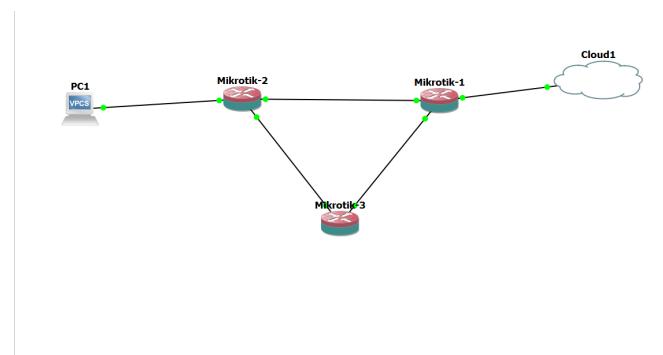


**ΣΤΟΙΧΕΙΑ: Διονυσία Ψυρρή, 1080424, 3<sup>ο</sup> έτος**

## **ΑΣΚΗΣΗ 6**



R1 mikrotik: admin- password:1080

R2-mikrotik:admin-password:10804

R3-mirkotik:admin-password:108042

### **ΕΡΩΤΗΣΗ 1:**

#### **R1:**

```
>Password changed
[admin@Mikrotik1] > system identity set name=R1
[admin@1] > interface bridge add name=loopback0
[admin@1] > ip address
[admin@1] /ip/address> add address=1.1.1.1/32 interface=loopback0
[admin@1] /ip/address> add address=108.4.24.1/30 interface=ether1
[admin@1] /ip/address> add address=108.4.24.5/30 interface=ether2
[admin@1] /ip/address> print
Columns: ADDRESS, NETWORK, INTERFACE
# ADDRESS      NETWORK      INTERFACE
0 1.1.1.1/32   1.1.1.1      loopback0
1 108.4.24.1/30 108.4.24.0  ether1
2 108.4.24.5/30 108.4.24.4  ether2
[admin@1] /ip/address> ..
[admin@1] /ip> ..
[admin@1] > ip route print
Flags: D - DYNAMIC; A - ACTIVE; c, y - COPY
Columns: DST-ADDRESS, GATEWAY, DISTANCE
DST-ADDRESS      GATEWAY      DISTANCE
Dac 1.1.1.1/32  loopback0      0
DAC 108.4.24.0/30  ether1      0
DAC 108.4.24.4/30  ether2      0
[admin@1] > |
```

#### **R2:**

```

Password changed
[admin@nikrolli] > system identity set name=R2
[admin@R2] > interface bridge add name=loopback0
[admin@R2] > ip address
[admin@R2] /ip/address> add address=2.2.2.2/32 interface=loopback0
[admin@R2] /ip/address> add address=108.4.24.2/30 interface=ether1
[admin@R2] /ip/address> add address=108.4.24.9/30 interface=ether2
[admin@R2] /ip/address> print
Columns: ADDRESS, NETWORK, INTERFACE
# ADDRESS      NETWORK      INTERFACE
0 2.2.2.2/32   2.2.2.2    loopback0
1 108.4.24.2/30 108.4.24.0 ether1
2 108.4.24.9/30 108.4.24.8 ether2
[admin@R2] /ip/address> ..
[admin@R2] /ip> ..
[admin@R2] > ip route print
Flags: D - DYNAMIC; A - ACTIVE; c, y - COPY
Columns: DST-ADDRESS, GATEWAY, DISTANCE
  DST-ADDRESS      GATEWAY      DISTANCE
DAC 2.2.2.2/32  loopback0      0
DAC 108.4.24.0/30  ether1      0
DAC 108.4.24.8/30  ether2      0
[admin@R2] > 

```

### R3:

```

[admin@nikrolli] > system identity set name=R3
[admin@R3] > interface bridge add name=loopback0
[admin@R3] > ip address
[admin@R3] /ip/address> add address=3.3.3.3/32 interface=loopback0
[admin@R3] /ip/address> add address=108.4.24.6/30 interface=ether2
[admin@R3] /ip/address> add address=108.4.24.10/30 interface=ether1
[admin@R3] /ip/address> ..
[admin@R3] /ip> ..
[admin@R3] > ip route print
Flags: D - DYNAMIC; A - ACTIVE; c, y - COPY
Columns: DST-ADDRESS, GATEWAY, DISTANCE
  DST-ADDRESS      GATEWAY      DISTANCE
DAC 3.3.3.3/32  loopback0      0
DAC 108.4.24.6/30  ether2      0
DAC 108.4.24.10/30 108.4.24.8 ether1
[admin@R3] > 

```

Ελέγχω τα ping του R1 προς το R2 στην αντικριστή και μη διεύθυνση:

```
[admin@R2] > ping 108.4.24.2 count=5
SEQ HOST SIZE TTL TIME STATUS
0 108.4.24.2 56 64 2ms568us
1 108.4.24.2 56 64 2ms366us
2 108.4.24.2 56 64 2ms411us
3 108.4.24.2 56 64 5ms345us
4 108.4.24.2 56 64 1ms986us
sent=5 received=5 packet-loss=0% min-rtt=1ms986us avg-rtt=2ms341us max-rtt=5ms345us

[admin@R2] > ping 108.4.24.9 count=5
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
4 no route to host
sent=5 received=0 packet-loss=100%
[admin@R2] >
```

Από τον R2 στο R1 στην αντικριστή και μη διεύθυνση:

```
[admin@R2] > ping 108.4.24.1 count=5
SEQ HOST SIZE TTL TIME STATUS
0 108.4.24.1 56 64 1ms528us
1 108.4.24.1 56 64 2ms721us
2 108.4.24.1 56 64 3ms703us
3 108.4.24.1 56 64 2ms238us
4 108.4.24.1 56 64 2ms562us
sent=5 received=5 packet-loss=0% min-rtt=1ms528us avg-rtt=2ms295us max-rtt=3ms703us

[admin@R2] > ping 108.4.24.5 count=5
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
4 no route to host
sent=5 received=0 packet-loss=100%
[admin@R2] >
```

Από τον R3 στον R2 στην αντικριστή και μη διεύθυνση:

```
[admin@R3] > ping 108.4.24.2 count=5
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
4 no route to host
sent=5 received=0 packet-loss=100%
[admin@R3] > ping 108.4.24.9 count=5
SEQ HOST SIZE TTL TIME STATUS
0 108.4.24.9 56 64 2ms474us
1 108.4.24.9 56 64 1ms695us
2 108.4.24.9 56 64 1ms54us
3 108.4.24.9 56 64 1ms410us
4 108.4.24.9 56 64 1ms931us
sent=5 received=5 packet-loss=0% min-rtt=1ms54us avg-rtt=1ms712us max-rtt=2ms474us
[admin@R3] >
```

**ΣΗΜΕΙΩΣΗ:** έχω τα ίδια αποτελέσματα και αντίστοιχα για R1-R3, R2-R3, R3-R1

## ΕΡΩΤΗΣΗ 2:

R1:

```
[admin@R1] > routing ospf instance
[admin@R1] > /routing/ospf	instance add name=default router-id=1.1.1.1
[admin@R1] > /routing/ospf	instance ..
[admin@R1] > /routing/ospf	area
[admin@R1] > /routing/ospf/area add name=backbone area-id=0.0.0.0 instance=default
[admin@R1] > /routing/ospf/area ..
[admin@R1] > /routing/ospf/interface-template
[admin@R1] > /routing/ospf/interface-template> add network=108.4.24.0/30 area=backbone
[admin@R1] > /routing/ospf/interface-template> add network=ether1 area=backbone
[admin@R1] > /routing/ospf/interface-template> add network=108.4.24.4/30 area=backbone
[admin@R1] > /routing/ospf/interface-template> add network=ether2 area=backbone
```

```
[admin@RJ] > ip route print
Flags: D - DYNAMIC; A - ACTIVE; c, o, y - COPY; + - ECMP
Columns: DST-ADDRESS, GATEWAY, DISTANCE
          DST-ADDRESS      GATEWAY      DISTANCE
DAC  1.1.1.1/32    loopback0          0
DAO  2.2.2.2/32    108.4.24.2%ether1  110
DAO  3.3.3.3/32    108.4.24.6%ether2  110
DAC  108.4.24.0/30  ether1            0
DAC  108.4.24.4/30  ether2            0
DAO+ 108.4.24.8/30 108.4.24.6%ether2  110
DAO+ 108.4.24.8/30 108.4.24.2%ether1  110
[admin@RJ] >
```

R2:

```
[admin@Z1] > routing ospf instance
[admin@Z1] /routing/ospf	instance add name=default router-id=2.2.2.2
[admin@Z1] /routing/ospf	instance ..
[admin@Z1] /routing/ospf	area
[admin@Z1] /routing/ospf/area add name=backbone area-id=0.0.0.0 instance=default
[admin@Z1] /routing/ospf/area ..
[admin@Z1] /routing/ospf	interface-template
[admin@Z1] /routing/ospf/interface-template add network=198.4.24.0/30 area=backbone
[admin@Z1] /routing/ospf/interface-template add network=ether1 area=backbone
[admin@Z1] /routing/ospf/interface-template add network=198.4.24.8/30 area=backbone
[admin@Z1] /routing/ospf/interface-template add network=ether2 area=backbone
```

```
[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  1.1.1.1/32          108.4.24.1%ether1    110
DAC  2.2.2.2/32         loopback0            0
DAO  3.3.3.3/32          108.4.24.10%ether2   110
DAC  108.4.24.0/30        ether1                0
DAO+ 108.4.24.4/30       108.4.24.10%ether2   110
DAO+ 108.4.24.4/30       108.4.24.1%ether1    110
DAC  108.4.24.8/30        ether2                0
[admin@R2] >
```

R3:

```

[admin@1] > routing ospf instance
[admin@1] /routing/ospf/{instance} add name=default router-id=3.3.3.3
[admin@1] /routing/ospf/{instance} ..
[admin@1] /routing/ospf area
[admin@1] /routing/ospf/{area} add name=backbone area-id=0.0.0.0 instance=default
[admin@1] /routing/ospf/{area} ..
[admin@1] /routing/ospf interface-template
[admin@1] /routing/ospf/interface-template add network=108.4.24.8/30 area=backbone
[admin@1] /routing/ospf/interface-template add network=ether1 area=backbone
[admin@1] /routing/ospf/interface-template add network=108.4.24.4/30 area=backbone
[admin@1] /routing/ospf/interface-template add network=ether2 area=backbone
[admin@1] /routing/ospf/interface-template .. .
[admin@1] /routing/ospf ..
[admin@1] ..
[admin@1] > ip route print
Flags: D - DYNAMIC; A - ACTIVE; C, o, y - COPY; + - ECMP
Columns: DST-ADDRESS, GATEWAY, DISTANCE
      DST-ADDRESS      GATEWAY      DISTANCE
D<o> 1.1.1.1/32    108.4.24.5%ether2    110
D<o> 2.2.2.2/32    108.4.24.9%ether1    110
D<+> 3.3.3.3/32    loopback0            0
D<+> 108.4.24.0/30 108.4.24.5%ether2    110
D<+> 108.4.24.0/30 108.4.24.9%ether1    110
D<+> 108.4.24.4/30 ether2                0
D<+> 108.4.24.8/30 ether1                0
[admin@1] > [ ]

```

### ΕΡΩΤΗΣΗ 3:

Θα κάνω ping από τον R1 προς R2,R3 σε όλες τις μη αντικριστές διευθύνσεις:

```
[admin@R1] > ping 108.4.24.9 count=5          110
SEQ HOST                                SIZE TTL TIME      STATUS
  1 108.4.24.9                           66 64 2ms861us
  1 108.4.24.9                           66 64 2ms840us
  2 108.4.24.9                           66 64 2ms785us
  3 108.4.24.9                           66 64 2ms442us
  4 108.4.24.9                           66 64 3ms14us
sent=5 received=5 packet-loss=0% min-rtt=2ms442us avg-rtt=2ms788us max-rtt=3ms14us

[admin@R1] > ping 108.4.24.10 count=5
SEQ HOST                                SIZE TTL TIME      STATUS
  0 108.4.24.10                          66 64 2ms18us
  1 108.4.24.10                          66 64 1ms77us
  2 108.4.24.10                          66 64 1ms148us
  3 108.4.24.10                          66 64 1ms139us
  4 108.4.24.10                          66 64 2ms960us
sent=5 received=5 packet-loss=0% min-rtt=1ms77us avg-rtt=1ms688us max-rtt=2ms960us

[admin@R1] >
```

#### ΕΡΩΤΗΣΗ 4:

```
[admin@R1] > ip dhcp-server
[admin@R1] /ip/dhcp-server> setup
Select interface to run DHCP server on
dhcp server interface: ether3
Select network for DHCP addresses
dhcp address space: 10.80.42.0/24
Select gateway for given network
gateway for dhcp network: 10.80.42.1
Select pool of ip addresses given out by DHCP server
addresses to give out: 10.80.42.2-10.80.42.254
Select DNS servers
dns servers:
Select lease time
lease time: 10m
[admin@R1] /ip/dhcp-server>
```

```
Executing the startup file

PC1> dhcp
DORA IP 10.80.42.254/24 GW 10.80.42.1

PC1>
```

#### R1:

```
[admin@R1] > ip route print
Flags: D - DYNAMIC; A - ACTIVE; c, o, y - COPY; + - ECMP
Columns: DST-ADDRESS, GATEWAY, DISTANCE
          DST-ADDRESS   GATEWAY           DISTANCE
DAc  1.1.1.1/32    loopback0          0
DAc  2.2.2.2/32    108.4.24.2%ether1    110
DAO  3.3.3.3/32    108.4.24.6%ether2    110
DAO  10.80.42.0/24  108.4.24.2%ether1    110
DAC  108.4.24.0/30  ether1             0
DAC  108.4.24.4/30  ether2             0
DAO+ 108.4.24.8/30 108.4.24.6%ether2    110
DAO+ 108.4.24.8/30 108.4.24.2%ether1    110
[admin@R1] >
```

#### R2:

```
[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  1.1.1.1/32    108.4.24.1%ether1    110
DAO  2.2.2.2/32    loopback0          0
DAO  3.3.3.3/32    108.4.24.10%ether2    110
DAC  10.80.42.0/24  ether1             0
DAC  108.4.24.0/30  ether1             0
DAO+ 108.4.24.4/30 108.4.24.10%ether2    110
DAO+ 108.4.24.4/30 108.4.24.1%ether1    110
DAC  108.4.24.8/30  ether2             0
[admin@R2] >
```

#### R3:

```
[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  1.1.1.1/32    108.4.24.5%ether2    110
DAO  2.2.2.2/32    108.4.24.9%ether1    110
DAC  3.3.3.3/32    loopback0      0
DAO  10.80.42.0/24 108.4.24.9%ether1    110
DAO+ 108.4.24.0/30 108.4.24.5%ether2    110
DAO+ 108.4.24.0/30 108.4.24.9%ether1    110
DAC  108.4.24.4/30 ether2          0
DAC  108.4.24.8/30 ether1          0
[admin@R3] >
```

Παρατηρώ ότι είναι η βέλτιστη διαδρομή και από τους 3 δρομολογητές.

Ερώτηση 5:

R1:

```
[admin@R1] > ip dhcp-client
[admin@R1] /ip/dhcp-client> add interface=ether3
[admin@R1] /ip/dhcp-client> print
Flags: D - DYNAMIC; A - ACTIVE; c, o, d, y - COPY; + - ECMP
Columns: INTERFACE, USE-PEER-DNS, ADD-DEFAULT-ROUTE, STATUS, ADDRESS
# INTERFACE USE-PEER-DNS ADD-DEFAULT-ROUTE STATUS ADDRESS
0 ether1 yes yes searching...
1 ether3 yes yes bound 192.168.198.135/24
[admin@R1] /ip/dhcp-client> ..
[admin@R1] /ip> ..
[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    192.168.198.2    1
DAC  1.1.1.1/32    loopback0      0
DAO  2.2.2.2/32    108.4.24.2%ether1    110
DAO  3.3.3.3/32    108.4.24.6%ether2    110
DAO  10.80.42.0/24 108.4.24.2%ether1    110
DAC  108.4.24.0/30 ether1          0
DAC  108.4.24.4/30 ether2          0
DAO+ 108.4.24.8/30 108.4.24.6%ether2    110
DAO+ 108.4.24.8/30 108.4.24.2%ether1    110
DAC  192.168.198.0/24 ether3          0
[admin@R1] >
```

R2:

```
[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  1.1.1.1/32    108.4.24.1%ether1    110
DAC  2.2.2.2/32    loopback0      0
DAO  3.3.3.3/32    108.4.24.10%ether2    110
DAO  10.80.42.0/24  ether3          0
DAC  108.4.24.0/30 ether1          0
DAO+ 108.4.24.4/30 108.4.24.1%ether1    110
DAO+ 108.4.24.4/30 108.4.24.10%ether2    110
DAC  108.4.24.8/30 ether2          0
DAO  192.168.198.0/24 108.4.24.1%ether1    110
[admin@R2] >
```

R3:

```
[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  1.1.1.1/32    108.4.24.5%ether2    110
DAO  2.2.2.2/32    108.4.24.9%ether1    110
DAC  3.3.3.3/32    loopback0      0
DAO  10.80.42.0/24 108.4.24.9%ether1    110
DAO+ 108.4.24.0/30 108.4.24.9%ether1    110
DAO+ 108.4.24.0/30 108.4.24.5%ether2    110
DAC  108.4.24.4/30 ether2          0
DAC  108.4.24.8/30 ether1          0
DAO  192.168.198.0/24 108.4.24.5%ether2    110
[admin@R3] >
```

Παρατηρώ ότι και πάλι έχω την πιο σύντομη διαδρομή από κάθε δρομολογητή.

Ερώτηση 6:

Ping από R1 σε 8.8.8.8

```
[admin@R1] > ping 8.8.8.8 count=3
[admin@R1] > ping 8.8.8.8 count=3
SEQ HOST SIZE TTL TIME STATUS
 0 8.8.8.8      56 128 236ms900us
 1 8.8.8.8      56 128 244ms903us
 2 8.8.8.8      56 128 57ms337us
sent=3 received=3 packet-loss=0% min-rtt=57ms337us avg-rtt=179ms713us max-rtt=244ms903us
[admin@R1] >
```

α)

ping R2 προς ether3 του R1:

```
[admin@R1] > ping 192.168.198.135 count=3
SEQ HOST SIZE TTL TIME STATUS
 0 192.168.198.135      56 64 2ms21us
 1 192.168.198.135      56 64 1ms38us
 2 192.168.198.135      56 64 1ms13us
sent=3 received=3 packet-loss=0% min-rtt=1ms13us avg-rtt=1ms357us max-rtt=2ms21us
[admin@R1] >
```

ping R3 προς ether3 του R1:

```
[admin@R1] > ping 192.168.198.135 count=3
SEQ HOST SIZE TTL TIME STATUS
 0 192.168.198.135      56 64 1ms395us
 1 192.168.198.135      56 64 1ms47us
 2 192.168.198.135      56 64 1ms59us
sent=3 received=3 packet-loss=0% min-rtt=1ms47us avg-rtt=1ms167us max-rtt=1ms395us
[admin@R1] >
```

β)

από R2:

```
[admin@R2] > ping 192.168.198.1 count=3
SEQ HOST SIZE TTL TIME STATUS
 0 192.168.198.1      56 64 timeout
 1 192.168.198.1      56 64 timeout
 2 192.168.198.1      56 64 timeout
sent=3 received=0 packet-loss=100%
[admin@R2] >
[admin@R2] >
```

Από R3:

```
[admin@R3] > ping 192.168.198.1 count=3
SEQ HOST SIZE TTL TIME STATUS
 0 192.168.198.1      56 64 timeout
 1 192.168.198.1      56 64 timeout
 2 192.168.198.1      56 64 timeout
sent=3 received=0 packet-loss=100%
[admin@R3] >
```

Γ)

Από R2:

```
[admin@R2] > ping 8.8.8.8 count=3
SEQ HOST SIZE TTL TIME STATUS
 0          no route to host
 1          no route to host
 2          no route to host
sent=3 received=0 packet-loss=100%
[admin@R2] >
```

Από R3:

```
[admin@R3] > ping 8.8.8.8 count=3
SEQ HOST SIZE TTL TIME STATUS
0 192.168.198.2 56 127 5ms23us no route to host
1 192.168.198.2 56 127 8ms30us no route to host
2 192.168.198.2 56 127 2ms624us no route to host
sent=3 received=0 packet loss=100%
[admin@R3] > 
```

Ερώτηση 8:

Πρώτα έκανα nat στο ether3 του R1:

```
[admin@R1] > ip route print
Flags: D - DYNAMIC; A - ACTIVE; c, o, d, y - COPY
Columns: DST-ADDRESS, GATEWAY, DISTANCE
# DST-ADDRESS GATEWAY DISTANCE
Dad 0.0.0.0/0 192.168.198.2 1
DAc 1.1.1.1/32 loopback0 0
DAo 2.2.2.2/32 108.4.24.2ether1 110
DAo 10.80.42.0/24 108.4.24.2ether1 110
DAc 108.4.24.0/30 ether1 0
DAc 108.4.24.4/30 ether2 0
DAo 108.4.24.8/30 108.4.24.2ether1 110
DAc 192.168.198.0/24 ether3 0
[admin@R1] > ip firewall nat print
Flags: X - disabled, I - invalid; D - dynamic
[admin@R1] > ip firewall nat add chain=srcnat action=masquerade out-interface=ether3
[admin@R1] > ip firewall nat print
Flags: X - disabled, I - invalid; D - dynamic
0 chain=srcnat action=masquerade out-interface=ether3
[admin@R1] > 
```

Έπειτα άλλαξα R2,R3:

```
[admin@R2] > ping 8.8.8.8
SEQ HOST SIZE TTL TIME STATUS
0 8.8.8.8 56 127 17ms496us timeout
1 8.8.8.8 56 127 22ms903us
2 8.8.8.8 56 127 37ms678us
3 8.8.8.8 56 127 25ms236us
sent=3 received=4 packet loss=20% min-rtt=37ms678us avg-rtt=172ms70us max-rtt=252ms236us
[admin@R2] > ping 192.168.198.2
SEQ HOST SIZE TTL TIME STATUS
0 192.168.198.2 56 127 2ms538us
1 192.168.198.2 56 127 8ms388us
2 192.168.198.2 56 127 3ms738us
sent=3 received=3 packet loss=0% min-rtt=2ms538us avg-rtt=4ms888us max-rtt=8ms388us
[admin@R2] > 
```

```
[admin@R3] > ping 8.8.8.8
SEQ HOST SIZE TTL TIME STATUS
0 8.8.8.8 56 127 180ms666us
1 8.8.8.8 56 127 571ms318us
2 8.8.8.8 56 127 389ms861us
3 8.8.8.8 56 127 212ms624us
sent=4 received=4 packet loss=0% min-rtt=180ms666us avg-rtt=340ms617us max-rtt=571ms318us
[admin@R3] > ping 192.168.198.2
SEQ HOST SIZE TTL TIME STATUS
0 192.168.198.2 56 127 5ms23us
1 192.168.198.2 56 127 8ms30us
2 192.168.198.2 56 127 2ms624us
3 192.168.198.2 56 127 2ms882us
sent=4 received=4 packet loss=0% min-rtt=2ms96us avg-rtt=4ms577us max-rtt=8ms389us
[admin@R3] > 
```

## ΑΣΚΗΣΗ 7:

R1 mikrotik: admin- password:1

R2-mikrotik:admin-password:2

R3-mirkotik:admin-password:3

R4 mikrotik: admin- password:4

R5-mikrotik:admin-password:5

R6-mirkotik:admin-password:6

R4:

```
[admin@R4] > routing bgp connection
[admin@R4] > /routing/bgp/connection set toR1 listen=yes
[admin@R4] > /routing/bgp/connection set toR1 templates=default
[admin@R4] > /routing/bgp/connection ..
[admin@R4] > /routing/bgp> template
[admin@R4] > /routing/bgp/template set default router-id=10.255.255.4
[admin@R4] > /routing/bgp/template set default as=65530
[admin@R4] > /routing/bgp/template ..
[admin@R4] > /routing/bgp connection
[admin@R4] > /routing/bgp> print
Flags: D - dynamic, X - disabled, I - inactive
0    name="toR1"
    remote-address=192.168.2.2
    local-default-address=192.168.2.1 .role=ebgp
    listen=yes routing-table=main router-id=10.255.255.4 templates=default as=65531
[admin@R4] > /routing/bgp/connection
```

R1:

```
[admin@R1] > routing bgp connection
[admin@R1] > /routing/bgp/connection add name=toR4 remote.address=192.168.2.1 as=65531 local.role=ebgp
[admin@R1] > /routing/bgp/connection set toR4 listen=yes
[admin@R1] > /routing/bgp/connection set toR4 templates=default
[admin@R1] > /routing/bgp/connection ..
[admin@R1] > /routing/bgp> template
[admin@R1] > /routing/bgp/template set default router-id=10.255.255.4
[admin@R1] > /routing/bgp/template set default as=65530
[admin@R1] > /routing/bgp/template ..
[admin@R1] > /routing/bgp connection
[admin@R1] > /routing/bgp> print
Flags: D - dynamic, X - disabled, I - inactive
0    name="toR4"
    remote.address=192.168.2.1
    local.default-address=192.168.2.2 .role=ebgp
    listen=yes routing-table=main router-id=10.255.255.4 templates=default as=65531
[admin@R1] > /routing/bgp/connection
```

## Ερώτηση 10:

R1:

```
[admin@R1] > routing> ..
[admin@R1] > ip route print
Flags: D - DYNAMIC; A - ACTIVE; C, O, Y - COPY; + - ECMP
Columns: DST-ADDRESS, GATEWAY, DISTANCE
      DST-ADDRESS          GATEWAY          DISTANCE
DAc  1.1.1.1/32        loopback0          0
DAo  2.2.2.2/32        108.4.24.2ether1     110
DAo  3.3.3.3/32        108.4.24.6ether2     110
DAo  4.4.4.4/32        192.168.2.1ether3     110
DAo  5.5.5.5/32        192.168.2.1ether3     110
DAo  6.6.6.6/32        192.168.2.1ether3     110
DAo  10.80.42.0/24     108.4.24.2ether1     110
DAo  11.80.42.0/24     192.168.2.1ether3     110
DAC  108.4.24.0/30     ether1              0
DAC  108.4.24.4/30     ether2              0
DAO+ 108.4.24.8/30     108.4.24.2ether1     110
DAO+ 108.4.24.8/30     108.4.24.6ether2     110
DAO  108.4.25.0/30     192.168.2.1ether3     110
DAO  108.4.25.4/30     192.168.2.1ether3     110
DAO  108.4.25.8/30     192.168.2.1ether3     110
DAC  192.168.2.0/30     ether3              0
[admin@R1] >
```

R2:

```
[admin@R2] > ip route print
Flags: D - DYNAMIC; A - ACTIVE; c, o, y - COPY; + - ECMP
Columns: DST-ADDRESS, GATEWAY, DISTANCE
      DST-ADDRESS      GATEWAY      DISTANCE
D Ao 1.1.1.1/32    108.4.24.1%ether1    110
D Ac 2.2.2.2/32    loopback0            0
D Ao 3.3.3.3/32    108.4.24.10%ether2   110
D Ao 4.4.4.4/32    108.4.24.1%ether1   110
D Ao 5.5.5.5/32    108.4.24.1%ether1   110
D Ao 6.6.6.6/32    108.4.24.1%ether1   110
D Ac 10.80.42.0/24 ether3                0
D Ao 11.80.42.0/24 108.4.24.1%ether1   110
D Ac 108.4.24.0/30 ether1                0
D Ao+ 108.4.24.4/30 108.4.24.10%ether2   110
D Ao+ 108.4.24.4/30 108.4.24.1%ether1   110
D Ac 108.4.24.8/30 ether2                0
D Ao 108.4.25.0/30 108.4.24.1%ether1   110
D Ao 108.4.25.4/30 108.4.24.1%ether1   110
D Ao 108.4.25.8/30 108.4.24.1%ether1   110
D Ao 192.168.2.0/30 108.4.24.1%ether1   110
```

R3:

```
[admin@R3] > ip route print
Flags: D - DYNAMIC; A - ACTIVE; c, o, y - COPY; + - ECMP
Columns: DST-ADDRESS, GATEWAY, DISTANCE
      DST-ADDRESS      GATEWAY      DISTANCE
D Ao 1.1.1.1/32    108.4.24.5%ether2   110
D Ao 2.2.2.2/32    108.4.24.9%ether1   110
D Ac 3.3.3.3/32    loopback0            0
D Ao 4.4.4.4/32    108.4.24.5%ether2   110
D Ao 5.5.5.5/32    108.4.24.5%ether2   110
D Ao 6.6.6.6/32    108.4.24.5%ether2   110
D Ao 10.80.42.0/24 108.4.24.9%ether1   110
D Ao 11.80.42.0/24 108.4.24.5%ether2   110
D Ao+ 108.4.24.0/30 108.4.24.5%ether2   110
D Ao+ 108.4.24.0/30 108.4.24.9%ether1   110
D Ac 108.4.24.4/30 ether2                0
D Ac 108.4.24.8/30 ether1                0
D Ao 108.4.25.0/30 108.4.24.5%ether2   110
D Ao 108.4.25.4/30 108.4.24.5%ether2   110
D Ao 108.4.25.8/30 108.4.24.5%ether2   110
D Ao 192.168.2.0/30 108.4.24.5%ether2   110
```

R4:

```
[admin@R4] /routing/bgp/connection> ..
[admin@R4] /routing/bgp> ..
[admin@R4] /routing> ..
[admin@R4] > ip route print
Flags: D - DYNAMIC; A - ACTIVE; c, o, y - COPY; + - ECMP
Columns: DST-ADDRESS, GATEWAY, DISTANCE
      DST-ADDRESS      GATEWAY      DISTANCE
D Ao 1.1.1.1/32    192.168.2.2%ether3   110
D Ao 2.2.2.2/32    192.168.2.2%ether3   110
D Ao 3.3.3.3/32    192.168.2.2%ether3   110
D Ac 4.4.4.4/32    loopback0            0
D Ao 5.5.5.5/32    108.4.25.2%ether1   110
D Ao 6.6.6.6/32    108.4.25.6%ether2   110
D Ao 10.80.42.0/24 192.168.2.2%ether3   110
D Ao 11.80.42.0/24 108.4.25.2%ether1   110
D Ao 108.4.24.0/30 192.168.2.2%ether3   110
D Ao 108.4.24.4/30 192.168.2.2%ether3   110
D Ao 108.4.24.8/30 192.168.2.2%ether3   110
D Ao 108.4.25.0/30 ether1                0
D Ac 108.4.25.4/30 ether2                0
D Ao+ 108.4.25.8/30 108.4.25.2%ether1   110
D Ao+ 108.4.25.8/30 108.4.25.6%ether2   110
D Ac 192.168.2.0/30 ether3                0
```

R5:

```
[admin@R5] /ip/dhcp-server> ..
[admin@R5] /ip> ..
[admin@R5] > ip route print
Flags: D - DYNAMIC; A - ACTIVE; c, o, y - COPY; + - ECMP
Columns: DST-ADDRESS, GATEWAY, DISTANCE
      DST-ADDRESS      GATEWAY      DISTANCE
D Ao 1.1.1.1/32    108.4.25.1%ether1   110
D Ao 2.2.2.2/32    108.4.25.1%ether1   110
D Ao 3.3.3.3/32    108.4.25.1%ether1   110
D Ao 4.4.4.4/32    108.4.25.1%ether1   110
D Ac 5.5.5.5/32    loopback0            0
D Ao 6.6.6.6/32    108.4.25.10%ether2  110
D Ao 10.80.42.0/24 108.4.25.1%ether1   110
D Ac 11.80.42.0/24 ether3                0
D Ao 108.4.24.0/30 108.4.25.1%ether1   110
D Ao 108.4.24.4/30 108.4.25.1%ether1   110
D Ao 108.4.24.8/30 108.4.25.1%ether1   110
D Ac 108.4.25.0/30 ether1                0
D Ao+ 108.4.25.4/30 108.4.25.1%ether1   110
D Ao+ 108.4.25.4/30 108.4.25.10%ether2  110
D Ac 108.4.25.8/30 ether2                0
D Ao 192.168.2.0/30 108.4.25.1%ether1   110
```

R6:

```
[admin@R6] > ip route print
Flags: D - DYNAMIC; A - ACTIVE; c, o, y - COPY; + - ECMP
Columns: DST-ADDRESS, GATEWAY, DISTANCE
      DST-ADDRESS          GATEWAY          DISTANCE
D4o  1.1.1.1/32          108.4.25.5%ether2    110
D4o  2.2.2.2/32          108.4.25.5%ether2    110
D4o  3.3.3.3/32          108.4.25.5%ether2    110
D4o  4.4.4.4/32          108.4.25.5%ether2    110
D4o  5.5.5.5/32          108.4.25.9%ether1    110
D4c  6.6.6.6/32          loopback0           0
D4o  10.80.42.0/24        108.4.25.5%ether2    110
D4o  11.80.42.0/24        108.4.25.9%ether1    110
D4o  108.4.24.0/30        108.4.25.5%ether2    110
D4o  108.4.24.4/30        108.4.25.5%ether2    110
D4o  108.4.24.8/30        108.4.25.5%ether2    110
D4o+ 108.4.25.0/30        108.4.25.9%ether1    110
D4o+ 108.4.25.4/30        ether2              0
D4c  108.4.25.8/30        ether1              0
D4o  192.168.2.0/30       108.4.25.5%ether2    110
[admin@R6] >
```

Ερώτηση 11:

Ping PC1 to PC2:

```
PC1> ping 11.80.42.4
84 bytes from 11.80.42.4 icmp_seq=1 ttl=60 time=15.673 ms
84 bytes from 11.80.42.4 icmp_seq=2 ttl=60 time=9.569 ms
84 bytes from 11.80.42.4 icmp_seq=3 ttl=60 time=9.047 ms
84 bytes from 11.80.42.4 icmp_seq=4 ttl=60 time=9.412 ms
84 bytes from 11.80.42.4 icmp_seq=5 ttl=60 time=18.292 ms

PC1>
```

Ερώτηση 12:

```
PC1> trace 11.80.42.4
trace to 11.80.42.4, 8 hops max, press Ctrl+C to stop
 1  10.80.42.1   2.810 ms  2.653 ms  2.431 ms
 2  108.4.24.1   3.816 ms  3.378 ms  2.617 ms
 3  192.168.2.1   5.897 ms  5.084 ms  5.835 ms
 4  108.4.25.2   6.606 ms  8.191 ms  8.004 ms
 5  *11.80.42.4   7.433 ms (ICMP type:3, code:3, Destination port unreachable)

PC1>
```