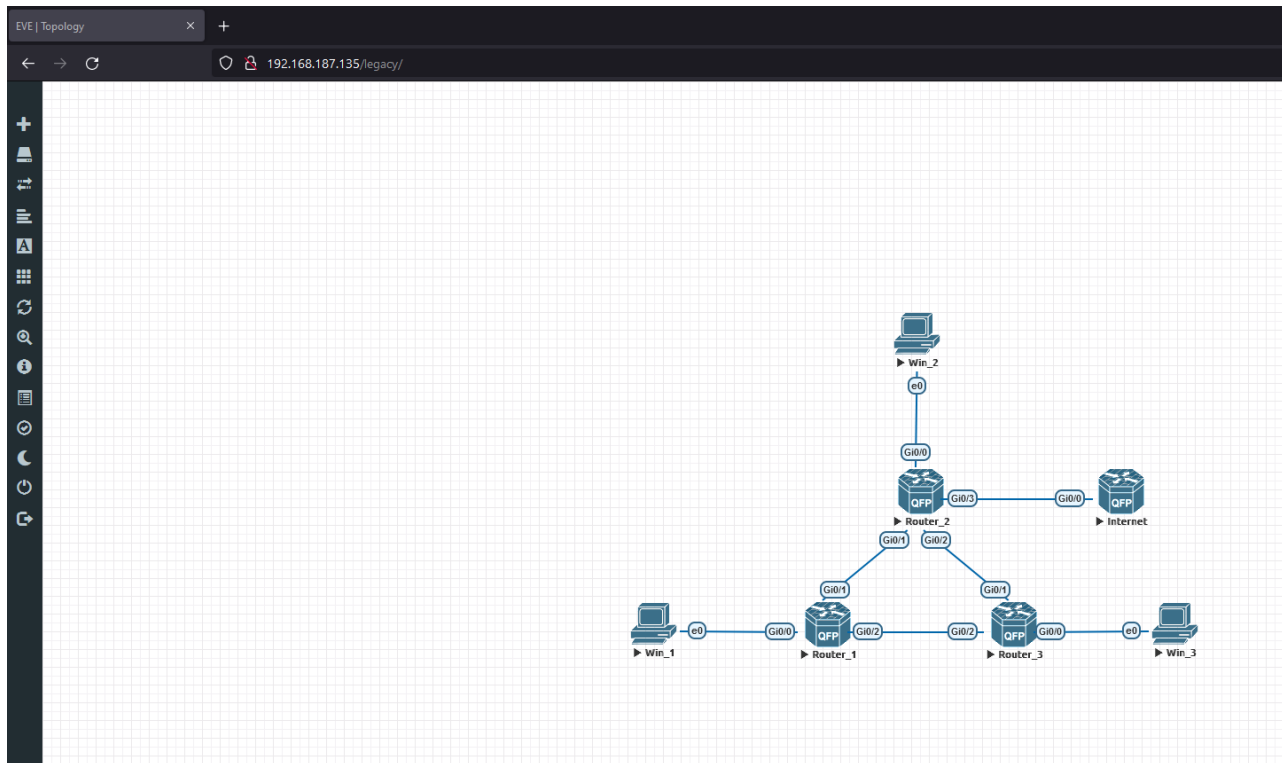


# Настройка протокола OSPF

## Задание 1. Настройка топологии сети с маршрутизацией OSPFv2

Step 1: Создать произвольную топологию сети, включающую не менее трёх маршрутизаторов и подключённых к нему ПК, interconnect network с маской /30. Подсети для связности между ПК и роутером используйте с маской /24.



Данную работу я делал на данной топологии.

Step 2: Настроить базовые параметры для ПК и маршрутизаторов.

```

Internet
Router con0 is now available

Press RETURN to get started.

*****
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* purposes is expressly prohibited except as otherwise authorized by *
* Cisco in writing. *
*****
Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname Internet
Internet(config)#intn g0/0
^
% Invalid input detected at '^' marker.

Internet(config)#int g0/0
Internet(config-if)#ip addr 209.165.200.225 255.255.255.224
Internet(config-if)#no shut
Internet(config-if)#
*Jul 13 03:41:55.415: %LINK-3-UPDOWN: Interface GigabitEthernet0/0, changed stat
e to up
*Jul 13 03:41:56.415: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEth
ernet0/0, changed state to upexit
Internet(config)#int loopback
% Incomplete command.

Internet(config)#int loopback0
Internet(config-if)#
*Jul 13 03:42:11.045: %LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback0,
changed state to upip addr 8.8.8.8 255.255.255.0
Internet(config-if)#^Z
Internet#
*Jul 13 03:42:24.779: %SYS-5-CONFIG_I: Configured from console by console
Internet#sh ip int br
Interface IP-Address OK? Method Status Prot
ocol
GigabitEthernet0/0 209.165.200.225 YES manual up up
GigabitEthernet0/1 unassigned YES unset administratively down down
GigabitEthernet0/2 unassigned YES unset administratively down down
GigabitEthernet0/3 unassigned YES unset administratively down down
Loopback0 8.8.8.8 YES manual up up
Internet#

```

Это от роутера Internet

```

Router_1
Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname Router_1
Router_1(config)#^Z
Router_1#
*Jul 13 03:23:40.876: %SYS-5-CONFIG_I: Configured from console by console
Router_1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router_1(config)#int g0/0
Router_1(config-if)#ip addr 172.16.1.1 255.255.255.0
Router_1(config-if)#exit
Router_1(config)#int g0/1
Router_1(config-if)#ip addr 192.168.10.5 255.255.255.252
Router_1(config-if)#int g0/2
Router_1(config-if)#ip addr 172.16.3.1 255.255.255.0
Router_1(config-if)#^Z
Router_1#
*Jul 13 03:26:13.700: %SYS-5-CONFIG_I: Configured from console by console
Building configuration...
[OK]
Router_1#
*Jul 13 03:26:19.937: %GRUB-5-CONFIG_WRITING: GRUB configuration is being update
d on disk. Please wait...
*Jul 13 03:26:20.721: %GRUB-5-CONFIG_WRITTEN: GRUB configuration was written to
disk successfully.
Router_1#sh ip int br
Interface IP-Address OK? Method Status Prot
ocol
GigabitEthernet0/0 172.16.1.1 YES manual administratively down down
GigabitEthernet0/1 192.168.10.5 YES manual administratively down down
GigabitEthernet0/2 172.16.3.1 YES manual administratively down down
GigabitEthernet0/3 unassigned YES unset administratively down down

Router_1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router_1(config)#int ran
Router_1(config)#int range gig0/0-2
Router_1(config-if-range)#no shut
Router_1(config-if-range)#^Z
Router_1#
*Jul 13 03:26:59.948: %LINK-3-UPDOWN: Interface GigabitEthernet0/0, changed stat
e to up
*Jul 13 03:27:00.106: %LINK-3-UPDOWN: Interface GigabitEthernet0/1, changed stat
e to up
*Jul 13 03:27:00.294: %LINK-3-UPDOWN: Interface GigabitEthernet0/2, changed stat
e to upsh 1
*Jul 13 03:27:00.947: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEth
ernet0/0, changed state to up
*Jul 13 03:27:01.106: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEth
ernet0/1, changed state to up
*Jul 13 03:27:01.181: %SYS-5-CONFIG_I: Configured from console by console
*Jul 13 03:27:01.295: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEth
ernet0/2, changed state to up
Router_1#sh ip int br
Interface IP-Address OK? Method Status Prot
ocol
GigabitEthernet0/0 172.16.1.1 YES manual up up
GigabitEthernet0/1 192.168.10.5 YES manual up up

```

Это от роутера Router\_1

```
Router_2
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*****
Router>
Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#no logging con
Router(config)#no logging console
Router(config)#no ip doma
Router(config)#no ip domain-lo
Router(config)#no ip domain-lookup
Router(config)#sh ip int br

% Invalid input detected at '^' marker.

Router(config)#^Z
Router#sh ip int br
Interface IP-Address OK? Method Status Prot
GigabitEthernet0/0 unassigned YES unset administratively down down
GigabitEthernet0/1 unassigned YES unset administratively down down
GigabitEthernet0/2 unassigned YES unset administratively down down
GigabitEthernet0/3 unassigned YES unset administratively down down

Router#en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int gig0/1
Router(config-if)#ip addr 172.16.3.2 255.255.255.252
Router(config-if)#ip addr 172.16.2.1 255.255.255.0
Router(config-if)#ip addr 172.16.2.1 255.255.255.0
Router(config-if)#ip addr 192.168.10.9 255.255.255.252
Router(config-if)#int g0/3
Router(config-if)#ip addr 209.165.200.226 255.255.255.224
Router(config-if)#do sh ip int br
Interface IP-Address OK? Method Status Prot
GigabitEthernet0/0 172.16.2.1 YES manual administratively down down
GigabitEthernet0/1 172.16.3.2 YES manual administratively down down
GigabitEthernet0/2 192.168.10.9 YES manual administratively down down
GigabitEthernet0/3 209.165.200.226 YES manual administratively down down
```

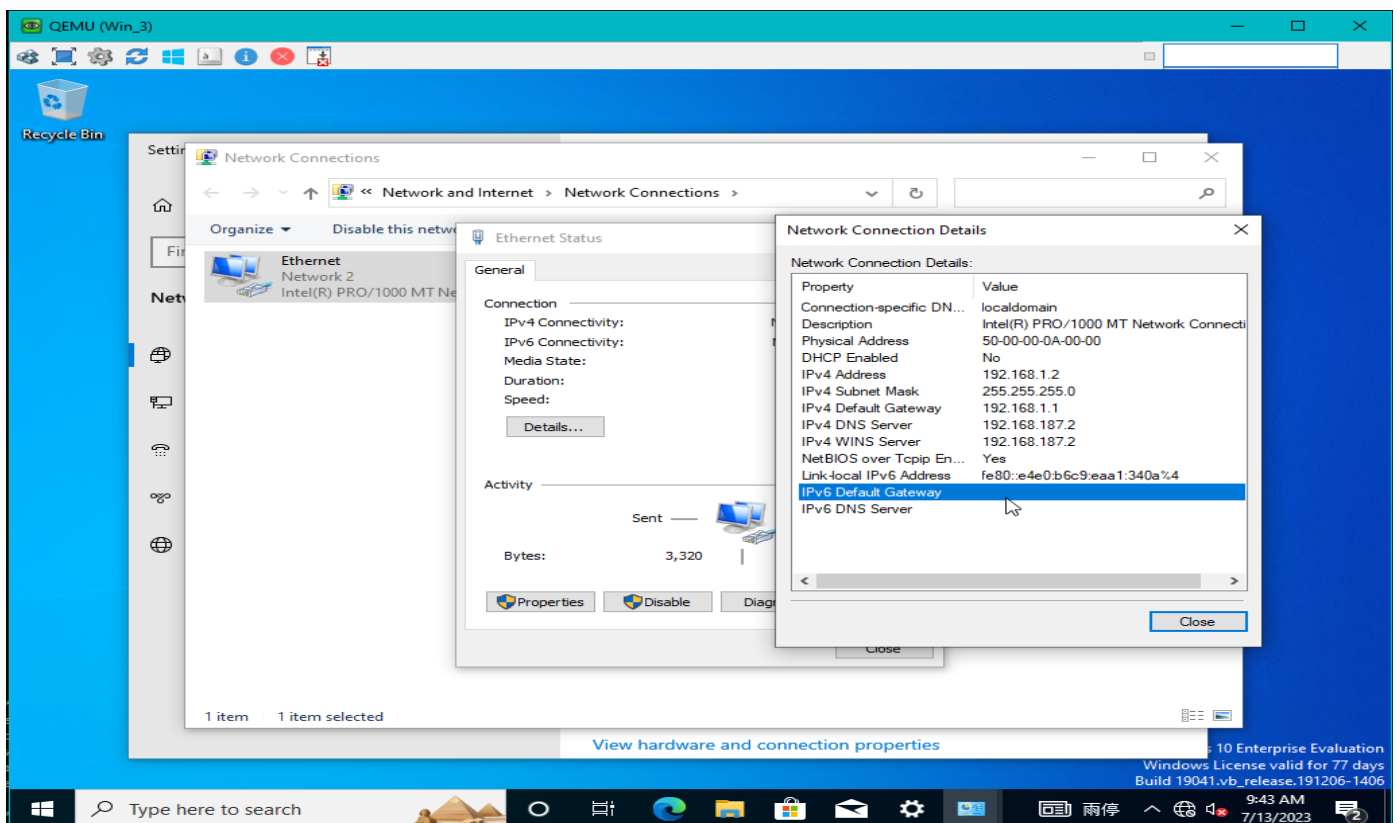
## Это от поутера Router\_2

```
Router_3
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* of the IOSv Software or Documentation to any third party for any *
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* Cisco in writing. *
*****
Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname Router_3
% Hostname contains one or more illegal characters.

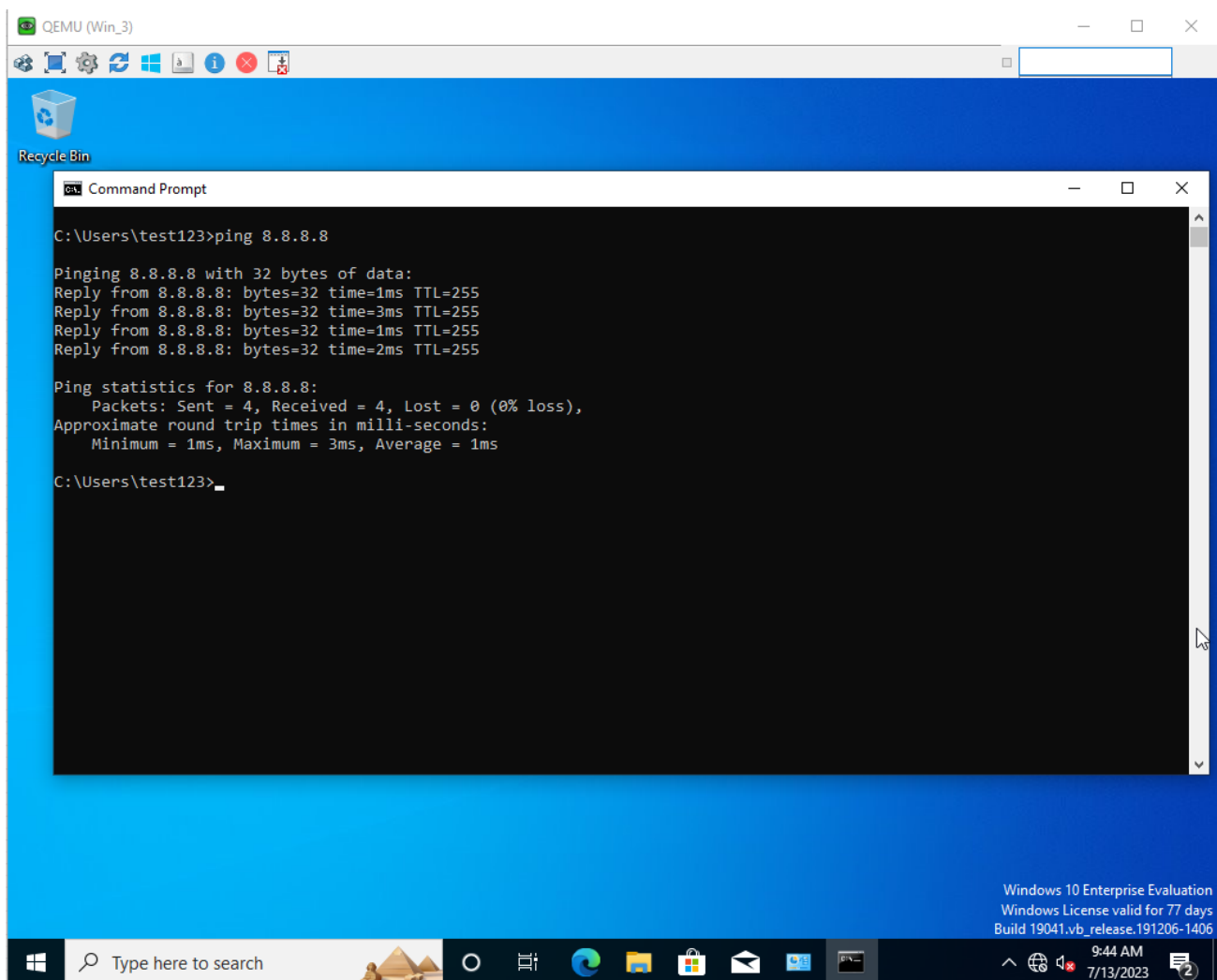
% Hostname "ROUTER_#" is not a legal LAT node name, Using "CISCO_0300000"
Router_3(config)#
*Jul 13 03:36:18.449: %CNS-3-WARNING: CNS ID not changed: bad hostname -Process=
"Exec", ip= 0, pid= 3
*Jul 13 03:36:18.449: %CNS-3-WARNING: CNS ID not changed: bad hostname -Process=
"Exec", ip= 0, pid= 3
*Jul 13 03:36:18.449: %CNS-3-WARNING: CNS ID not changed: bad hostname -Process=
"Exec", ip= 0, pid= 3
Router_3(config)#no logging console
Router_3(config)#no ip domain-lookup
Router_3(config)#int g0/2
Router_3(config-if)#ip addr 192.168.10.6 255.255.255.252
Router_3(config-if)#int g0/0
Router_3(config-if)#ip addr 192.168.1.1 255.255.255.0
Router_3(config-if)#int g0/1
Router_3(config-if)#ip addr 192.168.10.10 255.255.255.252
Router_3(config-if)#^Z
Router_3#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router_3(config)#^Z
Router_3#sh ip int br
Interface IP-Address OK? Method Status Prot
GigabitEthernet0/0 192.168.1.1 YES manual administratively down down
GigabitEthernet0/1 192.168.10.10 YES manual administratively down down
GigabitEthernet0/2 192.168.10.6 YES manual administratively down down
GigabitEthernet0/3 unassigned YES unset administratively down down

Router_3#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router_3(config)#int range gig0/0-2
Router_3(config-if-range)#no shut
Router_3(config-if-range)#^Z
Router_3#wr
Building configuration...
[OK]
Router_3#sh ip int br
Interface IP-Address OK? Method Status Prot
GigabitEthernet0/0 192.168.1.1 YES manual up up
GigabitEthernet0/1 192.168.10.10 YES manual up up
GigabitEthernet0/2 192.168.10.6 YES manual up up
GigabitEthernet0/3 unassigned YES unset administratively down down
```

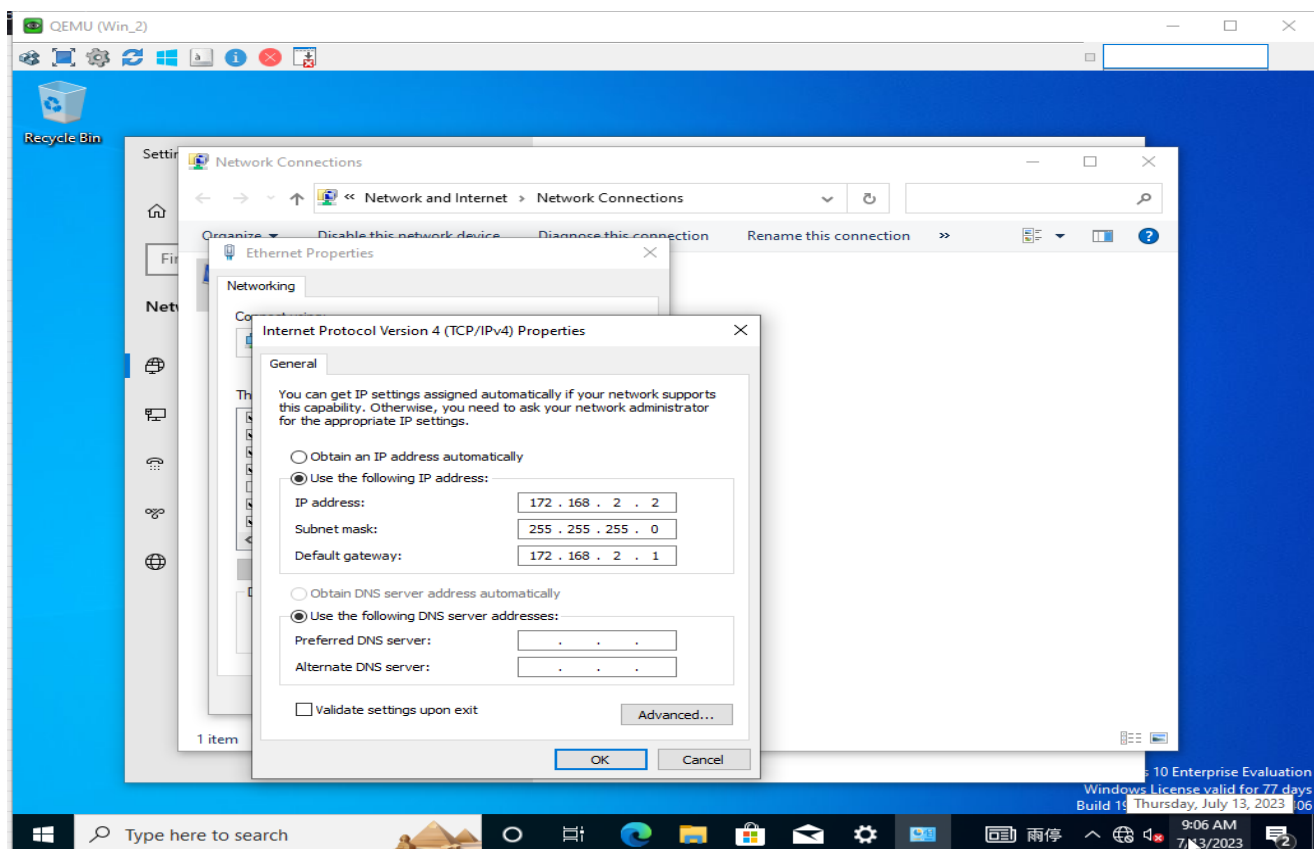
## Это от поутера Router\_3



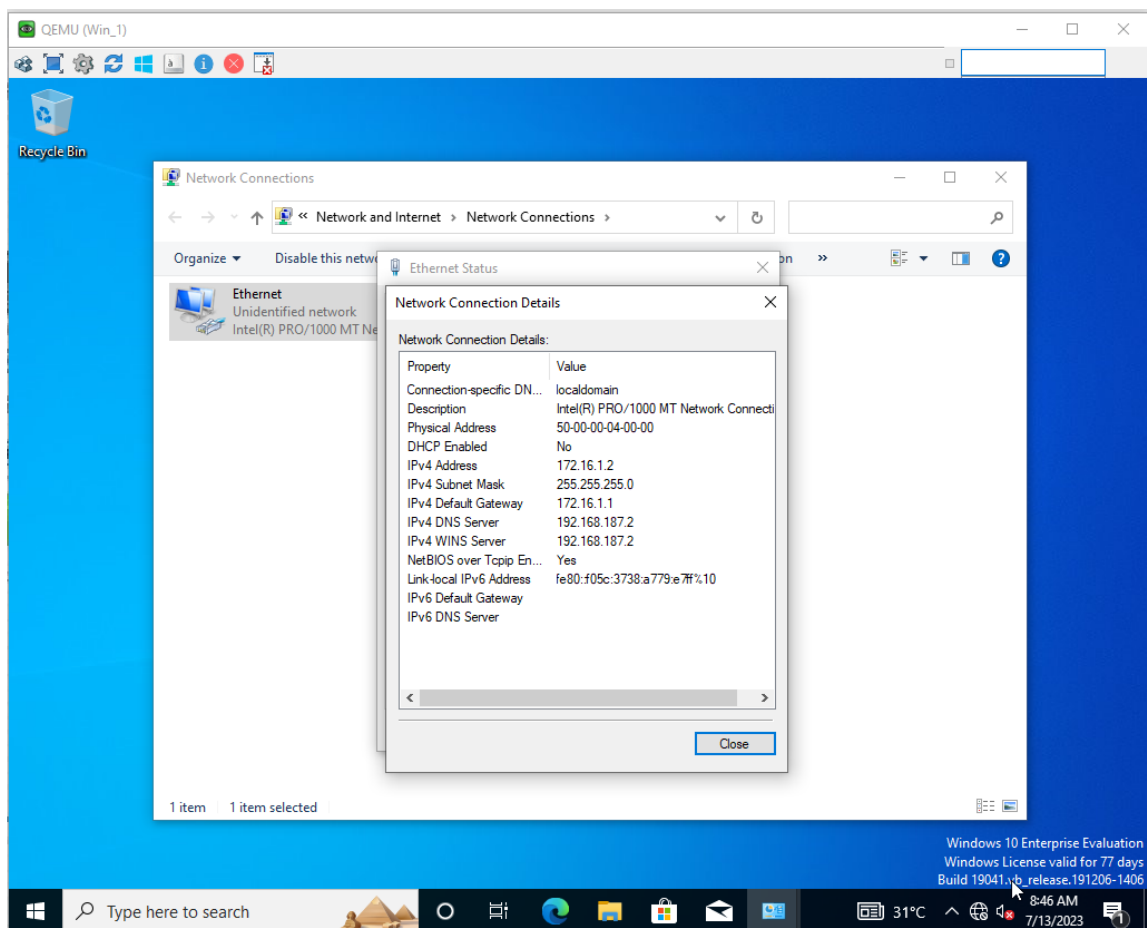
Windows узел подсоединённый к Router\_3 (набрал IP и узел из данного роутера).



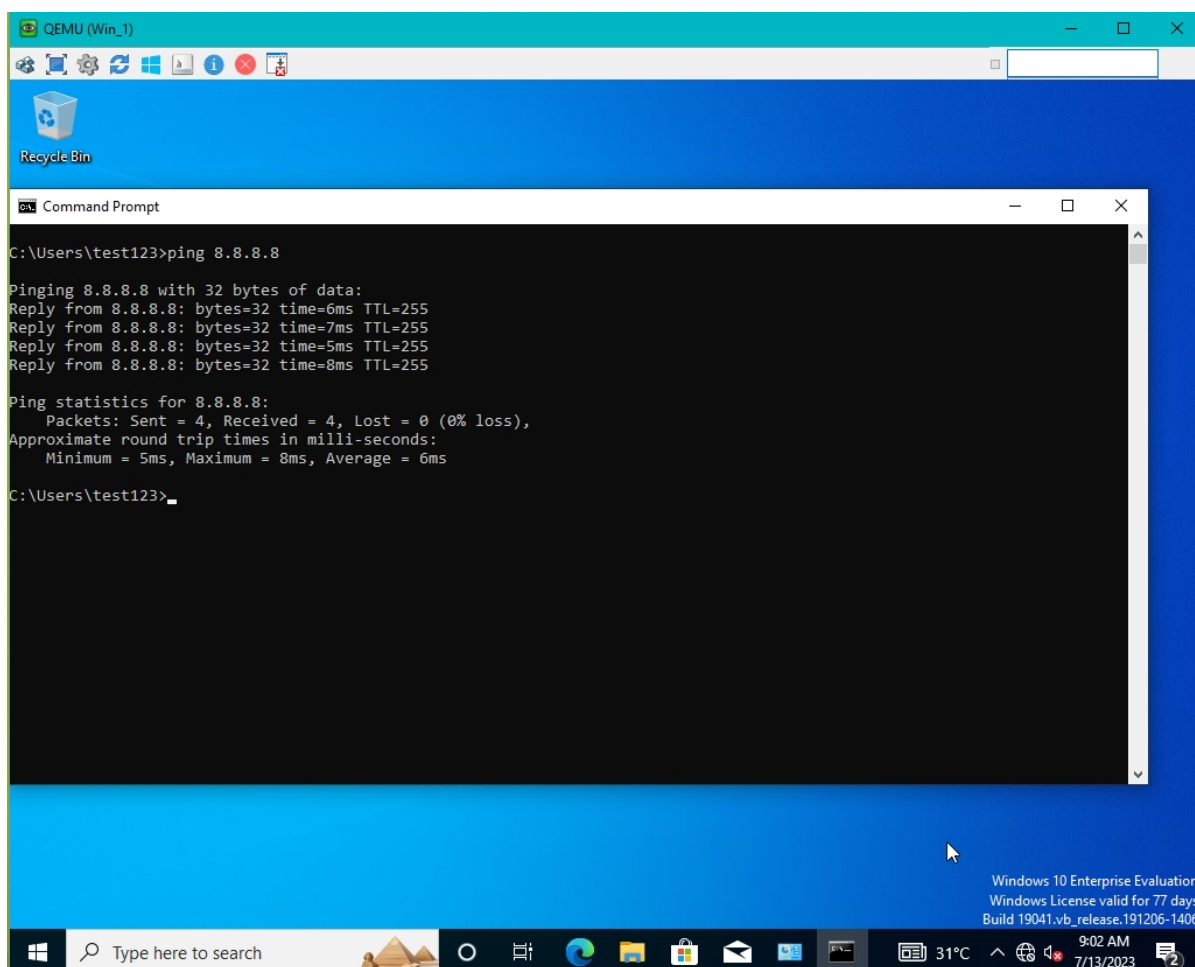
Проверка на 8.8.8.8



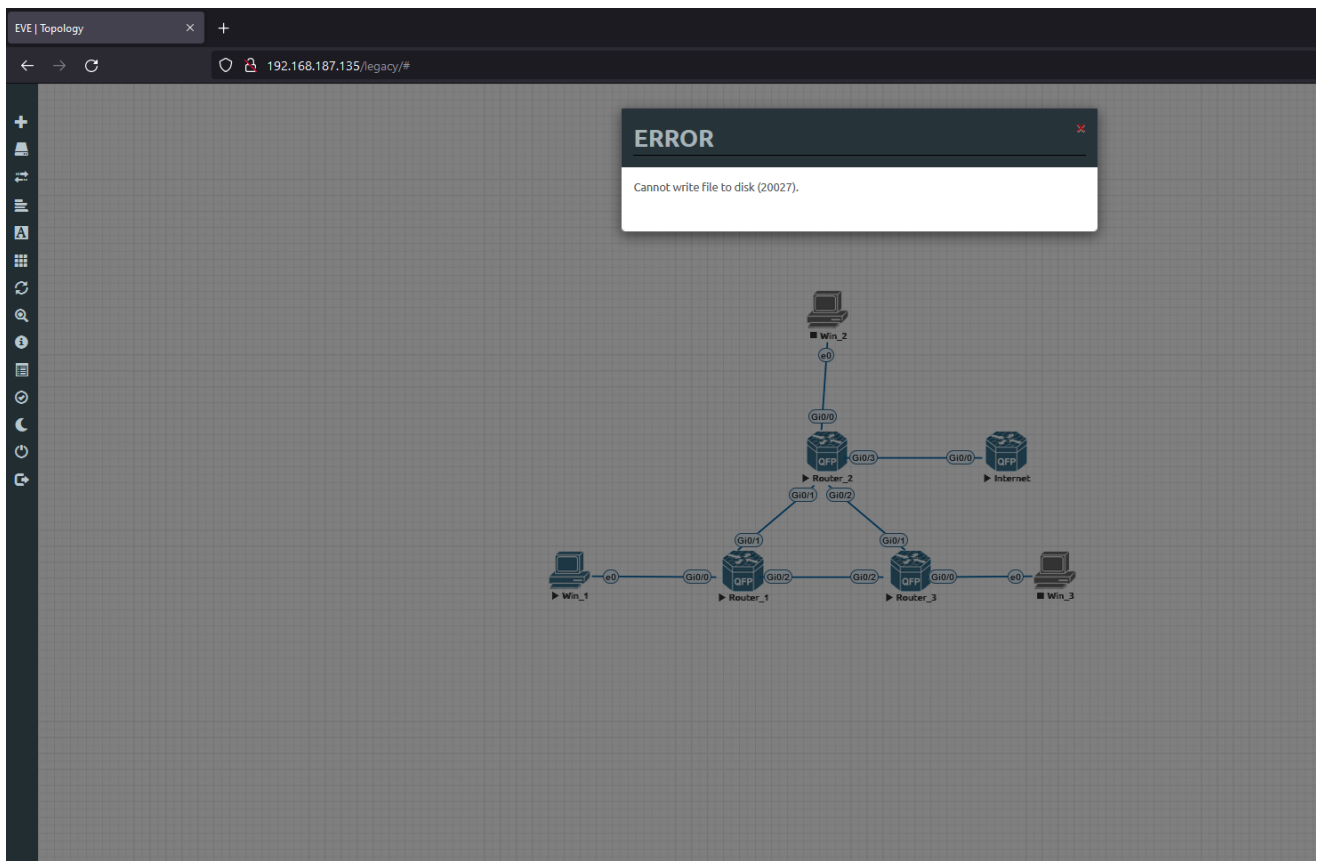
Windows узел подсоединённый к Router\_2 (набрал IP и узел из данного роутера). Здесь я бы поменял маску на 255.255.0.0, поскольку при проверке на 8.8.8.8 — была ошибка (не ошибка доступа или time out).



Windows узел подсоединённый к Router\_1 (набрал IP и узел из данного роутера).



Проверка на 8.8.8.8



P.S. Во время работы у меня вылезла такая ошибка — и мне пришлось её решать, что означает — выключать роутеры (некоторые опции сохранились в 3 роутерах).

## Задание 2. Изменение назначения идентификаторов маршрутизаторов

Step 1: Настроить маршрутизацию OSPFv2 на всех маршрутизаторах в сети.

Step 2: Убедиться в том, что таблицы маршрутизации правильно обновляются на всех устройствах в сети: все роутеры должны знать обо всех сетях региона.

```
Router_1
Routing Protocol is "application"
  Sending updates every 0 seconds
  Invalid after 0 seconds, hold down 0, flushed after 0
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Maximum path: 32
  Routing for Networks:
  Routing Information Sources:
    Gateway         Distance         Last Update
  Distance: (default is 4)

Routing Protocol is "ospf 9"
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Router ID 0.0.0.0
  Number of areas in this router is 0. 0 normal 0 stub 0 nssa
  Maximum path: 4
  Routing for Networks:
  Routing Information Sources:
    Gateway         Distance         Last Update
  Distance: (default is 110)

Routing Protocol is "ospf 10"
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Router ID 1.1.1.1
  Number of areas in this router is 1. 1 normal 0 stub 0 nssa
  Maximum path: 4
  Routing for Networks:
    172.16.1.0 0.0.0.255 area 0
    172.16.3.0 0.0.0.3 area 0
    192.168.10.4 0.0.0.3 area 0
  Routing Information Sources:
    Gateway         Distance         Last Update
  Distance: (default is 110)

Routing Protocol is "ospf 8"
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Router ID 0.0.0.0
  Number of areas in this router is 0. 0 normal 0 stub 0 nssa
  Maximum path: 4
  Routing for Networks:
  Routing Information Sources:
    Gateway         Distance         Last Update
  Distance: (default is 110)

Routing Protocol is "ospf 7"
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Router ID 0.0.0.0
  Number of areas in this router is 0. 0 normal 0 stub 0 nssa
  Maximum path: 4
  Routing for Networks:
  Routing Information Sources:
    Gateway         Distance         Last Update
  Distance: (default is 110)

Router_1#no ospf 7
^
% Invalid input detected at '^' marker.

Router_1#
```

Добавил данные адреса в протокол OSPF, 10 версии роутера OSPF. (Вы можете их случайно заметить, так что смотрите на 10 версию OSPF – в других ничего нет.)



```

Router_2
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*****
Router_2>en
Router_2#conf t
Enter Configuration commands, one per line. End with CNTL/Z.
Router_2(config)#router ospf 10
Router_2(config-router)#router-
Router_2(config-router)#router-id 2.2.2.2
Router_2(config-router)#area
Router_2(config-router)#network 172.16.3.0 0.0.0.3 a
Router_2(config-router)#network 172.16.3.0 0.0.0.3 area 0
Router_2(config-router)#network 192.168.10.8 0.0.0.3 area 0
Router_2(config-router)#network 172.16.2.0 0.0.0.255 area 0
Router_2(config-router)#?
Router_2#sh ip protocols
*** IP Routing is NSF aware ***

Routing Protocol is "ospf 10"
  Sending updates every 0 seconds
  Invalid after 0 seconds, hold down 0, flushed after 0
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Maximum path: 32
  Routing for Networks:
    Routing Information Sources:
      Gateway         Distance      Last Update
  Distance: (default is 4)

Routing Protocol is "ospf 10"
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Router ID 2.2.2.2
  Number of areas in this router is 1. 1 normal 0 stub 0 nssa
  Maximum path: 4
  Routing for Networks:
    172.16.2.0 0.0.0.255 area 0
    172.16.3.0 0.0.0.3 area 0
    192.168.10.8 0.0.0.3 area 0
  Routing Information Sources:
    Gateway         Distance      Last Update
  3.3.3.3           110           00:00:07
  Distance: (default is 110)

Router_2#conf t
Enter Configuration commands, one per line. End with CNTL/Z.
Router_2(config)#router ospf 10
Router_2(config-router)#f
Router_2(config-router)#default-in
Router_2(config-router)#default-information ori
Router_2(config-router)#default-information originate
Router_2(config-router)#?
Router_2#sh ip ospf neighbo
Router_2#sh ip ospf neighbor

Neighbor ID      Pri   State           Dead Time   Address        Interface
3.3.3.3          1    FULL/DR         00:00:32    192.168.10.10  GigabitEtherne
t0/2
Router_2#

```

Подобное и для роутера Router\_2 (используя sh ip ospf neighbor, появился первый соседний адрес — конечно на данной картинке их 2, поскольку я данные адреса добавил не один раз)

```

Router_3
192.168.10.8 0.0.0.3 area 0
Routing Information Sources:
  Gateway         Distance      Last Update
Distance: (default is 110)

Router_3#sh ip ospf neigh
Router_3#sh ip ospf neighbor
Router_3#sh ip ospf neighbor

Neighbor ID      Pri   State           Dead Time   Address        Interface
2.2.2.2          1    FULL/DR         00:00:31    192.168.10.9   GigabitEtherne
t0/1
Router_3#en
Router_3#conf t
Enter Configuration commands, one per line. End with CNTL/Z.
Router_3(config)#router ospf 10
Router_3(config-router)#router-
Router_3(config-router)#router-id 3.3.3.3
Router_3(config-router)#network 192.168.1.0 0.0.0.255 a
Router_3(config-router)#network 192.168.1.0 0.0.0.255 area 0
Router_3(config-router)#network 192.168.10.4 0.0.0.3 area 0
Router_3(config-router)#network 192.168.10.8 0.0.0.3 area 0
Router_3(config-router)#network 192.168.1.0 0.0.0.255 area 0
Router_3(config-router)#?
Router_3#sh ip protocols
*** IP Routing is NSF aware ***

Routing Protocol is "ospf 10"
  Sending updates every 0 seconds
  Invalid after 0 seconds, hold down 0, flushed after 0
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Maximum path: 32
  Routing for Networks:
    Routing Information Sources:
      Gateway         Distance      Last Update
  Distance: (default is 4)

Routing Protocol is "ospf 10"
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Router ID 3.3.3.3
  Number of areas in this router is 1. 1 normal 0 stub 0 nssa
  Maximum path: 4
  Routing for Networks:
    192.168.1.0 0.0.0.255 area 0
    192.168.10.4 0.0.0.3 area 0
    192.168.10.8 0.0.0.3 area 0
  Routing Information Sources:
    Gateway         Distance      Last Update
  2.2.2.2           110           00:00:56
  Distance: (default is 110)

Router_3#sh ip ospf neighbor
^
% Invalid input detected at '^' marker.

Router_3#sh ip ospf neighbor

Neighbor ID      Pri   State           Dead Time   Address        Interface
2.2.2.2          1    FULL/DR         00:00:34    192.168.10.9   GigabitEtherne
t0/1
Router_3#

```

Подобное и для роутера Router\_3 (используя sh ip ospf neighbor, там тоже есть соседи — но в 2 роутерах небольшая проблема в том, что ID соседа помечено как t0/1 и t0/2; как по мне это связано с добавленными адресами).

```

Internet
Internet#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Internet(config)#ip route 172.16.1.0.255.255.255.0 209.165.200.226
^
% Invalid input detected at '^' marker.

Internet(config)#ip route 172.16.1.0 255.255.255.0 209.165.200.226
Internet(config)#ip route 172.16.2.0 255.255.255.0 209.165.200.226
Internet(config)#ip route 192.168.1.0 255.255.255.0 209.165.200.226
Internet(config)#^
Internet#sh ip r
*Jul 13 08:35:33.244: %SYS-5-CONFIG_I: Configured from console by console
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2
I - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
ia - IS-IS inter area, * - candidate default, U - per-user static route
o - ODR, P - periodic downloaded static route, H - NHRP, l - LISP
a - application route
+ - replicated route, % - next hop override, p - overrides from PfR

Gateway of last resort is not set

8.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C      8.8.8.0/24 is directly connected, Loopback0
L      8.8.8.8/32 is directly connected, Loopback0
L      209.165.200.0/24 is variably subnetted, 2 subnets, 2 masks
C      209.165.200.224/27 is directly connected, GigabitEthernet0/0
L      209.165.200.225/32 is directly connected, GigabitEthernet0/0
Internet#
Internet#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Internet(config)#ip route 172.16.1.0 255.255.255.0 209.165.200.226
Internet(config)#ip route 172.16.2.0 255.255.255.0 209.165.200.226
Internet(config)#ip route 192.168.1.0 255.255.255.0 209.165.200.226
Internet(config)#^
Internet#
*Jul 13 08:36:51.126: %SYS-5-CONFIG_I: Configured from console by console
Internet#sh ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2
I - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
ia - IS-IS inter area, * - candidate default, U - per-user static route
o - ODR, P - periodic downloaded static route, H - NHRP, l - LISP
a - application route
+ - replicated route, % - next hop override, p - overrides from PfR

Gateway of last resort is not set

8.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C      8.8.8.0/24 is directly connected, Loopback0
L      8.8.8.8/32 is directly connected, Loopback0
L      172.16.0.0/24 is subnetted, 2 subnets
S      172.16.1.0 [1/0] via 209.165.200.226
S      172.16.2.0 [1/0] via 209.165.200.226
S      192.168.1.0/24 [1/0] via 209.165.200.226
L      209.165.200.0/24 is variably subnetted, 2 subnets, 2 masks
C      209.165.200.224/27 is directly connected, GigabitEthernet0/0
L      209.165.200.225/32 is directly connected, GigabitEthernet0/0
Internet#

```

Сконфигурировал роутер Internet, чтобы он видел адреса других роутеров.

```

Router_1
GigabitEthernet0/0      172.16.1.1      YES NVRAM  up          up
GigabitEthernet0/1      192.168.10.5    YES NVRAM  up          up
GigabitEthernet0/2      172.16.3.1      YES NVRAM  up          up
GigabitEthernet0/3      unassigned      YES NVRAM  administratively down down

Router_1#sh ip proto
Router_1#sh ip protocols
*** IP Routing is NSF aware ***

Routing Protocol is "application"
Sending updates every 0 seconds
Invalid after 0 seconds, hold down 0, flushed after 0
Outgoing update filter list for all interfaces is not set
Incoming update filter list for all interfaces is not set
Maximum path: 32
Routing for Networks:
Routing Information Sources:
  Gateway         Distance      Last Update
Distance: (default is 4)

Routing Protocol is "ospf 9"
Outgoing update filter list for all interfaces is not set
Incoming update filter list for all interfaces is not set
Router ID 172.16.3.1
Number of areas in this router is 0, 0 normal 0 stub 0 nssa
Maximum path: 4
Routing for Networks:
Routing Information Sources:
  Gateway         Distance      Last Update
Distance: (default is 110)

Routing Protocol is "ospf 10"
Outgoing update filter list for all interfaces is not set
Incoming update filter list for all interfaces is not set
Router ID 1.1.1.1
Number of areas in this router is 1, 1 normal 0 stub 0 nssa
Maximum path: 4
Routing for Networks:
  172.16.1.0 0.0.0.255 area 0
  172.16.3.0 0.0.0.3 area 0
  172.16.3.0 0.0.0.255 area 0
  192.168.10.4 0.0.0.3 area 0
Routing Information Sources:
  Gateway         Distance      Last Update
Distance: (default is 110)

Routing Protocol is "ospf 8"
Outgoing update filter list for all interfaces is not set
Incoming update filter list for all interfaces is not set
Router ID 192.168.10.5
Number of areas in this router is 0, 0 normal 0 stub 0 nssa
Maximum path: 4
Routing for Networks:
Routing Information Sources:
  Gateway         Distance      Last Update

Router_1#sh ip ospf nei
Router_1#sh ip ospf neighbor
Router_1#sh ip ospf neighbor
Router_1#

```

Но почему-то несмотря на конфигурации в роутере Router\_1, OSPF соседей он не может увидеть.

```

Router_1
Incoming update filter list for all interfaces is not set
Router ID 172.16.3.1
Number of areas in this router is 0. 0 normal 0 stub 0 nssa
Maximum path: 4
Routing for Networks:
Routing Information Sources:
  Gateway          Distance      Last Update
Distance: (default is 110)

Routing Protocol is "ospf 10"
Outgoing update filter list for all interfaces is not set
Incoming update filter list for all interfaces is not set
Router ID 1.1.1.1
Number of areas in this router is 1. 1 normal 0 stub 0 nssa
Maximum path: 4
Routing for Networks:
  172.16.1.0 0.0.0.255 area 0
  172.16.3.0 0.0.0.3 area 0
  172.16.3.0 0.0.0.255 area 0
  192.168.10.4 0.0.0.3 area 0
Routing Information Sources:
  Gateway          Distance      Last Update
Distance: (default is 110)

Routing Protocol is "ospf 8"
Outgoing update filter list for all interfaces is not set
Incoming update filter list for all interfaces is not set
Router ID 192.168.10.5
Number of areas in this router is 0. 0 normal 0 stub 0 nssa
Maximum path: 4
Routing for Networks:
Routing Information Sources:
  Gateway          Distance      Last Update

Router_1#sh ip ospf nei
Router_1#sh ip ospf neighbor
Router_1#sh ip ospf neighbor
Router_1#
Router_1#
Router_1#
Router_1#^Z
Router_1#sh ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
       ia - IS-IS inter area, * - candidate default, U - per-user static route
       o - ODR, P - periodic downloaded static route, H - NHRP, l - LISP
       a - application route
       + - replicated route, % - next hop override, p - overrides from PfR

Gateway of last resort is not set

    172.16.0.0/16 is variably subnetted, 4 subnets, 2 masks
C       172.16.1.0/24 is directly connected, GigabitEthernet0/0
L       172.16.1.1/32 is directly connected, GigabitEthernet0/0
C       172.16.3.0/24 is directly connected, GigabitEthernet0/2
L       172.16.3.1/32 is directly connected, GigabitEthernet0/2
L       192.168.10.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.10.4/30 is directly connected, GigabitEthernet0/1
L       192.168.10.5/32 is directly connected, GigabitEthernet0/1
Router_1#

```

Но при этом данные адреса были в протоколе OSPF.

P.S. Как по мне это связано с тем, что данные адреса были административно выключены — я это поздно заметил, но включил их и проверил на 8.8.8.8. Проверка на 8.8.8.8 была перед тем, как я включил данные адреса использую no shut.

### Задание 3. Изменение параметра router-id

Step 1: Изменить назначение идентификатора OSPF-маршрутизатора с помощью loopback-адресов.

Step 2: Воспользоваться командой router-id для смены идентификатора маршрутизатора.

[illegible]

Использовал для этого задания в роутер Router\_2 (Здесь я использовал немного другой способ изменения router-id)

```
R# Router3
Router_3>sh ip int br
Interface                IP-Address      OK? Method Status          Protocol
GigabitEthernet0/0       192.168.1.1     YES NVRAM   up              up
GigabitEthernet0/1       192.168.10.10   YES NVRAM   up              up
GigabitEthernet0/2       192.168.10.6    YES NVRAM   up              up
GigabitEthernet0/3       unassigned      YES NVRAM   administratively down down
Router_3>en
Router_3>conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router_3(config)#int loopo
Router_3(config-if)#ip addr 8.8.8.8 255.255.255.0
Router_3(config-if)#no shut
Router_3(config-if)#^Z
Router_3>w
Building configuration...
[OK]
Router_3>ping 8.8.8.8
Type escape sequence to abort.
Sending S, 100-byte ICMP Echos to 8.8.8.8, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/1/1 ms
Router_3>
Router_3>
Router_3>
Router_3>
Router_3>
Router_3>
Router_3>
Router_3>
Router_3>
Router_3>
Router_3>
Router_3>
Router_3>
Router_3>
Router_3>
Router_3>
Router_3>
Router_3>
Router_3>
Router_3>
Router_3>show ip ospf nei
Router_3>show ip ospf neighbor
```

Neighbor ID	Pri	State	Dead Time	Address	Interface
2.2.2.2	1	FULL/BDR	00:00:00	192.168.10.9	GigabitEthere
10/11					

Изначально был примерно такой соседний-id

```
R# Router3
Router_3>sh ip int br

```

	IP-Address	OK?	Method	Status	Protocol
GigabitEthernet0/0	192.168.1.1	YES	NVRAM	up	up
GigabitEthernet0/1	192.168.10.10	YES	NVRAM	up	up
GigabitEthernet0/2	192.168.10.6	YES	NVRAM	up	up
GigabitEthernet0/3	unassigned	YES	NVRAM	administratively down	down

```
Router_3>en
Router_3>conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router_3(config)#int loop0
Router_3(config-if)#ip addr 8.8.8.8 255.255.255.0
Router_3(config-if)#no shut
Router_3(config-if)#Z
Router_3>er
Building configuration...
[OK]
Router_3#ping 8.8.8.8
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 8.8.8.8, timeout is 2 seconds:
!!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/1/1 ms
Router_3#
Router_3#
Router_3#
Router_3#
Router_3#
Router_3#
Router_3#
Router_3#
Router_3#
Router_3#
Router_3#
Router_3#
Router_3#
Router_3#
Router_3#
Router_3#
Router_3#
Router_3#
Router_3#
Router_3#
Router_3#show ip ospf nei
Router_3#show ip ospf neighbor
3.5.5.5      1    EXSTART/DROTHER 00:00:37   192.168.10.9   GigabitEtherne
0/1
Router_3#
```

Но после конфигурации примерно вот такой (по крайней мере после данной конфигурации, изменения в ID-соседа точно были).

## Задание 4. Настройка пассивных интерфейсов

## Что нужно сделать

- 1.Использовать команду `passive-interface` для настройки интерфейса в качестве пассивного.
- 2.Настроить OSPF таким образом, чтобы все интерфейсы маршрутизатора были пассивными по умолчанию, а затем включите объявления протокола маршрутизации OSPF для выбранных интерфейсов.

P.S. Получится показать, как примерно я сделал (Так как я делал, там использовался 3-х слоённый интерфейс, типо g0/0/0 – не из-за того что мне не хотелось, а из-за того что я постоянно получал синтаксические ошибки в наборе нужных команд для пассивных интерфейсов).

Router2#**configure terminal**

Enter configuration commands, one per line. End with CNTL/Z.

```
Router2(config)#router ospf 33
```

```
Router2(config-router)#network 0.0.0.0 255.255.255.255 area 100
```

```
Router2(config-router)#passive-interface Ethernet0
```

```
Router2(config-router)#exit
```

```
Router2(config)#end
```

Router2#

OSPF is disabled on **Ethernet0** interface

Используя данные команды можно превратить данный интерфейс в пассивный, я набирал так же, как и на данной картинке.

## Задание 5. Изменение метрик протокола

### Что нужно сделать

Изменить метрики OSPF с помощью команд `auto-cost reference-bandwidth`, `bandwidth` и `ip ospf cost`.

```
Router_2#
Router_2#
Router_2#
Router_2#
Router_2#
Router_2#
Router_2#
Router_2#
Router_2#
Router_2#
Router_2#
Router_2#
Router_2#
Router_2#
Router_2#
Router_2#
Router_2#
Router_2#
Router_2#sh ip ospf proce
Router_2#sh ip ospf process

% Invalid input detected at '^' marker.

Router_2#sh ip ospf process?
% Unrecognized command
Router_2#?
Router_2#conf t
Enter Configuration commands, one per line. End with CNTL/Z.
Router_2(config)#sh ip os
Router_2(config)#sh ip ospf process
% Invalid input detected at '^' marker.

Router_2(config)#sh ip ospf int gloop0
% Invalid input detected at '^' marker.

Router_2(config)#sh ip ospf int g0/0
% Invalid input detected at '^' marker.

Router_2(config)#?
Router_2#sh ip ospf int g0/0
GigabitEthernet0/0 is up, line protocol is up
Internet Address 172.16.2.1/24, Area 0, Attached via Network Statement
Process ID 10, Router ID 2.2.2.2, Network Type BROADCAST, Cost: 1
Topology-MTID Cost Disabled Shutdown Topology Name
0 1 no no Base
Transmit Delay is 1 sec, State DR, Priority 1
Designated Router (ID) 2.2.2.2, Interface address 172.16.2.1
No backup designated router on this network
Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
oob-resync timeout 40
Hello due in 00:00:00
Supports Link-Local Signaling (LLS)
Cisco NSF helper support enabled
IETF NSF helper support enabled
Index 1/3/3, flood queue length 0
Next 0x0(0)/0x0(0)/0x0(0)
Last flood scan length is 0, maximum is 0
Last flood scan time is 0 msec, maximum is 0 msec
Neighbor Count is 0, Adjacent neighbor count is 0
Suppress hello for 0 neighbor(s)
Router_2#
```

Это мои изначальные показатели до конфигурации в этом задании.

```
Router_2
Router_2(config-router)#ip os
Router_2(config-router)#exit
Router_2(config)#band
Router_2(config)#sh ip ospf int g0/0
% Invalid input detected at '^' marker.

Router_2(config)#?
Router_2#sh ip ospf int g0/0
GigabitEthernet0/0 is up, line protocol is up
Internet Address 172.16.2.1/24, Area 0, Attached via Network Statement
Process ID 10, Router ID 2.2.2.2, Network Type BROADCAST, Cost: 1
Topology-MTID Cost Disabled Shutdown Topology Name
0 1 no no Base
Transmit Delay is 1 sec, State DR, Priority 1
Designated Router (ID) 2.2.2.2, Interface address 172.16.2.1
No backup designated router on this network
Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
oob-resync timeout 40
Hello due in 00:00:00
Supports Link-Local Signaling (LLS)
Cisco NSF helper support enabled
IETF NSF helper support enabled
Index 1/3/3, flood queue length 0
Next 0x0(0)/0x0(0)/0x0(0)
Last flood scan length is 0, maximum is 0
Last flood scan time is 0 msec, maximum is 0 msec
Neighbor Count is 0, Adjacent neighbor count is 0
Suppress hello for 0 neighbor(s)
Router_2#sh ip ospf int g0/0 | inc cost
Router_2#sh ip ospf int g0/0 | inc Cost
Process ID 10, Router ID 2.2.2.2, Network Type BROADCAST, Cost: 1
Topology-MTID Cost Disabled Shutdown Topology Name
Router_2#conf t
Enter Configuration commands, one per line. End with CNTL/Z.
Router_2(config)#router ospf 10
Router_2(config-router)#au
Router_2(config-router)#auto-cost ref
Router_2(config-router)#auto-cost reference-bandwidth 1000
% OSPF: Reference bandwidth is changed.
Please ensure reference bandwidth is consistent across all routers.
Router_2(config-router)#exit
Router_2(config)#conf t
% Invalid input detected at '^' marker.

Router_2(config)#?
Router_2#conf t
Enter Configuration commands, one per line. End with CNTL/Z.
Router_2(config)#int g0/0
Router_2(config-if)#band
Router_2(config-if)#bandwidth 100000
Router_2(config-if)#exit
Router_2(config)#router ospf 10
Router_2(config-router)#neighbor 10.1.1.2 cost 500
Router_2(config-router)#neighbor 10.1.1.3 cost 200
Router_2(config-router)#?
Router_2#sh ip ospf in
Router_2#sh ip ospf interface g0/0 | inc Cost
Process ID 10, Router ID 2.2.2.2, Network Type BROADCAST, Cost: 10
Topology-MTID Cost Disabled Shutdown Topology Name
Router_2#
```

Это показатели после данных команд.