ΔΙΚΤΥΑ ΥΠΟΛΟΓΙΣΤΩΝ

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ΑΚΑΔΗΜΑΙΚΟ ΕΤΟΣ: 2022-2023

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2η Εργασία - Εισαγωγή στη Χρήση GNS3

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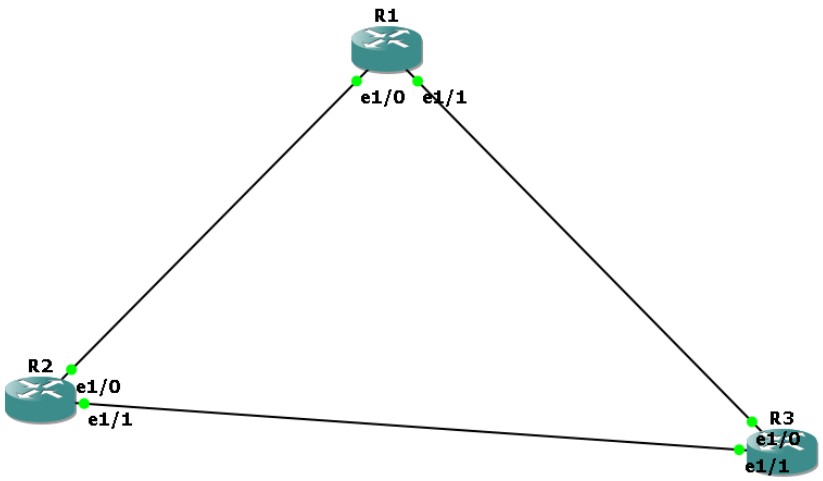
ΕΡΩΤΗΜΑΤΑ:

Τοπολογία:



1)Για κάθε έναν δρομολογητή αναθέστε IP διευθύνσεις στα απαιτούμενα interfaces. Ελέγξτε το αποτέλεσμα με sh ip int br κάθε φορά και την κατάσταση του κάθε interface με την εντολή: sh int <όνομα διεπαφής>

Βάση της παραπάνω τοπολογίας, επιλέγουμε να αναθέσουσε τα παρακάτω ip addresses με σκοπό να βρίσκονται τα αντίστοιχα ethernet κάθε φορά των R1,R2,R3 στο ίδιο υποδίκτυο:
Παραθέτω κάθε φορά ύστερα από την ανάθεση των loopback και των ethernet τα αντίστοιχα output:
R1:

```
R1#sh ip int br
Interface                  IP-Address      OK? Method Status                Protocol
FastEthernet0/0            unassigned      YES unset  administratively down down
Ethernet1/0                10.1.1.1        YES manual administratively down down
Ethernet1/1                10.1.3.1        YES manual administratively down down
Ethernet1/2                unassigned      YES unset  administratively down down
Ethernet1/3                unassigned      YES unset  administratively down down
Serial3/0                  unassigned      YES unset  administratively down down
Serial3/1                  unassigned      YES unset  administratively down down
Serial3/2                  unassigned      YES unset  administratively down down
Serial3/3                  unassigned      YES unset  administratively down down
Loopback0                  1.1.1.1         YES manual up                    up
```

R2:

```
R2#show ip int br
Interface                  IP-Address      OK? Method Status                Protocol
FastEthernet0/0            unassigned      YES unset  administratively down down
Ethernet1/0                10.1.1.2        YES manual up                    up
Ethernet1/1                10.1.2.1        YES manual administratively down down
Ethernet1/2                unassigned      YES unset  administratively down down
Ethernet1/3                unassigned      YES unset  administratively down down
Serial3/0                  unassigned      YES unset  administratively down down
Serial3/1                  unassigned      YES unset  administratively down down
Serial3/2                  unassigned      YES unset  administratively down down
Serial3/3                  unassigned      YES unset  administratively down down
Loopback0                  2.2.2.2         YES manual up                    up
R2#ping 10.1.1.2
```

R3:

```
R3#show ip int br
Interface                  IP-Address      OK? Method Status                Protocol
FastEthernet0/0            unassigned      YES unset  administratively down down
Ethernet1/0                10.1.3.2        YES manual administratively down down
Ethernet1/1                10.1.2.2        YES manual administratively down down
Ethernet1/2                unassigned      YES unset  administratively down down
Ethernet1/3                unassigned      YES unset  administratively down down
Serial3/0                  unassigned      YES unset  administratively down down
Serial3/1                  unassigned      YES unset  administratively down down
Serial3/2                  unassigned      YES unset  administratively down down
Serial3/3                  unassigned      YES unset  administratively down down
Loopback0                  3.3.3.3         YES manual up                    up
```

2)Εκτελέστε την εντολή ping από όλους προς όλους τους δρομολογητές να βεβαιωθείτε ότι επικοινωνούν:

R1:

```
R1#ping 10.1.1.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.1.1.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 4/4/8 ms
R1#ping 10.1.3.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.1.3.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 4/7/8 ms
```

R2:

```
R2#ping 10.1.1.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.1.1.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 4/4/4 ms
R2#ping 10.1.2.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.1.2.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 4/6/8 ms
```

R3:

```
R3#ping 10.1.3.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.1.3.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 4/4/4 ms
R3#10.1.2.2
Trying 10.1.2.2 ... Open


Password required, but none set

[Connection to 10.1.2.2 closed by foreign host]
R3#ping 10.1.2.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.1.2.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 4/6/8 ms
```

3) Ενεργοποιείστε το πρωτόκολλο δρομολόγησης opsf έτσι ώστε όλοι οι δρομολογητές να ενημερωθούν για όλα τα μονοπάτια.

R1:

```
R1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#router ospf 1
R1(config-router)#router-id 1.1.1.1
R1(config-router)#network 0.0.0.0 255.255.255.255 area 0
R1(config-router)#end
R1#
*Mar 19 13:56:19.455: %SYS-5-CONFIG_I: Configured from console by console
R1#
*Mar 19 13:57:15.207: %OSPF-5-ADJCHG: Process 1, Nbr 2.2.2.2 on Ethernet1/0 from LOADING to FULL, Loading Done
R1#
*Mar 19 13:58:37.651: %OSPF-5-ADJCHG: Process 1, Nbr 3.3.3.3 on Ethernet1/1 from LOADING to FULL, Loading Done
```

R2:

```
R2#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R2(config)#int ethernet 1/1
R2(config-if)#no shut
R2(config-if)#end
R2#
*Mar 19 13:51:40.035: %SYS-5-CONFIG_I: Configured from console by console
R2#p
*Mar 19 13:51:40.975: %LINK-3-UPDOWN: Interface Ethernet1/1, changed state to up
*Mar 19 13:51:41.975: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/1, changed state to up
```

R3:

```
R3#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R3(config)#router ospf 1
R3(config-router)#router-id 3.3.3.3
R3(config-router)#network 0.0.0.0 255.255.255.255 area 0
R3(config-router)#end
R3#
*Mar 19 13:58:36.727: %SYS-5-CONFIG_I: Configured from console by console
R3#
*Mar 19 13:58:38.419: %OSPF-5-ADJCHG: Process 1, Nbr 1.1.1.1 on Ethernet1/0 from LOADING to FULL, Loading Done
R3#
*Mar 19 13:58:39.827: %OSPF-5-ADJCHG: Process 1, Nbr 2.2.2.2 on Ethernet1/1 from LOADING to FULL, Loading Done
```

4) Ξανα-εκτελέσετε τις εντολές ping όχι για τις αντικριστές συνδέσεις για να βεβαιωθείτε ότι οι δρομολογητές βλέπουν όλες τις διεπαφές των άλλων δρομολογητών

Από R1:

```
R1#ping 10.1.1.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.1.1.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 16/28/60 ms
R1#ping 10.1.2.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.1.2.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 16/34/48 ms
R1#ping 10.1.3.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.1.3.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 20/24/36 ms
R1#ping 10.1.2.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.1.2.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 36/46/68 ms
```

Από R2 :

```
R2#ping 10.1.1.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.1.1.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 20/22/28 ms
R2#ping 10.1.3.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.1.3.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 12/28/60 ms
R2#ping 10.1.3.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.1.3.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 16/25/32 ms
R2#ping 10.1.2.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.1.2.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 24/27/32 ms
```

Από R3:

```
R3#ping 10.1.1.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.1.1.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 8/23/48 ms
R3#ping 10.1.3.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.1.3.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 12/22/32 ms
R3#ping 10.1.2.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.1.2.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 16/24/32 ms
R3#ping 10.1.1.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.1.1.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 20/51/160 ms
```

5) Δείξτε τα μονοπάτια δρομολόγησης για κάθε έναν δρομολογητή με τις εντολές: sh ip ospf neigh και sh ip route

R1:

```
R1#sh ip ospf neigh

Neighbor ID     Pri   State           Dead Time   Address         Interface
3.3.3.3           1   FULL/BDR        00:00:36    10.1.3.2        Ethernet1/1
2.2.2.2           1   FULL/BDR        00:00:36    10.1.1.2        Ethernet1/0
R1#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

Gateway of last resort is not set

      1.0.0.0/32 is subnetted, 1 subnets
C        1.1.1.1 is directly connected, Loopback0
      2.0.0.0/32 is subnetted, 1 subnets
O        2.2.2.2 [110/11] via 10.1.1.2, 00:02:12, Ethernet1/0
      3.0.0.0/32 is subnetted, 1 subnets
O        3.3.3.3 [110/11] via 10.1.3.2, 00:00:50, Ethernet1/1
      10.0.0.0/8 is variably subnetted, 5 subnets, 2 masks
C        10.1.1.0/24 is directly connected, Ethernet1/0
L        10.1.1.1/32 is directly connected, Ethernet1/0
O        10.1.2.0/24 [110/20] via 10.1.3.2, 00:00:40, Ethernet1/1
                     [110/20] via 10.1.1.2, 00:02:12, Ethernet1/0
```

R2:

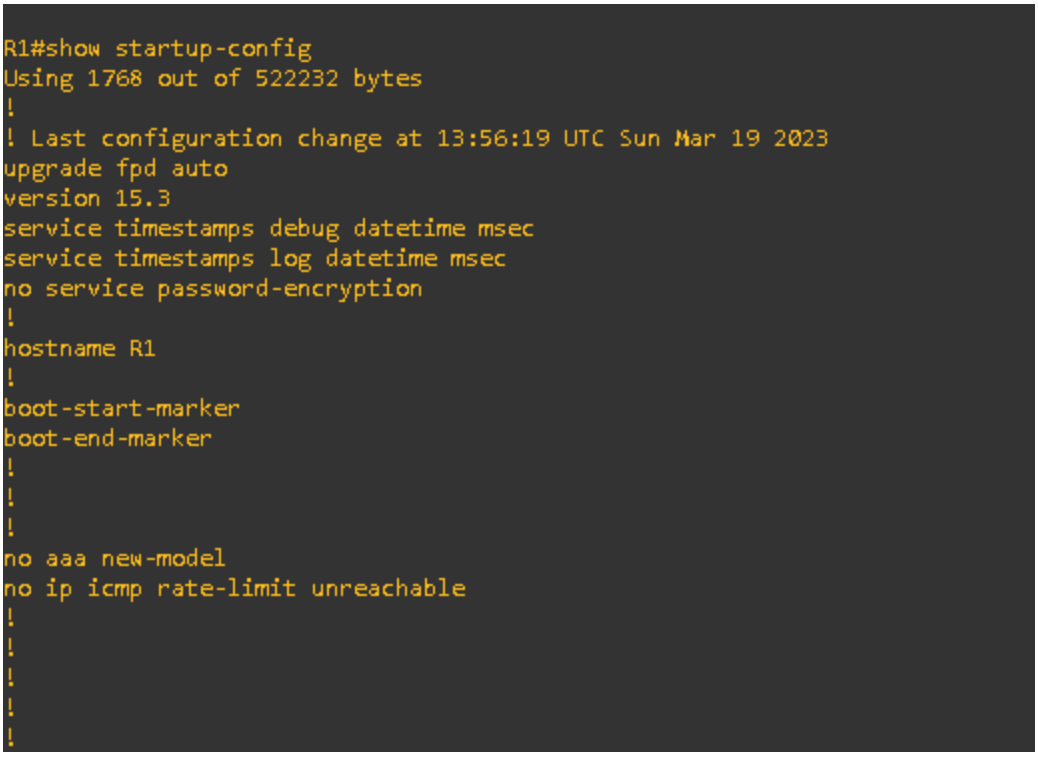
```
R2#sh ip ospf neigh

Neighbor ID     Pri   State           Dead Time   Address         Interface
3.3.3.3           1   FULL/BDR        00:00:32    10.1.2.2        Ethernet1/1
1.1.1.1           1   FULL/DR         00:00:38    10.1.1.1        Ethernet1/0
R2#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

Gateway of last resort is not set

      1.0.0.0/32 is subnetted, 1 subnets
O        1.1.1.1 [110/11] via 10.1.1.1, 00:02:17, Ethernet1/0
      2.0.0.0/32 is subnetted, 1 subnets
C        2.2.2.2 is directly connected, Loopback0
      3.0.0.0/32 is subnetted, 1 subnets
O        3.3.3.3 [110/11] via 10.1.2.2, 00:00:44, Ethernet1/1
      10.0.0.0/8 is variably subnetted, 5 subnets, 2 masks
C        10.1.1.0/24 is directly connected, Ethernet1/0
L        10.1.1.2/32 is directly connected, Ethernet1/0
C        10.1.2.0/24 is directly connected, Ethernet1/1
```

R3:

```
R3#sh ip ospf neigh

Neighbor ID     Pri   State           Dead Time   Address         Interface
2.2.2.2           1   FULL/DR         00:00:39    10.1.2.1        Ethernet1/1
1.1.1.1           1   FULL/DR         00:00:38    10.1.3.1        Ethernet1/0
R3#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

Gateway of last resort is not set

      1.0.0.0/32 is subnetted, 1 subnets
O        1.1.1.1 [110/11] via 10.1.3.1, 00:00:54, Ethernet1/0
      2.0.0.0/32 is subnetted, 1 subnets
O        2.2.2.2 [110/11] via 10.1.2.1, 00:00:54, Ethernet1/1
      3.0.0.0/32 is subnetted, 1 subnets
C        3.3.3.3 is directly connected, Loopback0
      10.0.0.0/8 is variably subnetted, 5 subnets, 2 masks
O        10.1.1.0/24 [110/20] via 10.1.3.1, 00:00:54, Ethernet1/0
                     [110/20] via 10.1.2.1, 00:00:54, Ethernet1/1
C        10.1.2.0/24 is directly connected, Ethernet1/1
```

Στη συνέχεια, κάνουμε save για να αποθηκεύσουμε την παραμετροποίηση,
με την εντολή wr .Έχοντας ανοικτά όλα τα commnad lines των δρομολογητών,
βλέπουμε τα μηνύματα που
εμφανίζονται τη στιγμή που ολοκληρώνετε το configuration ενός link και από τις δύο πλευρές, που ο κάθε δρομολογητής “ανακαλύπτει” τον γείτονα του:

```
R1#wr
Warning: Attempting to overwrite an NVRAM configuration previously written
by a different version of the system image.
Overwrite the previous NVRAM configuration?[confirm]
Building configuration...
[OK]
```



Αντίστοιχα για τα άλλα 2.

ΤΕΛΟΣ ΑΝΑΦΟΡΑΣ