10.0.13.3       GigabitEthernet 0/0/0

<R2>display ip routing-table
10.0.1.1/32  OSPF    10   1           D   10.0.12.1       GigabitEthernet 0/0/1
10.0.3.3/32  OSPF    10   2           D   10.0.12.1       GigabitEthernet 0/0/1
10.0.13.0/24  OSPF    10   2           D   10.0.12.1       GigabitEthernet 0/0/1

<R3>display ip routing-table
10.0.1.1/32  OSPF    10   1           D   10.0.13.1       GigabitEthernet 0/0/0
10.0.2.2/32  OSPF    10   2           D   10.0.13.1       GigabitEthernet 0/0/0
10.0.12.0/24  OSPF    10   2           D   10.0.13.1       GigabitEthernet 0/0/0

<R2>ping 10.0.1.1
  --- 10.0.1.1 ping statistics ---
    0.00% packet loss

<R2>ping 10.0.3.3
  --- 10.0.3.3 ping statistics ---
    0.00% packet loss

<R1>display ospf peer brief
Area Id          Interface                       Neighbor id      State
 0.0.0.0          GigabitEthernet0/0/1            10.0.2.2         Full
 0.0.0.0          GigabitEthernet0/0/0            10.0.3.3         Full

<R2>display ospf peer brief
Area Id          Interface                       Neighbor id      State
```

```
 0.0.0.0          GigabitEthernet0/0/1             10.0.1.1         Full

<R3>display ospf peer brief
Area Id          Interface                        Neighbor id      State
 0.0.0.0          GigabitEthernet0/0/0             10.0.1.1         Full

<R1>display ospf interface GigabitEthernet 0/0/0
        OSPF Process 1 with Router ID 10.0.1.1
Timers: Hello 10 , Dead 40 , Poll  120 , Retransmit 5 , Transmit Delay 1
```

После изменение параметров hello и dead:

```
<R1>display ospf interface GigabitEthernet 0/0/0
        OSPF Process 1 with Router ID 10.0.1.1
Timers: Hello 15 , Dead 60 , Poll  120 , Retransmit 5 , Transmit Delay 1

<R1>display ospf peer brief
Area Id          Interface                        Neighbor id      State
 0.0.0.0          GigabitEthernet0/0/1             10.0.2.2         Full

[R3]ip route-static 0.0.0.0 0.0.0.0 LoopBack 2
<R1>display ip routing-table
0.0.0.0/0   O_ASE   150  1           D   10.0.13.3       GigabitEthernet 0/0/0

<R2>display ip routing-table
0.0.0.0/0   O_ASE   150  1           D   10.0.12.1       GigabitEthernet 0/0/1

<R2>ping 172.16.0.1
  --- 172.16.0.1 ping statistics ---
    0.00% packet loss

<R1>display ospf peer 10.0.3.3
   DR: 10.0.13.3  BDR: 10.0.13.1

[R1]display ospf peer 10.0.3.3
   DR: 10.0.13.1  BDR: 10.0.13.3
```

3. Implementing DHCP




```
<S1>display interface brief
GigabitEthernet0/0/9        *down down        0%     0%          0          0
GigabitEthernet0/0/10       *down down        0%     0%          0          0
GigabitEthernet0/0/13       *down down        0%     0%          0          0
GigabitEthernet0/0/14       *down down        0%     0%          0          0

<S2>display interface brief
GigabitEthernet0/0/6        *down down        0%     0%          0          0
```

```
GigabitEthernet0/0/7        *down down        0%     0%          0          0
GigabitEthernet0/0/9        *down down        0%     0%          0          0
GigabitEthernet0/0/10       *down down        0%     0%          0          0

<R1>display ip interface brief
GigabitEthernet0/0/2              10.0.23.1/24         *down      down

<R3>
GigabitEthernet0/0/1              10.0.12.3/24         *down      down

<R1>display ip pool name pool1
         Start           End     Total  Used  Idle(Expired)  Conflict  Disable
       10.0.12.1     10.0.12.254   253     0        253(0)         0        0

<S1>display ip interface brief
Vlanif1                           10.0.12.254/24       up         up

<R1>display ip pool name pool1
  Gateway-0      : 10.0.12.

<R1>display ip pool interface GigabitEthernet0/0/2
  Gateway-0      : 10.0.23.
         Start           End     Total  Used  Idle(Expired)  Conflict  Disable
       10.0.23.1     10.0.23.254   0      0        252(0)         0        1

<R1>display ip pool interface GigabitEthernet0/0/2
  Gateway-0      : 10.0.23.1
         Start           End     Total  Used  Idle(Expired)  Conflict  Disable
       10.0.23.1     10.0.23.254   1     0        252(0)         0        1

<S2>display ip interface brief
Vlanif1                           10.0.23.253/24           up         down

[R1]display current-configuration
interface GigabitEthernet0/0/0
interface GigabitEthernet0/0/1
 shutdown
 ip address 10.0.12.1 255.255.255.0
 dhcp select global
interface GigabitEthernet0/0/2
 ip address 10.0.23.1 255.255.255.0
 dhcp select interface
 dhcp server excluded-ip-address 10.0.23.254
 dhcp server lease day 1 hour 12 minute 0
 dhcp server dns-list 10.0.23.254

[R3]display current-configuration
interface GigabitEthernet0/0/0
interface GigabitEthernet0/0/1
 ip address 10.0.12.3 255.255.255.0
 dhcp select interface
 dhcp server excluded-ip-address 10.0.12.254
 dhcp server lease day 1 hour 12 minute 0
 dhcp server dns-list 10.0.12.254
interface GigabitEthernet0/0/2
 shutdown
 ip address 10.0.23.3 255.255.255.0
 dhcp select global
```