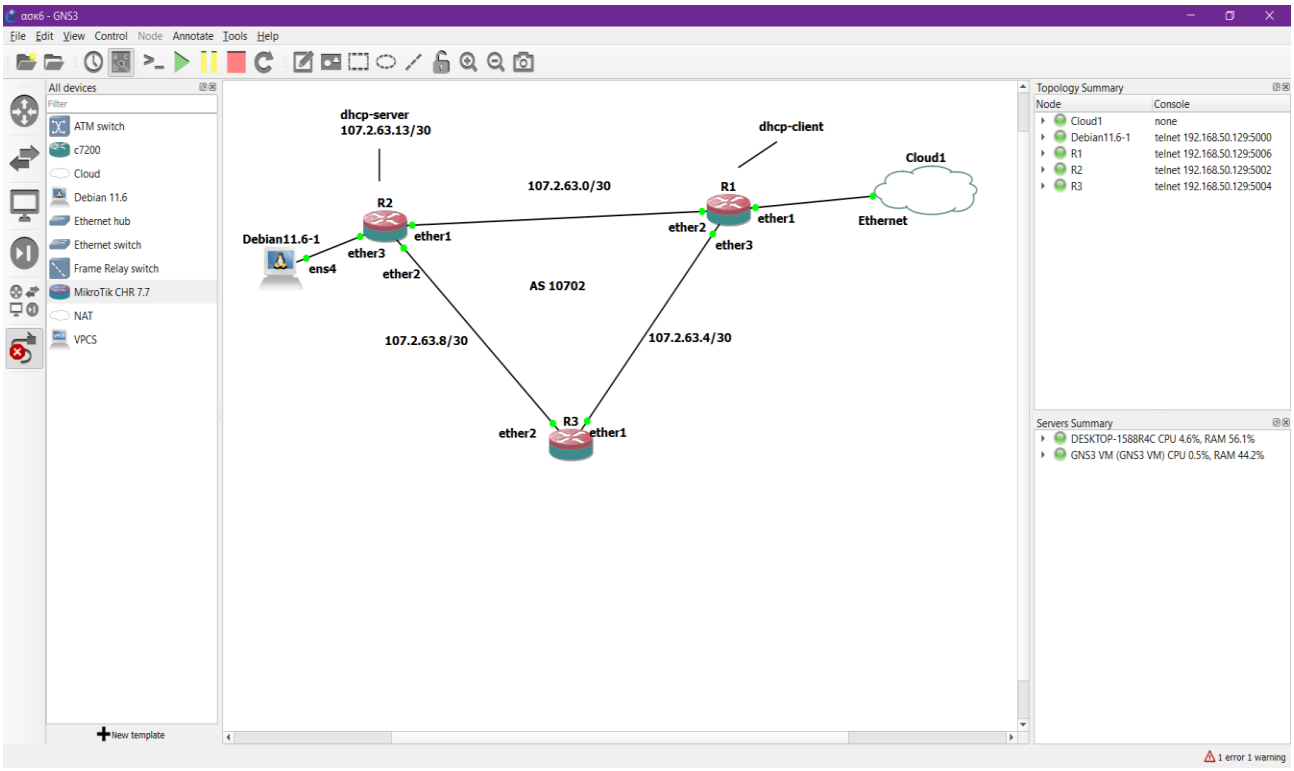
ΑΝΑΦΟΡΑ ΓΙΑ ΤΟ 5ο ΕΡΓΑΣΤΗΡΙΟ ΣΤΑ ΔΙΚΤΥΑ ΥΠΟΛΟΓΙΣΤΩΝ

ΑΜ = 1070263

Ον/μο = ΣΠΥΡΟ ΣΟΥΛΙ

Έτος = 6ο

Υλοποίηση



***Δεν ξερω αν πήρατε τις απαντήσεις αλλα τις ανεβάζω και εδώ για το κομμάτι

Από το τερματικό Debiab 11.6.1 εκτελέστε τις παρακάτω εντολές:

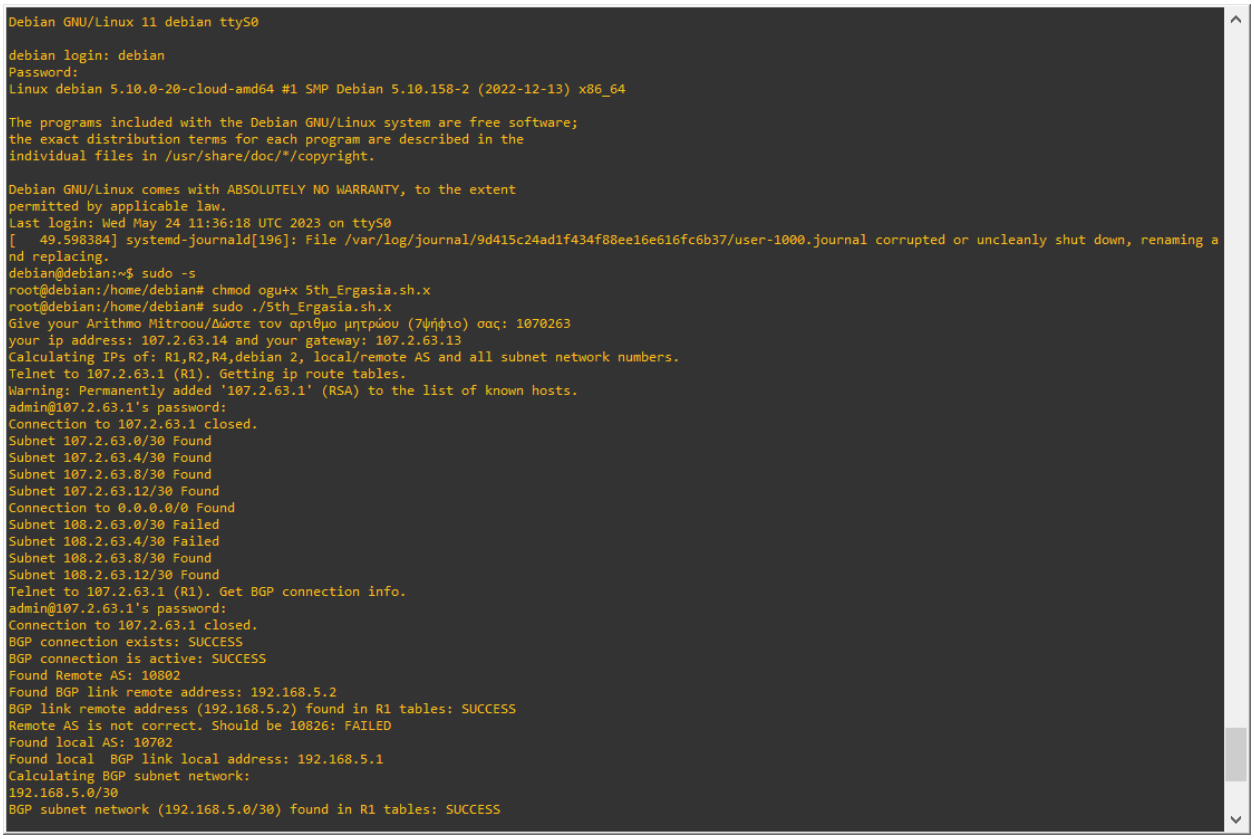
wget https://github.com/kyrg/gns3-test/raw/main/5th_Ergasia.sh.x

chmod ogu+x 5th_Ergasia.sh.x

sudo ./5th_Ergasia.sh.x

Το πρόβλημα είναι ότι ενώ τα κάνει όλα στο τέλος γράφει

curl: (6) Could not resolve host: nextcloud.com.gr



ip/route/print

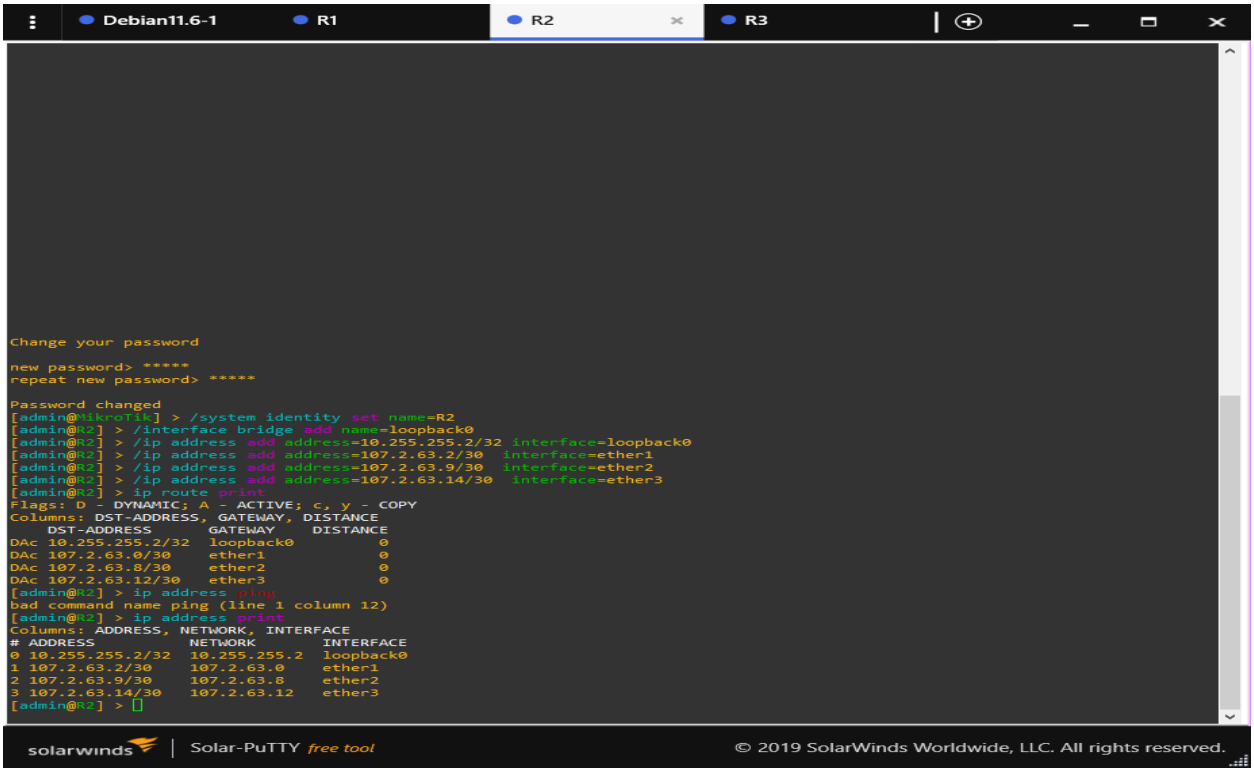
R1

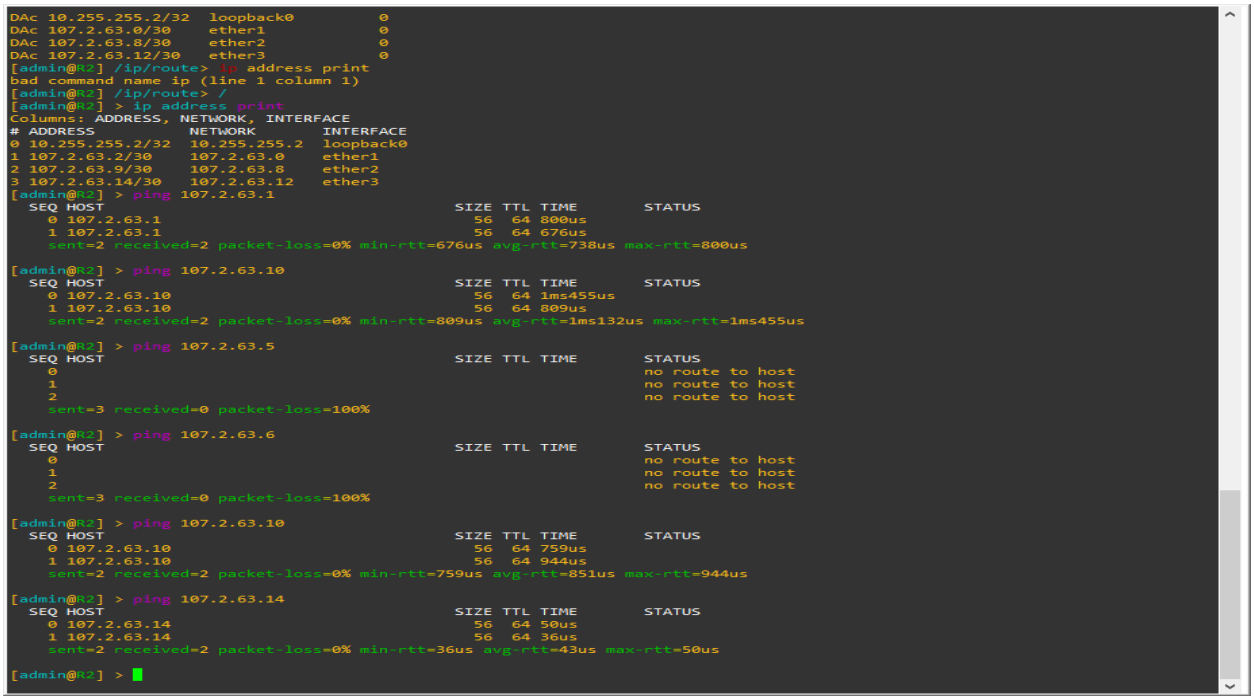
```
Change your password

new password> *****
repeat new password> *****

Password changed
[admin@MikroTik] > /system identity set name=R1
[admin@R1] > /interface bridge add name=loopback0
[admin@R1] > /ip address add address=10.255.255.1/32 interface=loopback0
[admin@R1] > routing/id/ print
Flags: D, I - INACTIVE
Columns: NAME, DYNAMIC-ID, SELECT-DYNAMIC-ID, SELECT-FROM-VRF
#    NAME  DYNAMIC-ID     SELECT-DYNAMIC-ID  SELECT-FROM-VRF
0 D main   192.168.1.77   only-vrf           main
[admin@R1] > routing/id/ print
Flags: D, I - INACTIVE
Columns: NAME, DYNAMIC-ID, SELECT-DYNAMIC-ID, SELECT-FROM-VRF
#    NAME  DYNAMIC-ID     SELECT-DYNAMIC-ID  SELECT-FROM-VRF
0 D main   192.168.1.77   only-vrf           main
[admin@R1] > /interface bridge add name=loopback0
failure: already have interface with such name
[admin@R1] > /ip address add address=107.2.63.1/30 interface=ether2
[admin@R1] > /ip address add address=107.2.63.5/30 interface=ether3
[admin@R1] > ip route print
Flags: D - DYNAMIC; A - ACTIVE; c, d, y - COPY
Columns: DST-ADDRESS, GATEWAY, DISTANCE
    DST-ADDRESS       GATEWAY         DISTANCE
DAd 0.0.0.0/0         192.168.1.254          1
DAc 10.255.255.1/32   loopback0              0
DAc 107.2.63.0/30     ether2                 0
DAc 107.2.63.4/30     ether3                 0
DAc 192.168.1.0/24    ether1                 0
[admin@R1] > ip address print
Flags: D - DYNAMIC
Columns: ADDRESS, NETWORK, INTERFACE
#    ADDRESS           NETWORK       INTERFACE
0 D 192.168.1.77/24   192.168.1.0   ether1
1   10.255.255.1/32   10.255.255.1  loopback0
2   107.2.63.1/30     107.2.63.0    ether2
3   107.2.63.5/30     107.2.63.4    ether3
[admin@R1] >
```

```
DAc 10.255.255.1/32   loopback0              0
DAc 107.2.63.0/30     ether2                 0
DAc 107.2.63.4/30     ether3                 0
DAc 192.168.1.0/24    ether1                 0
[admin@R1] > ip address print
Flags: D - DYNAMIC
Columns: ADDRESS, NETWORK, INTERFACE
#    ADDRESS           NETWORK       INTERFACE
0 D 192.168.1.77/24   192.168.1.0   ether1
1   10.255.255.1/32   10.255.255.1  loopback0
2   107.2.63.1/30     107.2.63.0    ether2
3   107.2.63.5/30     107.2.63.4    ether3
[admin@R1] > ping 107.2.63.6
  SEQ HOST                                     SIZE TTL TIME       STATUS
    0 107.2.63.6                                 56  64 1ms505us
    1 107.2.63.6                                 56  64 891us
    2 107.2.63.6                                 56  64 643us
    sent=3 received=3 packet-loss=0% min-rtt=643us avg-rtt=1ms13us max-rtt=1ms505us

[admin@R1] > ping 107.2.63.2
  SEQ HOST                                     SIZE TTL TIME       STATUS
    0 107.2.63.2                                 56  64 1ms389us
    1 107.2.63.2                                 56  64 1ms72us
    sent=2 received=2 packet-loss=0% min-rtt=1ms72us avg-rtt=1ms230us max-rtt=1ms389us

[admin@R1] > ping 107.2.63.9
  SEQ HOST                                     SIZE TTL TIME       STATUS
    0 107.2.63.9                                                   timeout
    1 107.2.63.9                                                   timeout
    sent=2 received=0 packet-loss=100%

[admin@R1] > ping 107.2.63.14
  SEQ HOST                                     SIZE TTL TIME       STATUS
    0 107.2.63.14                                                  timeout
    1 107.2.63.14                                                  timeout
    sent=2 received=0 packet-loss=100%

[admin@R1] > ping 8.8.8.8
  SEQ HOST                                     SIZE TTL TIME       STATUS
    0 8.8.8.8                                    56 116 128ms871us
    1 8.8.8.8                                    56 116 24ms362us
    sent=2 received=2 packet-loss=0% min-rtt=24ms362us avg-rtt=76ms616us max-rtt=128ms871us

[admin@R1] >
```

Κάνει ping σε αντικριστά ενώ δεν κάνει σε ΜΗ αντικριστά και σε εξ. δίκτυο

R2





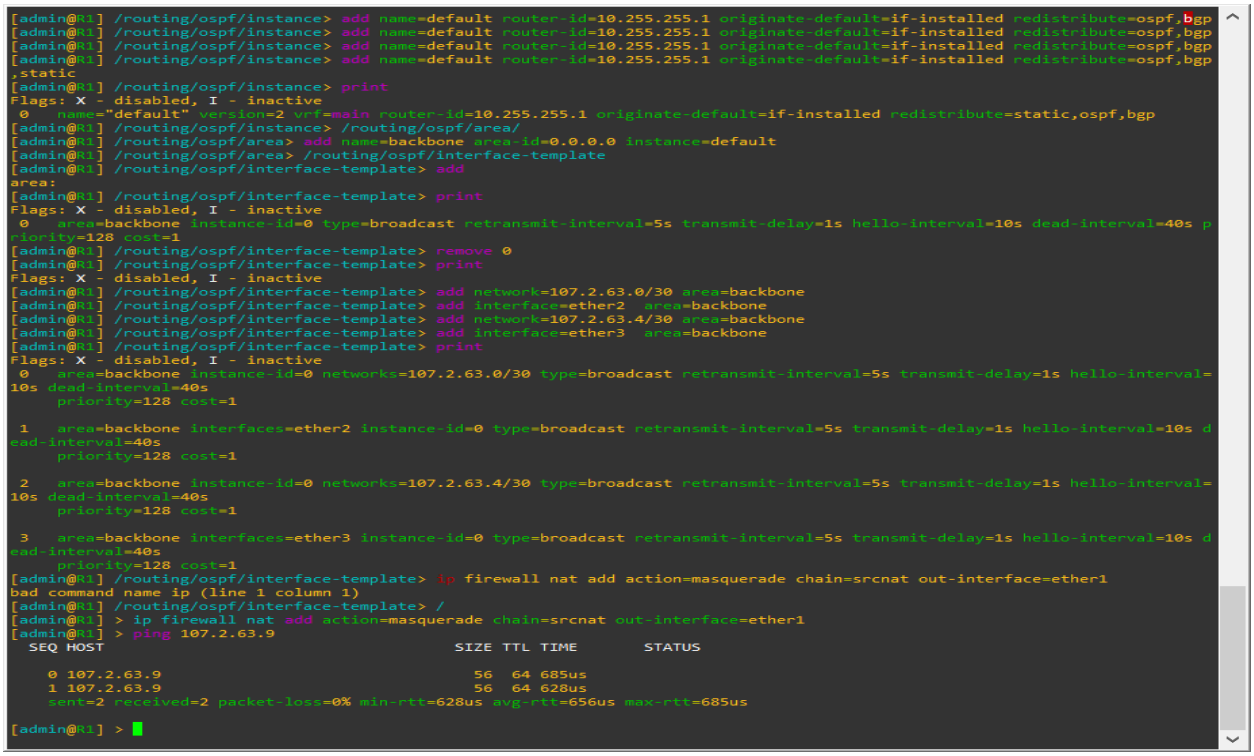
Κάνει ping σε αντικριστά ενώ δεν κάνει σε ΜΗ αντικριστά

R3

Κάνει ping σε αντικριστά ενώ δεν κάνει σε ΜΗ αντικριστά

Παραμετροποίηση ospf δρομολόγησης.

R1



R2

```
0 10.255.255.2/32  10.255.255.2  loopback0
1 107.2.63.2/30    107.2.63.0    ether1
2 107.2.63.9/30    107.2.63.8    ether2
3 107.2.63.14/30   107.2.63.12   ether3
[admin@R2] > /ip/address/
[admin@R2] /ip/address> remove 3
[admin@R2] /ip/address> /ip address add address=109.45.49.5/30 interface=ether3
[admin@R2] /ip/address> remove 3
no such item (4)
[admin@R2] /ip/address> print
Columns: ADDRESS, NETWORK, INTERFACE
# ADDRESS           NETWORK       INTERFACE
0 10.255.255.2/32   10.255.255.2  loopback0
1 107.2.63.2/30     107.2.63.0    ether1
2 107.2.63.9/30     107.2.63.8    ether2
3 109.45.49.5/30    109.45.49.4   ether3
[admin@R2] /ip/address> remove 3
[admin@R2] /ip/address> /ip address add address=107.2.63.13/30 interface=ether3
[admin@R2] /ip/address> print
Columns: ADDRESS, NETWORK, INTERFACE
# ADDRESS           NETWORK       INTERFACE
0 10.255.255.2/32   10.255.255.2  loopback0
1 107.2.63.2/30     107.2.63.0    ether1
2 107.2.63.9/30     107.2.63.8    ether2
3 107.2.63.13/30    107.2.63.12   ether3
[admin@R2] /ip/address> /routing/ospf/interface-template
[admin@R2] /routing/ospf/interface-template> add network=107.2.63.12/30 area=backbone
[admin@R2] /routing/ospf/interface-template> add interface=ether3  area=backbone
[admin@R2] /routing/ospf/interface-template> /
[admin@R2] > ip route print
Flags: D - DYNAMIC; A - ACTIVE; c, o, y - COPY
Columns: DST-ADDRESS, GATEWAY, DISTANCE
    DST-ADDRESS       GATEWAY              DISTANCE
DAo 0.0.0.0/0         107.2.63.1%ether1         110
DAc 10.255.255.2/32   loopback0                   0
DAc 107.2.63.0/30     ether1                      0
DAo 107.2.63.4/30     107.2.63.1%ether1         110
DAc 107.2.63.8/30     ether2                      0
DAc 107.2.63.12/30    ether3                      0
[admin@R2] > ip address  print
Columns: ADDRESS, NETWORK, INTERFACE
# ADDRESS           NETWORK       INTERFACE
0 10.255.255.2/32   10.255.255.2  loopback0
1 107.2.63.2/30     107.2.63.0    ether1
2 107.2.63.9/30     107.2.63.8    ether2
3 107.2.63.13/30    107.2.63.12   ether3
[admin@R2] > ping 107.2.63.5
  SEQ HOST                                     SIZE TTL TIME       STATUS
    0 107.2.63.5                                 56  64 776us
    1 107.2.63.5                                 56  64 832us
    sent=2 received=2 packet-loss=0% min-rtt=776us avg-rtt=804us max-rtt=832us

[admin@R2] >
```

R3

```
[admin@R3] > ping 107.2.63.1
  SEQ HOST                                     SIZE TTL TIME       STATUS
    0                                                              no route to host
    1                                                              no route to host
    sent=2 received=0 packet-loss=100%

[admin@R3] > ping 107.2.63.14
  SEQ HOST                                     SIZE TTL TIME       STATUS
    0                                                              no route to host
    1                                                              no route to host
    sent=2 received=0 packet-loss=100%

[admin@R3] > /routing/ospf/instance/
[admin@R3] /routing/ospf/instance> add name=default router-id=10.255.255.3 originate-default=if-installed redistribute=ospf,bgp
static
syntax error (line 1 column 90)
[admin@R3] /routing/ospf/instance> add name=default router-id=10.255.255.3 originate-default=if-installed redistribute=ospf,bgp
,static
[admin@R3] /routing/ospf/instance> print
Flags: X - disabled, I - inactive
 0  name="default" version=2 vrf=main router-id=10.255.255.3 originate-default=if-installed redistribute=static,ospf,bgp
[admin@R3] /routing/ospf/instance> /routing/ospf/area/
[admin@R3] /routing/ospf/area> add name=backbone areaid=0.0.0.0 instance=default
expected end of command (line 1 column 19)
[admin@R3] /routing/ospf/area> add name=backbone area-id=0.0.0.0 instance=default
[admin@R3] /routing/ospf/area> /routing/ospf/interface-template
[admin@R3] /routing/ospf/interface-template> add network=107.2.63.4/30 area=backbone
[admin@R3] /routing/ospf/interface-template> add interface=ether1  area=backbone
[admin@R3] /routing/ospf/interface-template> add network=107.2.63.8/30 area=backbone
[admin@R3] /routing/ospf/interface-template> add interface=ether2  area=backbone
[admin@R3] /routing/ospf/interface-template> print
Flags: X - disabled, I - inactive
 0   area=backbone instance-id=0 networks=107.2.63.4/30 type=broadcast retransmit-interval=5s transmit-delay=1s
     hello-interval=10s dead-interval=40s priority=128 cost=1

 1   area=backbone interfaces=ether1 instance-id=0 type=broadcast retransmit-interval=5s transmit-delay=1s hello-interval=10s
     dead-interval=40s priority=128 cost=1

 2   area=backbone instance-id=0 networks=107.2.63.8/30 type=broadcast retransmit-interval=5s transmit-delay=1s
     hello-interval=10s dead-interval=40s priority=128 cost=1

 3   area=backbone interfaces=ether2 instance-id=0 type=broadcast retransmit-interval=5s transmit-delay=1s hello-interval=10s
     dead-interval=40s priority=128 cost=1
[admin@R3] /routing/ospf/interface-template> /
[admin@R3] > ping 107.2.63.1
  SEQ HOST                                     SIZE TTL TIME       STATUS
    0 107.2.63.1                                 56  64 1ms119us
    1 107.2.63.1                                 56  64 888us
    2 107.2.63.1                                 56  64 1ms180us
    sent=3 received=3 packet-loss=0% min-rtt=888us avg-rtt=1ms62us max-rtt=1ms180us

[admin@R3] >
```

ip/route/print

R1

```
area:
[admin@R1] /routing/ospf/interface-template> print
Flags: X - disabled, I - inactive
 0   area=backbone instance-id=0 type=broadcast retransmit-interval=5s transmit-delay=1s hello-interval=10s dead-interval=40s p
riority=128 cost=1
[admin@R1] /routing/ospf/interface-template> remove 0
[admin@R1] /routing/ospf/interface-template> print
Flags: X - disabled, I - inactive
[admin@R1] /routing/ospf/interface-template> add network=107.2.63.0/30 area=backbone
[admin@R1] /routing/ospf/interface-template> add interface=ether2  area=backbone
[admin@R1] /routing/ospf/interface-template> add network=107.2.63.4/30 area=backbone
[admin@R1] /routing/ospf/interface-template> add interface=ether3  area=backbone
[admin@R1] /routing/ospf/interface-template> print
Flags: X - disabled, I - inactive
 0   area=backbone instance-id=0 networks=107.2.63.0/30 type=broadcast retransmit-interval=5s transmit-delay=1s hello-interval=
10s dead-interval=40s
     priority=128 cost=1

 1   area=backbone interfaces=ether2 instance-id=0 type=broadcast retransmit-interval=5s transmit-delay=1s hello-interval=10s d
ead-interval=40s
     priority=128 cost=1

 2   area=backbone instance-id=0 networks=107.2.63.4/30 type=broadcast retransmit-interval=5s transmit-delay=1s hello-interval=
10s dead-interval=40s
     priority=128 cost=1

 3   area=backbone interfaces=ether3 instance-id=0 type=broadcast retransmit-interval=5s transmit-delay=1s hello-interval=10s d
ead-interval=40s
     priority=128 cost=1
[admin@R1] /routing/ospf/interface-template> ip firewall nat add action=masquerade chain=srcnat out-interface=ether1
bad command name ip (line 1 column 1)
[admin@R1] /routing/ospf/interface-template> /
[admin@R1] > ip firewall nat add action=masquerade chain=srcnat out-interface=ether1
[admin@R1] > ping 107.2.63.9
  SEQ HOST                                     SIZE TTL TIME       STATUS
    0 107.2.63.9                                 56  64 685us
    1 107.2.63.9                                 56  64 628us
    sent=2 received=2 packet-loss=0% min-rtt=628us avg-rtt=656us max-rtt=685us

[admin@R1] > ip/route/print
Flags: D - DYNAMIC; A - ACTIVE; c, o, d, y - COPY; + - ECMP
Columns: DST-ADDRESS, GATEWAY, DISTANCE
     DST-ADDRESS       GATEWAY              DISTANCE
DAd  0.0.0.0/0         192.168.1.254               1
DAc  10.255.255.1/32   loopback0                   0
DAc  107.2.63.0/30     ether2                      0
DAc  107.2.63.4/30     ether3                      0
DAo+ 107.2.63.8/30     107.2.63.6%ether3         110
DAo+ 107.2.63.8/30     107.2.63.2%ether2         110
DAo  107.2.63.12/30    107.2.63.2%ether2         110
DAc  192.168.1.0/24    ether1                      0
[admin@R1] >
```

R2

```
# ADDRESS           NETWORK        INTERFACE
0 10.255.255.2/32   10.255.255.2   loopback0
1 107.2.63.2/30     107.2.63.0     ether1
2 107.2.63.9/30     107.2.63.8     ether2
3 109.45.49.5/30    109.45.49.4    ether3
[admin@R2] /ip/address> remove 3
[admin@R2] /ip/address> /ip address add address=107.2.63.13/30 interface=ether3
[admin@R2] /ip/address> print
Columns: ADDRESS, NETWORK, INTERFACE
# ADDRESS           NETWORK        INTERFACE
0 10.255.255.2/32   10.255.255.2   loopback0
1 107.2.63.2/30     107.2.63.0     ether1
2 107.2.63.9/30     107.2.63.8     ether2
3 107.2.63.13/30    107.2.63.12    ether3
[admin@R2] /ip/address> /routing/ospf/interface-template
[admin@R2] /routing/ospf/interface-template> add network=107.2.63.12/30 area=backbone
[admin@R2] /routing/ospf/interface-template> add interface=ether3  area=backbone
[admin@R2] /routing/ospf/interface-template> /
[admin@R2] > ip route print
Flags: D - DYNAMIC; A - ACTIVE; c, o, y - COPY
Columns: DST-ADDRESS, GATEWAY, DISTANCE
     DST-ADDRESS       GATEWAY              DISTANCE
DAo 0.0.0.0/0          107.2.63.1%ether1         110
DAc 10.255.255.2/32    loopback0                   0
DAc 107.2.63.0/30      ether1                      0
DAo 107.2.63.4/30      107.2.63.1%ether1         110
DAc 107.2.63.8/30      ether2                      0
DAc 107.2.63.12/30     ether3                      0
[admin@R2] > ip address  print
Columns: ADDRESS, NETWORK, INTERFACE
# ADDRESS           NETWORK        INTERFACE
0 10.255.255.2/32   10.255.255.2   loopback0
1 107.2.63.2/30     107.2.63.0     ether1
2 107.2.63.9/30     107.2.63.8     ether2
3 107.2.63.13/30    107.2.63.12    ether3
[admin@R2] > ping 107.2.63.5
  SEQ HOST                                     SIZE TTL TIME       STATUS
    0 107.2.63.5                                 56  64 776us
    1 107.2.63.5                                 56  64 832us
    sent=2 received=2 packet-loss=0% min-rtt=776us avg-rtt=804us max-rtt=832us

[admin@R2] > ip/route/print
Flags: D - DYNAMIC; A - ACTIVE; c, o, y - COPY; + - ECMP
Columns: DST-ADDRESS, GATEWAY, DISTANCE
     DST-ADDRESS       GATEWAY              DISTANCE
DAo  0.0.0.0/0         107.2.63.1%ether1         110
DAc  10.255.255.2/32   loopback0                   0
DAc  107.2.63.0/30     ether1                      0
DAo+ 107.2.63.4/30     107.2.63.10%ether2        110
DAo+ 107.2.63.4/30     107.2.63.1%ether1         110
DAc  107.2.63.8/30     ether2                      0
DAc  107.2.63.12/30    ether3                      0
[admin@R2] >
```

R3

```
    sent=2 received=0 packet-loss=100%

[admin@R3] > /routing/ospf/instance/
[admin@R3] /routing/ospf/instance> add name=default router-id=10.255.255.3 originate-default=if-installed redistribute=ospf,bgp
static
syntax error (line 1 column 90)
[admin@R3] /routing/ospf/instance> add name=default router-id=10.255.255.3 originate-default=if-installed redistribute=ospf,bgp
,static
[admin@R3] /routing/ospf/instance> print
Flags: X - disabled, I - inactive
 0   name="default" version=2 vrf=main router-id=10.255.255.3 originate-default=if-installed redistribute=static,ospf,bgp
[admin@R3] /routing/ospf/instance> /routing/ospf/area/
[admin@R3] /routing/ospf/area> add name=backbone areaid=0.0.0.0 instance=default
expected end of command (line 1 column 19)
[admin@R3] /routing/ospf/area> add name=backbone area-id=0.0.0.0 instance=default
[admin@R3] /routing/ospf/area> /routing/ospf/interface-template
[admin@R3] /routing/ospf/interface-template> add network=107.2.63.4/30 area=backbone
[admin@R3] /routing/ospf/interface-template> add interface=ether1  area=backbone
[admin@R3] /routing/ospf/interface-template> add network=107.2.63.8/30 area=backbone
[admin@R3] /routing/ospf/interface-template> add interface=ether2  area=backbone
[admin@R3] /routing/ospf/interface-template> print
Flags: X - disabled, I - inactive
 0   area=backbone instance-id=0 networks=107.2.63.4/30 type=broadcast retransmit-interval=5s transmit-delay=1s
     hello-interval=10s dead-interval=40s priority=128 cost=1

 1   area=backbone interfaces=ether1 instance-id=0 type=broadcast retransmit-interval=5s transmit-delay=1s hello-interval=10s
     dead-interval=40s priority=128 cost=1

 2   area=backbone instance-id=0 networks=107.2.63.8/30 type=broadcast retransmit-interval=5s transmit-delay=1s
     hello-interval=10s dead-interval=40s priority=128 cost=1

 3   area=backbone interfaces=ether2 instance-id=0 type=broadcast retransmit-interval=5s transmit-delay=1s hello-interval=10s
     dead-interval=40s priority=128 cost=1
[admin@R3] /routing/ospf/interface-template> /
[admin@R3] > ping 107.2.63.1
  SEQ HOST                                     SIZE TTL TIME       STATUS
    0 107.2.63.1                                 56  64 1ms119us
    1 107.2.63.1                                 56  64 888us
    2 107.2.63.1                                 56  64 1ms180us
    sent=3 received=3 packet-loss=0% min-rtt=888us avg-rtt=1ms62us max-rtt=1ms180us

[admin@R3] > ip/route/print
Flags: D - DYNAMIC; A - ACTIVE; c, o, y - COPY; + - ECMP
Columns: DST-ADDRESS, GATEWAY, DISTANCE
     DST-ADDRESS       GATEWAY              DISTANCE
DAo  0.0.0.0/0         107.2.63.5%ether1         110
DAc  10.255.255.3/32   loopback0                   0
DAo+ 107.2.63.0/30     107.2.63.9%ether2         110
DAo+ 107.2.63.0/30     107.2.63.5%ether1         110
DAc  107.2.63.4/30     ether1                      0
DAc  107.2.63.8/30     ether2                      0
DAo  107.2.63.12/30    107.2.63.9%ether2         110
[admin@R3] >
```

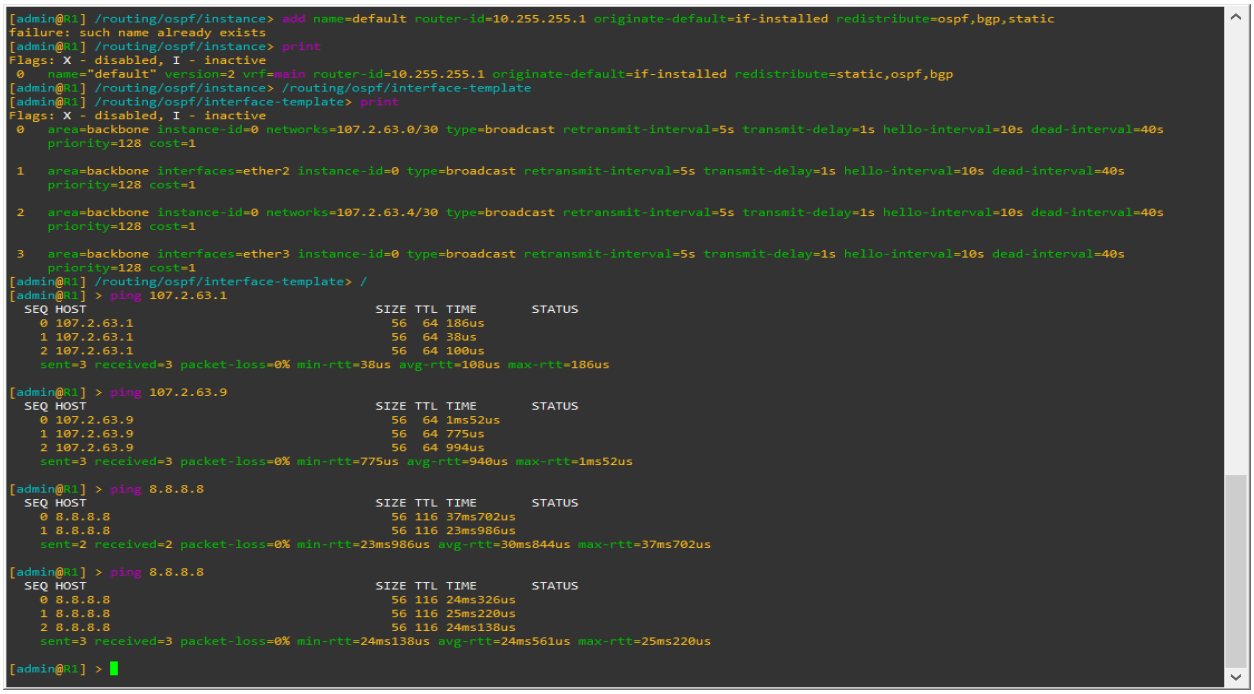
Υπάρχει από όλους ναι

Traceroute

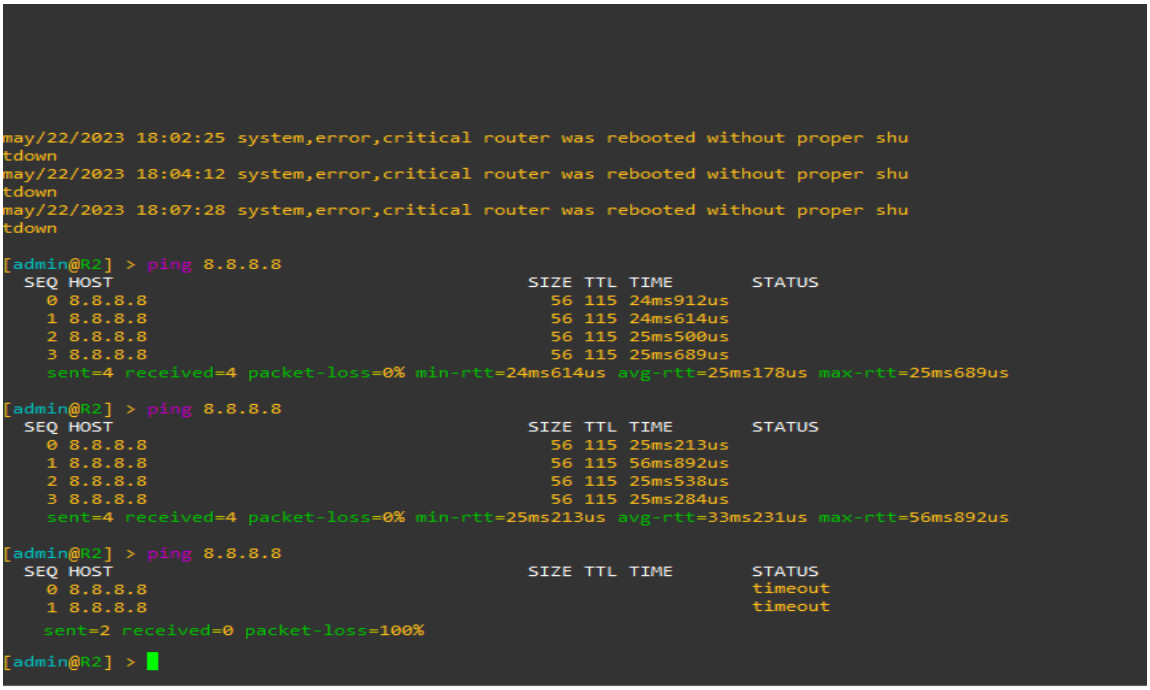
```
Subnet 108.2.63.12/30 Found
Telnet to 107.2.63.1 (R1). Get BGP connection info.
admin@107.2.63.1's password:
Connection to 107.2.63.1 closed.
BGP connection exists: SUCCESS
BGP connection is active: SUCCESS
Found Remote AS: 10802
Found BGP link remote address: 192.168.5.2
BGP link remote address (192.168.5.2) found in R1 tables: SUCCESS
Remote AS is not correct. Should be 10826: FAILED
Found local AS: 10702
Found local  BGP link local address: 192.168.5.1
Calculating BGP subnet network:
192.168.5.0/30
BGP subnet network (192.168.5.0/30) found in R1 tables: SUCCESS
Local AS is not correct. Should be 10726: FAILED
Telnet to 107.2.63.1 (R1). Get interfaces info.
admin@107.2.63.1's password:
Connection to 107.2.63.1 closed.
Starting traceroute to Debian 2 (max hops set to 7)
traceroute to 108.2.63.14 (108.2.63.14), 7 hops max, 60 byte packets
 1  107.2.63.13  4.131 ms  5.813 ms  5.808 ms
 2  107.2.63.1  3.471 ms  3.740 ms *
 3  192.168.5.2  17.952 ms  18.020 ms  18.325 ms
 4  108.2.63.2  18.503 ms  18.735 ms  18.798 ms
 5  108.2.63.14  18.971 ms  19.069 ms  19.214 ms
Traceroute to Debian 2 reach: you reach 108.2.63.14 in 5 hops
Testing IPs of hops:
ip address (107.2.63.1) of R1 found in path: SUCCESS
BGP remote address (192.168.5.2) found in path: SUCCESS
Begin ping to 8.8.8.8:  ping to 8.8.8.8: CORRECT
Begin ping to google.com:  : google.com: Temporary failure in name resolution
sh: 348: [: -eq: unexpected operator
ping to google.coms: FAILED
Start traceroute to 8.8.8.8 with ICMP:  SUCCESS : you reach 8.8.8.8 in 13 hops
Submit result: y/n ? y
entered yes. uploading results....good bye
curl: (6) Could not resolve host: nextcloud.com.gr
root@debian:/home/debian# ^C
root@debian:/home/debian# traceroute 107.2.63.1
traceroute to 107.2.63.1 (107.2.63.1), 30 hops max, 60 byte packets
 1  107.2.63.13 (107.2.63.13)  0.741 ms  0.567 ms  0.371 ms
 2  107.2.63.1 (107.2.63.1)  1.465 ms  1.292 ms  1.795 ms
root@debian:/home/debian# traceroute 107.2.63.5
traceroute to 107.2.63.5 (107.2.63.5), 30 hops max, 60 byte packets
 1  107.2.63.13 (107.2.63.13)  1.508 ms  1.441 ms  1.428 ms
 2  107.2.63.5 (107.2.63.5)  2.800 ms  2.751 ms  2.738 ms
root@debian:/home/debian#
```

Μετά την εκτέλεση διαπιστώνουμε ότι όντως μονο ο R1 έχει πρόσβαση στο εξ.δίκτυο

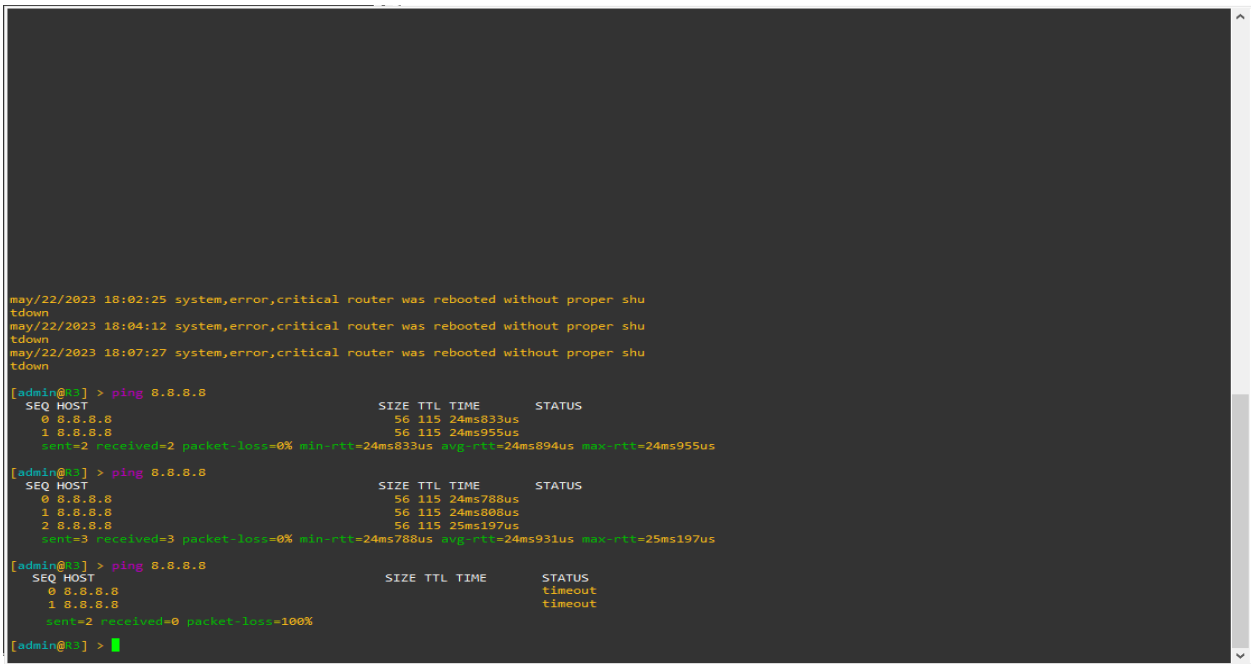
R1



R2

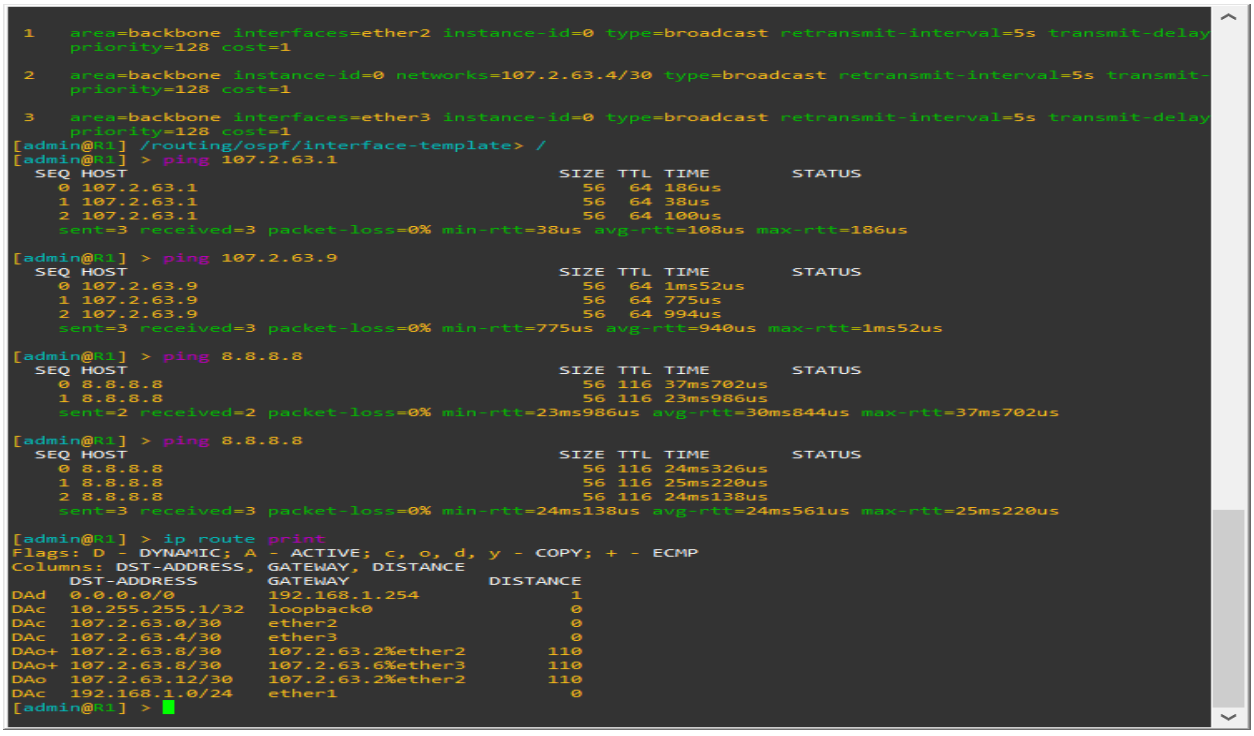


R3



Πρόσθεση στατικής Διαδρομής μόνο στον R2

R1



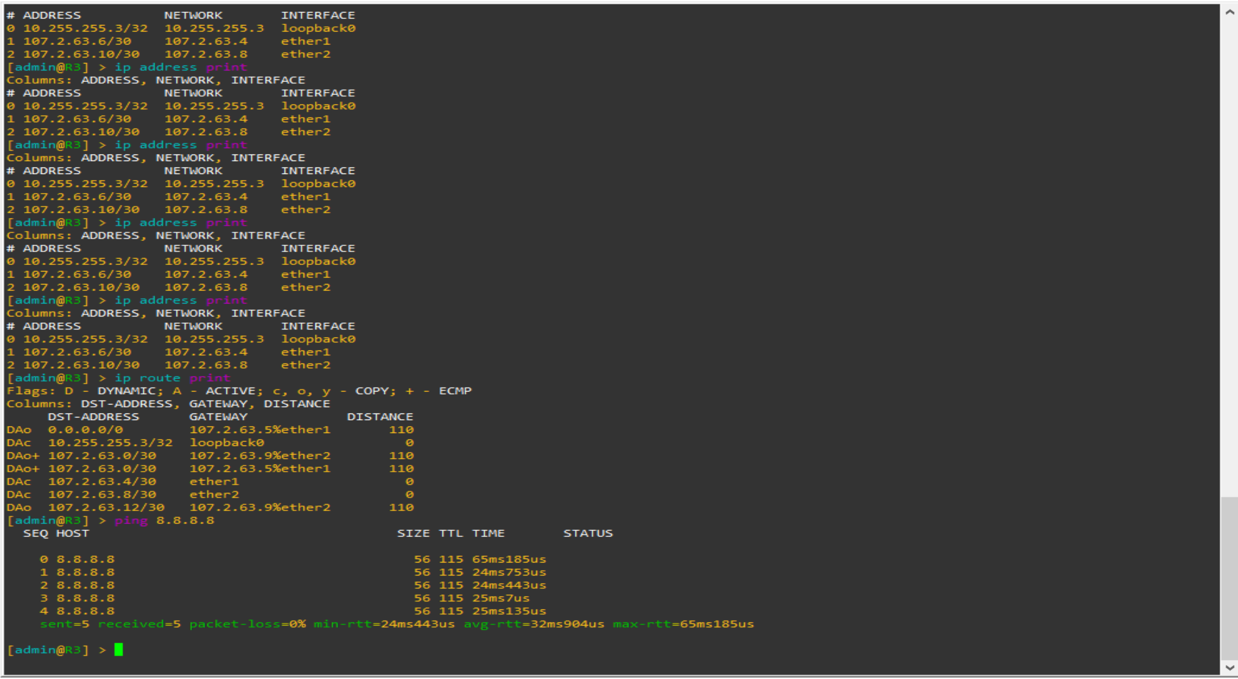
R2

```
Flags: D - DYNAMIC; A - ACTIVE; c, s, o, y - COPY; + - ECMP
Columns: DST-ADDRESS, GATEWAY, DISTANCE
#       DST-ADDRESS       GATEWAY                DISTANCE
0   s   0.0.0.0/0         107.2.63.1                  112
  DAo   0.0.0.0/0         107.2.63.1%ether1           110
  DAc   10.255.255.2/32   loopback0                     0
  DAc   107.2.63.0/30     ether1                        0
  DAo+  107.2.63.4/30     107.2.63.1%ether1           110
  DAo+  107.2.63.4/30     107.2.63.10%ether2          110
  DAc   107.2.63.8/30     ether2                        0
  DAc   107.2.63.12/30    ether3                        0
[admin@R2] > ip route print
Flags: D - DYNAMIC; A - ACTIVE; c, s, o, y - COPY; + - ECMP
Columns: DST-ADDRESS, GATEWAY, DISTANCE
#       DST-ADDRESS       GATEWAY                DISTANCE
0   s   0.0.0.0/0         107.2.63.1                  112
  DAo   0.0.0.0/0         107.2.63.1%ether1           110
  DAc   10.255.255.2/32   loopback0                     0
  DAc   107.2.63.0/30     ether1                        0
  DAo+  107.2.63.4/30     107.2.63.1%ether1           110
  DAo+  107.2.63.4/30     107.2.63.10%ether2          110
  DAc   107.2.63.8/30     ether2                        0
  DAc   107.2.63.12/30    ether3                        0
[admin@R2] > ip address print
Columns: ADDRESS, NETWORK, INTERFACE
# ADDRESS           NETWORK         INTERFACE
0 10.255.255.2/32   10.255.255.2    loopback0
1 107.2.63.2/30     107.2.63.0      ether1
2 107.2.63.9/30     107.2.63.8      ether2
3 107.2.63.13/30    107.2.63.12     ether3
[admin@R2] > ip address print
Columns: ADDRESS, NETWORK, INTERFACE
# ADDRESS           NETWORK         INTERFACE
0 10.255.255.2/32   10.255.255.2    loopback0
1 107.2.63.2/30     107.2.63.0      ether1
2 107.2.63.9/30     107.2.63.8      ether2
3 107.2.63.13/30    107.2.63.12     ether3
[admin@R2] > ip route print
Flags: D - DYNAMIC; A - ACTIVE; c, s, o, y - COPY; + - ECMP
Columns: DST-ADDRESS, GATEWAY, DISTANCE
#       DST-ADDRESS       GATEWAY                DISTANCE
0   s   0.0.0.0/0         107.2.63.1                  112
  DAo   0.0.0.0/0         107.2.63.1%ether1           110
  DAc   10.255.255.2/32   loopback0                     0
  DAc   107.2.63.0/30     ether1                        0
  DAo+  107.2.63.4/30     107.2.63.1%ether1           110
  DAo+  107.2.63.4/30     107.2.63.10%ether2          110
  DAc   107.2.63.8/30     ether2                        0
  DAc   107.2.63.12/30    ether3                        0
[admin@R2] >
```

R3

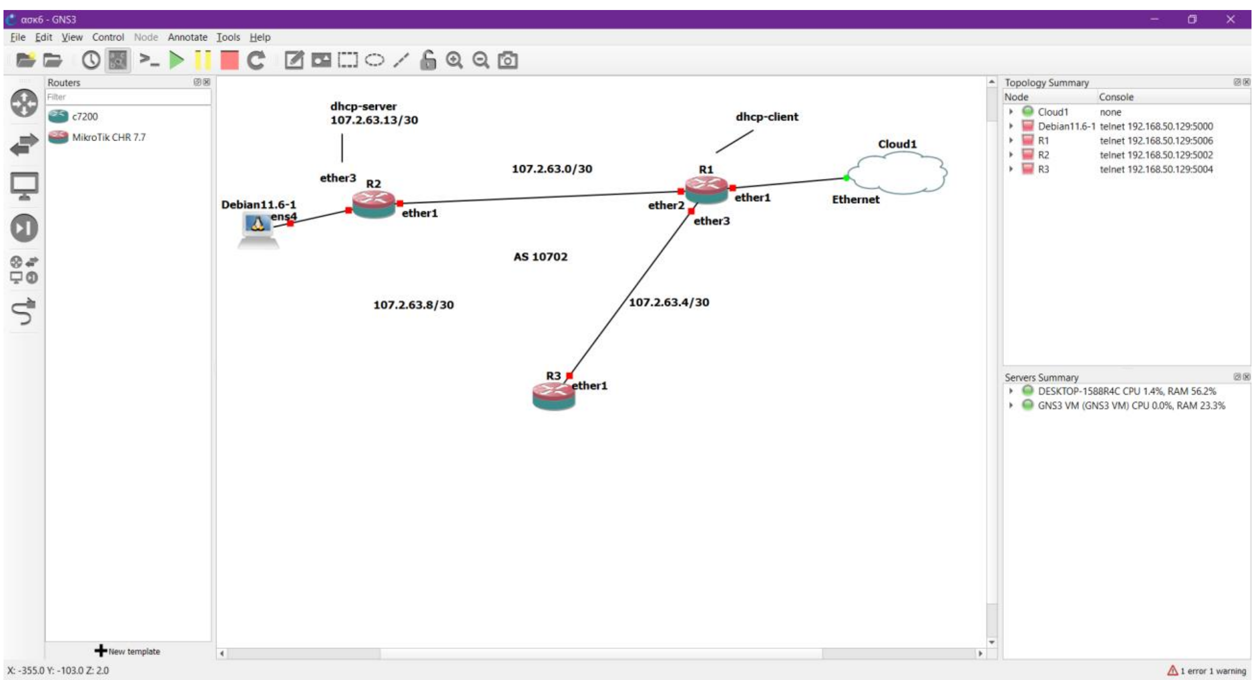
```
[admin@R3] >
[admin@R3] >
[admin@R3] > ip address print
Columns: ADDRESS, NETWORK, INTERFACE
# ADDRESS           NETWORK         INTERFACE
0 10.255.255.3/32   10.255.255.3    loopback0
1 107.2.63.6/30     107.2.63.4      ether1
2 107.2.63.10/30    107.2.63.8      ether2
[admin@R3] > ip address print
Columns: ADDRESS, NETWORK, INTERFACE
# ADDRESS           NETWORK         INTERFACE
0 10.255.255.3/32   10.255.255.3    loopback0
1 107.2.63.6/30     107.2.63.4      ether1
2 107.2.63.10/30    107.2.63.8      ether2
[admin@R3] > ip address print
Columns: ADDRESS, NETWORK, INTERFACE
# ADDRESS           NETWORK         INTERFACE
0 10.255.255.3/32   10.255.255.3    loopback0
1 107.2.63.6/30     107.2.63.4      ether1
2 107.2.63.10/30    107.2.63.8      ether2
[admin@R3] > ip address print
Columns: ADDRESS, NETWORK, INTERFACE
# ADDRESS           NETWORK         INTERFACE
0 10.255.255.3/32   10.255.255.3    loopback0
1 107.2.63.6/30     107.2.63.4      ether1
2 107.2.63.10/30    107.2.63.8      ether2
[admin@R3] > ip address print
Columns: ADDRESS, NETWORK, INTERFACE
# ADDRESS           NETWORK         INTERFACE
0 10.255.255.3/32   10.255.255.3    loopback0
1 107.2.63.6/30     107.2.63.4      ether1
2 107.2.63.10/30    107.2.63.8      ether2
[admin@R3] > ip address print
Columns: ADDRESS, NETWORK, INTERFACE
# ADDRESS           NETWORK         INTERFACE
0 10.255.255.3/32   10.255.255.3    loopback0
1 107.2.63.6/30     107.2.63.4      ether1
2 107.2.63.10/30    107.2.63.8      ether2
[admin@R3] > ip route print
Flags: D - DYNAMIC; A - ACTIVE; c, o, y - COPY; + - ECMP
Columns: DST-ADDRESS, GATEWAY, DISTANCE
      DST-ADDRESS       GATEWAY               DISTANCE
DAo   0.0.0.0/0         107.2.63.5%ether1          110
DAc   10.255.255.3/32   loopback0                    0
DAo+  107.2.63.0/30     107.2.63.9%ether2          110
DAo+  107.2.63.0/30     107.2.63.5%ether1          110
DAc   107.2.63.4/30     ether1                       0
DAc   107.2.63.8/30     ether2                       0
DAo   107.2.63.12/30    107.2.63.9%ether2          110
[admin@R3] >
```

κίνηση από τον R3 προς 8.8.8.8



```
# ADDRESS           NETWORK        INTERFACE
0 10.255.255.3/32  10.255.255.3  loopback0
1 107.2.63.6/30    107.2.63.4    ether1
2 107.2.63.10/30   107.2.63.8    ether2
[admin@R3] > ip address print
Columns: ADDRESS, NETWORK, INTERFACE
# ADDRESS           NETWORK        INTERFACE
0 10.255.255.3/32  10.255.255.3  loopback0
1 107.2.63.6/30    107.2.63.4    ether1
2 107.2.63.10/30   107.2.63.8    ether2
[admin@R3] > ip address print
Columns: ADDRESS, NETWORK, INTERFACE
# ADDRESS           NETWORK        INTERFACE
0 10.255.255.3/32  10.255.255.3  loopback0
1 107.2.63.6/30    107.2.63.4    ether1
2 107.2.63.10/30   107.2.63.8    ether2
[admin@R3] > ip address print
Columns: ADDRESS, NETWORK, INTERFACE
# ADDRESS           NETWORK        INTERFACE
0 10.255.255.3/32  10.255.255.3  loopback0
1 107.2.63.6/30    107.2.63.4    ether1
2 107.2.63.10/30   107.2.63.8    ether2
[admin@R3] > ip address print
Columns: ADDRESS, NETWORK, INTERFACE
# ADDRESS           NETWORK        INTERFACE
0 10.255.255.3/32  10.255.255.3  loopback0
1 107.2.63.6/30    107.2.63.4    ether1
2 107.2.63.10/30   107.2.63.8    ether2
[admin@R3] > ip route print
Flags: D - DYNAMIC; A - ACTIVE; c, o, y - COPY; + - ECMP
Columns: DST-ADDRESS, GATEWAY, DISTANCE
     DST-ADDRESS       GATEWAY              DISTANCE
DAo  0.0.0.0/0         107.2.63.5%ether1         110
DAc  10.255.255.3/32   loopback0                   0
DAo+ 107.2.63.0/30     107.2.63.9%ether2         110
DAo+ 107.2.63.0/30     107.2.63.5%ether1         110
DAc  107.2.63.4/30     ether1                      0
DAc  107.2.63.8/30     ether2                      0
DAo  107.2.63.12/30    107.2.63.9%ether2         110
[admin@R3] > ping 8.8.8.8
  SEQ HOST                                     SIZE  TTL  TIME       STATUS

    0 8.8.8.8                                    56  115  65ms185us
    1 8.8.8.8                                    56  115  24ms753us
    2 8.8.8.8                                    56  115  24ms443us
    3 8.8.8.8                                    56  115  25ms7us
    4 8.8.8.8                                    56  115  25ms135us
    sent=5 received=5 packet-loss=0% min-rtt=24ms443us avg-rtt=32ms904us max-rtt=65ms185us

[admin@R3] >
```

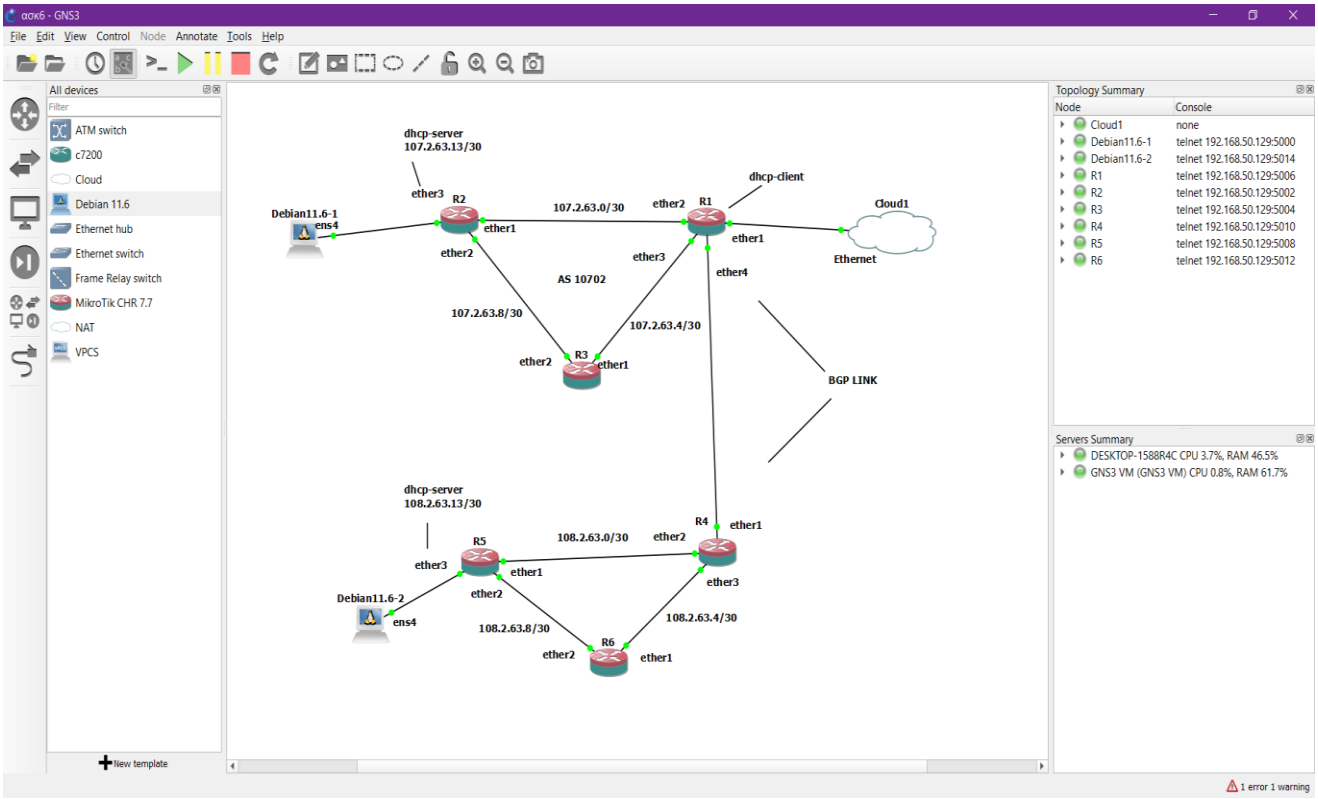
Αφαιρέστε την σύνδεση R3-R2, κίνηση από τον R3 προς 8.8.8.8



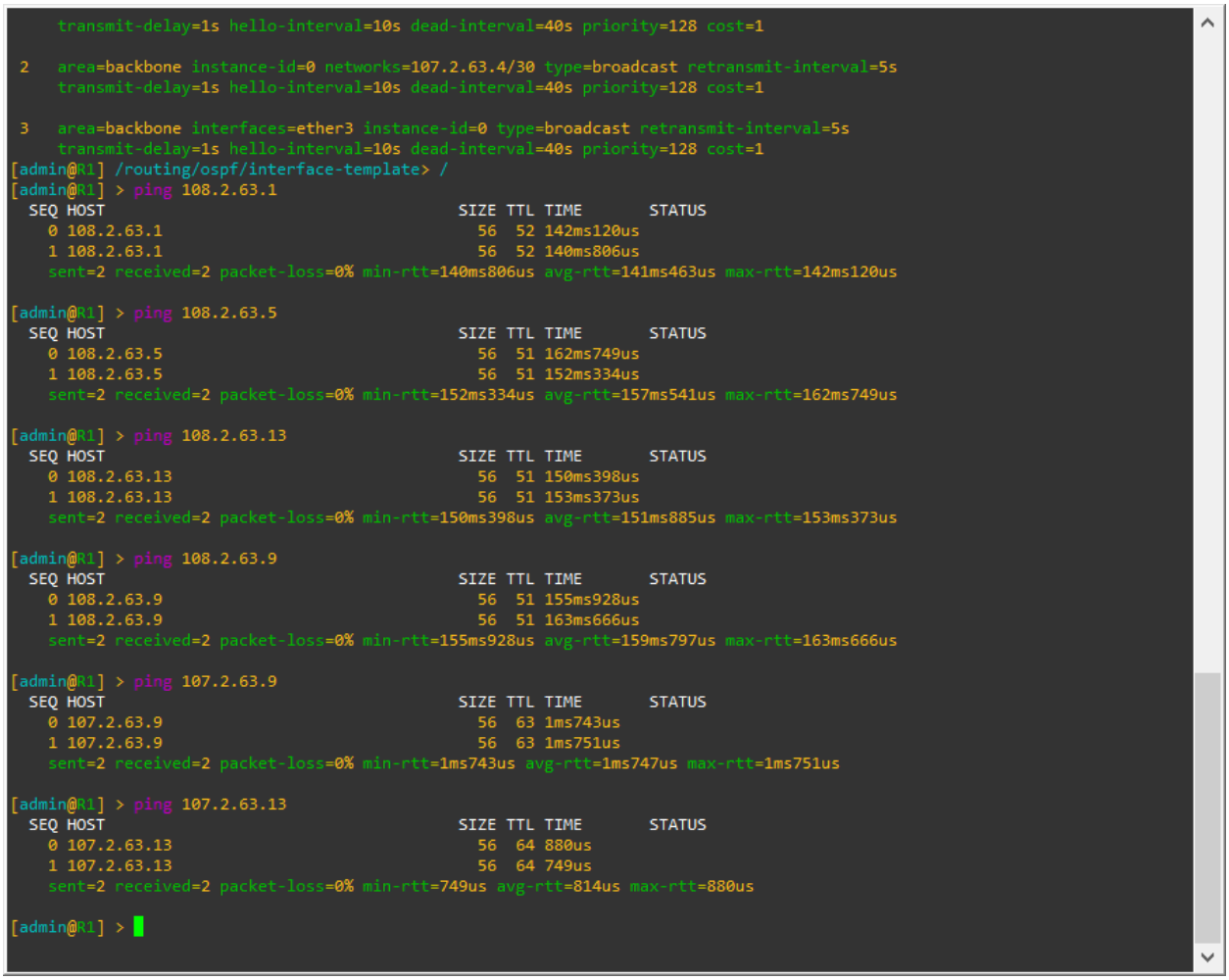
```
  MikroTik RouterOS 7.7 (c) 1999-2023       https://www.mikrotik.com/

Press F1 for help

may/22/2023 18:02:25 system,error,critical router was rebooted without proper shu
tdown
may/22/2023 18:04:12 system,error,critical router was rebooted without proper shu
tdown
may/22/2023 18:07:27 system,error,critical router was rebooted without proper shu
tdown
may/22/2023 18:33:27 system,error,critical router was rebooted without proper shu
tdown

[admin@R3] > ping 8.8.8.8
  SEQ HOST                                     SIZE TTL TIME       STATUS
    0                                                              no route to host
    1                                                              no route to host
    2                                                              no route to host
    3                                                              no route to host
    sent=4 received=0 packet-loss=100%

[admin@R3] >
```

Υλοποίηση διασύνδεσης δικτύων με χρήση του Border Gateway Protocol.

Υλοποίηση



Όπως βλέπουμε και στην εικόνα κάνουμε ping από R1 προς όλα τα interface και αυτό γίνεται με επιτυχία



Το ίδιο συμβαίνει και με το R2 και R3

```
may/23/2023 15:36:32 system,error,critical router was rebooted without proper shu
tdown
may/23/2023 15:42:06 system,error,critical router was rebooted without proper shu
tdown
may/23/2023 15:43:47 system,error,critical router was rebooted without proper shu
tdown
may/23/2023 16:06:38 system,error,critical router was rebooted without proper shu
tdown
may/23/2023 16:26:51 system,error,critical router was rebooted without proper shu
tdown
may/24/2023 11:07:20 system,error,critical router was rebooted without proper shu
tdown
may/24/2023 11:36:02 system,error,critical router was rebooted without proper shu
tdown
may/24/2023 11:39:01 system,error,critical router was rebooted without proper shu
tdown

[admin@R2] > ping 107.2.63.1
  SEQ HOST                                     SIZE TTL TIME       STATUS
    0 107.2.63.1                                 56  64 706us
    1 107.2.63.1                                 56  64 789us
    sent=2 received=2 packet-loss=0% min-rtt=706us avg-rtt=747us max-rtt=789us

[admin@R2] > ping 107.2.63.9
  SEQ HOST                                     SIZE TTL TIME       STATUS
    0 107.2.63.9                                 56  64 96us
    1 107.2.63.9                                 56  64 34us
    sent=2 received=2 packet-loss=0% min-rtt=34us avg-rtt=65us max-rtt=96us

[admin@R2] > ping 108.2.63.1
  SEQ HOST                                     SIZE TTL TIME       STATUS
    0 108.2.63.1                                 56  51 165ms133us
    sent=1 received=1 packet-loss=0% min-rtt=165ms133us avg-rtt=165ms133us max-rtt=165ms133us

[admin@R2] > ping 108.2.63.5
  SEQ HOST                                     SIZE TTL TIME       STATUS
    0 108.2.63.5                                 56  50 153ms693us
    1 108.2.63.5                                 56  50 153ms430us
    sent=2 received=2 packet-loss=0% min-rtt=153ms430us avg-rtt=153ms561us max-rtt=153ms693us

[admin@R2] > ping 108.2.63.9
  SEQ HOST                                     SIZE TTL TIME       STATUS
    0 108.2.63.9                                 56  62 1ms929us
    1 108.2.63.9                                 56  62 1ms666us
    2 108.2.63.9                                 56  62 2ms195us
    sent=3 received=3 packet-loss=0% min-rtt=1ms666us avg-rtt=1ms930us max-rtt=2ms195us

[admin@R2] >
```

```
tdown
may/23/2023 16:06:36 system,error,critical router was rebooted without proper shu
tdown
may/23/2023 16:26:49 system,error,critical router was rebooted without proper shu
tdown
may/24/2023 11:07:19 system,error,critical router was rebooted without proper shu
tdown
may/24/2023 11:36:05 system,error,critical router was rebooted without proper shu
tdown
may/24/2023 11:39:00 system,error,critical router was rebooted without proper shu
tdown

[admin@R3] > ping 107.2.63.1
  SEQ HOST                                     SIZE TTL TIME       STATUS
    0 107.2.63.1                                 56  64 1ms322us
    1 107.2.63.1                                 56  64 1ms63us
    sent=2 received=2 packet-loss=0% min-rtt=1ms63us avg-rtt=1ms192us max-rtt=1ms322us

[admin@R3] > ping 109.2.63.1
  SEQ HOST                                     SIZE TTL TIME       STATUS
    0 109.2.63.1                                                   timeout
    sent=1 received=0 packet-loss=100%

[admin@R3] > ping 108.2.63.1
  SEQ HOST                                     SIZE TTL TIME       STATUS
    0 108.2.63.1                                 56  51 142ms231us
    1 108.2.63.1                                 56  51 144ms951us
    sent=2 received=2 packet-loss=0% min-rtt=142ms231us avg-rtt=143ms591us max-rtt=144ms951us

[admin@R3] > ping 108.2.63.5
  SEQ HOST                                     SIZE TTL TIME       STATUS
    0 108.2.63.5                                 56  50 152ms525us
    1 108.2.63.5                                 56  50 153ms880us
    sent=2 received=2 packet-loss=0% min-rtt=152ms525us avg-rtt=153ms202us max-rtt=153ms880us

[admin@R3] > ping 108.2.63.9
  SEQ HOST                                     SIZE TTL TIME       STATUS
    0 108.2.63.9                                 56  62 1ms609us
    1 108.2.63.9                                 56  62 1ms955us
    sent=2 received=2 packet-loss=0% min-rtt=1ms609us avg-rtt=1ms782us max-rtt=1ms955us

[admin@R3] > ping 108.2.63.13
  SEQ HOST                                     SIZE TTL TIME       STATUS
    0 108.2.63.13                                56  62 1ms827us
    1 108.2.63.13                                56  62 1ms709us
    sent=2 received=2 packet-loss=0% min-rtt=1ms709us avg-rtt=1ms768us max-rtt=1ms827us

[admin@R3] >
```

```
  SEQ HOST                                     SIZE TTL TIME       STATUS
    0 107.2.63.6                                                   timeout
    1 107.2.63.6                                                   timeout
    sent=2 received=0 packet-loss=100%

[admin@R4] > ping 107.2.63.5
  SEQ HOST                                     SIZE TTL TIME       STATUS
    0 107.2.63.5                                 56  64 631us
    1 107.2.63.5                                 56  64 736us
    2 107.2.63.5                                 56  64 1ms10us
    sent=3 received=3 packet-loss=0% min-rtt=631us avg-rtt=792us max-rtt=1ms10us

[admin@R4] > ping 107.2.63.1
  SEQ HOST                                     SIZE TTL TIME       STATUS
    0 107.2.63.1                                 56  64 822us
    1 107.2.63.1                                 56  64 779us
    sent=2 received=2 packet-loss=0% min-rtt=779us avg-rtt=800us max-rtt=822us

[admin@R4] > ping 107.2.63.5
  SEQ HOST                                     SIZE TTL TIME       STATUS
    0 107.2.63.5                                 56  64 674us
    1 107.2.63.5                                 56  64 902us
    sent=2 received=2 packet-loss=0% min-rtt=674us avg-rtt=788us max-rtt=902us

[admin@R4] > ping 107.2.63.9
  SEQ HOST                                     SIZE TTL TIME       STATUS
    0 107.2.63.9                                 56  63 1ms456us
    1 107.2.63.9                                 56  63 1ms387us
    sent=2 received=2 packet-loss=0% min-rtt=1ms387us avg-rtt=1ms421us max-rtt=1ms456us

[admin@R4] > ping 107.2.63.13
  SEQ HOST                                     SIZE TTL TIME       STATUS
    0 107.2.63.13                                56  63 1ms85us
    1 107.2.63.13                                56  63 1ms791us
    sent=2 received=2 packet-loss=0% min-rtt=1ms85us avg-rtt=1ms438us max-rtt=1ms791us

[admin@R4] > ping 108.2.63.9
  SEQ HOST                                     SIZE TTL TIME       STATUS
    0 108.2.63.9                                 56  64 933us
    1 108.2.63.9                                 56  64 1ms71us
    sent=2 received=2 packet-loss=0% min-rtt=933us avg-rtt=1ms2us max-rtt=1ms71us

[admin@R4] > ping 108.2.63.13
Columns: SEQ, HOST, SIZE, TTL, TIME
SEQ  HOST          SIZE  TTL  TIME
  0  108.2.63.13    56   64  589us

[admin@R4] >
```

R4

```
[admin@R4] > ip route print
Flags: D - DYNAMIC; A - ACTIVE; c, o, y - COPY; + - ECMP
Columns: DST-ADDRESS, GATEWAY, DISTANCE
     DST-ADDRESS       GATEWAY              DISTANCE
DAc  10.255.255.4/32   loopback0                   0
DAc  108.2.63.0/30     ether2                      0
DAc  108.2.63.4/30     ether3                      0
DAo+ 108.2.63.8/30     108.2.63.6%ether3         110
DAo+ 108.2.63.8/30     108.2.63.2%ether2         110
DAo  108.2.63.12/30    108.2.63.2%ether2         110
DAc  192.168.5.2/32    ether1                      0
[admin@R4] >
[admin@R4] > ping 107.2.63.1
  SEQ HOST                                     SIZE TTL TIME       STATUS

    0                                                              no route to host

    1                                                              no route to host

    sent=2 received=0 packet-loss=100%

[admin@R4] > ping 108.2.63.9
  SEQ HOST                                     SIZE TTL TIME       STATUS

    0 108.2.63.9                                 56  63 1ms148us
    1 108.2.63.9                                 56  63 1ms130us
    sent=2 received=2 packet-loss=0% min-rtt=1ms130us avg-rtt=1ms139us max-rtt=1ms148us

[admin@R4] > ping 108.2.63.13
  SEQ HOST                                     SIZE TTL TIME       STATUS

    0 108.2.63.13                                56  64 653us
    1 108.2.63.13                                56  64 735us
    sent=2 received=2 packet-loss=0% min-rtt=653us avg-rtt=694us max-rtt=735us

[admin@R4] > ping 107.2.63.5
  SEQ HOST                                     SIZE TTL TIME       STATUS

    0                                                              no route to host

    1                                                              no route to host

    sent=2 received=0 packet-loss=100%

[admin@R4] >
```

R5

```
(2 messages not shown)
may/23/2023 15:28:42 system,error,critical router was rebooted without proper shu
tdown
may/23/2023 15:36:34 system,error,critical router was rebooted without proper shu
tdown
may/23/2023 15:43:49 system,error,critical router was rebooted without proper shu
tdown
may/23/2023 16:06:41 system,error,critical router was rebooted without proper shu
tdown
may/23/2023 16:26:51 system,error,critical router was rebooted without proper shu
tdown
may/24/2023 11:07:21 system,error,critical router was rebooted without proper shu
tdown
may/24/2023 11:36:03 system,error,critical router was rebooted without proper shu
tdown
may/24/2023 11:39:02 system,error,critical router was rebooted without proper shu
tdown

[admin@R5] > ping 108.2.63.1
  SEQ HOST                                     SIZE TTL TIME       STATUS
    0 108.2.63.1                                 56  64 636us
    1 108.2.63.1                                 56  64 557us
    sent=2 received=2 packet-loss=0% min-rtt=557us avg-rtt=596us max-rtt=636us

[admin@R5] > ping 107.2.63.1
  SEQ HOST                                     SIZE TTL TIME       STATUS
    0 107.2.63.1                                                   timeout
    sent=1 received=0 packet-loss=100%

[admin@R5] > ping 107.2.63.5
  SEQ HOST                                     SIZE TTL TIME       STATUS
    0 107.2.63.5                                                   timeout
    sent=1 received=0 packet-loss=100%

[admin@R5] > ping 107.2.63.5
  SEQ HOST                                     SIZE TTL TIME       STATUS
    0 107.2.63.5                                                   timeout
    1 107.2.63.5                                                   timeout
    sent=2 received=0 packet-loss=100%

[admin@R5] > ping 107.2.63.9
  SEQ HOST                                     SIZE TTL TIME       STATUS
    0 107.2.63.9                                                   timeout
    1 107.2.63.9                                                   timeout
    sent=2 received=0 packet-loss=100%

[admin@R5] >
```

R6

```
tdown
may/23/2023 16:06:41 system,error,critical router was rebooted without proper shu
tdown
may/23/2023 16:26:53 system,error,critical router was rebooted without proper shu
tdown
may/24/2023 11:07:20 system,error,critical router was rebooted without proper shu
tdown
may/24/2023 11:36:04 system,error,critical router was rebooted without proper shu
tdown
may/24/2023 11:39:02 system,error,critical router was rebooted without proper shu
tdown

[admin@R6] > ping 107.2.63.1
  SEQ HOST                                     SIZE TTL TIME       STATUS
    0 107.2.63.1                                                   timeout
    1 107.2.63.1                                                   timeout
    sent=2 received=0 packet-loss=100%

[admin@R6] > ping 107.2.63.5
  SEQ HOST                                     SIZE TTL TIME       STATUS
    0 107.2.63.5                                                   timeout
    sent=1 received=0 packet-loss=100%

[admin@R6] > ping 107.2.63.9
  SEQ HOST                                     SIZE TTL TIME       STATUS
    0 107.2.63.9                                                   timeout
    1 107.2.63.9                                                   timeout
    sent=2 received=0 packet-loss=100%

[admin@R6] > ping 108.2.63.1
  SEQ HOST                                     SIZE TTL TIME       STATUS
    0 108.2.63.1                                 56  63 1ms162us
    1 108.2.63.1                                 56  63 1ms341us
    sent=2 received=2 packet-loss=0% min-rtt=1ms162us avg-rtt=1ms251us max-rtt=1ms341us

[admin@R6] > ping 108.2.63.5
  SEQ HOST                                     SIZE TTL TIME       STATUS
    0 108.2.63.5                                 56  64 711us
    1 108.2.63.5                                 56  64 876us
    sent=2 received=2 packet-loss=0% min-rtt=711us avg-rtt=793us max-rtt=876us

[admin@R6] > ping 108.2.63.9
  SEQ HOST                                     SIZE TTL TIME       STATUS
    0 108.2.63.9                                 56  64 526us
    1 108.2.63.9                                 56  64 676us
    sent=2 received=2 packet-loss=0% min-rtt=526us avg-rtt=601us max-rtt=676us

[admin@R6] >
```

ip/route/print

R1

R2

```
may/22/2023 18:04:12 system,error,critical router was rebooted without proper shu
tdown
may/22/2023 18:07:28 system,error,critical router was rebooted without proper shu
tdown
may/22/2023 18:34:34 system,error,critical router was rebooted without proper shu
tdown
may/22/2023 18:45:59 system,error,critical router was rebooted without proper shu
tdown
may/22/2023 19:08:20 system,error,critical router was rebooted without proper shu
tdown

[admin@R2] > /routing/ospf/interface-template
[admin@R2] /routing/ospf/interface-template> print
Flags: X - disabled, I - inactive
 0    area=backbone instance-id=0 networks=107.2.63.0/30 type=broadcast retransmit-interval=5s
      transmit-delay=1s hello-interval=10s dead-interval=40s priority=128 cost=1

 1    area=backbone interfaces=ether1 instance-id=0 type=broadcast retransmit-interval=5s
      transmit-delay=1s hello-interval=10s dead-interval=40s priority=128 cost=1

 2    area=backbone instance-id=0 networks=107.2.63.8/30 type=broadcast retransmit-interval=5s
      transmit-delay=1s hello-interval=10s dead-interval=40s priority=128 cost=1

 3    area=backbone interfaces=ether2 instance-id=0 type=broadcast retransmit-interval=5s
      transmit-delay=1s hello-interval=10s dead-interval=40s priority=128 cost=1

 4    area=backbone instance-id=0 networks=107.2.63.12/30 type=broadcast retransmit-interval=5s
      transmit-delay=1s hello-interval=10s dead-interval=40s priority=128 cost=1

 5    area=backbone interfaces=ether3 instance-id=0 type=broadcast retransmit-interval=5s
      transmit-delay=1s hello-interval=10s dead-interval=40s priority=128 cost=1
[admin@R2] /routing/ospf/interface-template> /
[admin@R2] > ip route print
Flags: D - DYNAMIC; A - ACTIVE; c, s, o, y - COPY; + - ECMP
Columns: DST-ADDRESS, GATEWAY, DISTANCE
#      DST-ADDRESS       GATEWAY              DISTANCE
  DAo  0.0.0.0/0         107.2.63.1%ether1         110
0   s  0.0.0.0/0         107.2.63.1                112
  DAc  10.255.255.2/32   loopback0                   0
  DAc  107.2.63.0/30     ether1                      0
  DAo+ 107.2.63.4/30     107.2.63.10%ether2        110
  DAo+ 107.2.63.4/30     107.2.63.1%ether1         110
  DAc  107.2.63.8/30     ether2                      0
  DAc  107.2.63.12/30    ether3                      0
[admin@R2] >
```

R3

```
may/22/2023 18:02:25 system,error,critical router was rebooted without proper shu
tdown
may/22/2023 18:04:12 system,error,critical router was rebooted without proper shu
tdown
may/22/2023 18:07:27 system,error,critical router was rebooted without proper shu
tdown
may/22/2023 18:34:34 system,error,critical router was rebooted without proper shu
tdown
may/22/2023 18:45:55 system,error,critical router was rebooted without proper shu
tdown
may/22/2023 19:08:18 system,error,critical router was rebooted without proper shu
tdown

[admin@R3] > ip route print
Flags: D - DYNAMIC; A - ACTIVE; c, o, y - COPY; + - ECMP
Columns: DST-ADDRESS, GATEWAY, DISTANCE
    DST-ADDRESS       GATEWAY              DISTANCE
DAo  0.0.0.0/0         107.2.63.5%ether1         110
DAc  10.255.255.3/32   loopback0                   0
DAo+ 107.2.63.0/30     107.2.63.5%ether1         110
DAo+ 107.2.63.0/30     107.2.63.9%ether2         110
DAc  107.2.63.4/30     ether1                      0
DAc  107.2.63.8/30     ether2                      0
DAo  107.2.63.12/30    107.2.63.9%ether2         110
[admin@R3] >
```

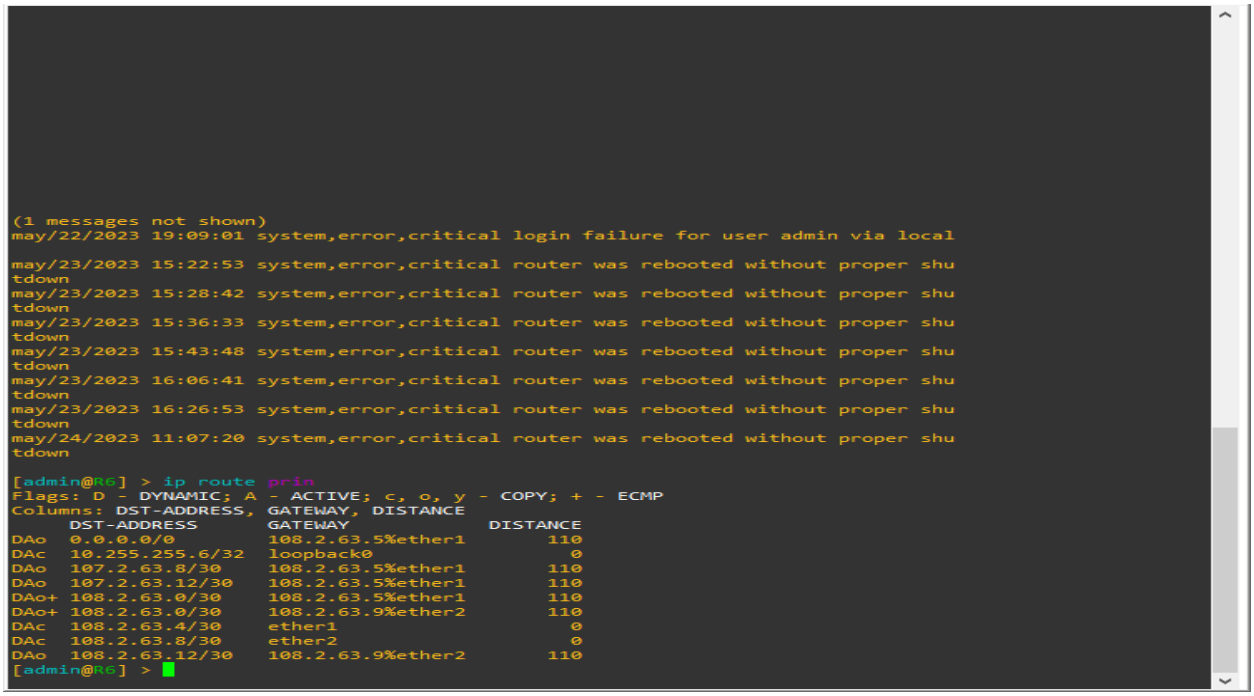
R4

```
[admin@R4] /ip/address> print
Columns: ADDRESS, NETWORK, INTERFACE
# ADDRESS            NETWORK        INTERFACE
0 10.255.255.4/32    10.255.255.4   loopback0
1 108.2.63.1/30      108.2.63.0     ether2
2 108.2.63.5/30      108.2.63.4     ether3
3 192.168.5.2/30     192.168.5.0    ether1
[admin@R4] /ip/address> /routing/bgp/connection/print
Flags: D - dynamic, X - disabled, I - inactive
 0 I ;;; missing or disabled template
     ;;; reserved AS value
     name="toR1"
     remote.address=192.168.5.1 .port=179 .as=10702
     local.port=179 .role=ebgp
     connect=yes listen=yes routing-table=main templates=*3 keepalive-time=1m
     output.default-originate=if-installed

 1   name="toR1"
     remote.address=192.168.5.1 .port=179 .as=10702
     local.port=179 .default-address=192.168.5.2 .role=ebgp
     connect=yes listen=yes routing-table=main router-id=10.255.255.4 templates=default as=10802 keepal
ive-time=1m
     output.redistribute=static,ospf,bgp .default-originate=if-installed
[admin@R4] /ip/address> /
[admin@R4] > ping 107.2.63.1
  SEQ HOST                                     SIZE TTL TIME       STATUS
    0 107.2.63.1                                 56  64 881us
    1 107.2.63.1                                 56  64 749us
    sent=2 received=2 packet-loss=0% min-rtt=749us avg-rtt=815us max-rtt=881us

[admin@R4] > ip route print
Flags: D - DYNAMIC; A - ACTIVE; c, b, o, y - COPY; + - ECMP
Columns: DST-ADDRESS, GATEWAY, DISTANCE
     DST-ADDRESS       GATEWAY             DISTANCE
DAb  0.0.0.0/0         192.168.5.1               20
DAc  10.255.255.4/32   loopback0                  0
DAb  107.2.63.8/30     192.168.5.1               20
DAb  107.2.63.12/30    192.168.5.1               20
DAc  108.2.63.0/30     ether2                     0
DAc  108.2.63.4/30     ether3                     0
DAo+ 108.2.63.8/30     108.2.63.2%ether2        110
DAo+ 108.2.63.8/30     108.2.63.6%ether3        110
DAo  108.2.63.12/30    108.2.63.2%ether2        110
DAc  192.168.5.0/30    ether1                     0
[admin@R4] >
```

R5

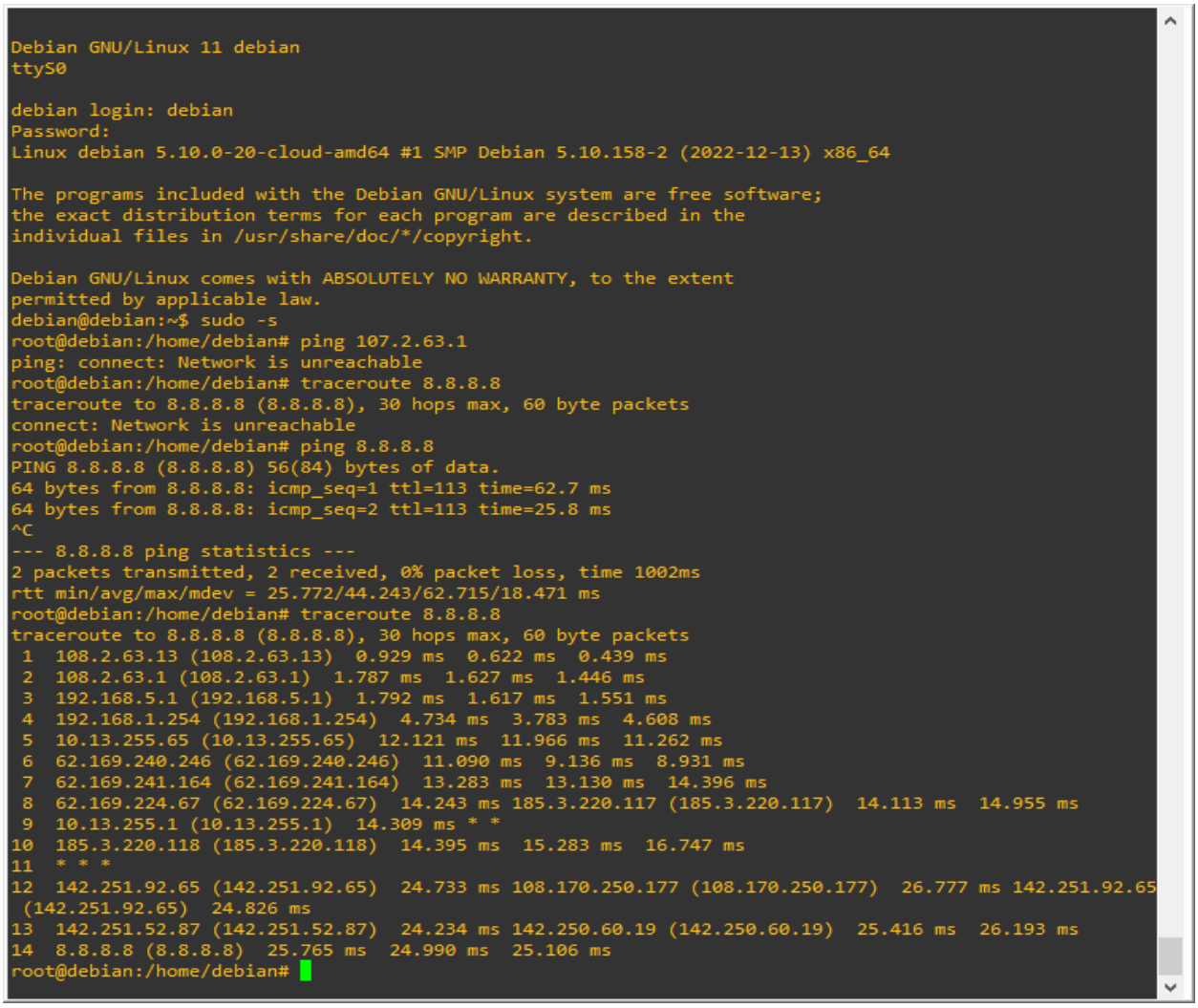
```
may/22/2023 19:08:21 system,error,critical router was rebooted without proper shu
tdown
may/23/2023 15:22:53 system,error,critical router was rebooted without proper shu
tdown
may/23/2023 15:28:42 system,error,critical router was rebooted without proper shu
tdown
may/23/2023 15:36:34 system,error,critical router was rebooted without proper shu
tdown
may/23/2023 15:43:49 system,error,critical router was rebooted without proper shu
tdown
may/23/2023 16:06:41 system,error,critical router was rebooted without proper shu
tdown
may/23/2023 16:26:51 system,error,critical router was rebooted without proper shu
tdown
may/24/2023 11:07:21 system,error,critical router was rebooted without proper shu
tdown

[admin@R5] > ip route print
Flags: D - DYNAMIC; A - ACTIVE; c, o, y - COPY; + - ECMP
Columns: DST-ADDRESS, GATEWAY, DISTANCE
     DST-ADDRESS       GATEWAY             DISTANCE
DAo  0.0.0.0/0         108.2.63.1%ether1         110
DAc  10.255.255.5/32   loopback0                  0
DAo  107.2.63.8/30     108.2.63.1%ether1         110
DAo  107.2.63.12/30    108.2.63.1%ether1         110
DAc  108.2.63.0/30     ether1                     0
DAo+ 108.2.63.4/30     108.2.63.1%ether1         110
DAo+ 108.2.63.4/30     108.2.63.10%ether2        110
DAc  108.2.63.8/30     ether2                     0
DAc  108.2.63.12/30    ether3                     0
[admin@R5] >
```

R6

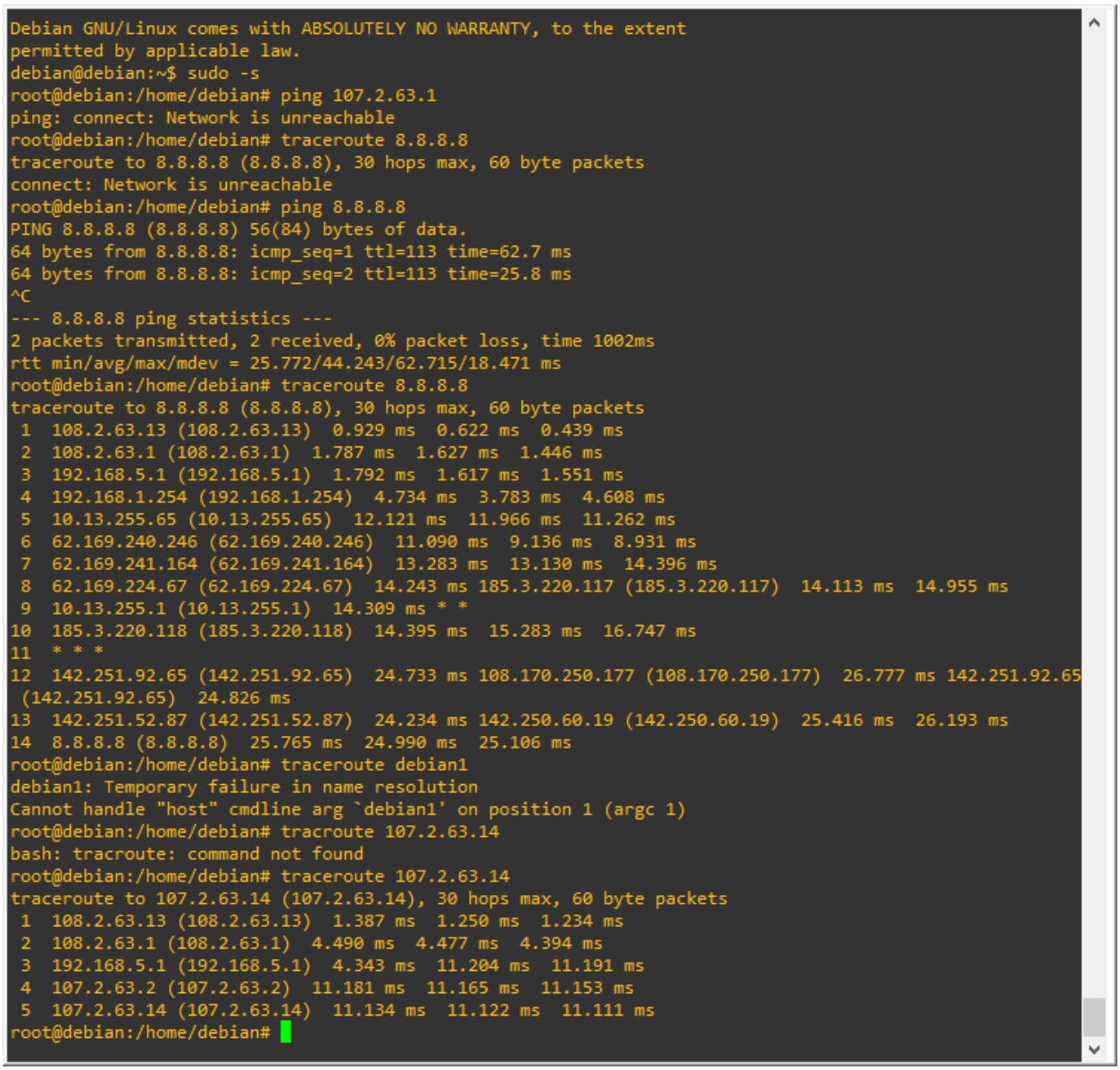


Υπάρχει διαδρομή προς το εξωτερικό δίκτυο (0.0.0.0/0) από όλους τους δρομολογητές

Traceroute debian2



Traceroute apo debian2 se debian1


Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
debian@debian:~$ sudo -s
root@debian:/home/debian# ping 107.2.63.1
ping: connect: Network is unreachable
root@debian:/home/debian# traceroute 8.8.8.8
traceroute to 8.8.8.8 (8.8.8.8), 30 hops max, 60 byte packets
connect: Network is unreachable
root@debian:/home/debian# ping 8.8.8.8
PING 8.8.8.8 (8.8.8.8) 56(84) bytes of data.
64 bytes from 8.8.8.8: icmp_seq=1 ttl=113 time=62.7 ms
64 bytes from 8.8.8.8: icmp_seq=2 ttl=113 time=25.8 ms
^C
--- 8.8.8.8 ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 1002ms
rtt min/avg/max/mdev = 25.772/44.243/62.715/18.471 ms
root@debian:/home/debian# traceroute 8.8.8.8
traceroute to 8.8.8.8 (8.8.8.8), 30 hops max, 60 byte packets
1 108.2.63.13 (108.2.63.13) 0.929 ms 0.622 ms 0.439 ms
2 108.2.63.1 (108.2.63.1) 1.787 ms 1.627 ms 1.446 ms
3 192.168.5.1 (192.168.5.1) 1.792 ms 1.617 ms 1.551 ms
4 192.168.1.254 (192.168.1.254) 4.734 ms 3.783 ms 4.608 ms
5 10.13.255.65 (10.13.255.65) 12.121 ms 11.966 ms 11.262 ms
6 62.169.240.246 (62.169.240.246) 11.090 ms 9.136 ms 8.931 ms
7 62.169.241.164 (62.169.241.164) 13.283 ms 13.130 ms 14.396 ms
8 62.169.224.67 (62.169.224.67) 14.243 ms 185.3.220.117 (185.3.220.117) 14.113 ms 14.955 ms
9 10.13.255.1 (10.13.255.1) 14.309 ms * *
10 185.3.220.118 (185.3.220.118) 14.395 ms 15.283 ms 16.747 ms
11 * * *
12 142.251.92.65 (142.251.92.65) 24.733 ms 108.170.250.177 (108.170.250.177) 26.777 ms 142.251.92.65
(142.251.92.65) 24.826 ms
13 142.251.52.87 (142.251.52.87) 24.234 ms 142.250.60.19 (142.250.60.19) 25.416 ms 26.193 ms
14 8.8.8.8 (8.8.8.8) 25.765 ms 24.990 ms 25.106 ms
root@debian:/home/debian# traceroute debian1
debian1: Temporary failure in name resolution
Cannot handle "host" cmdline arg `debian1' on position 1 (argc 1)
root@debian:/home/debian# tracroute 107.2.63.14
bash: tracroute: command not found
root@debian:/home/debian# traceroute 107.2.63.14
traceroute to 107.2.63.14 (107.2.63.14), 30 hops max, 60 byte packets
1 108.2.63.13 (108.2.63.13) 1.387 ms 1.250 ms 1.234 ms
2 108.2.63.1 (108.2.63.1) 4.490 ms 4.477 ms 4.394 ms
3 192.168.5.1 (192.168.5.1) 4.343 ms 11.204 ms 11.191 ms
4 107.2.63.2 (107.2.63.2) 11.181 ms 11.165 ms 11.153 ms
5 107.2.63.14 (107.2.63.14) 11.134 ms 11.122 ms 11.111 ms
root@debian:/home/debian#

ΤΕΛΟΣ