OSPF ROUTING

by

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Introduction

Graduated :

Magister of ITB (Institut Teknologi Bandung)

Experiences :

- ✓ Certified Mikrotik Trainer (Rep. Ceko 2009)
- ✓ Training of Cisco Security Instructor (Philipines 2009)
- ✓ Training of Open Source (FOSS) workshop Instructor (Malaysia 2008)
- ✓ Training of Oracle Academy Instructor (Singapore 2007)
- ✓ Instructor CCNA Cisco Networking Academy Program (2005)

Job :

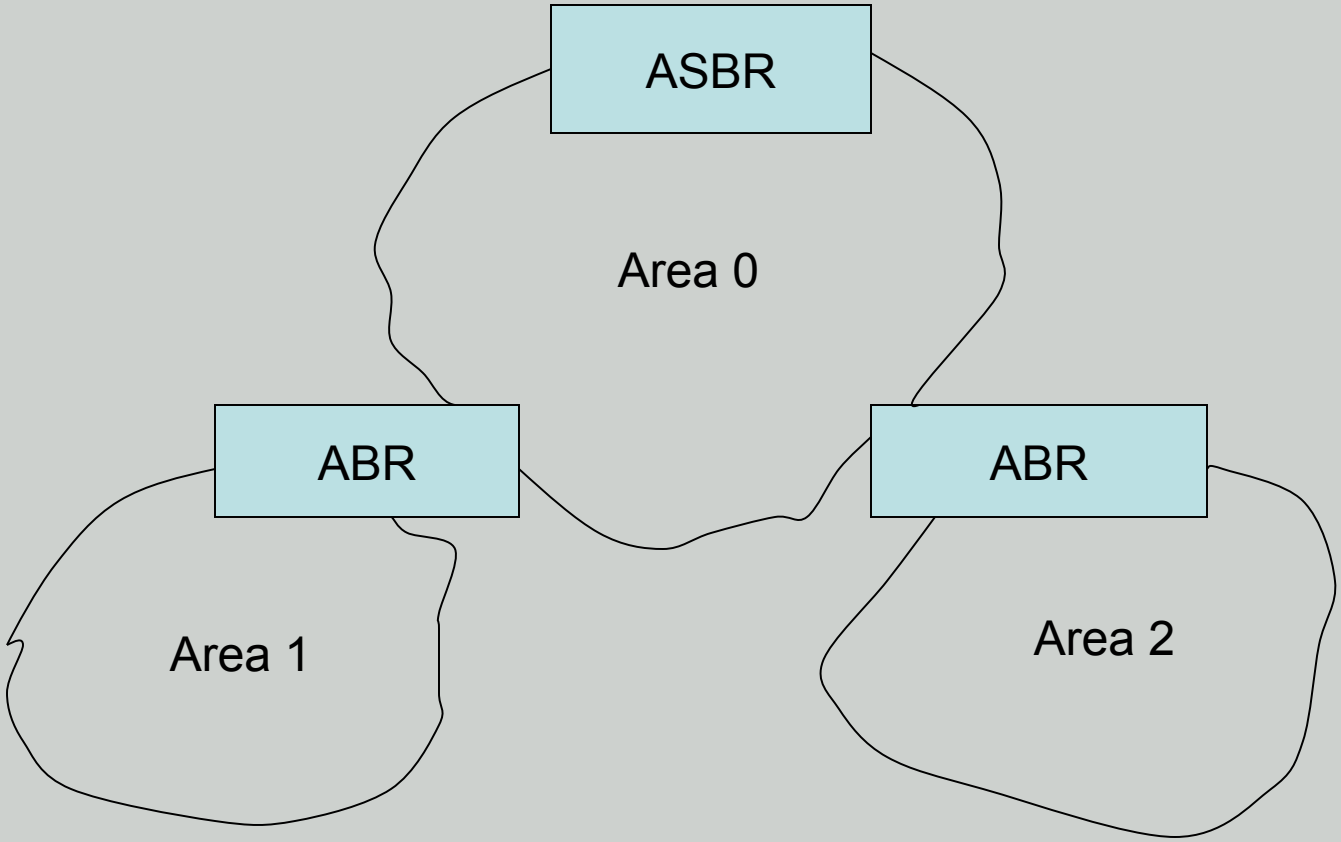
- ✓ SMK Telkom Sandhy Putra Malang
- ✓ STMIK Pradnya Paramita Malang
- ✓ Universitas Ma Chung Malang

- OSPF (Open shortest Path First) is an open standard routing protocol.
- OSPF has become one of the most widely used protocols in existence today because of being able to implement it cross multi-vendor platforms.
- The popularity of OSPF is continuing to grow with the advent of Multi Protocol Label Switching (MPLS)

- OSPF can be used for :
  - Automatic Distribution of routing information instead of using static routes
  - Making fail-over connections
  - Load balancing

OSPF Router Types

- Internal routers(inside an area)
- Back bone Routers(Inside area 0)
- Area Border routers (ABR)
  - An ABR sits between two or more areas and it must touch area 0.
- Autonomous system boundary routers(ASBR)
  - Redistribute routing information between OSPF and other routing protocols .


ASBR
Area 0
ABR
ABR
Area 1
Area 2

OSPF in RouterOS

- MikroTik RouterOS implements OSPF Version 2 (RFC 2328)
- The routing package should be installed
  - Check with “system package print”
  - If not installed,upload same version as system package routing-2.8.x.npk file and reboot the routers .
- OSPF uses protocol 89 to communicate with the neighbors . Make sure the Input firewall does not filter it .

OSPF Router ID

- Router ID must be unique within the AS
- Router ID can be left as 0.0.0.0

OSPF Default Route

- Leave ‘Distribute default’ route to ‘never’, unless it is an ASBR
  - /routing ospf
  - set distribute-default=as-type-1

OSPF Route Redistribution

- Set redistribute connected routes (and static routes) :
  - Routing ospf
  - Set redistribute-connected=as-type-1
  - Set redistribute-static=as-type-1

Area numbering

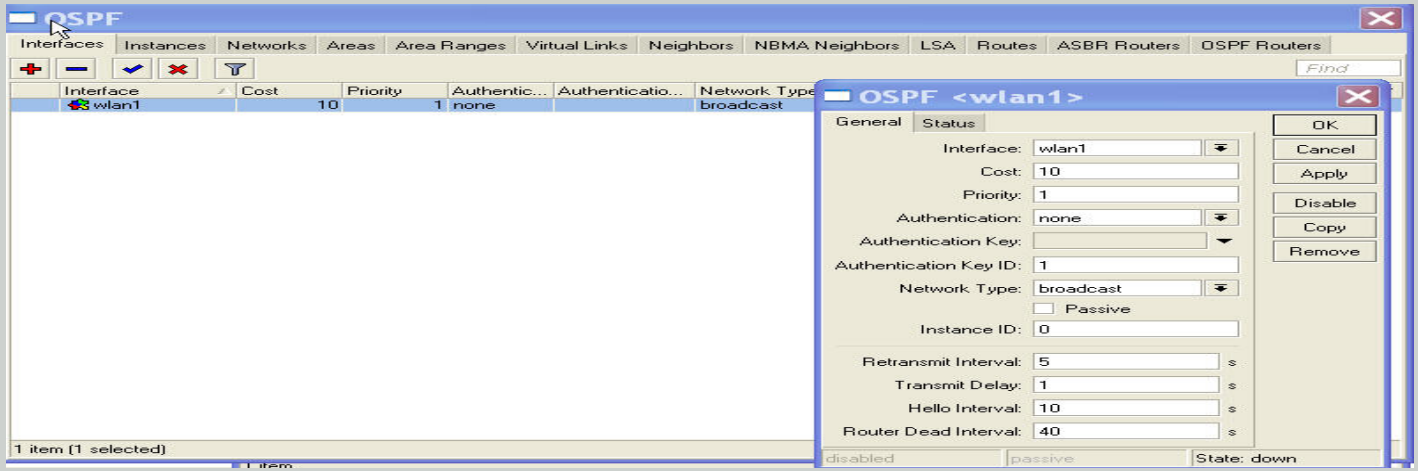
- Areas are defined by 32 bit numbers in IP address format.
- 0.0.0.0 reserved for the backbone area
- All areas must connect to area 0.0.0.0
- Configuration under
  - /routing ospf area
  - print
  - add name=internal1 area-id=0.0.0.0

OSPF Network

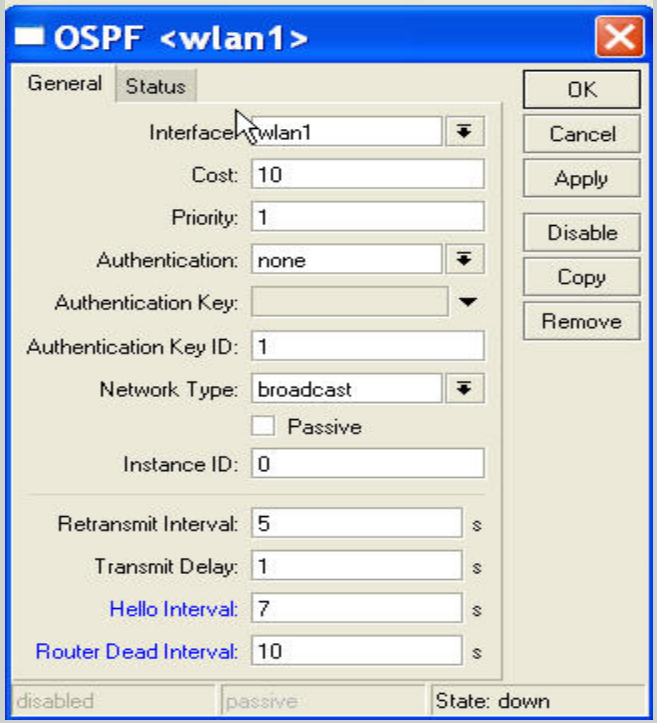
- Add networks to specify interfaces where you need OSPF running, and the area .
- The network address should include address of the inteface
  - Routing ospf network
  - Add network=10.10.10.0/30 area=backbone

OSPF Interface Configuration

- If needed , set interface cost :
  - Routing ospf interface
  - Add interface=wlan1 cost=10



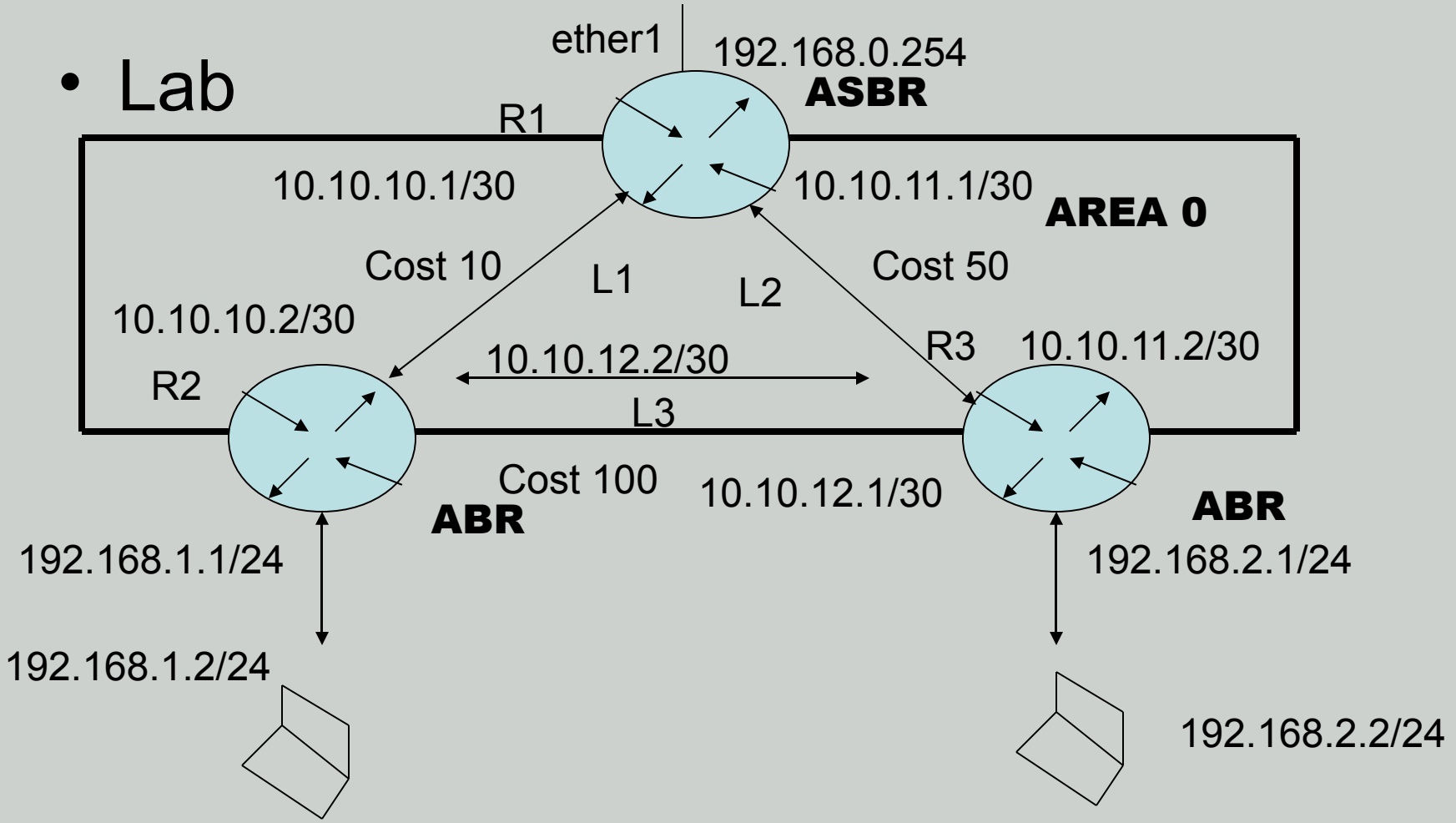
- For faster response , set Hello interval=7, Router dead interval=10 on all routers.



OSPF Troubleshooting

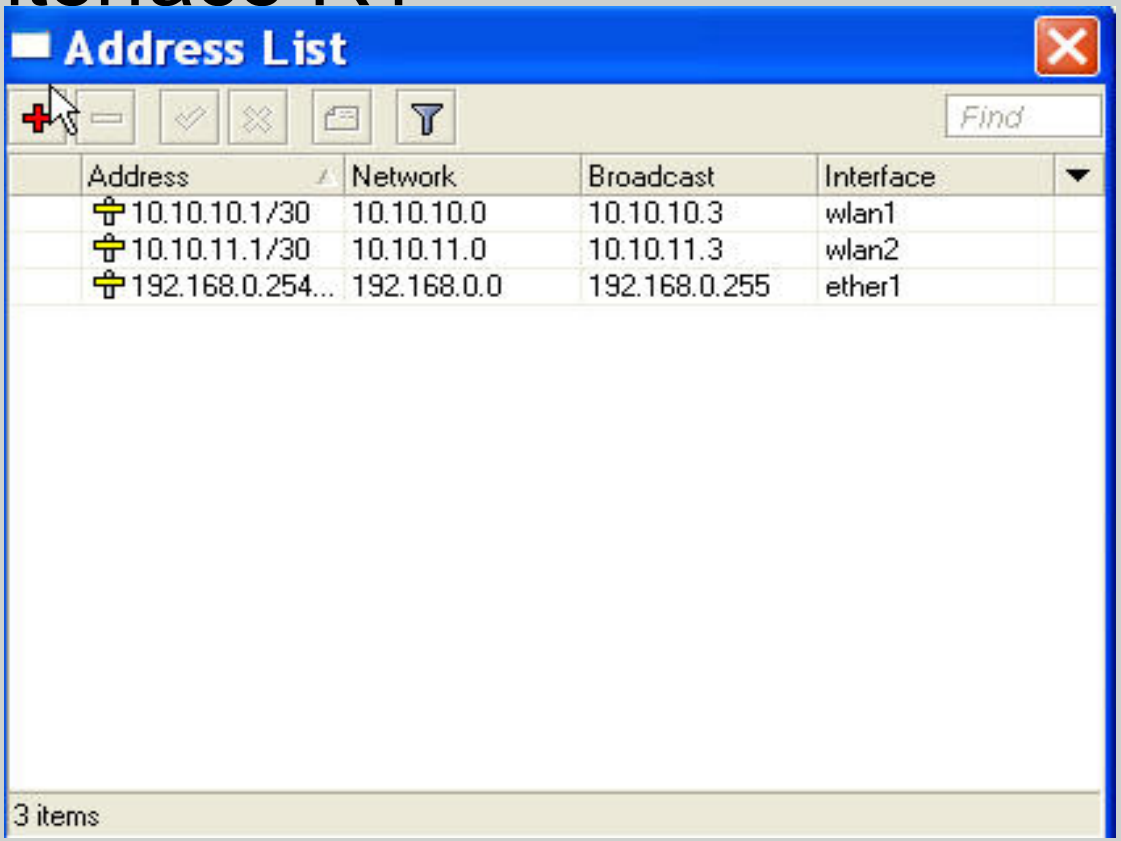
- Check MikroTik neighbors
  - /ip neighbor print
- Check OSPF neighbors
  - /routing ospf neighbor print
- Check routes
  - /ip route print
- Check logs
  - /log print

- Lab

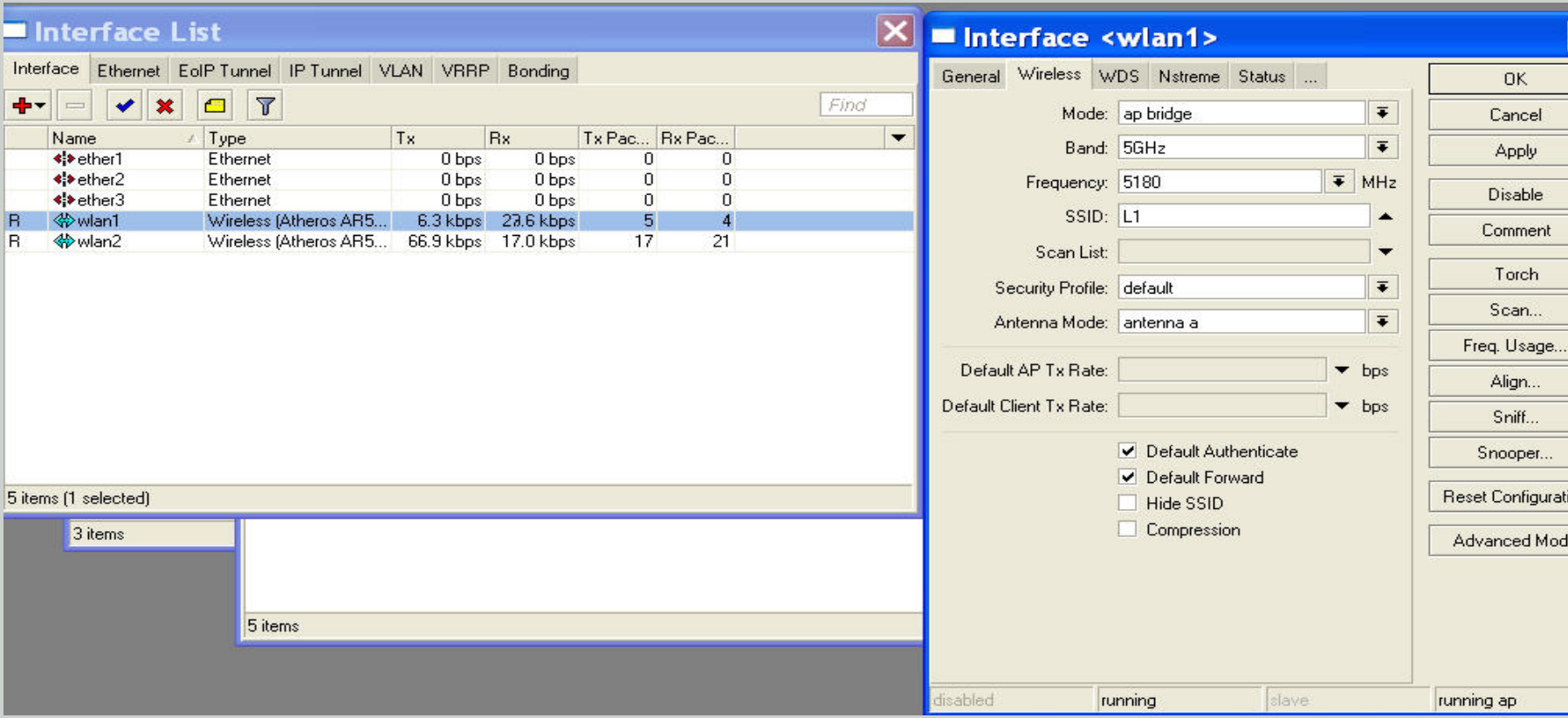

ether1
192.168.0.254
ASBR
R1
10.10.10.1/30
10.10.11.1/30
AREA 0
Cost 10
L1
L2
Cost 50
10.10.10.2/30
R3
10.10.11.2/30
10.10.12.2/30
R2
L3
Cost 100
10.10.12.1/30
ABR
ABR
192.168.1.1/24
192.168.2.1/24
192.168.1.2/24
192.168.2.2/24

Configuration of R1

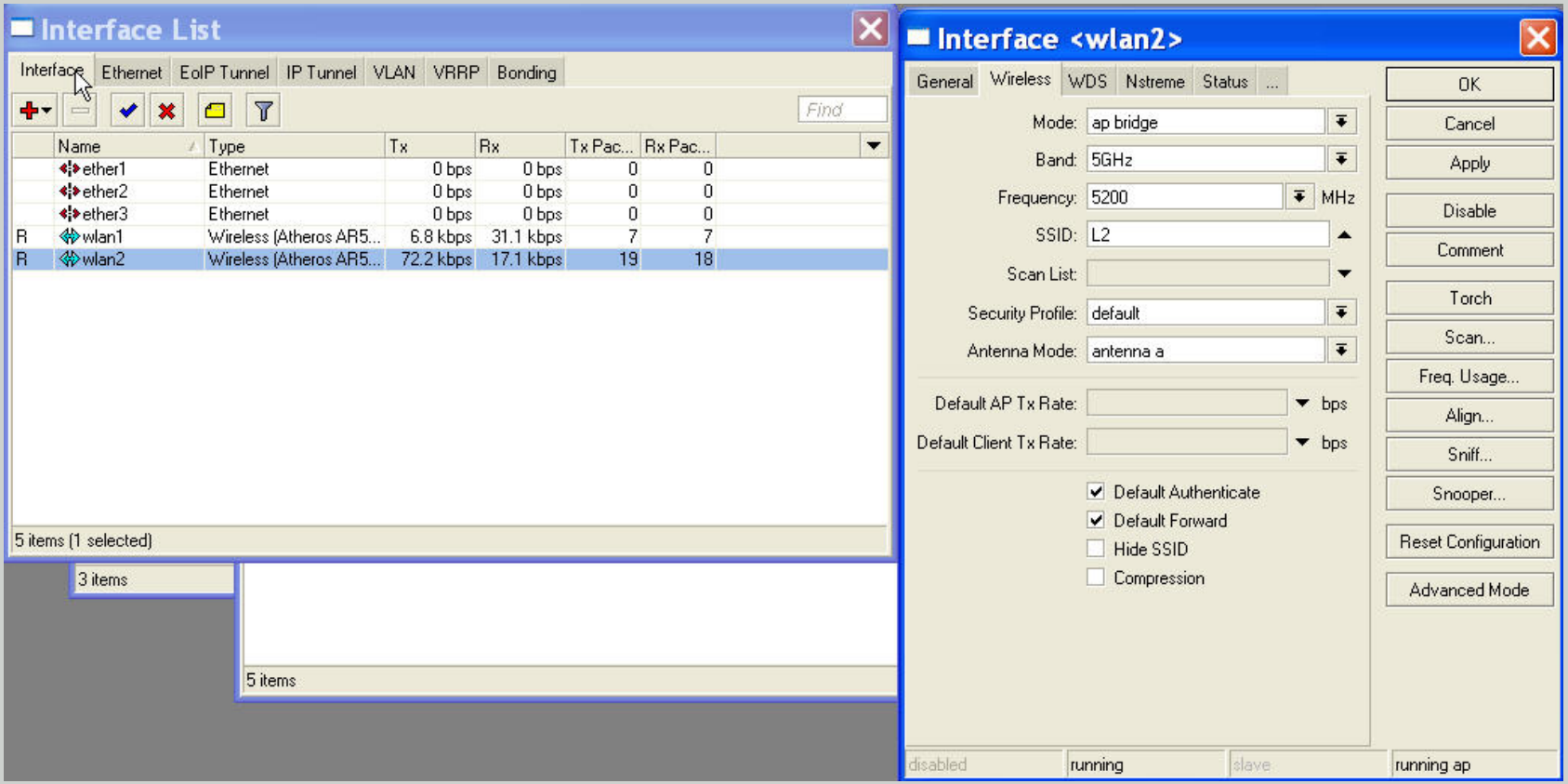
- IP interface R1



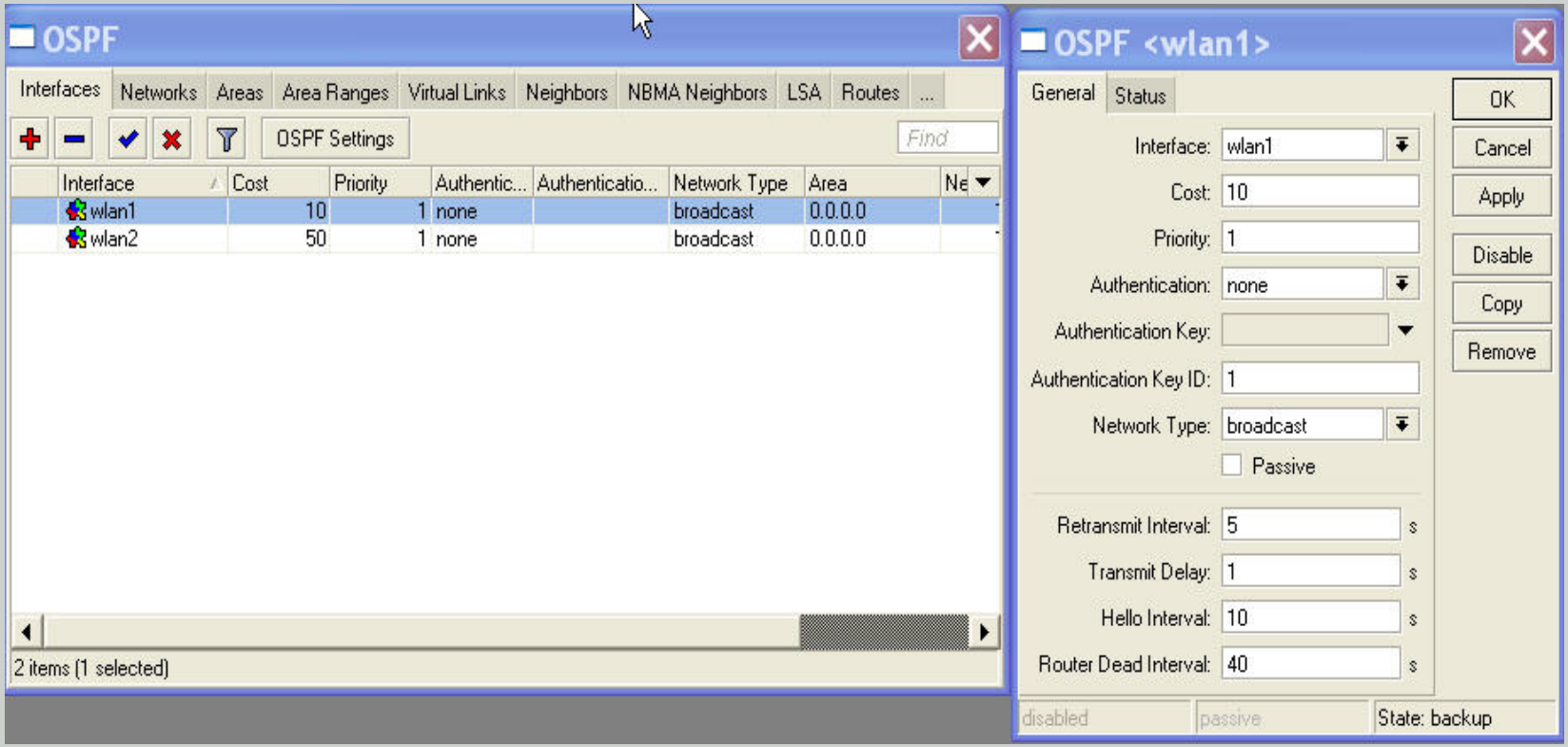
- Mode of wlan1 in R1



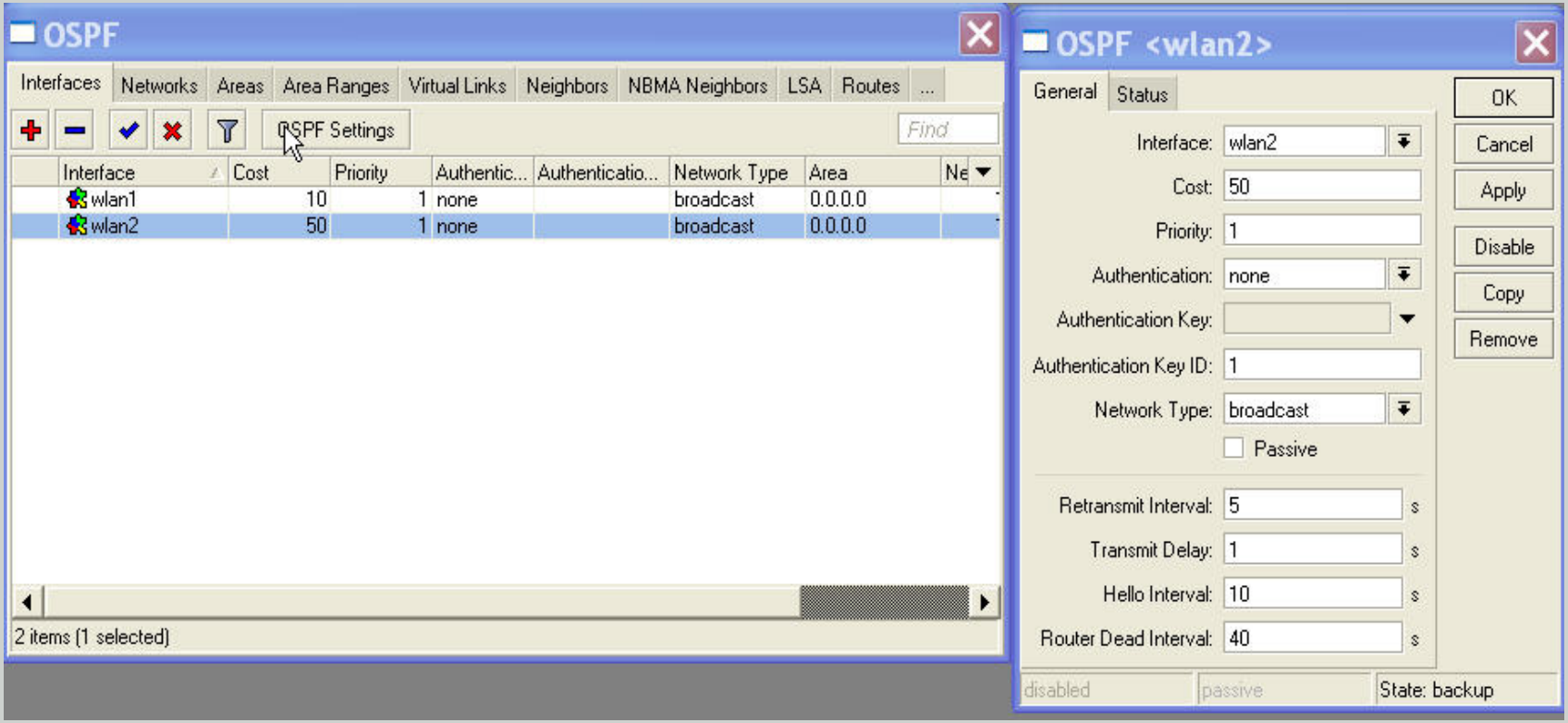
- Mode of wlan2 in R1



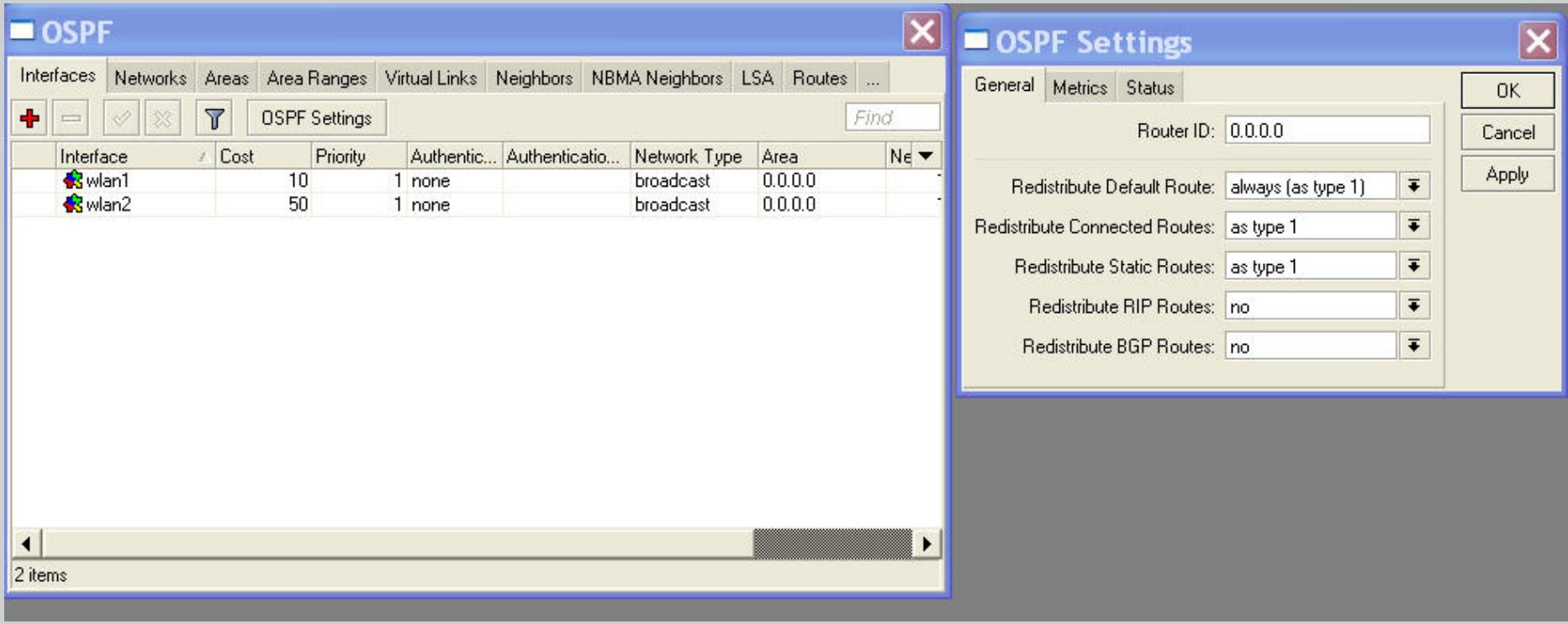
- Cost OSPF of wlan1



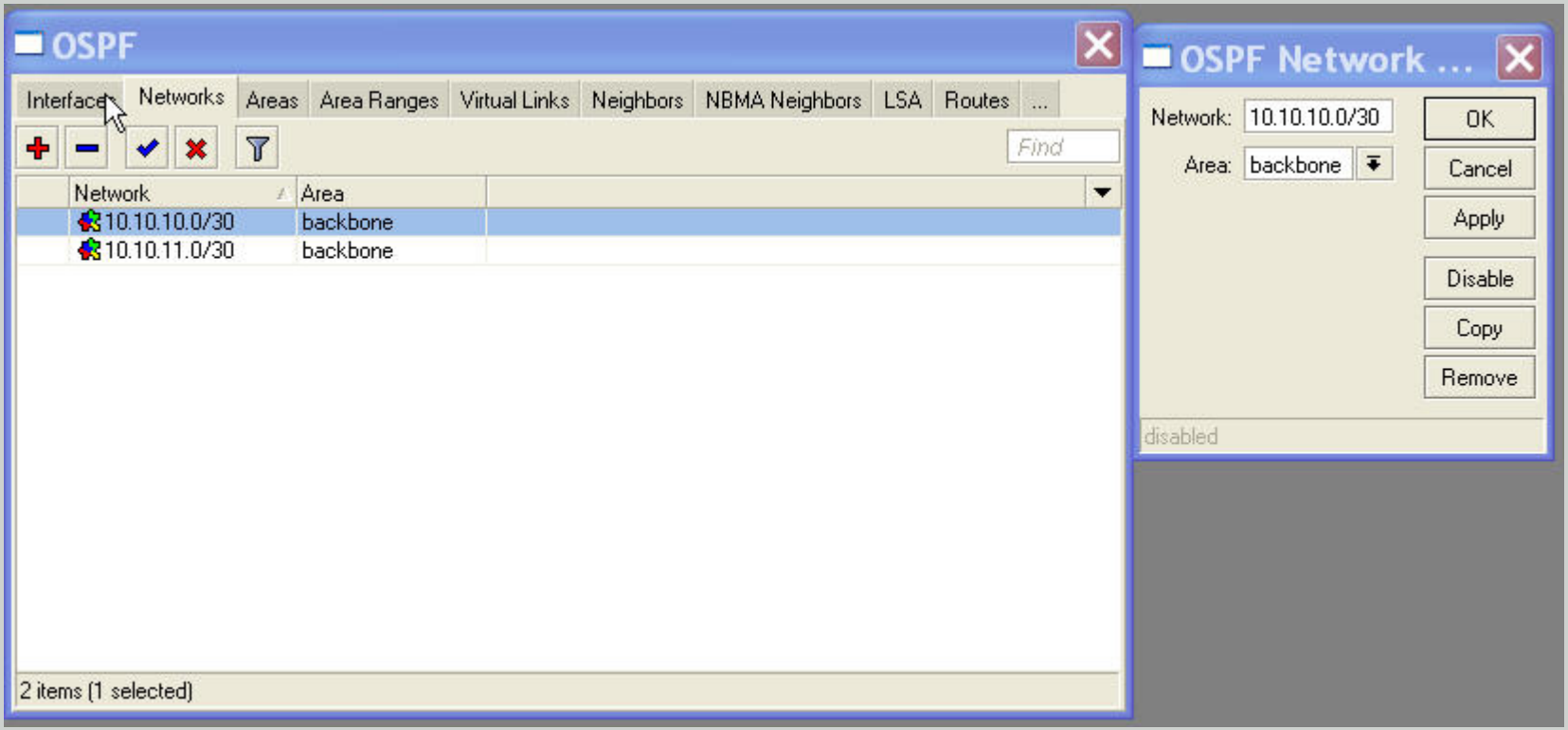
- Cost OSPF of wlan2



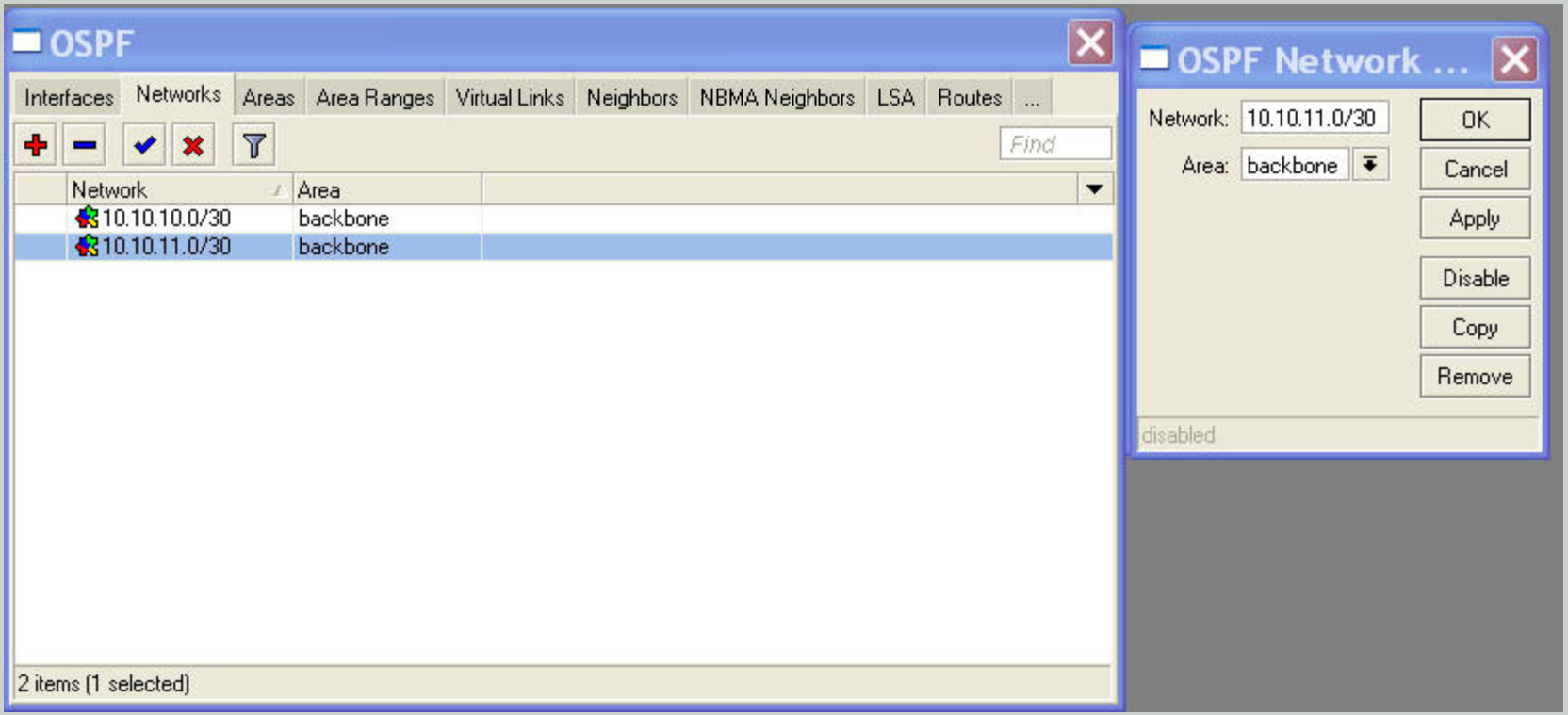
- Redistribute



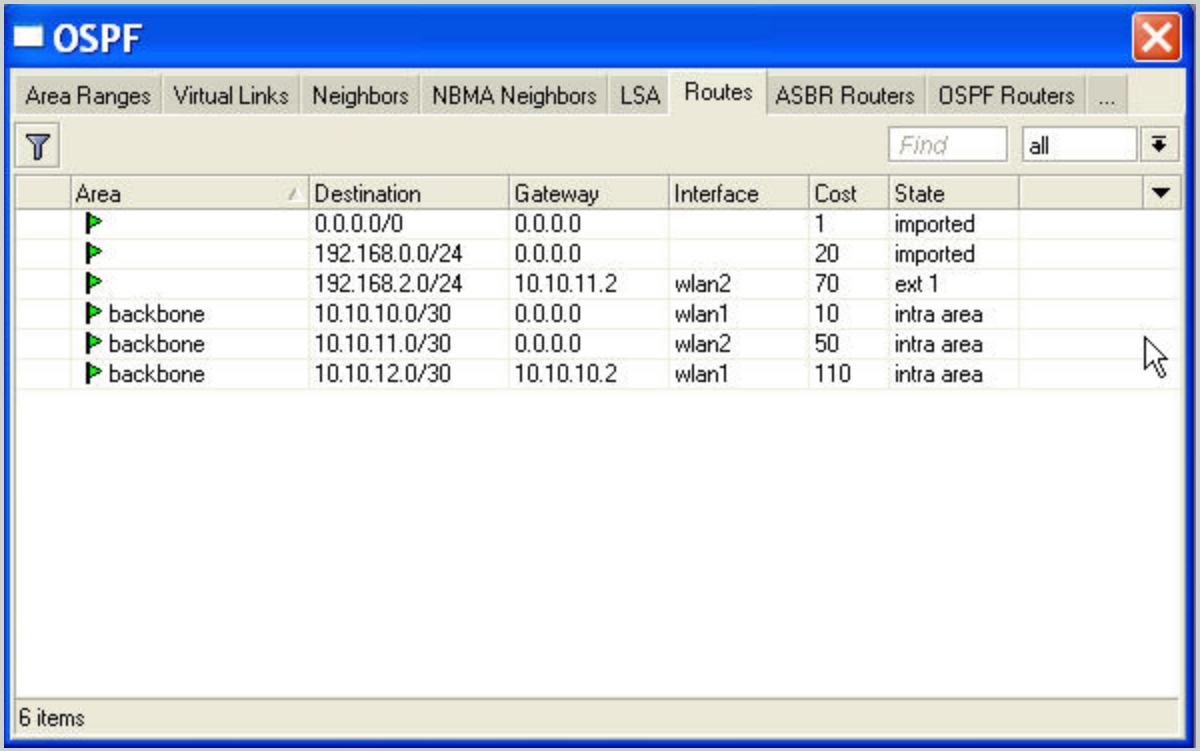
- OSPF network 1



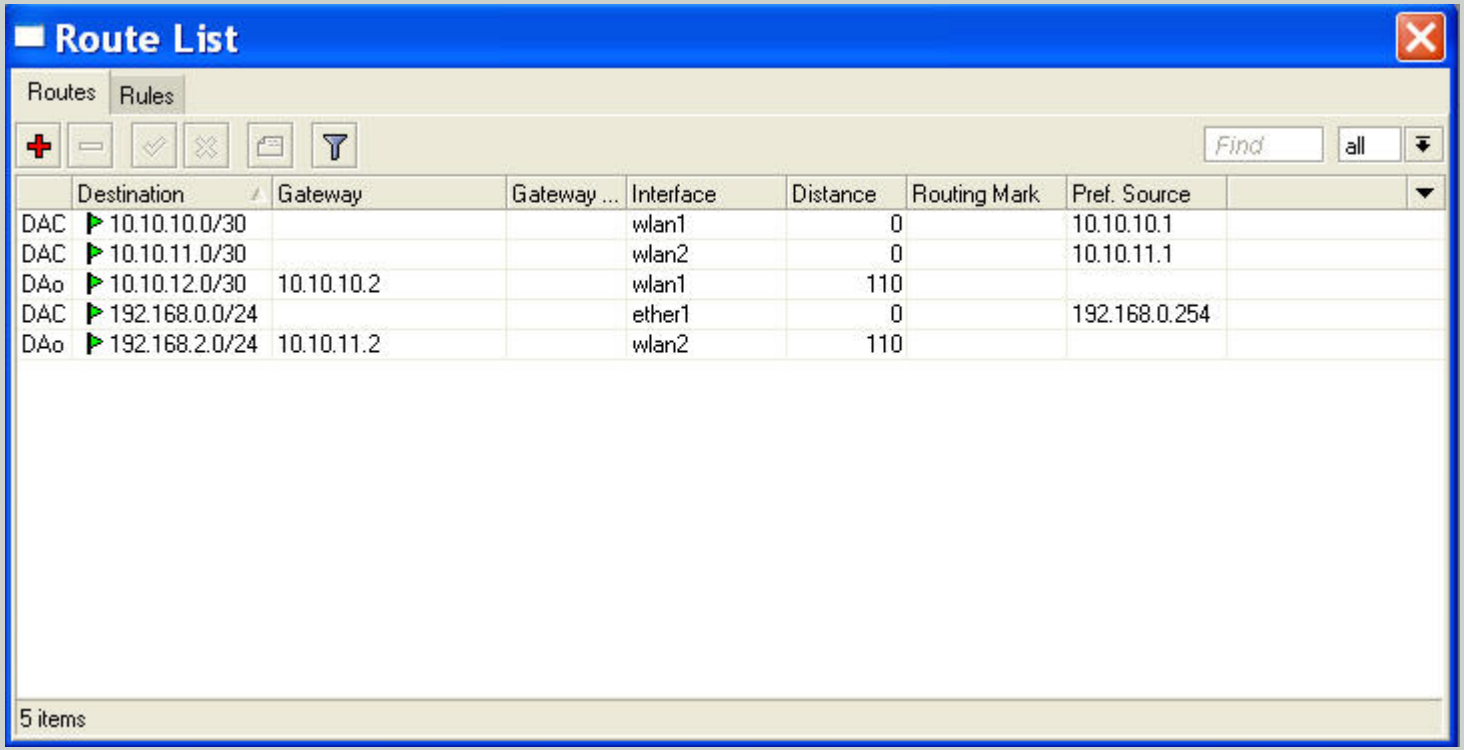
- OSPF network 2



- OSPF routes

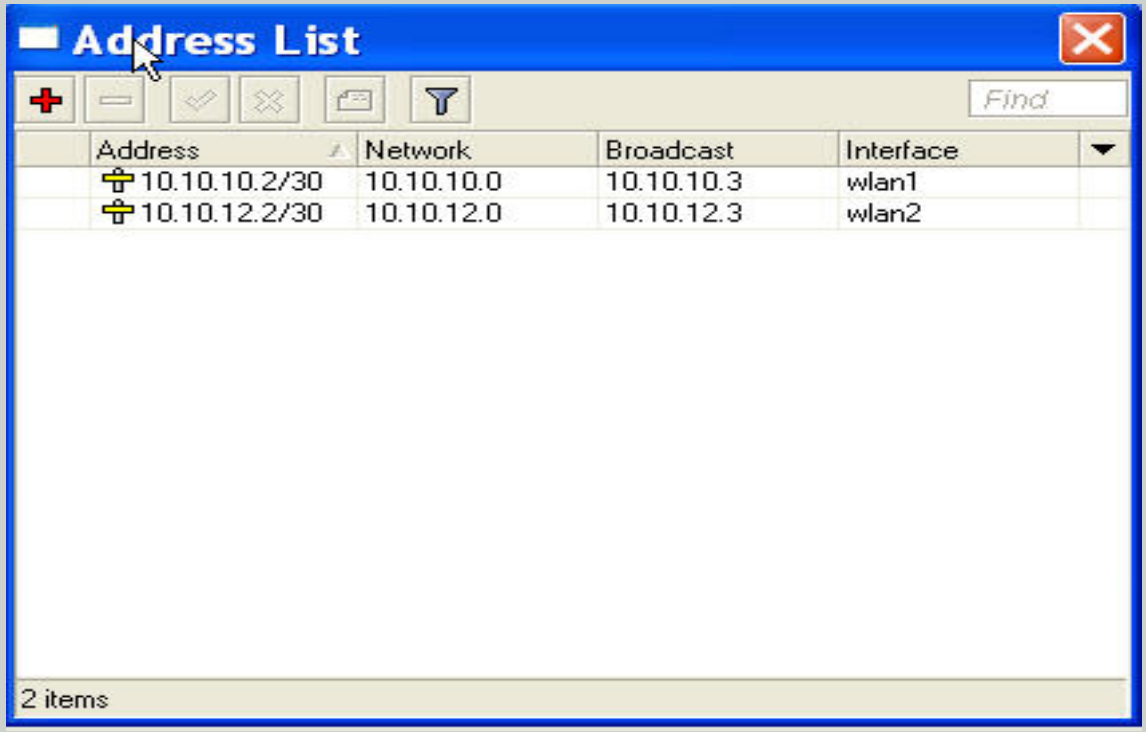

OSPF
Area Ranges
Virtual Links
Neighbors
NBMA Neighbors
LSA
Routes
ASBR Routers
OSPF Routers
...
Find
all
Area
Destination
Gateway
Interface
Cost
State
0.0.0.0/0 0.0.0.0 1 imported
192.168.0.0/24 0.0.0.0 20 imported
192.168.2.0/24 10.10.11.2 wlan2 70 ext 1
backbone 10.10.10.0/30 0.0.0.0 wlan1 10 intra area
backbone 10.10.11.0/30 0.0.0.0 wlan2 50 intra area
backbone 10.10.12.0/30 10.10.10.2 wlan1 110 intra area
6 items

- Route list

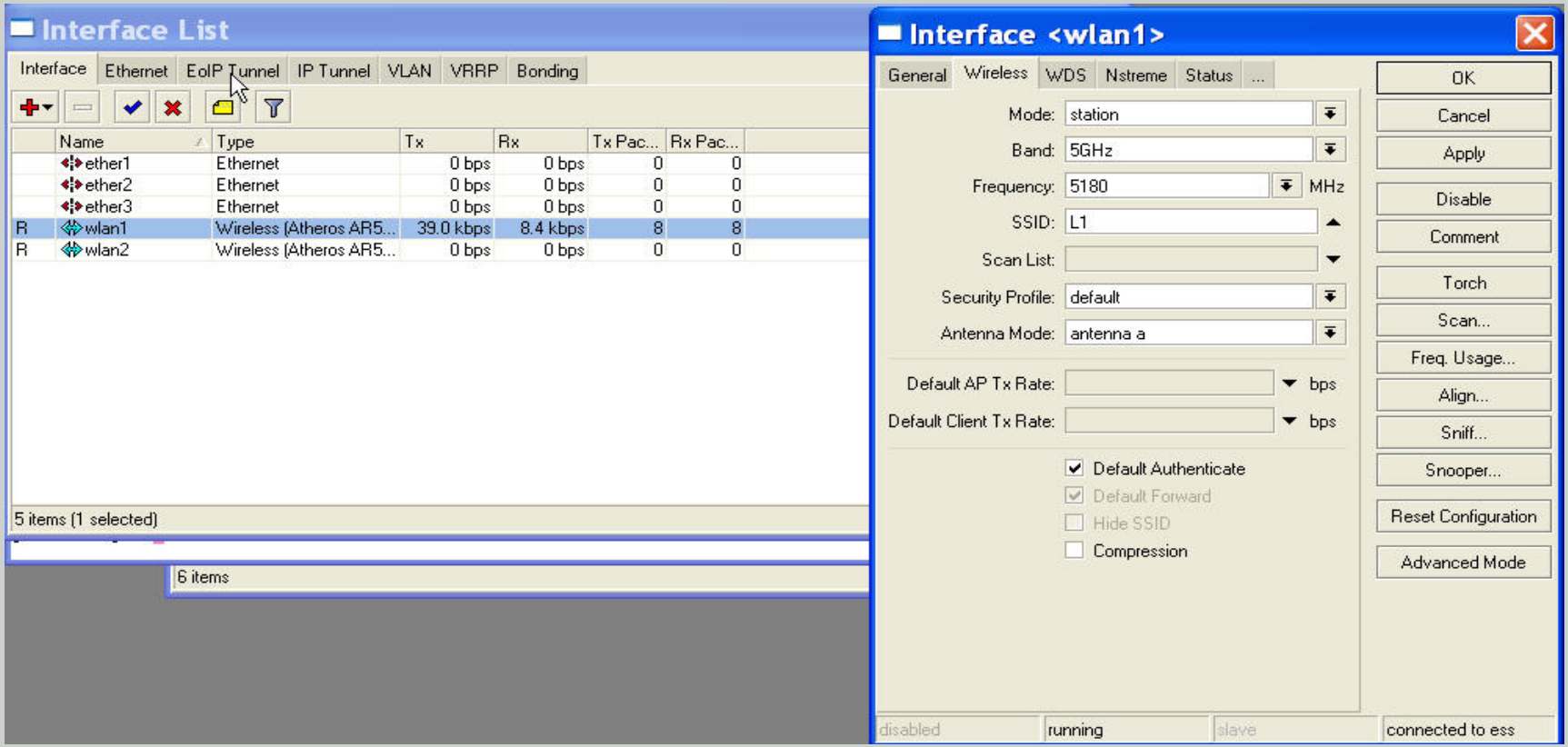

Route List
Routes
Rules
Find
all
Destination
Gateway
Gateway ...
Interface
Distance
Routing Mark
Pref. Source
DAC 10.10.10.0/30 wlan1 0 10.10.10.1
DAC 10.10.11.0/30 wlan2 0 10.10.11.1
DAo 10.10.12.0/30 10.10.10.2 wlan1 110
DAC 192.168.0.0/24 ether1 0 192.168.0.254
DAo 192.168.2.0/24 10.10.11.2 wlan2 110
5 items

Configuration of R2

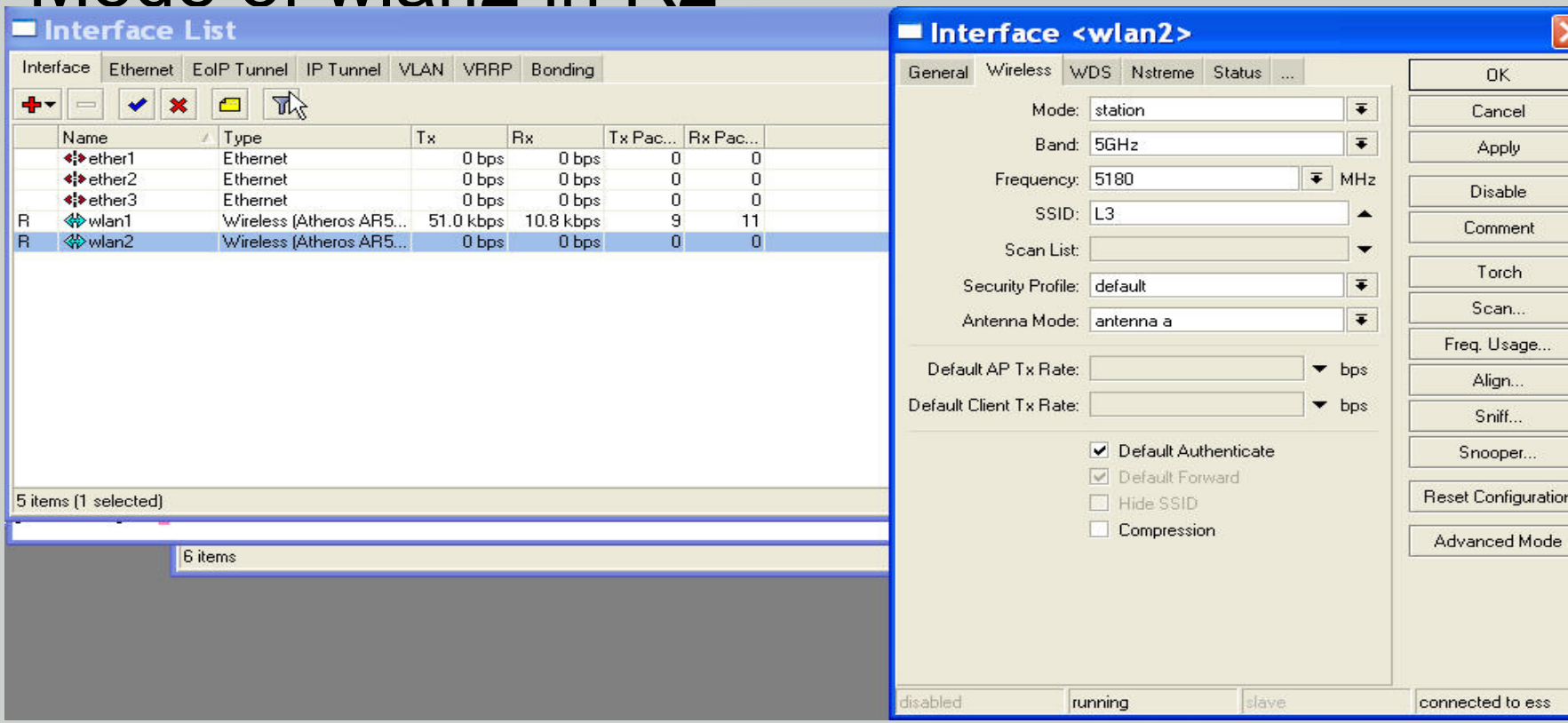
- IP interface of R2



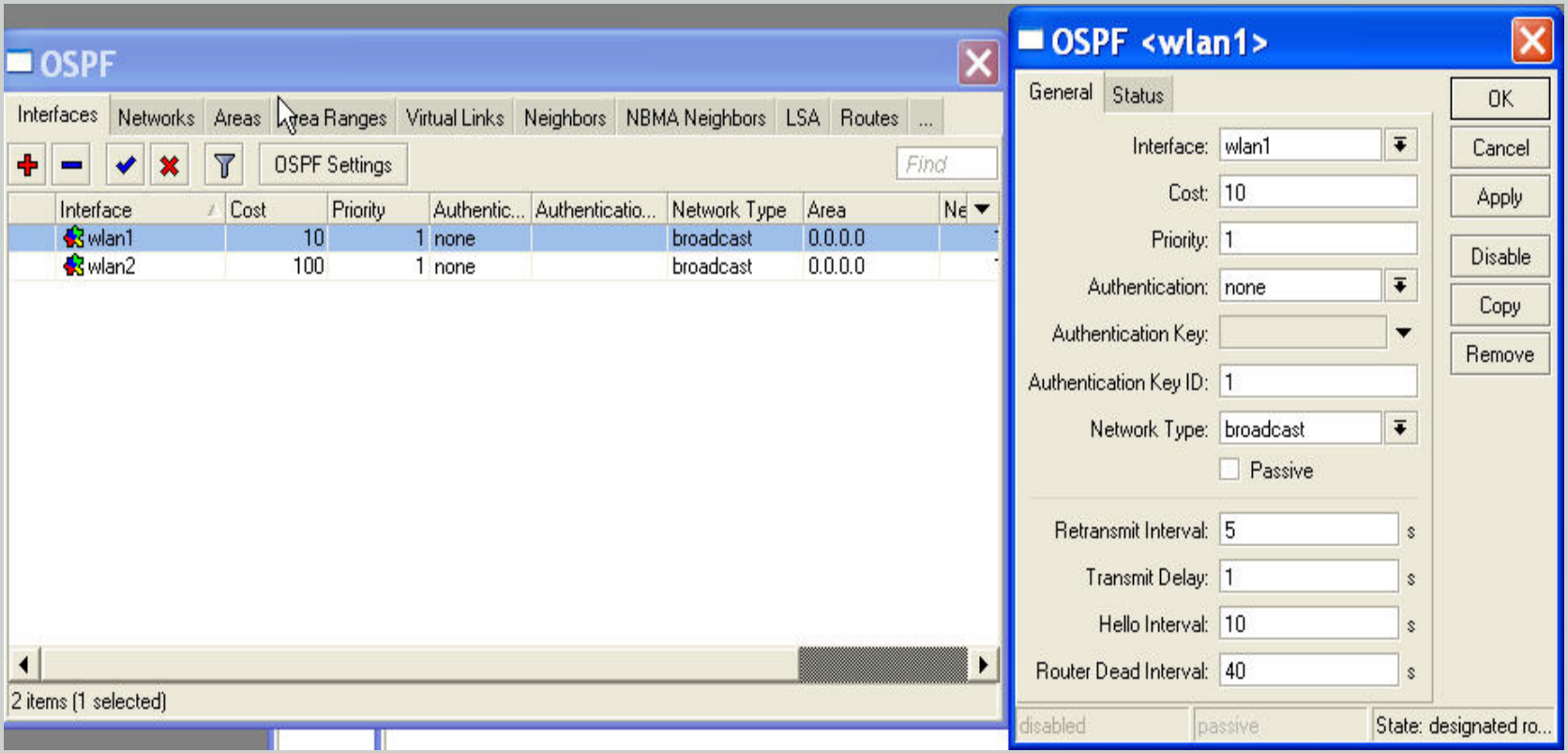
- Mode of wlan1 in R2



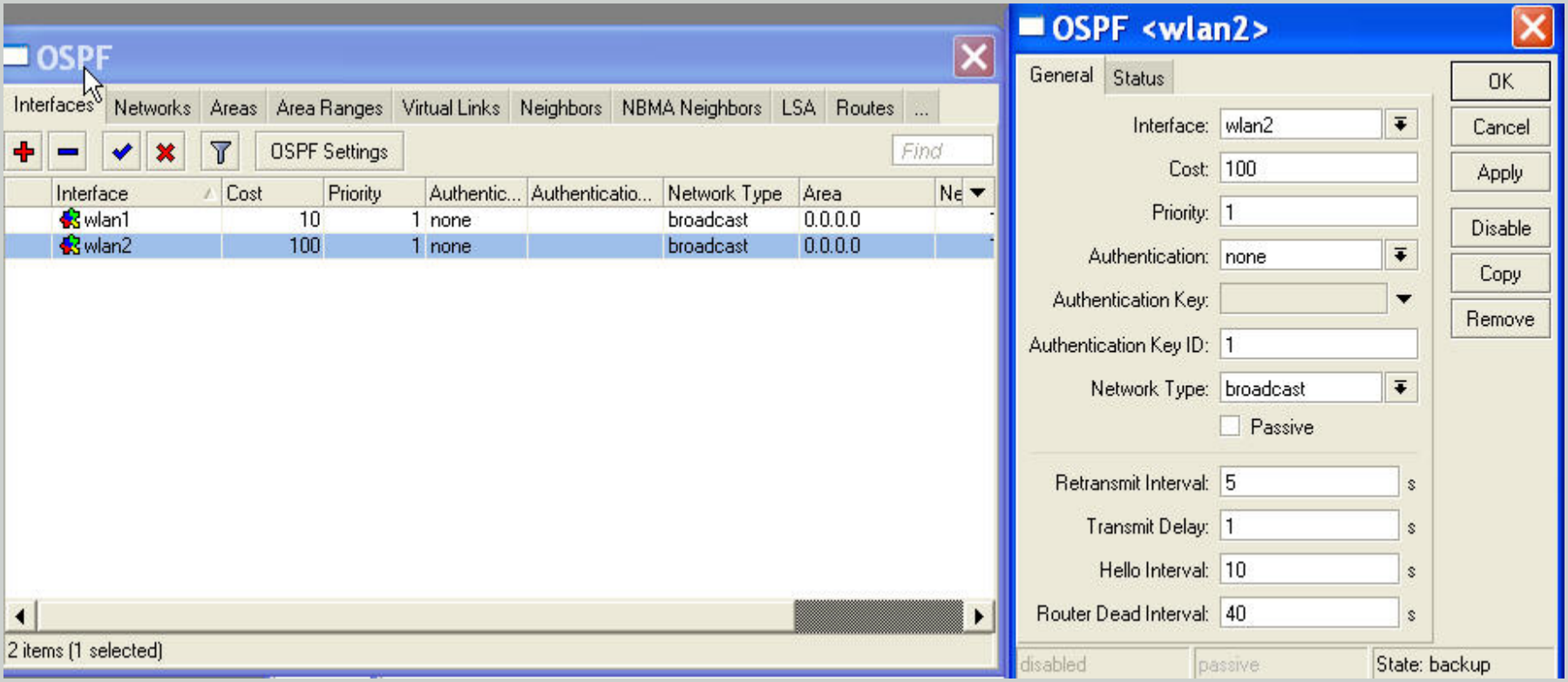
- Mode of wlan2 in R2



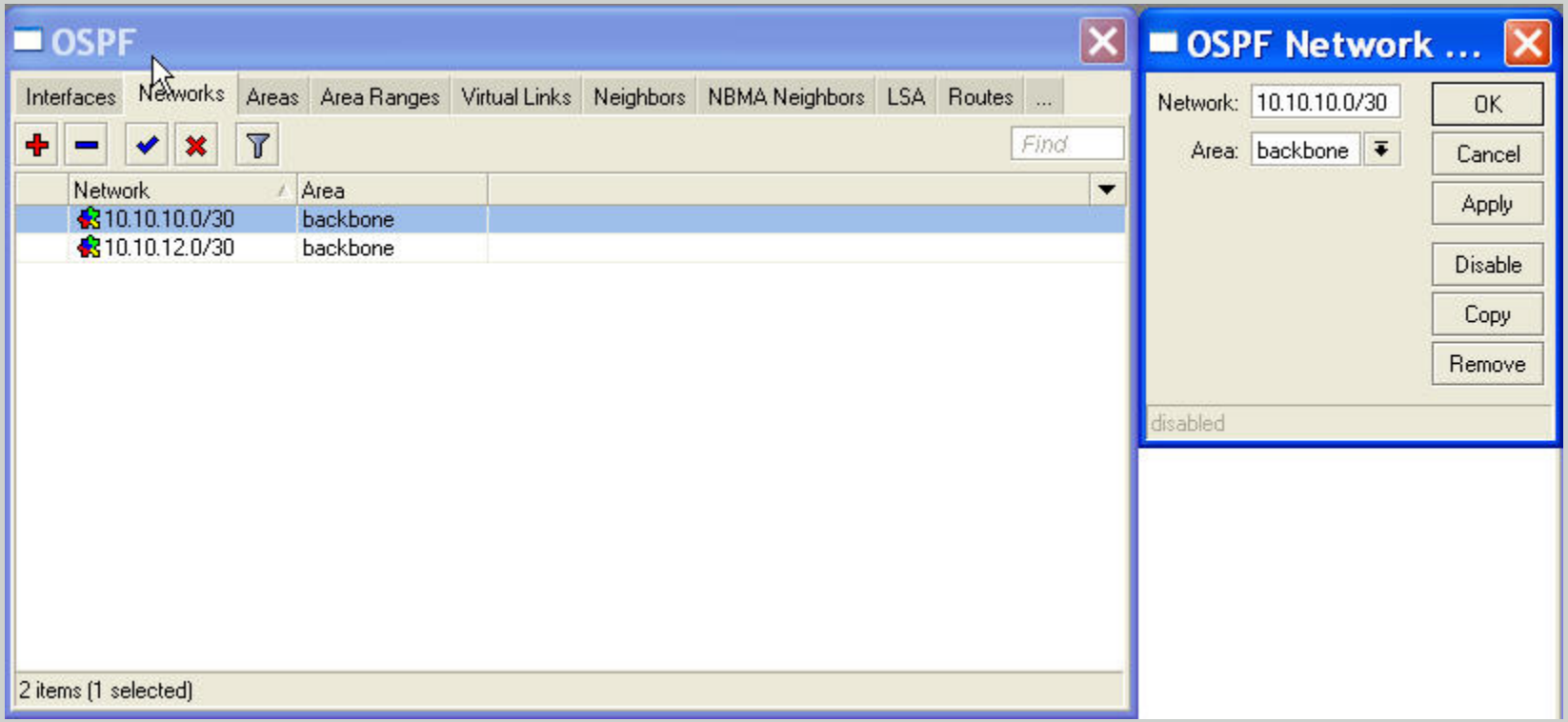
- OSPF cost of wlan1



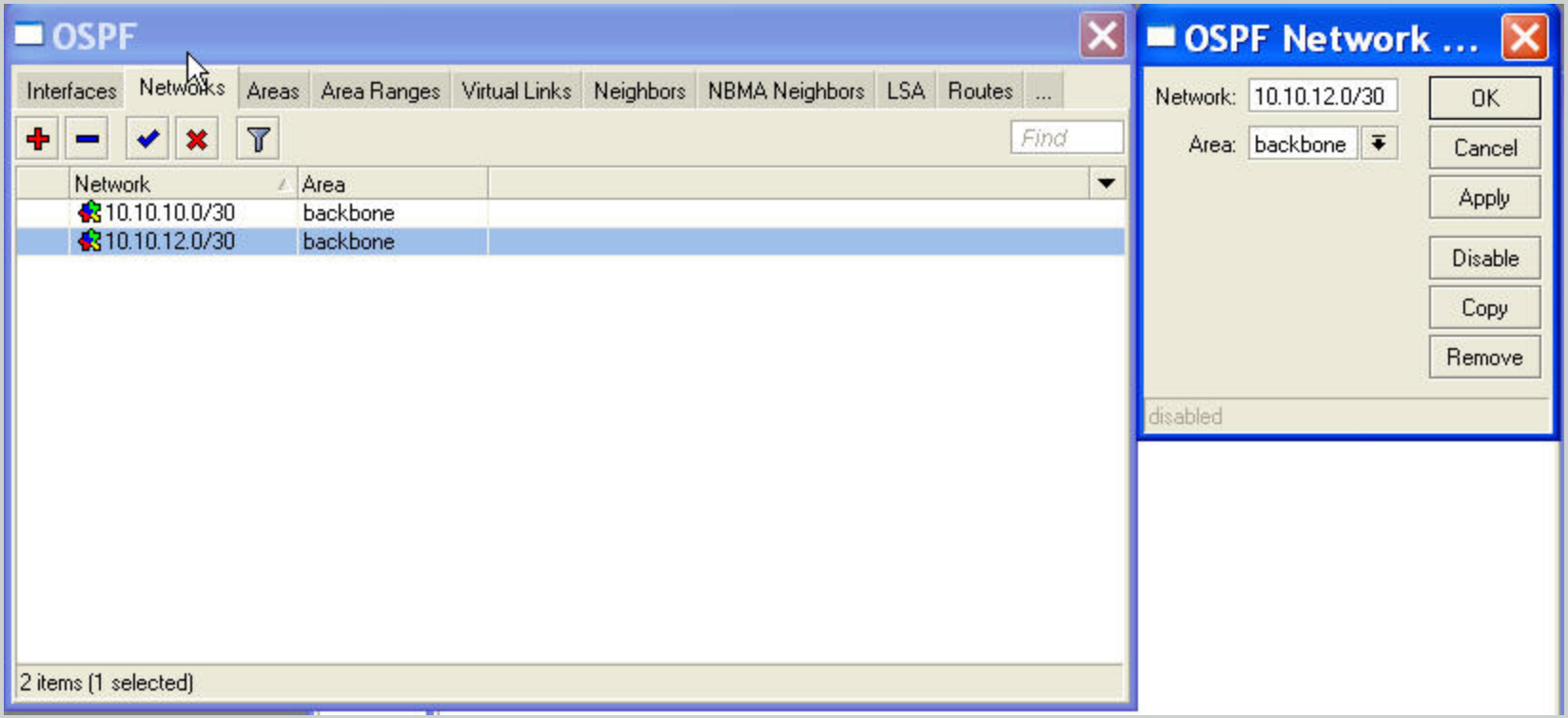
- OSPF cost of wlan2



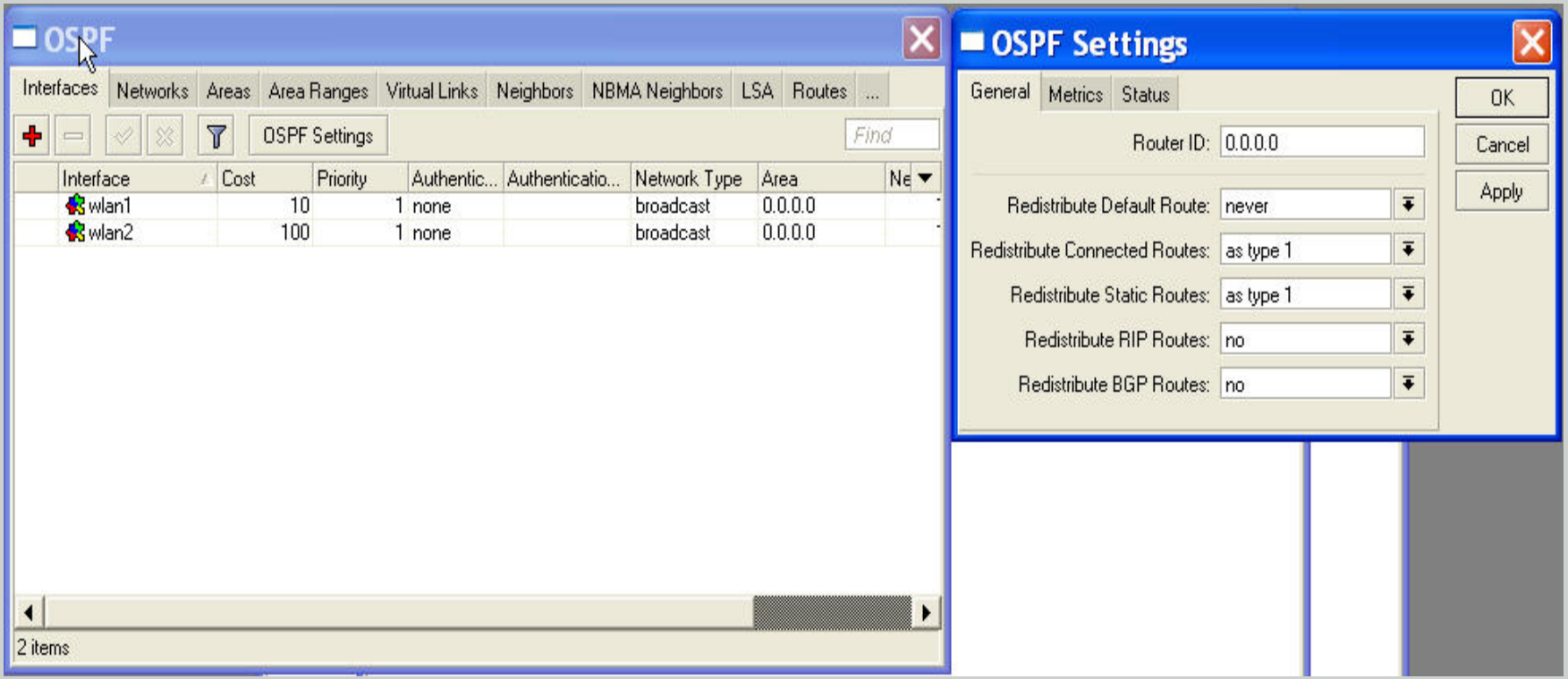
- OSPF network 1



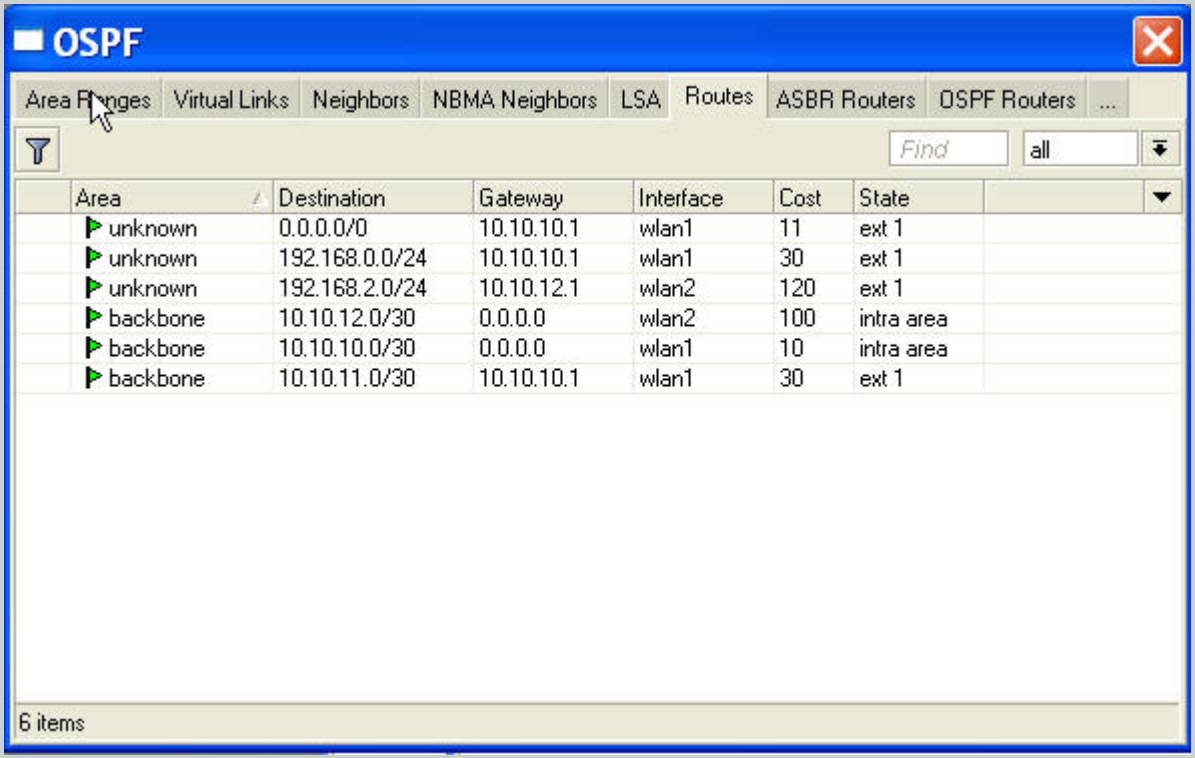
- OSPF network 2



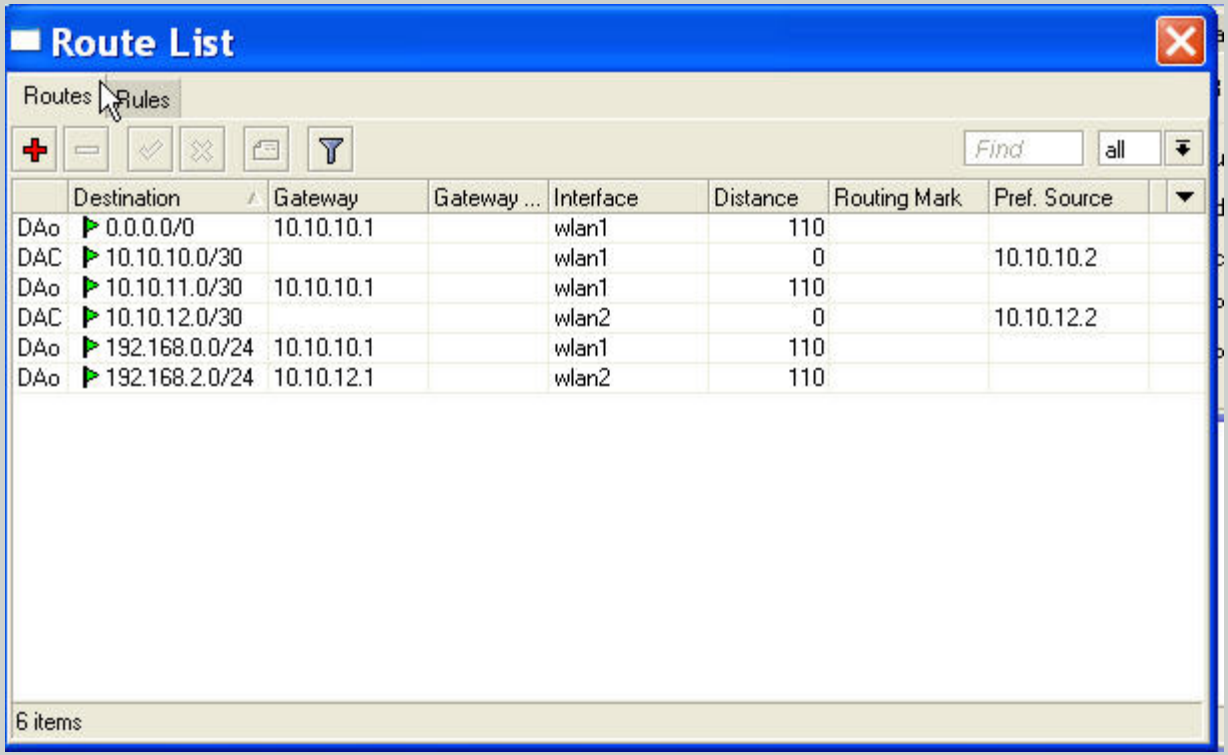
- Redistribute



- OSPF routes

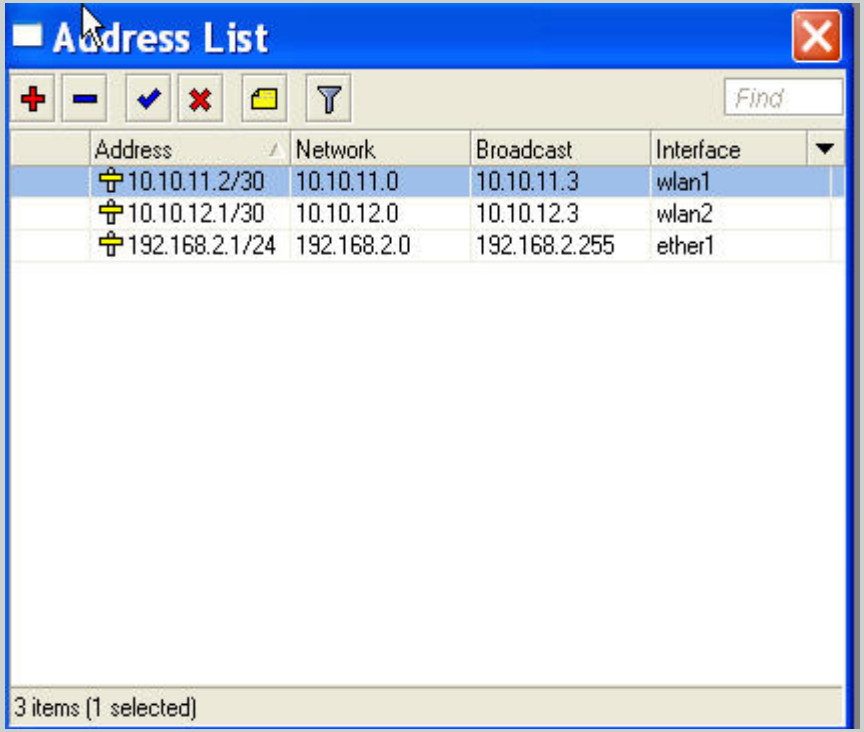

OSPF
Area Ranges
Virtual Links
Neighbors
NBMA Neighbors
LSA
Routes
ASBR Routers
OSPF Routers
...
Find
all
Area
Destination
Gateway
Interface
Cost
State
unknown 0.0.0.0/0 10.10.10.1 wlan1 11 ext 1
unknown 192.168.0.0/24 10.10.10.1 wlan1 30 ext 1
unknown 192.168.2.0/24 10.10.12.1 wlan2 120 ext 1
backbone 10.10.12.0/30 0.0.0.0 wlan2 100 intra area
backbone 10.10.10.0/30 0.0.0.0 wlan1 10 intra area
backbone 10.10.11.0/30 10.10.10.1 wlan1 30 ext 1
6 items

- Route list

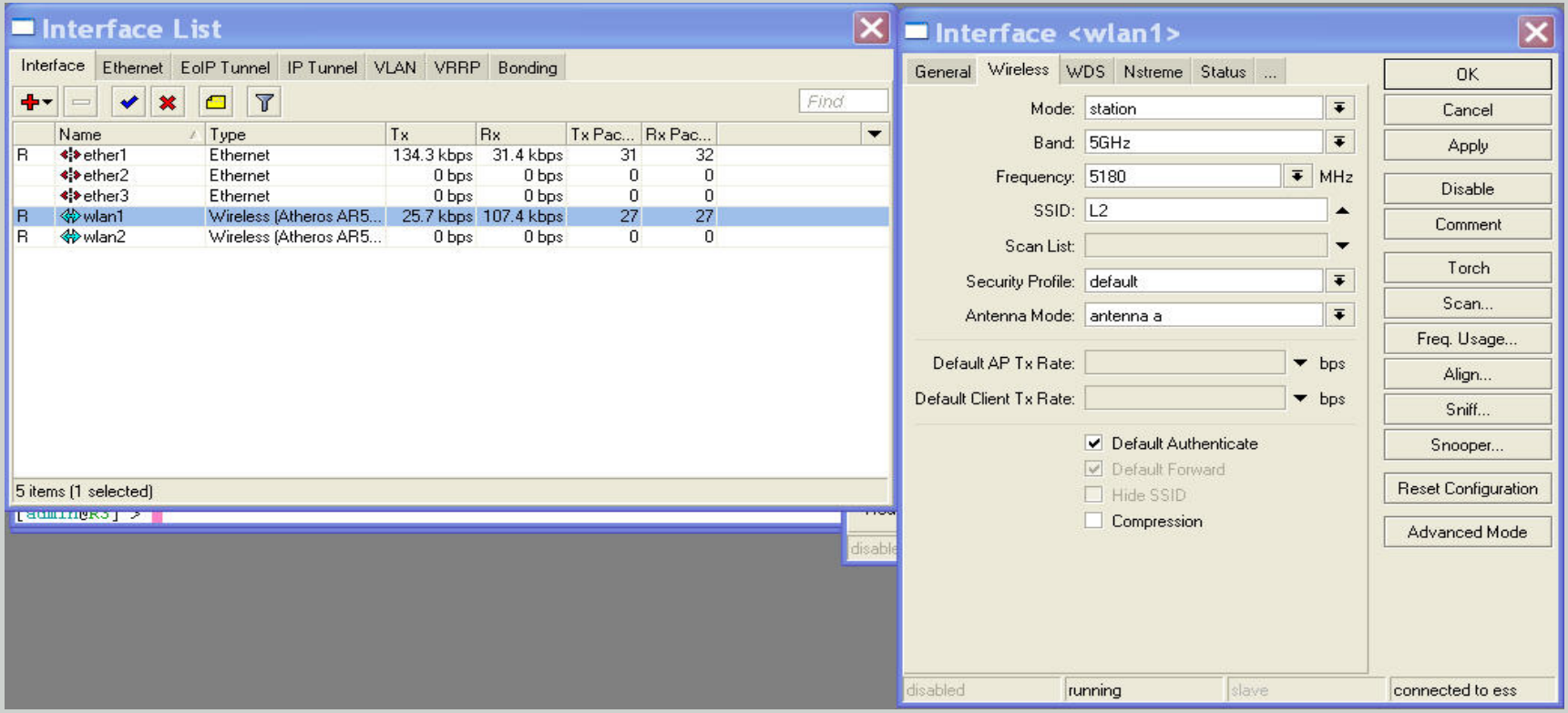

Route List
Routes
Rules
Find
all
Destination
Gateway
Gateway ...
Interface
Distance
Routing Mark
Pref. Source
DAo 0.0.0.0/0 10.10.10.1 wlan1 110
DAC 10.10.10.0/30 wlan1 0 10.10.10.2
DAo 10.10.11.0/30 10.10.10.1 wlan1 110
DAC 10.10.12.0/30 wlan2 0 10.10.12.2
DAo 192.168.0.0/24 10.10.10.1 wlan1 110
DAo 192.168.2.0/24 10.10.12.1 wlan2 110
6 items

Configuration of R3

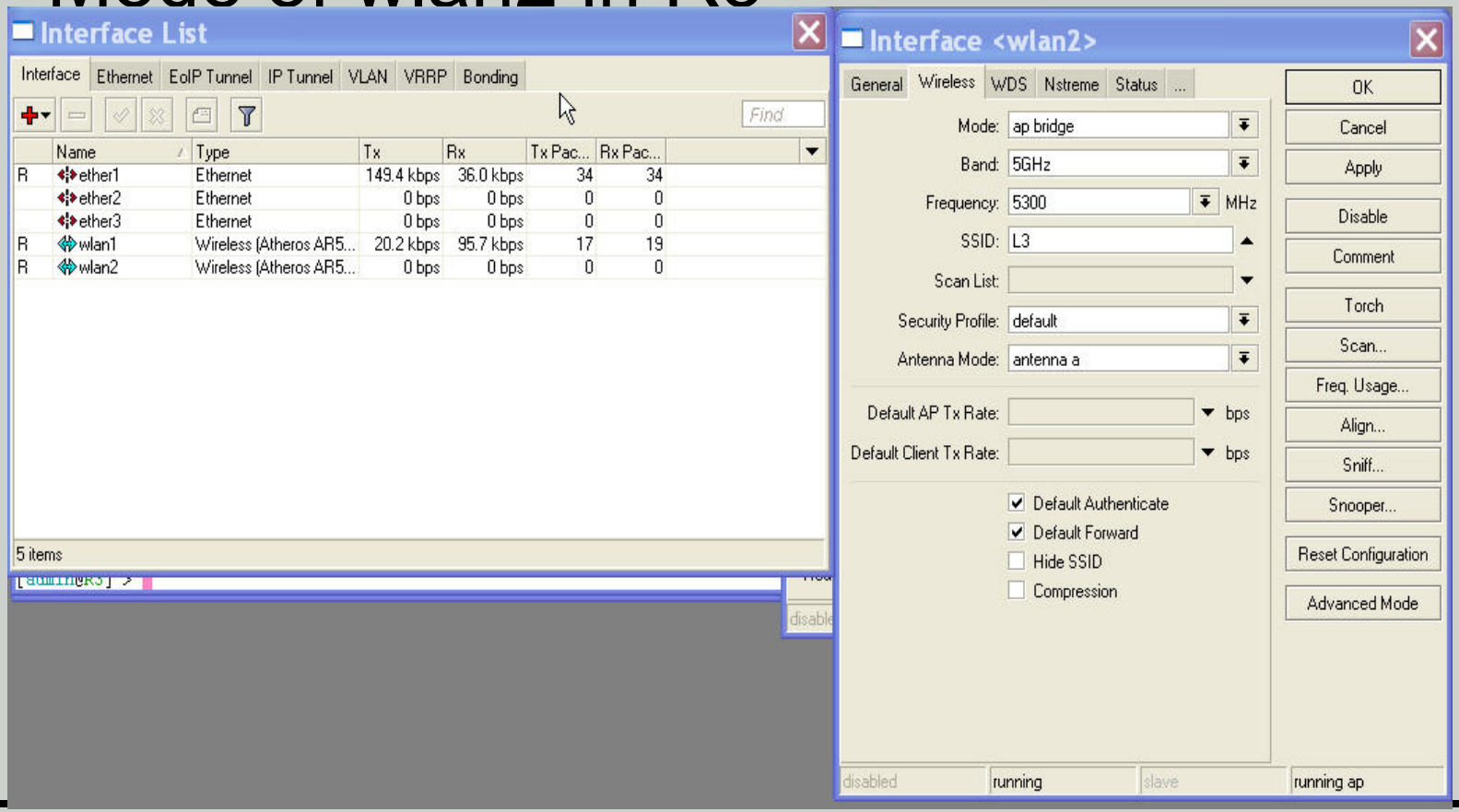
- IP interface of R3



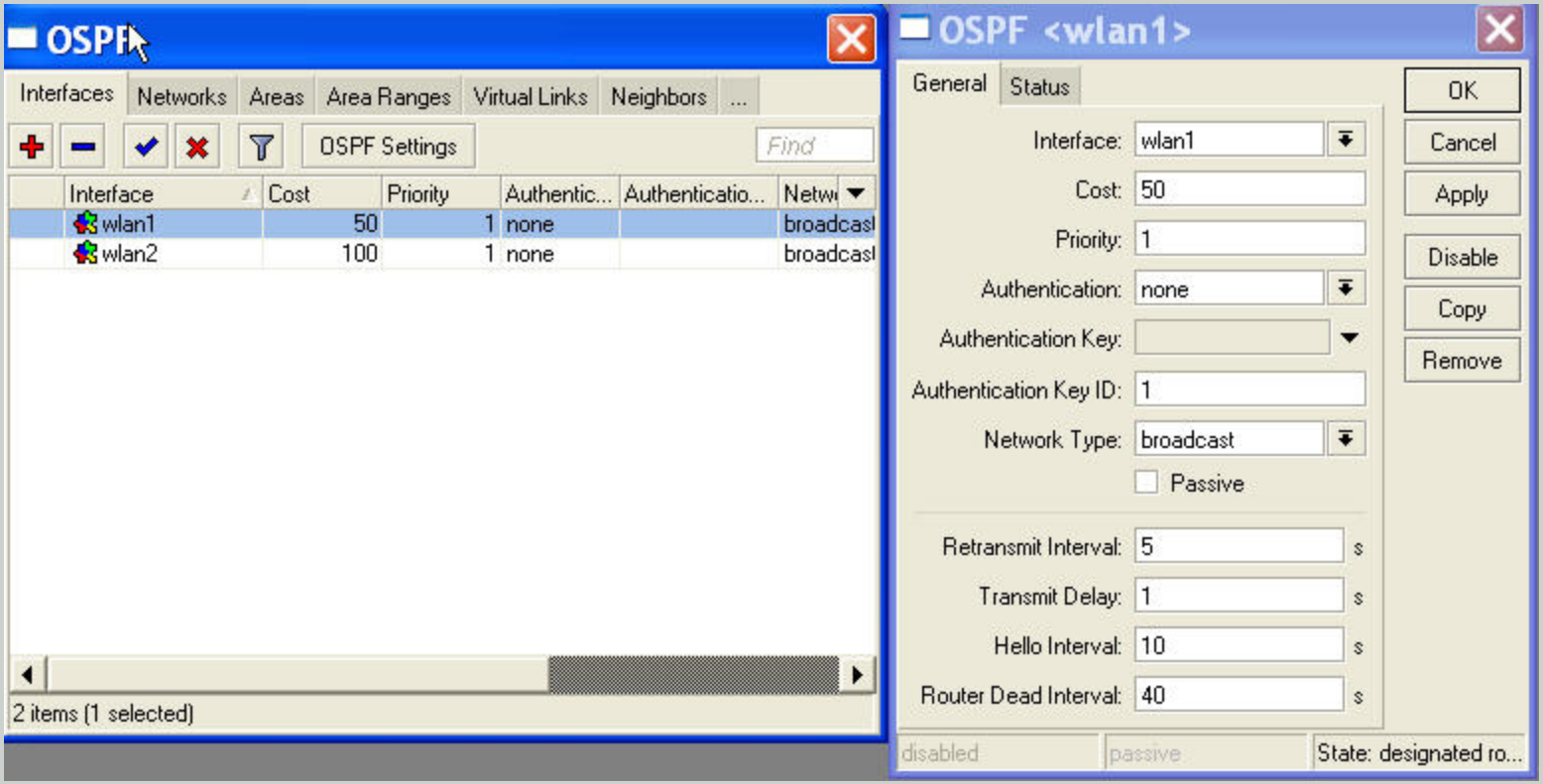
- Mode of wlan1 in R3



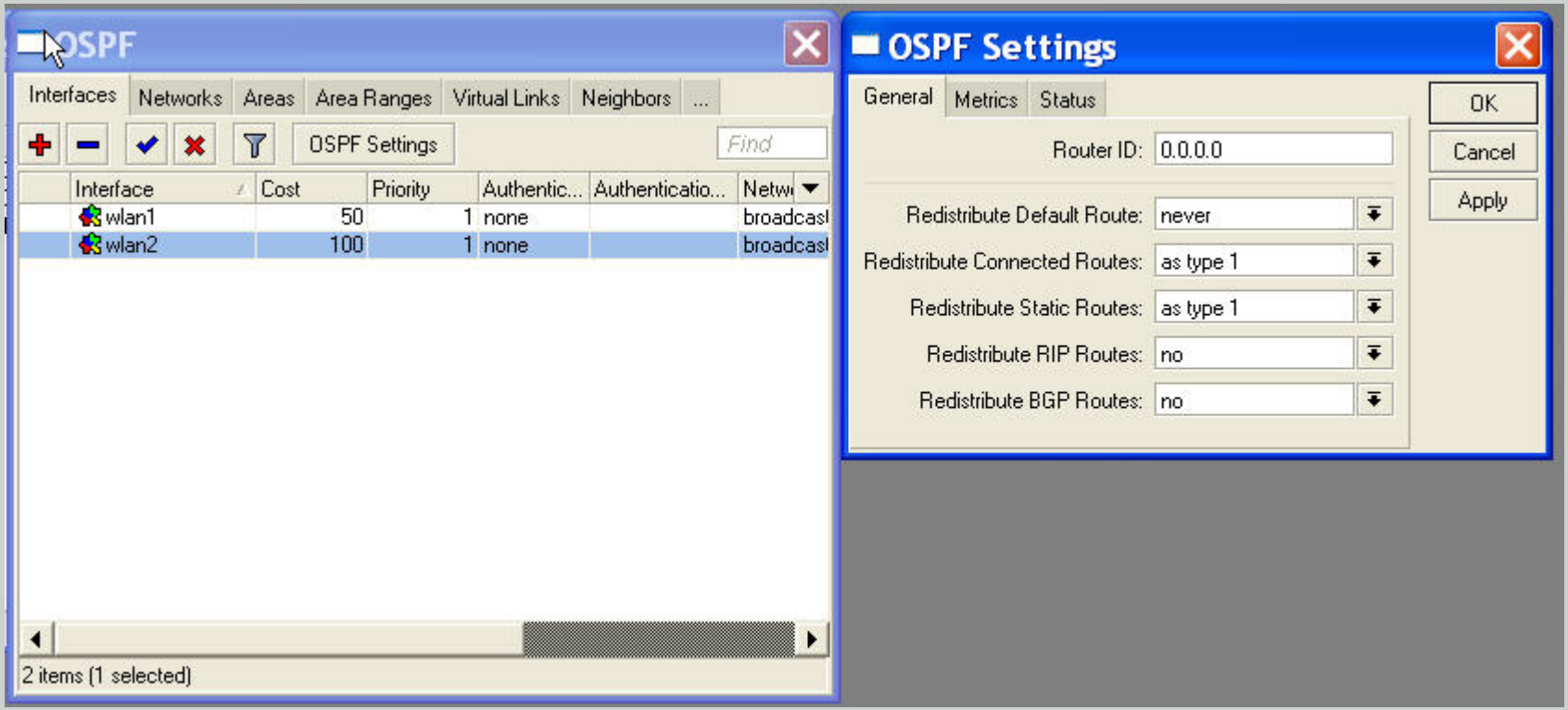
- Mode of wlan2 in R3



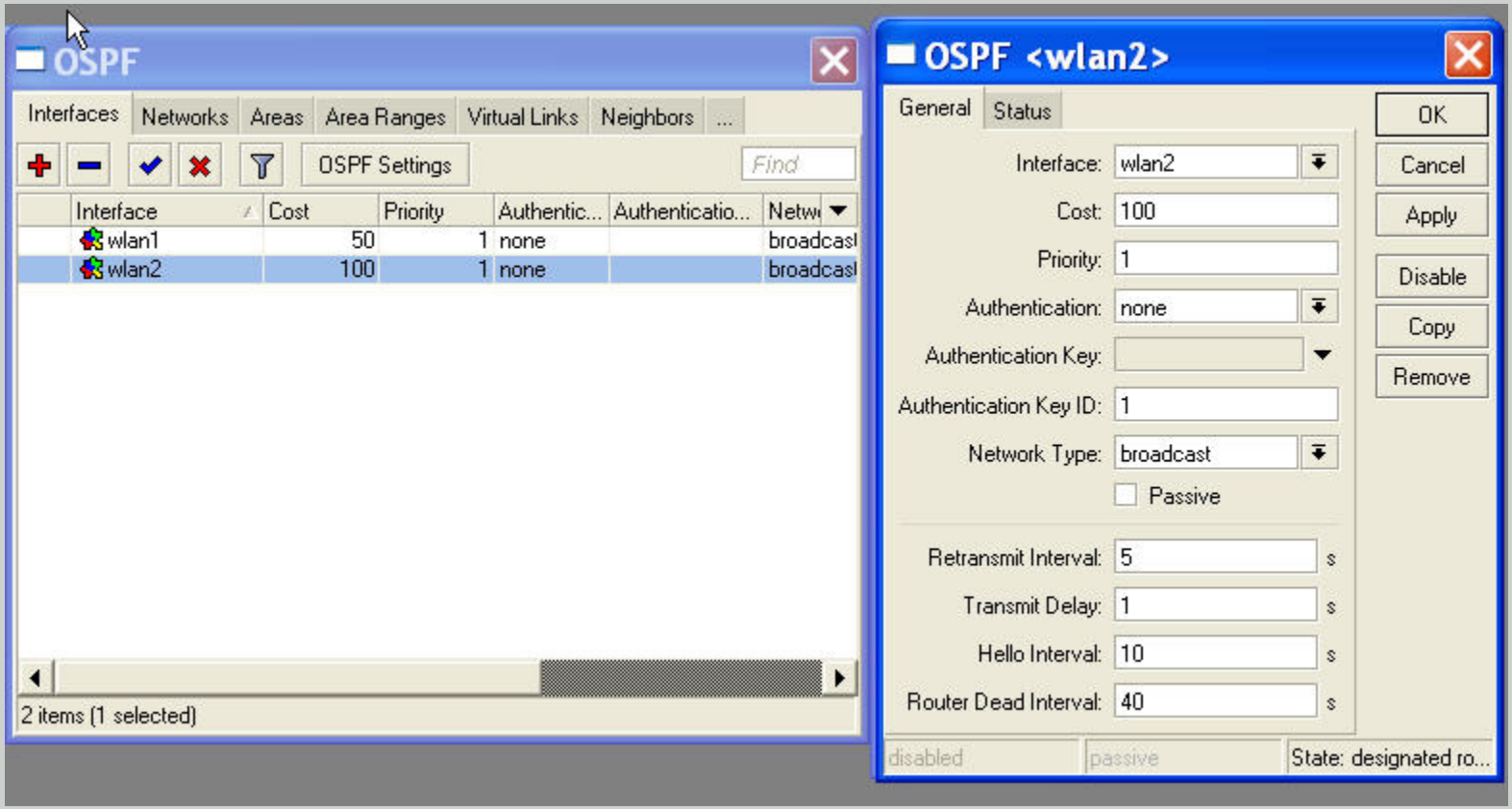
- OSPF Cost wlan1



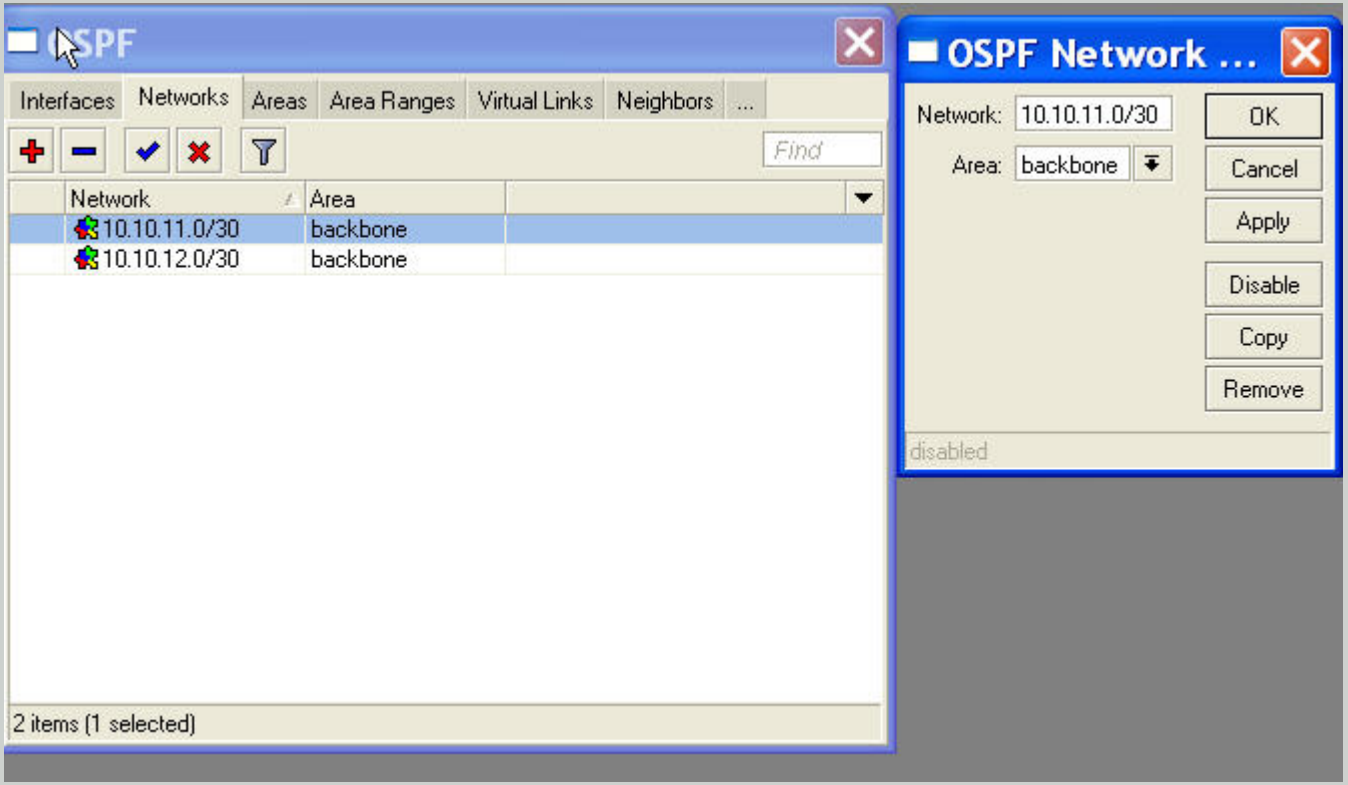
- Redistribute



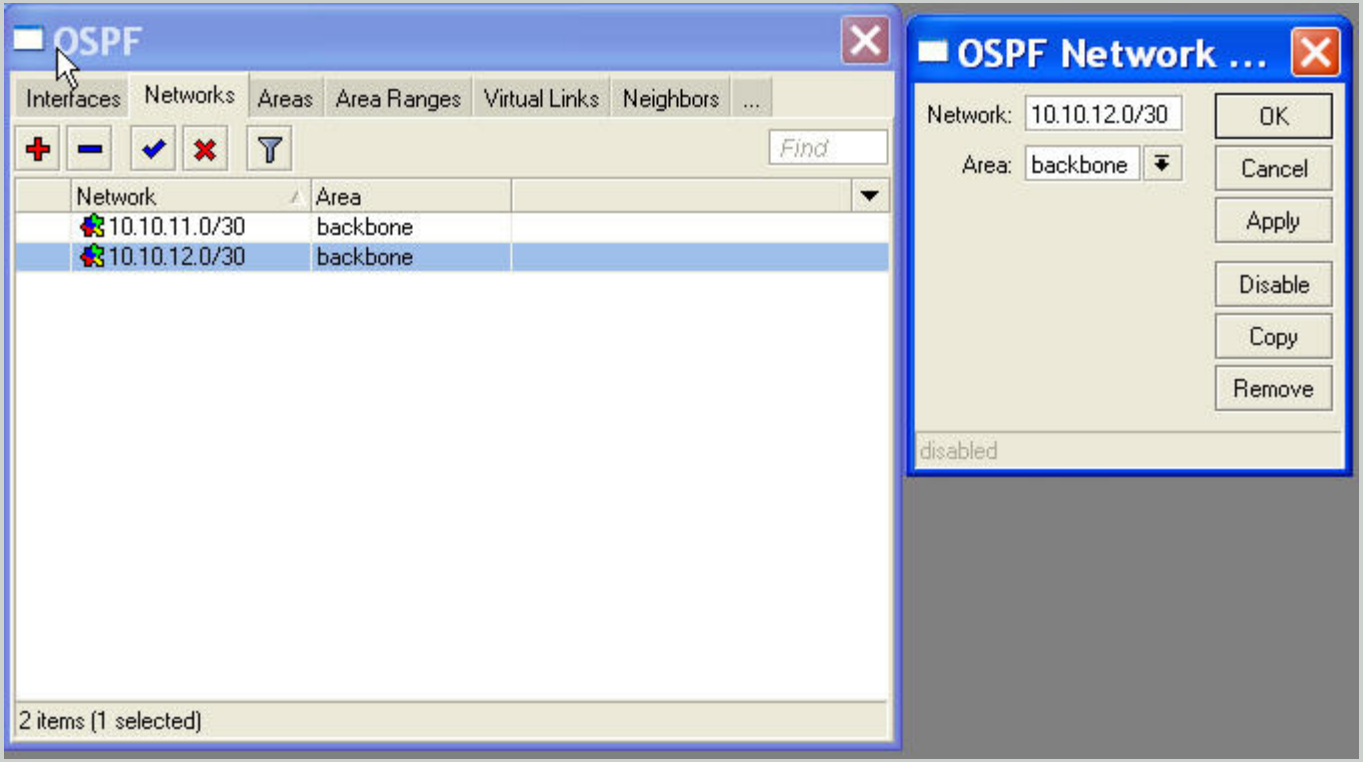
- OSPF cost wlan2



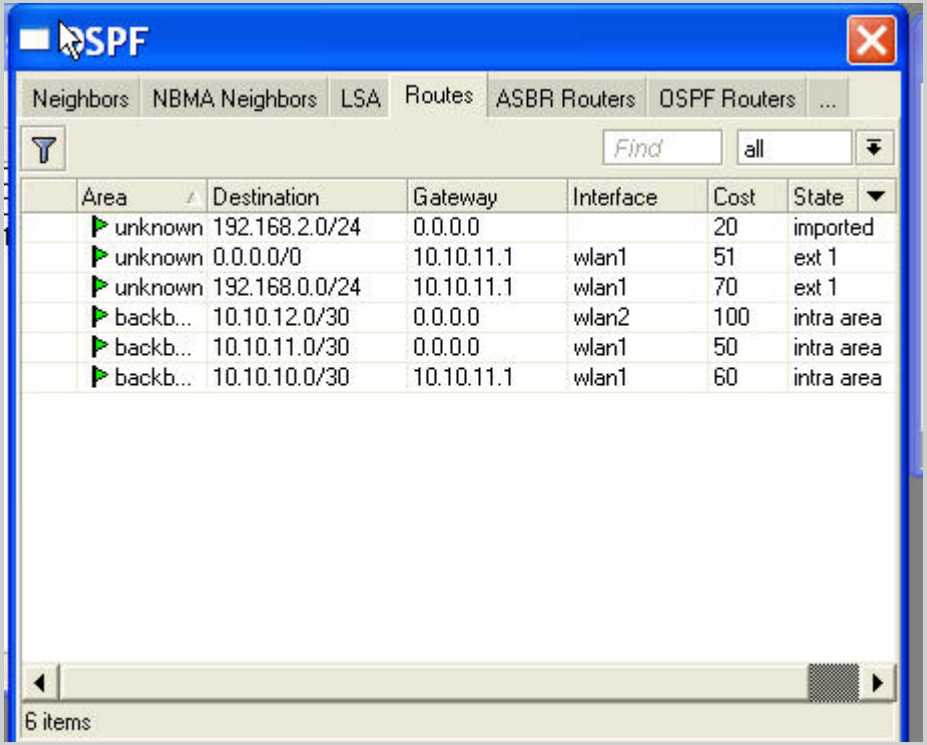
- OSPF network 1



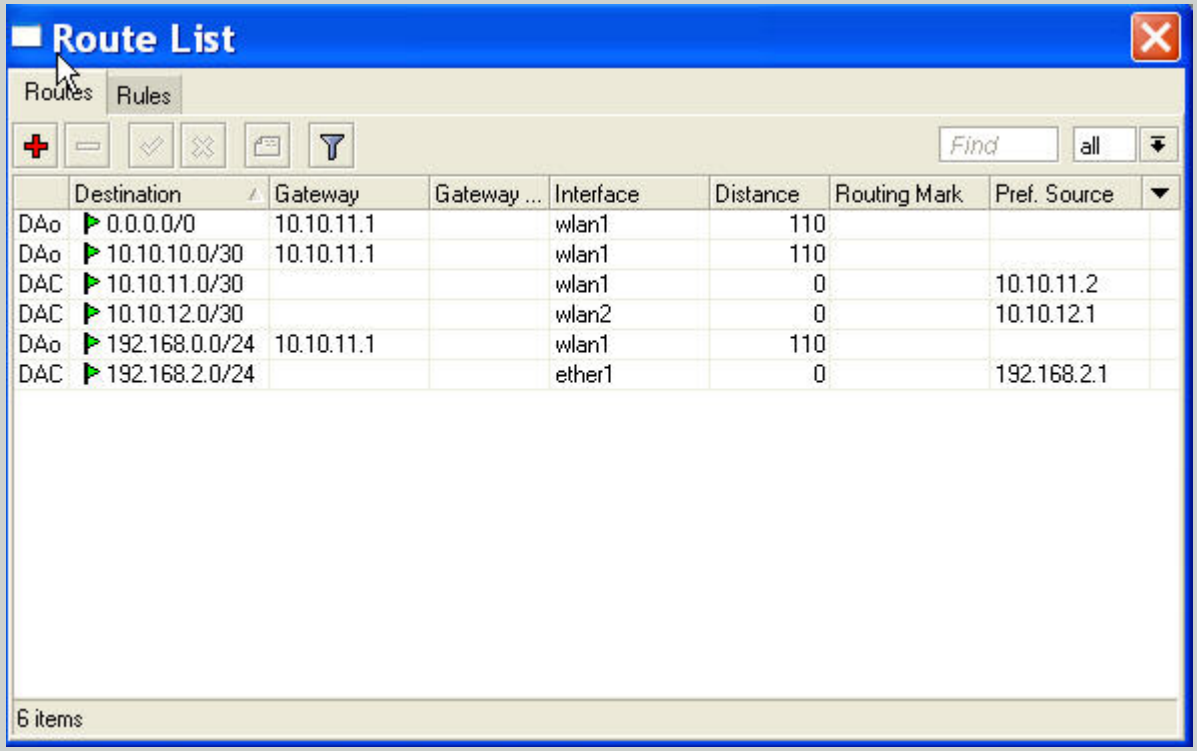
- OSPF network 2



- OSPF routes


OSPF
Neighbors
NBMA Neighbors
LSA
Routes
ASBR Routers
OSPF Routers
...
Find
all
Area
Destination
Gateway
Interface
Cost
State
unknown 192.168.2.0/24 0.0.0.0 20 imported
unknown 0.0.0.0/0 10.10.11.1 wlan1 51 ext 1
unknown 192.168.0.0/24 10.10.11.1 wlan1 70 ext 1
backb... 10.10.12.0/30 0.0.0.0 wlan2 100 intra area
backb... 10.10.11.0/30 0.0.0.0 wlan1 50 intra area
backb... 10.10.10.0/30 10.10.11.1 wlan1 60 intra area
6 items

- Route list


Route List
Routes
Rules
Find
all
Destination
Gateway
Gateway ...
Interface
Distance
Routing Mark
Pref. Source
DAo 0.0.0.0/0 10.10.11.1 wlan1 110
DAo 10.10.10.0/30 10.10.11.1 wlan1 110
DAC 10.10.11.0/30 wlan1 0 10.10.11.2
DAC 10.10.12.0/30 wlan2 0 10.10.12.1
DAo 192.168.0.0/24 10.10.11.1 wlan1 110
DAC 192.168.2.0/24 ether1 0 192.168.2.1
6 items

THANK YOU

Email : dutymlg@yahoo.com