

OSPF ROUTING

by

Antonius Duty S

SMK Telkom Sandhy Putra Malang

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 :

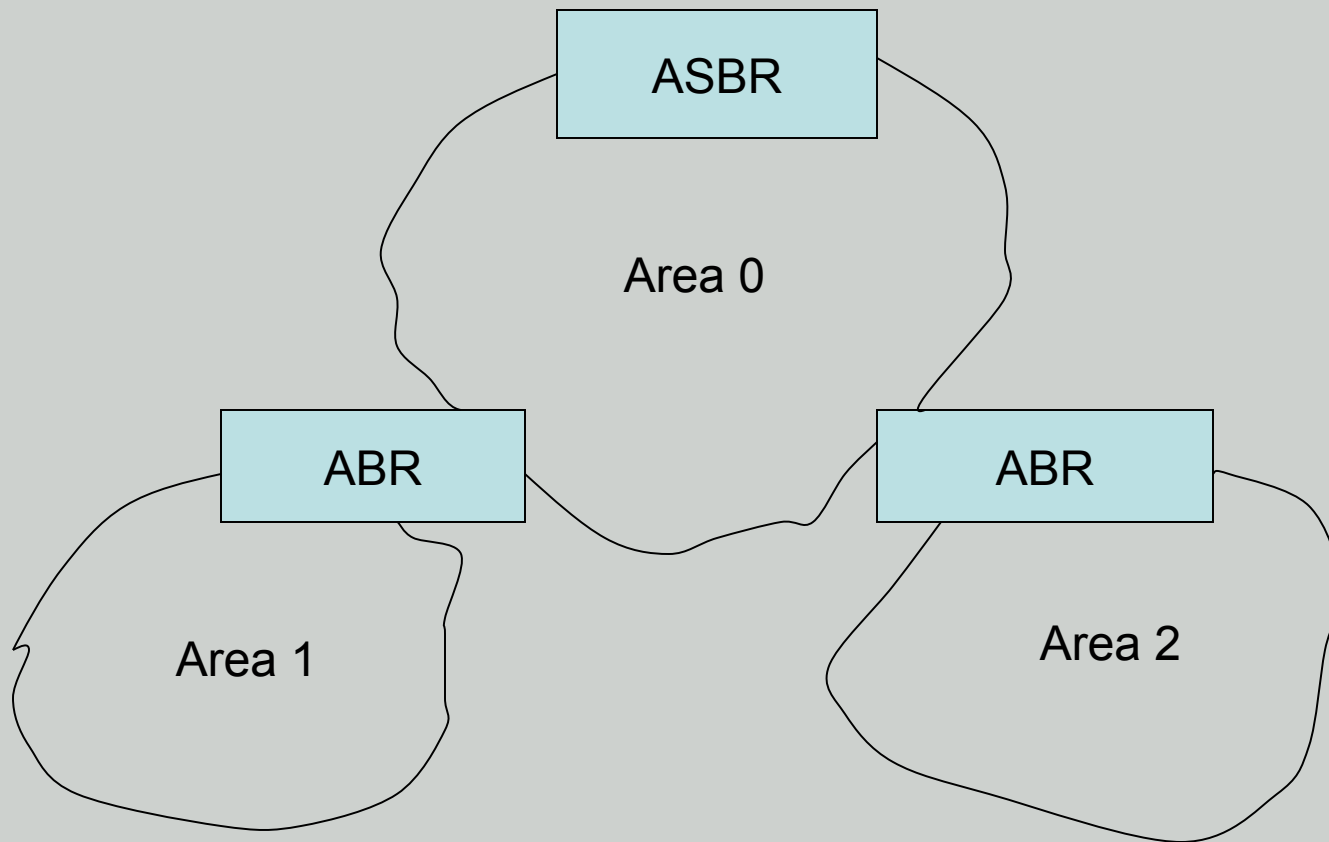
- ✓ SMK Telkom Sandhy Putra Malang
- ✓ STMIK Pradnya Paramita Malang
- ✓ Universitas Ma Chung Malang

- 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 .



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

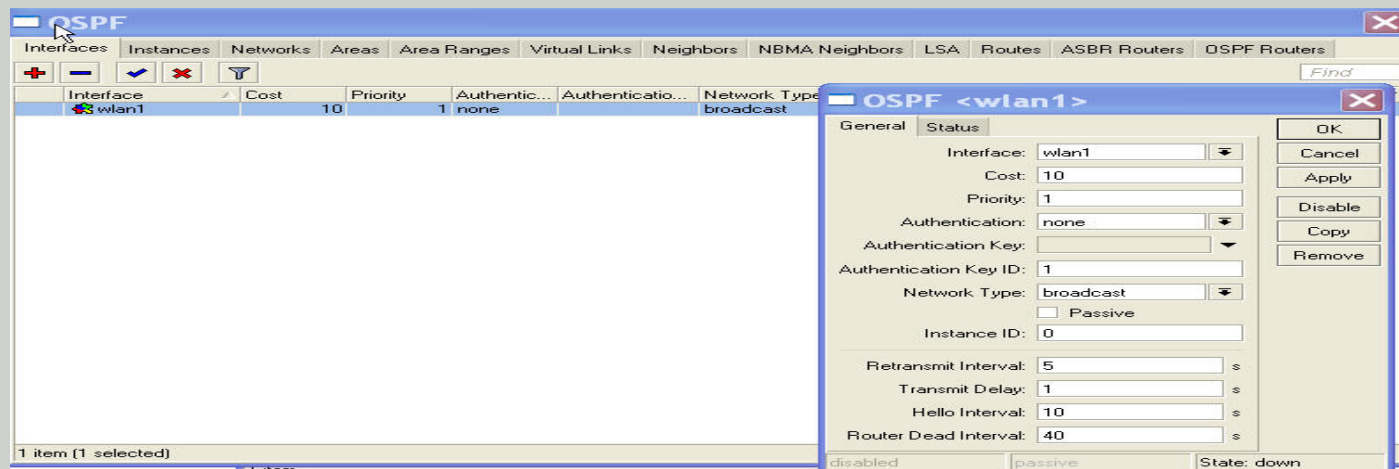
- Areas are defined by 32 bit numbers in IP address format.
- 0.0.0.0 reserved for the backbone area
- All areas must connect to area 0.0.0.0
- Configuration under
 - /routing ospf area
 - print
 - add name=internal1 area-id=0.0.0.0

OSPF Network

- Add networks to specify interfaces where you need OSPF running, and the area .
- The network address should include address of the interface
 - 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.

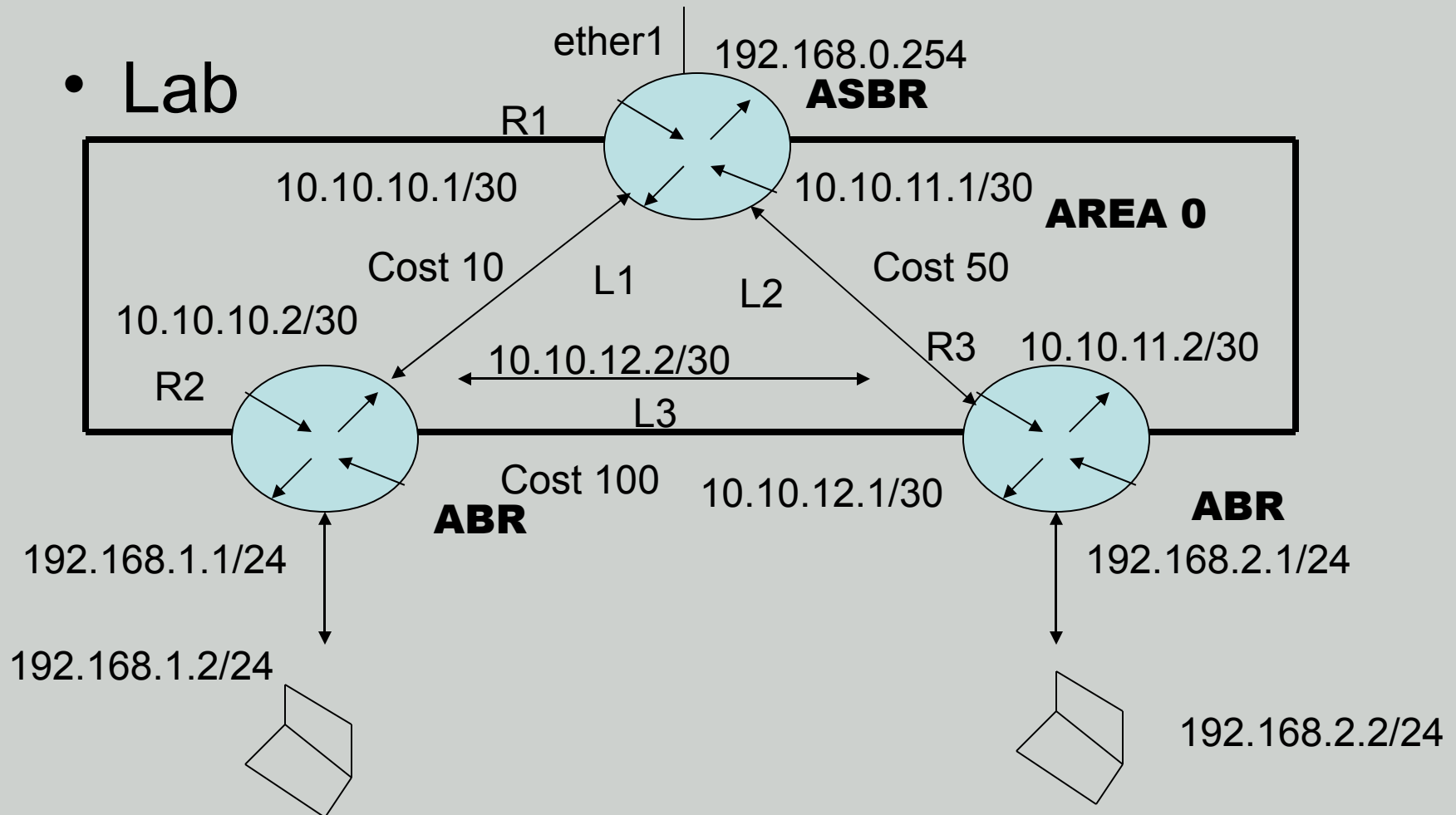
The screenshot shows the 'OSPF <wlan1>' configuration window. The 'General' tab is selected. The 'Interface' is set to 'wlan1'. The 'Cost' is 10, 'Priority' is 1, and 'Authentication' is set to 'none'. The 'Network Type' is 'broadcast'. The 'Hello Interval' is 7 seconds and the 'Router Dead Interval' is 10 seconds. The 'Instance ID' is 0. The 'Retransmit Interval' is 5 seconds and the 'Transmit Delay' is 1 second. The 'State' is 'down'.

Field	Value
Interface	wlan1
Cost	10
Priority	1
Authentication	none
Authentication Key	
Authentication Key ID	1
Network Type	broadcast
Passive	<input type="checkbox"/>
Instance ID	0
Retransmit Interval	5 s
Transmit Delay	1 s
Hello Interval	7 s
Router Dead Interval	10 s
State	down

OSPF Troubleshooting

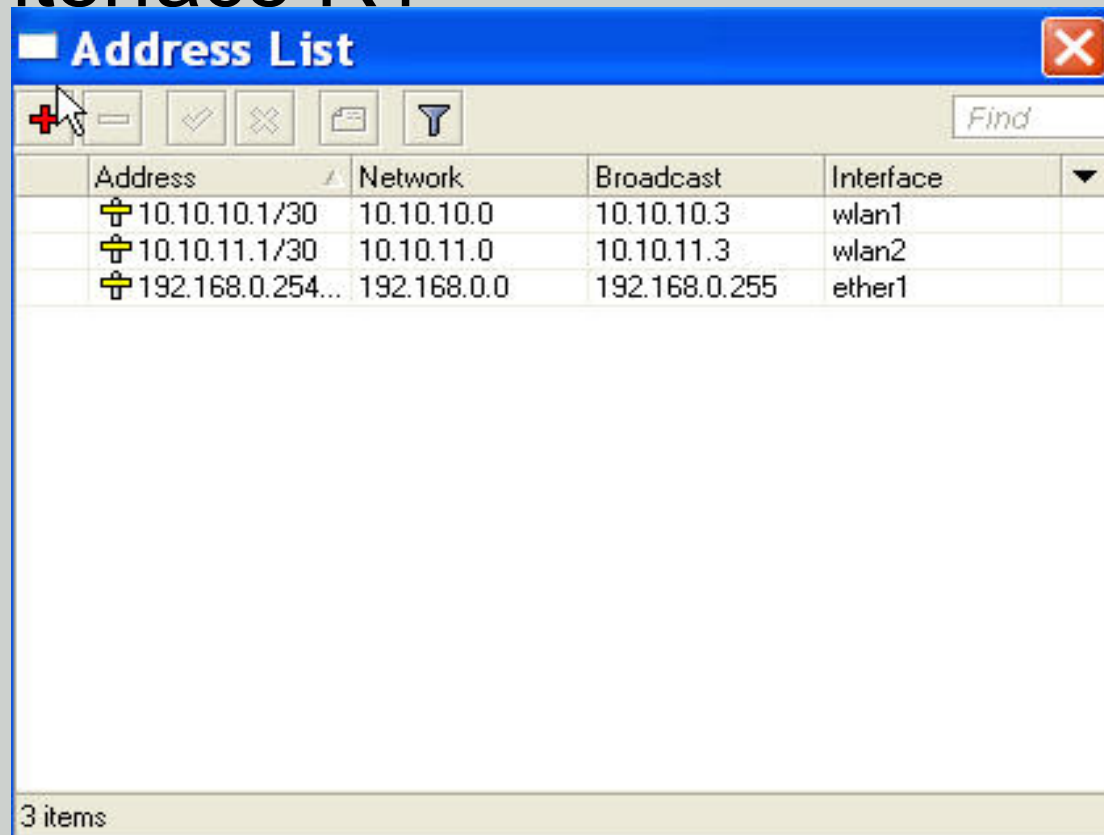
- Check MikroTik neighbors
 - /ip neighbor print
- Check OSPF neighbors
 - /routing ospf neighbor print
- Check routes
 - /ip route print
- Check logs
 - /log print

• Lab



Configuration of R1

- IP interface R1



Address	Network	Broadcast	Interface
10.10.10.1/30	10.10.10.0	10.10.10.3	wlan1
10.10.11.1/30	10.10.11.0	10.10.11.3	wlan2
192.168.0.254...	192.168.0.0	192.168.0.255	ether1

3 items

- Mode of wlan1 in R1

Interface List

Interface	Ethernet	EoIP Tunnel	IP Tunnel	VLAN	VRRP	Bonding
Name	Type	Tx	Rx	Tx Pac...	Rx Pac...	
ether1	Ethernet	0 bps	0 bps	0	0	
ether2	Ethernet	0 bps	0 bps	0	0	
ether3	Ethernet	0 bps	0 bps	0	0	
R wlan1	Wireless (Atheros AR5...	6.3 kbps	27.6 kbps	5	4	
R wlan2	Wireless (Atheros AR5...	66.9 kbps	17.0 kbps	17	21	

5 items (1 selected)

3 items

5 items

Interface <wlan1>

General Wireless WDS Nstreme Status ...

Mode: ap bridge

Band: 5GHz

Frequency: 5180 MHz

SSID: L1

Scan List:

Security Profile: default

Antenna Mode: antenna a

Default AP Tx Rate: bps

Default Client Tx Rate: bps

☒ Default Authenticate
☒ Default Forward
☐ Hide SSID
☐ Compression

disabled running slave running ap

• Mode of wlan2 in R1

Interface List

Interface Ethernet EoIP Tunnel IP Tunnel VLAN VRRP Bonding

Find

Name	Type	Tx	Rx	Tx Pac...	Rx Pac...
ether1	Ethernet	0 bps	0 bps	0	0
ether2	Ethernet	0 bps	0 bps	0	0
ether3	Ethernet	0 bps	0 bps	0	0
R wlan1	Wireless (Atheros AR5...	6.8 kbps	31.1 kbps	7	7
R wlan2	Wireless (Atheros AR5...	72.2 kbps	17.1 kbps	19	18

5 items (1 selected)

3 items

5 items

Interface <wlan2>

General Wireless WDS Nstreme Status ...

Mode: ap bridge

Band: 5GHz

Frequency: 5200 MHz

SSID: L2

Scan List:

Security Profile: default

Antenna Mode: antenna a

Default AP Tx Rate: bps

Default Client Tx Rate: bps

☒ Default Authenticate
☒ Default Forward
☐ Hide SSID
☐ Compression

disabled running slave running ap

- Cost OSPF of wlan1

OSPF

Interfaces

Networks

Areas

Area Ranges

Virtual Links

Neighbors

NBMA Neighbors

LSA

Routes

...

+

-

✓

✗

⌵

OSPF Settings

Find

Interface	Cost	Priority	Authentic...	Authenticatio...	Network Type	Area	Ne
wlan1	10	1	none		broadcast	0.0.0.0	
wlan2	50	1	none		broadcast	0.0.0.0	

2 items (1 selected)

OSPF <wlan1>

General

Status

Interface:

wlan1

Cost:

10

Priority:

1

Authentication:

none

Authentication Key:

Authentication Key ID:

1

Network Type:

broadcast

☐ Passive

Retransmit Interval:

5

s

Transmit Delay:

1

s

Hello Interval:

10

s

Router Dead Interval:

40

s

disabled

passive

State: backup

OK

Cancel

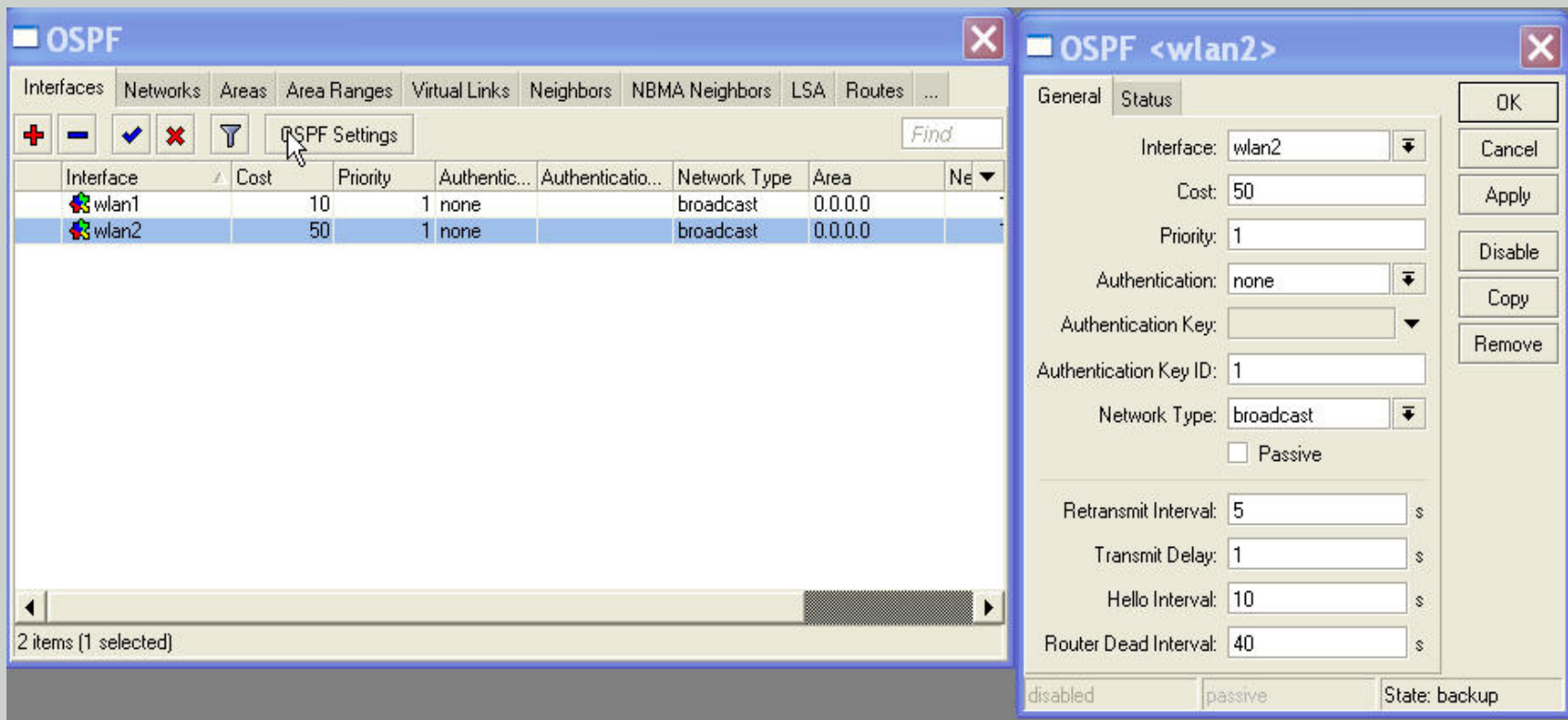
Apply

Disable

Copy

Remove

- Cost OSPF of wlan2



OSPF

Interfaces Networks Areas Area Ranges Virtual Links Neighbors NBMA Neighbors LSA Routes ...

OSPF Settings

Interface	Cost	Priority	Authentic...	Authenticatio...	Network Type	Area	Ne
wlan1	10	1	none		broadcast	0.0.0.0	
wlan2	50	1	none		broadcast	0.0.0.0	

2 items (1 selected)

OSPF <wlan2>

General Status

Interface: wlan2

Cost: 50

Priority: 1

Authentication: none

Authentication Key:

Authentication Key ID: 1

Network Type: broadcast

☐ Passive

Retransmit Interval: 5 s

Transmit Delay: 1 s

Hello Interval: 10 s

Router Dead Interval: 40 s

disabled passive State: backup

OK Cancel Apply Disable Copy Remove

• Redistribute

OSPF

Interfaces Networks Areas Area Ranges Virtual Links Neighbors NBMA Neighbors LSA Routes ...

+ - ✓ ✕ Y OSPF Settings Find

Interface	Cost	Priority	Authentic...	Authenticatio...	Network Type	Area	Ne
wlan1	10	1	none		broadcast	0.0.0.0	
wlan2	50	1	none		broadcast	0.0.0.0	

2 items

OSPF Settings

General Metrics Status

Router ID: 0.0.0.0

Redistribute Default Route: always (as type 1)

Redistribute Connected Routes: as type 1

Redistribute Static Routes: as type 1

Redistribute RIP Routes: no

Redistribute BGP Routes: no

OK Cancel Apply

- OSPF network 1

The screenshot displays the Mikrotik WinBox interface for configuring OSPF. The main window, titled 'OSPF', has several tabs: 'Interface', 'Networks', 'Areas', 'Area Ranges', 'Virtual Links', 'Neighbors', 'NBMA Neighbors', 'LSA', and 'Routes'. The 'Networks' tab is active, showing a table with two entries:

Network	Area
10.10.10.0/30	backbone
10.10.11.0/30	backbone

At the bottom of the 'OSPF' window, it indicates '2 items (1 selected)'. An 'OSPF Network ...' dialog box is open on the right, showing the 'Network' field set to '10.10.10.0/30' and the 'Area' dropdown menu set to 'backbone'. The dialog includes buttons for 'OK', 'Cancel', 'Apply', 'Disable', 'Copy', and 'Remove'. The 'disabled' status is shown at the bottom of the dialog.

- OSPF network 2

OSPF

Interfaces Networks Areas Area Ranges Virtual Links Neighbors NBMA Neighbors LSA Routes ...

+ - ✓ ✗ ⚙ Find

Network	Area
10.10.10.0/30	backbone
10.10.11.0/30	backbone

2 items [1 selected]

OSPF Network ...

Network: 10.10.11.0/30 OK

Area: backbone ▾ Cancel

Apply

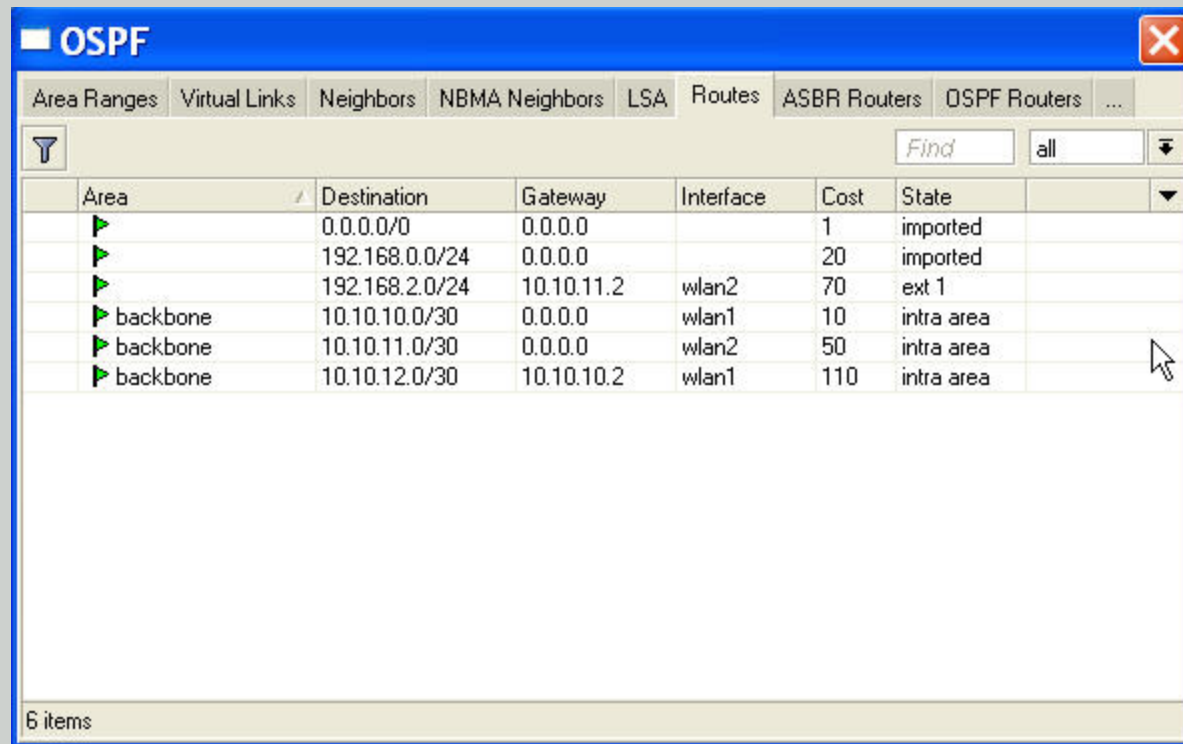
Disable

Copy

Remove

disabled

- OSPF routes










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

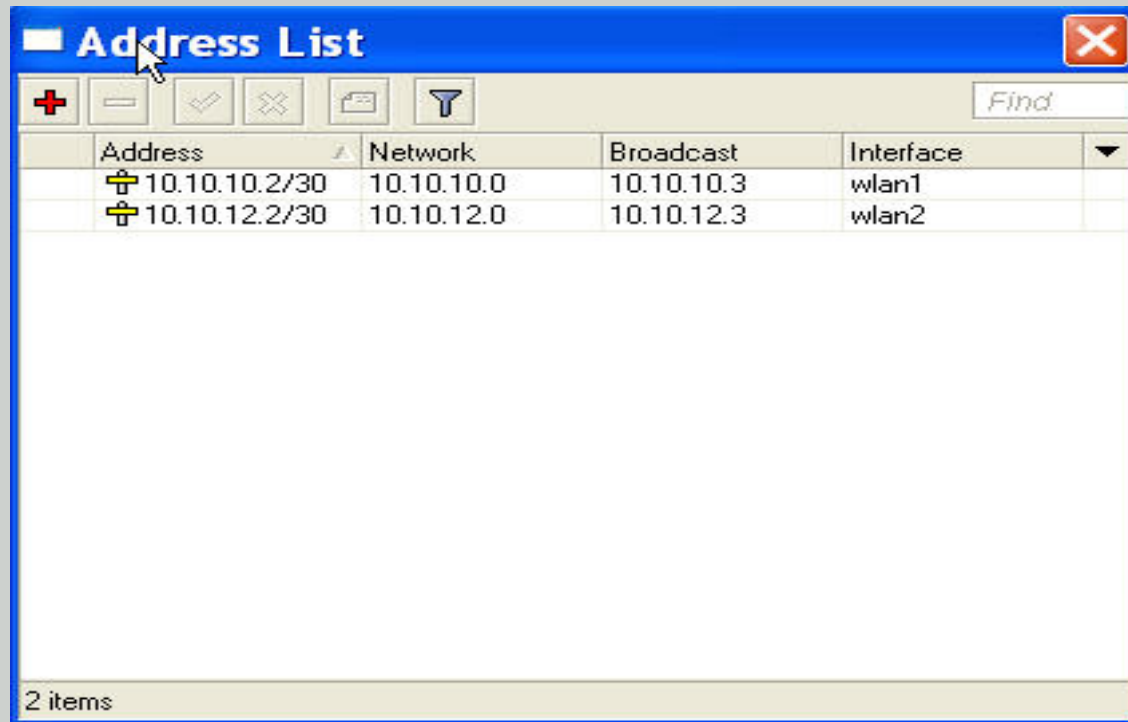






 Find all 

	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



Address	Network	Broadcast	Interface
10.10.10.2/30	10.10.10.0	10.10.10.3	wlan1
10.10.12.2/30	10.10.12.0	10.10.12.3	wlan2

2 items

- Mode of wlan1 in R2

Interface List

Interface	Ethernet	EoIP Tunnel	IP Tunnel	VLAN	VRPP	Bonding
Name	Type	Tx	Rx	Tx Pac...	Rx Pac...	
ether1	Ethernet	0 bps	0 bps	0	0	
ether2	Ethernet	0 bps	0 bps	0	0	
ether3	Ethernet	0 bps	0 bps	0	0	
R wlan1	Wireless (Atheros AR5...	39.0 kbps	8.4 kbps	8	8	
R wlan2	Wireless (Atheros AR5...	0 bps	0 bps	0	0	

5 items (1 selected)

6 items

Interface <wlan1>

General

Wireless

WDS

Nstreme

Status

...

Mode:

station

Band:

5GHz

Frequency:

5180

MHz

SSID:

L1

Scan List:

Security Profile:

default

Antenna Mode:

antenna a

Default AP Tx Rate:

bps

Default Client Tx Rate:

bps

☒ Default Authenticate
 ☒ Default Forward
 ☐ Hide SSID
 ☐ Compression

disabled

running

slave

connected to ess

OK

Cancel

Apply

Disable

Comment

Torch

Scan...

Freq. Usage...

Align...

Sniff...

Snooper...

Reset Configuration

Advanced Mode

- Mode of wlan2 in R2

Interface List

Interface

Ethernet

EoIP Tunnel

IP Tunnel

VLAN

VRRP

Bonding

+

-

✓

✗

📁

🔍

Name	Type	Tx	Rx	Tx Pac...	Rx Pac...
ether1	Ethernet	0 bps	0 bps	0	0
ether2	Ethernet	0 bps	0 bps	0	0
ether3	Ethernet	0 bps	0 bps	0	0
R wlan1	Wireless (Atheros AR5...	51.0 kbps	10.8 kbps	9	11
R wlan2	Wireless (Atheros AR5...	0 bps	0 bps	0	0

5 items [1 selected]

6 items

Interface <wlan2>

General

Wireless

WDS

Nstreme

Status

...

Mode: station

Band: 5GHz

Frequency: 5180 MHz

SSID: L3

Scan List:

Security Profile: default

Antenna Mode: antenna a

Default AP Tx Rate: bps

Default Client Tx Rate: bps

☒ Default Authenticate
 ☒ Default Forward
 ☐ Hide SSID
 ☐ Compression

disabled

running

slave

connected to ess

OK

Cancel

Apply

Disable

Comment

Torch

Scan...

Freq. Usage...

Align...

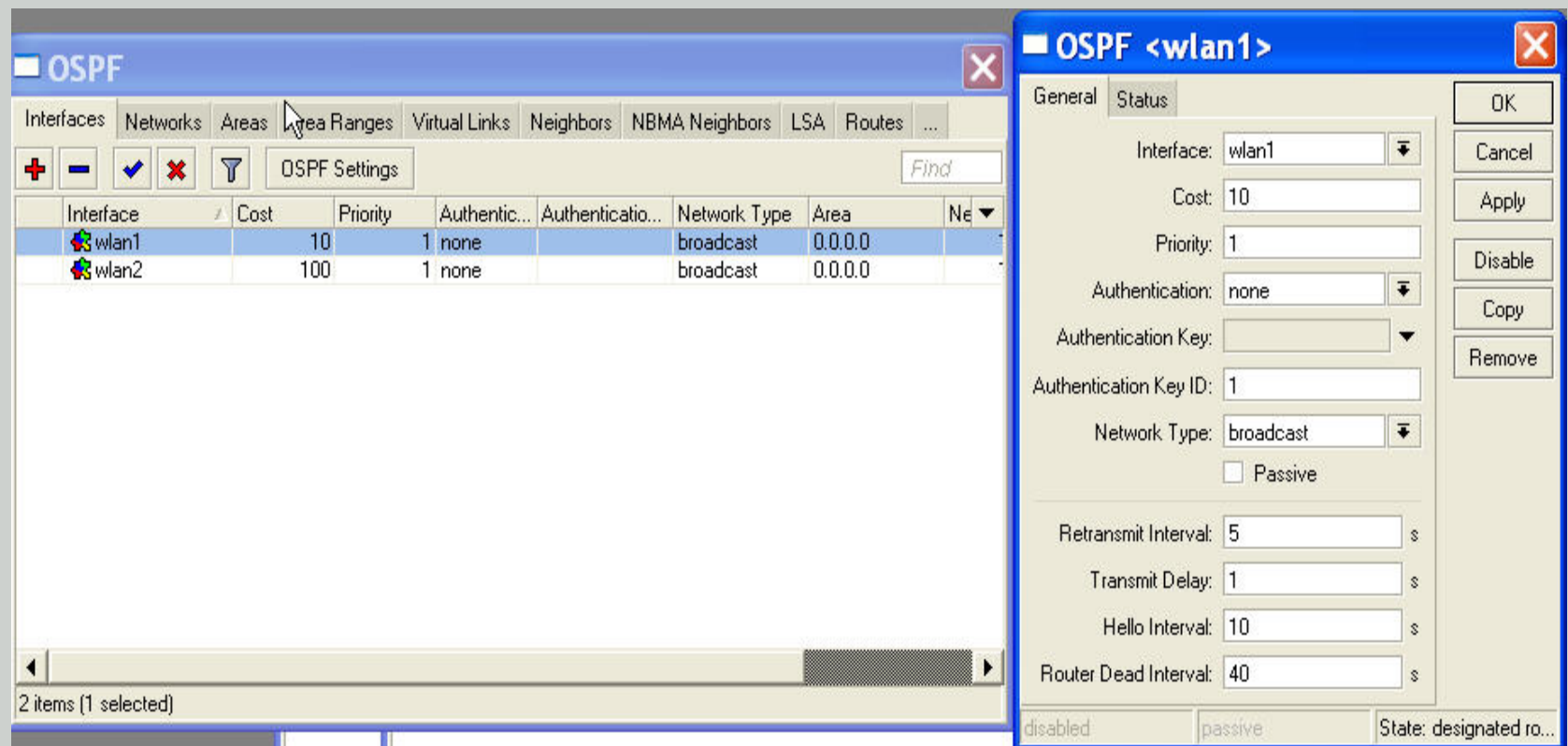
Sniff...

Snooper...

Reset Configuration

Advanced Mode

- OSPF cost of wlan1



The screenshot shows the Mikrotik WinBox interface. The main window is titled "OSPF" and displays a table of OSPF interfaces. The "Area Ranges" tab is selected. The table lists two interfaces: wlan1 and wlan2. wlan1 has a cost of 10, priority of 1, and is in area 0.0.0.0. wlan2 has a cost of 100, priority of 1, and is in area 0.0.0.0. A pop-up window titled "OSPF <wlan1>" is open, showing the configuration for wlan1. The "General" tab is selected, and the "Cost" is set to 10. Other settings include Priority: 1, Authentication: none, Authentication Key: (empty), Authentication Key ID: 1, Network Type: broadcast, and a checkbox for "Passive" which is unchecked. Timers are set to Retransmit Interval: 5s, Transmit Delay: 1s, Hello Interval: 10s, and Router Dead Interval: 40s. The status at the bottom shows "disabled", "passive", and "State: designated ro...".

Interface	Cost	Priority	Authentic...	Authenticatio...	Network Type	Area
wlan1	10	1	none		broadcast	0.0.0.0
wlan2	100	1	none		broadcast	0.0.0.0

OSPF <wlan1> Configuration:

- Interface: wlan1
- Cost: 10
- Priority: 1
- Authentication: none
- Authentication Key: (empty)
- Authentication Key ID: 1
- Network Type: broadcast
- ☐ Passive
- Retransmit Interval: 5 s
- Transmit Delay: 1 s
- Hello Interval: 10 s
- Router Dead Interval: 40 s
- disabled
- passive
- State: designated ro...

- OSPF cost of wlan2

The screenshot shows the Mikrotik WinBox interface. The main window is titled "OSPF" and has tabs for Interfaces, Networks, Areas, Area Ranges, Virtual Links, Neighbors, NBMA Neighbors, LSA, Routes, and ... The "Interfaces" tab is active, showing a table of OSPF interfaces. The table has columns for Interface, Cost, Priority, Authentication, Authentication Key, Network Type, and Area. Two items are listed: wlan1 and wlan2. wlan2 is selected, and its configuration is shown in the right-hand pane.

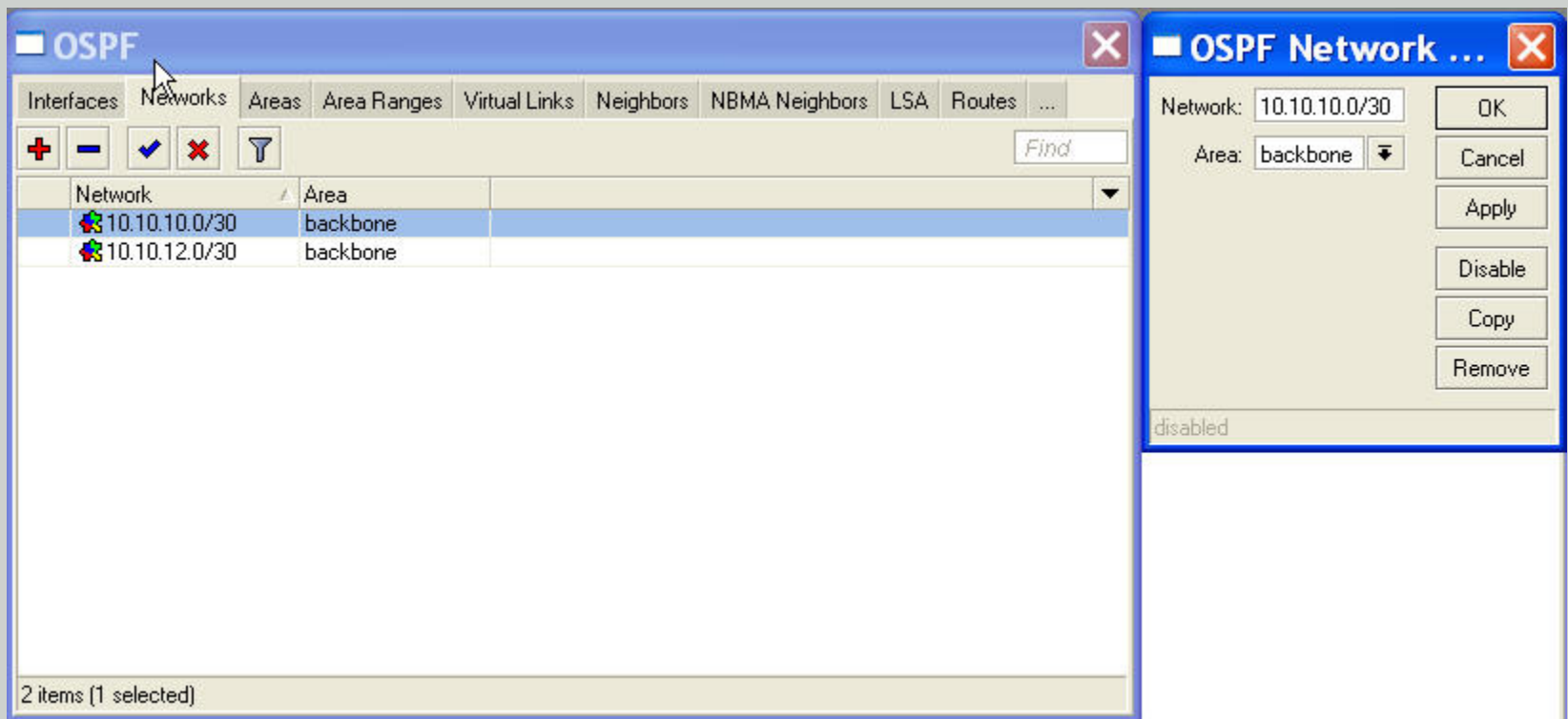
Interface	Cost	Priority	Authentic...	Authenticatio...	Network Type	Area
wlan1	10	1	none		broadcast	0.0.0.0
wlan2	100	1	none		broadcast	0.0.0.0

The right-hand pane is titled "OSPF <wlan2>" and has tabs for General and Status. The "General" tab is active, showing the following configuration:

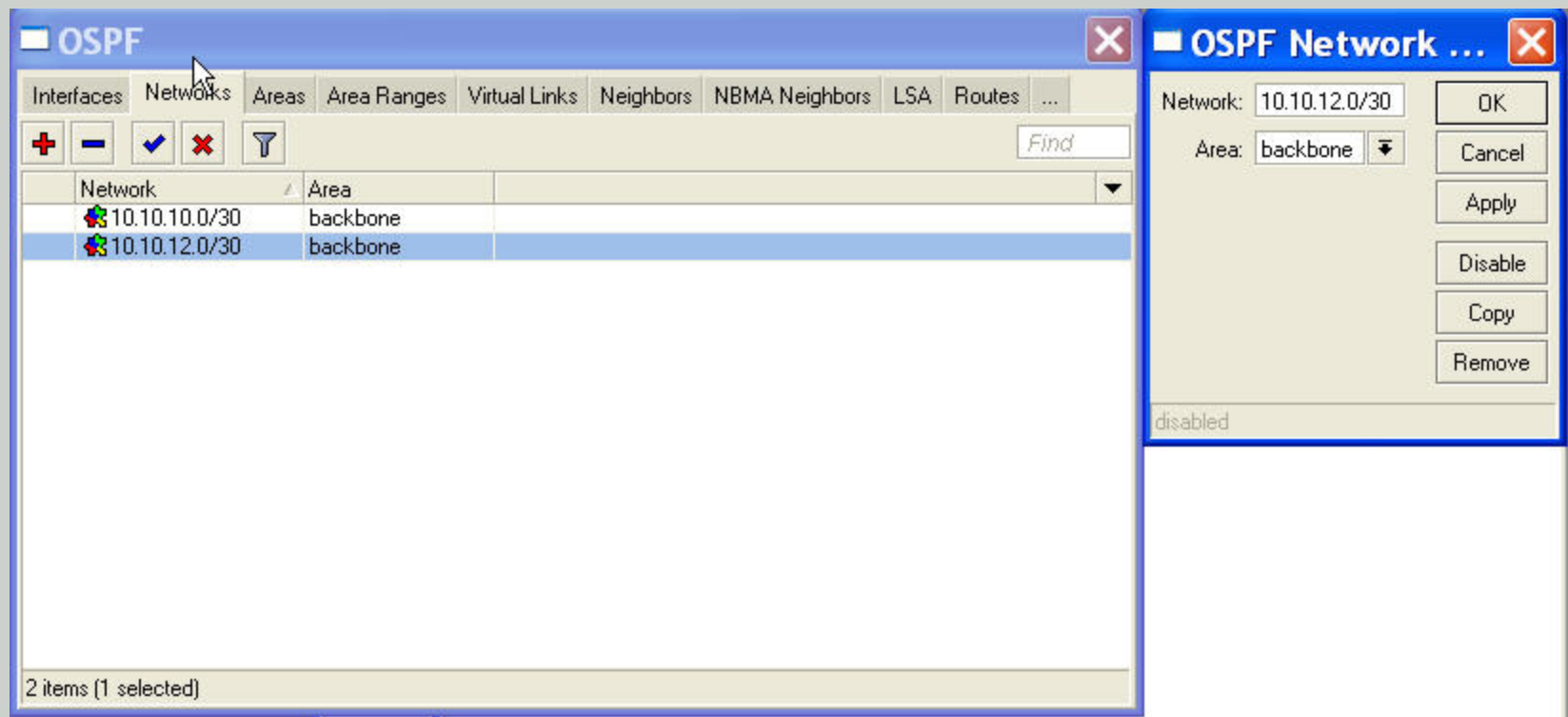
- Interface: wlan2
- Cost: 100
- Priority: 1
- Authentication: none
- Authentication Key:
- Authentication Key ID: 1
- Network Type: broadcast
- ☐ Passive
- Retransmit Interval: 5 s
- Transmit Delay: 1 s
- Hello Interval: 10 s
- Router Dead Interval: 40 s

Buttons on the right include OK, Cancel, Apply, Disable, Copy, and Remove. At the bottom, there are checkboxes for "disabled" and "passive", and a "State: backup" label.

- OSPF network 1



- OSPF network 2



- Redistribute

The screenshot shows the Mikrotik WinBox interface. The main window is titled 'OSPF' and has tabs for Interfaces, Networks, Areas, Area Ranges, Virtual Links, Neighbors, NBMA Neighbors, LSA, and Routes. The 'Interfaces' tab is active, showing a table of OSPF interfaces. Below the table is a scrollbar and a status bar indicating '2 items'.

Interface	Cost	Priority	Authentic...	Authenticatio...	Network Type	Area	Ne
wlan1	10	1	none		broadcast	0.0.0.0	
wlan2	100	1	none		broadcast	0.0.0.0	

The 'OSPF Settings' window is open, showing the 'General' tab. It contains the following fields and options:

- Router ID: 0.0.0.0
- Redistribute Default Route: never
- Redistribute Connected Routes: as type 1
- Redistribute Static Routes: as type 1
- Redistribute RIP Routes: no
- Redistribute BGP Routes: no

Buttons for OK, Cancel, and Apply are located on the right side of the 'OSPF Settings' window.

- OSPF routes

OSPF

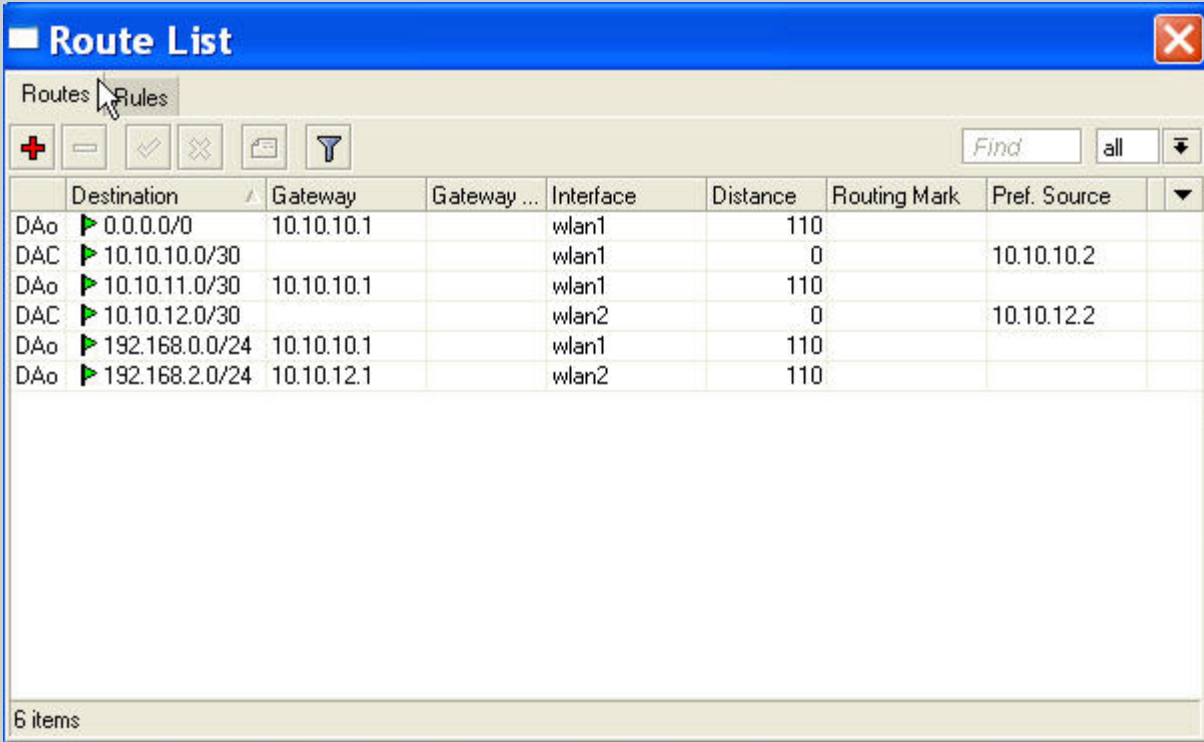
Area Ranges Virtual Links Neighbors NBMA Neighbors LSA Routes ASBR Routers OSPF Routers ...

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

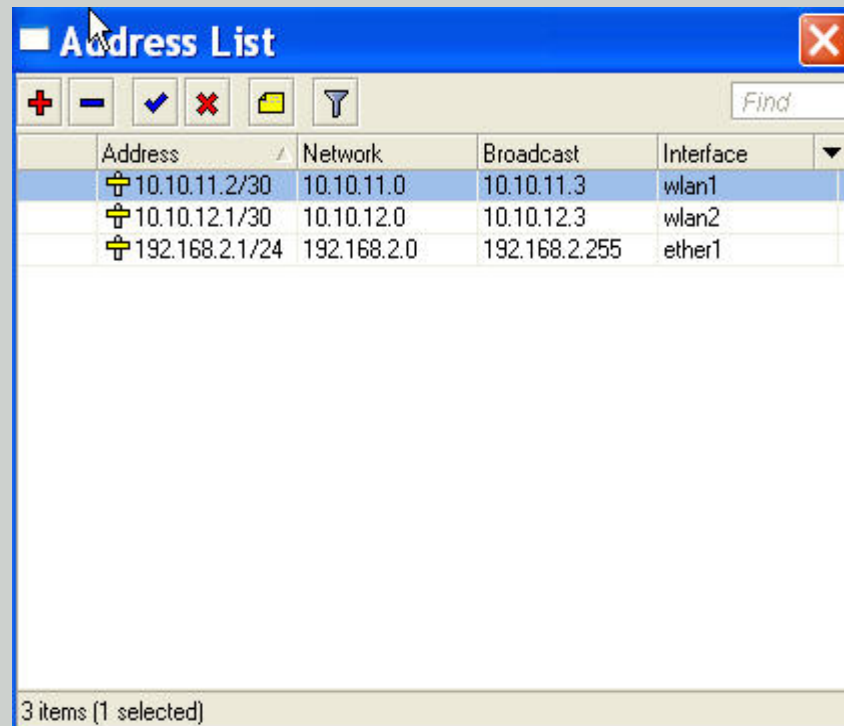


	Destination	Gateway	Gateway ...	Interface	Distance	Routing Mark	Pref. Source	
DAo	0.0.0.0/0	10.10.10.1		wlan1	110			
DAC	10.10.10.0/30			wlan1	0		10.10.10.2	
DAo	10.10.11.0/30	10.10.10.1		wlan1	110			
DAC	10.10.12.0/30			wlan2	0		10.10.12.2	
DAo	192.168.0.0/24	10.10.10.1		wlan1	110			
DAo	192.168.2.0/24	10.10.12.1		wlan2	110			

6 items

Configuration of R3

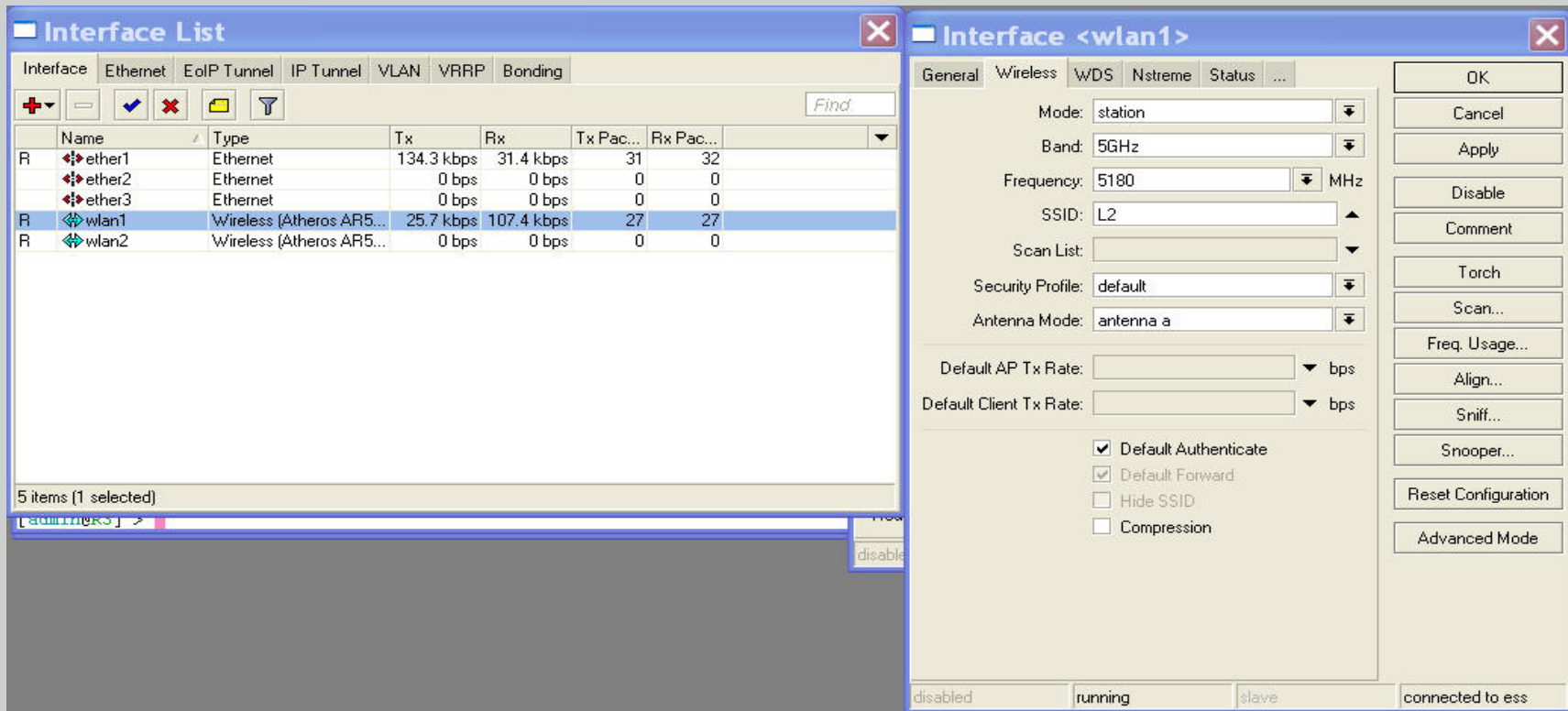
- IP interface of R3



Address	Network	Broadcast	Interface
10.10.11.2/30	10.10.11.0	10.10.11.3	wlan1
10.10.12.1/30	10.10.12.0	10.10.12.3	wlan2
192.168.2.1/24	192.168.2.0	192.168.2.255	ether1

3 items (1 selected)

- Mode of wlan1 in R3



The screenshot shows two windows from the Mikrotik WinBox interface. The left window, titled "Interface List", displays a table of network interfaces. The right window, titled "Interface <wlan1>", shows the configuration settings for the wlan1 interface.

Interface List

Interface	Type	Tx	Rx	Tx Pac...	Rx Pac...
R ether1	Ethernet	134.3 kbps	31.4 kbps	31	32
R ether2	Ethernet	0 bps	0 bps	0	0
R ether3	Ethernet	0 bps	0 bps	0	0
R wlan1	Wireless (Atheros AR5...	25.7 kbps	107.4 kbps	27	27
R wlan2	Wireless (Atheros AR5...	0 bps	0 bps	0	0

5 items [1 selected]

Interface <wlan1>

General Wireless WDS Nstreme Status ...

Mode: station
Band: 5GHz
Frequency: 5180 MHz
SSID: L2
Scan List:
Security Profile: default
Antenna Mode: antenna a
Default AP Tx Rate: bps
Default Client Tx Rate: bps
☒ Default Authenticate
☒ Default Forward
☐ Hide SSID
☐ Compression

OK
Cancel
Apply
Disable
Comment
Torch
Scan...
Freq. Usage...
Align...
Sniff...
Snooper...
Reset Configuration
Advanced Mode

disabled running slave connected to ess

• Mode of wlan2 in R3

Interface List

Interface

Ethernet

EoIP Tunnel

IP Tunnel

VLAN

VRRP

Bonding

+

-

✓

✗

📄

🔍

Find

	Name	Type	Tx	Rx	Tx Pac...	Rx Pac...
R	ether1	Ethernet	149.4 kbps	36.0 kbps	34	34
	ether2	Ethernet	0 bps	0 bps	0	0
	ether3	Ethernet	0 bps	0 bps	0	0
R	wlan1	Wireless (Atheros AR5...	20.2 kbps	95.7 kbps	17	19
R	wlan2	Wireless (Atheros AR5...	0 bps	0 bps	0	0

5 items

Interface <wlan2>

General

Wireless

WDS

Nstreme

Status

...

Mode:

ap bridge

Band:

5GHz

Frequency:

5300

MHz

SSID:

L3

Scan List:

Security Profile:

default

Antenna Mode:

antenna a

Default AP Tx Rate:

bps

Default Client Tx Rate:

bps

☒ Default Authenticate

☒ Default Forward

☐ Hide SSID

☐ Compression

OK

Cancel

Apply

Disable

Comment

Torch

Scan...

Freq. Usage...

Align...

Sniff...

Snooper...

Reset Configuration

Advanced Mode

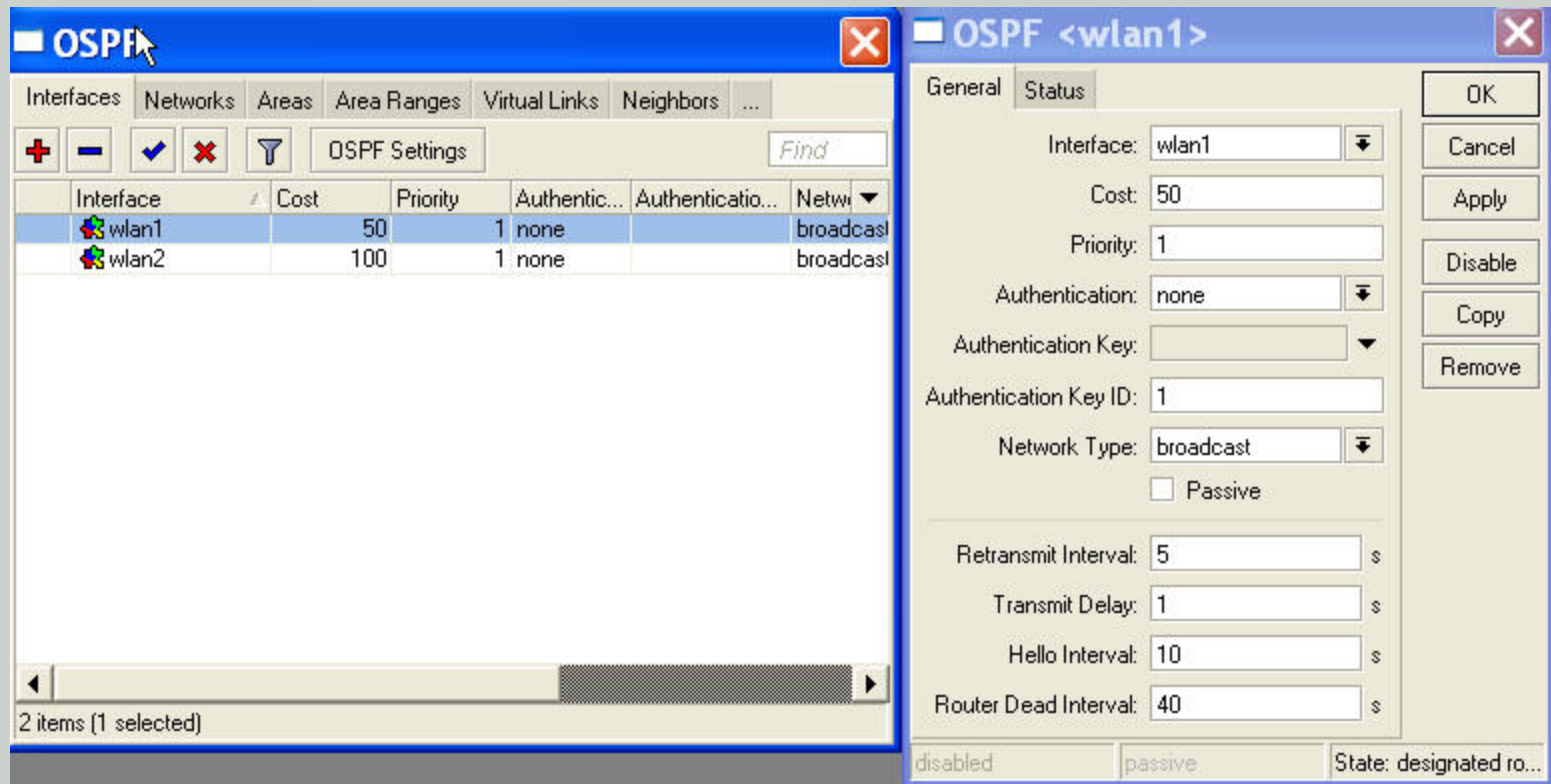
disabled

running

slave

running ap

- OSPF Cost wlan1



The screenshot shows the Mikrotik WinBox interface with the OSPF configuration window open. The left pane shows the OSPF configuration table, and the right pane shows the detailed configuration for the selected interface, wlan1.

OSPF Configuration Table:

Interface	Cost	Priority	Authentic...	Authenticatio...	Netw...
wlan1	50	1	none		broadcast
wlan2	100	1	none		broadcast

OSPF <wlan1> Configuration:

- Interface: wlan1
- Cost: 50
- Priority: 1
- Authentication: none
- Authentication Key:
- Authentication Key ID: 1
- Network Type: broadcast
- ☐ Passive
- Retransmit Interval: 5 s
- Transmit Delay: 1 s
- Hello Interval: 10 s
- Router Dead Interval: 40 s

Buttons: OK, Cancel, Apply, Disable, Copy, Remove.

State: designated ro...

- Redistribute

The screenshot shows the Mikrotik WinBox interface. On the left, the 'OSPF' window is open, displaying a table of interfaces configured for OSPF. On the right, the 'OSPF Settings' dialog is open, showing the 'General' tab with various redistribution options.

OSPF Window:

Interface	Cost	Priority	Authentic...	Authenticatio...	Netw...
wlan1	50	1	none		broadcast
wlan2	100	1	none		broadcast

OSPF Settings Dialog:

Router ID: 0.0.0.0

Redistribute Default Route: never

Redistribute Connected Routes: as type 1

Redistribute Static Routes: as type 1

Redistribute RIP Routes: no

Redistribute BGP Routes: no

- OSPF cost wlan2

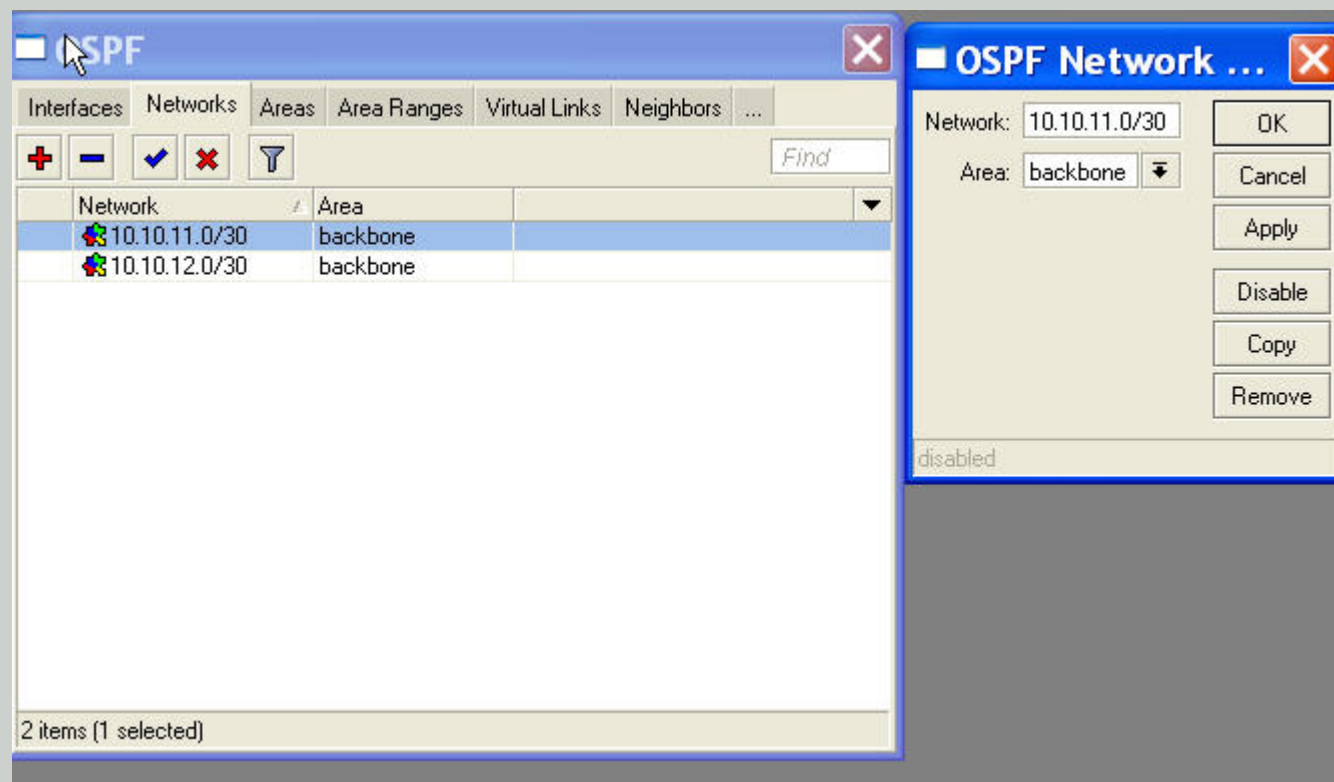
The screenshot shows the Mikrotik WinBox interface for configuring OSPF. The main window is titled 'OSPF' and has tabs for 'Interfaces', 'Networks', 'Areas', 'Area Ranges', 'Virtual Links', and 'Neighbors'. The 'Interfaces' tab is active, showing a table of OSPF interfaces. The table has columns for 'Interface', 'Cost', 'Priority', 'Authentic...', 'Authentication...', and 'Netw...'. Two interfaces are listed: 'wlan1' with a cost of 50 and 'wlan2' with a cost of 100. 'wlan2' is selected. A right-hand pane titled 'OSPF <wlan2>' shows the configuration for the selected interface. It has tabs for 'General' and 'Status'. The 'General' tab is active, showing fields for 'Interface' (wlan2), 'Cost' (100), 'Priority' (1), 'Authentication' (none), 'Authentication Key' (empty), 'Authentication Key ID' (1), 'Network Type' (broadcast), and a 'Passive' checkbox. Below these are fields for 'Retransmit Interval' (5 s), 'Transmit Delay' (1 s), 'Hello Interval' (10 s), and 'Router Dead Interval' (40 s). At the bottom, there are buttons for 'disabled', 'passive', and 'State: designated ro...'. On the right side of the right-hand pane are buttons for 'OK', 'Cancel', 'Apply', 'Disable', 'Copy', and 'Remove'.

Interface	Cost	Priority	Authentic...	Authentication...	Netw...
wlan1	50	1	none		broadcast
wlan2	100	1	none		broadcast

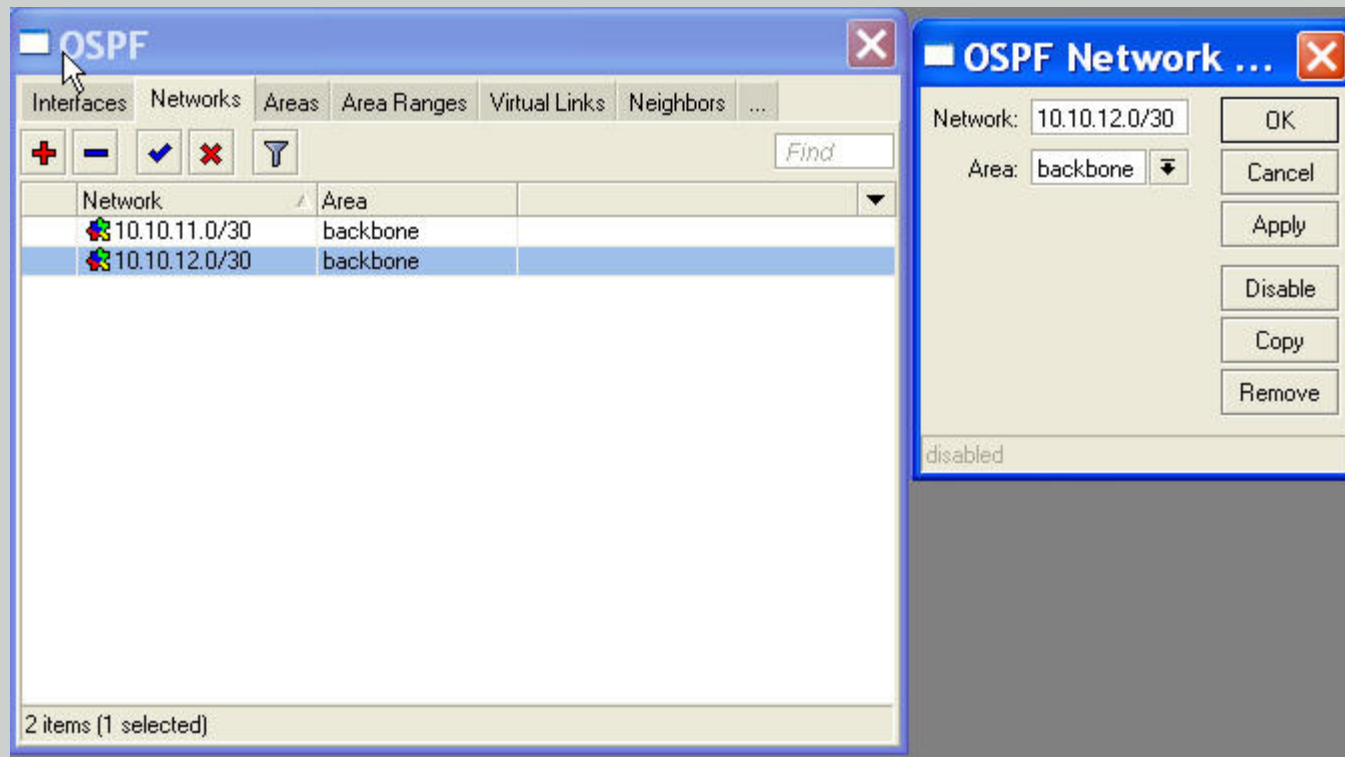
OSPF <wlan2> Configuration:

- Interface: wlan2
- Cost: 100
- Priority: 1
- Authentication: none
- Authentication Key:
- Authentication Key ID: 1
- Network Type: broadcast
- ☐ Passive
- Retransmit Interval: 5 s
- Transmit Delay: 1 s
- Hello Interval: 10 s
- Router Dead Interval: 40 s
- disabled | passive | State: designated ro...

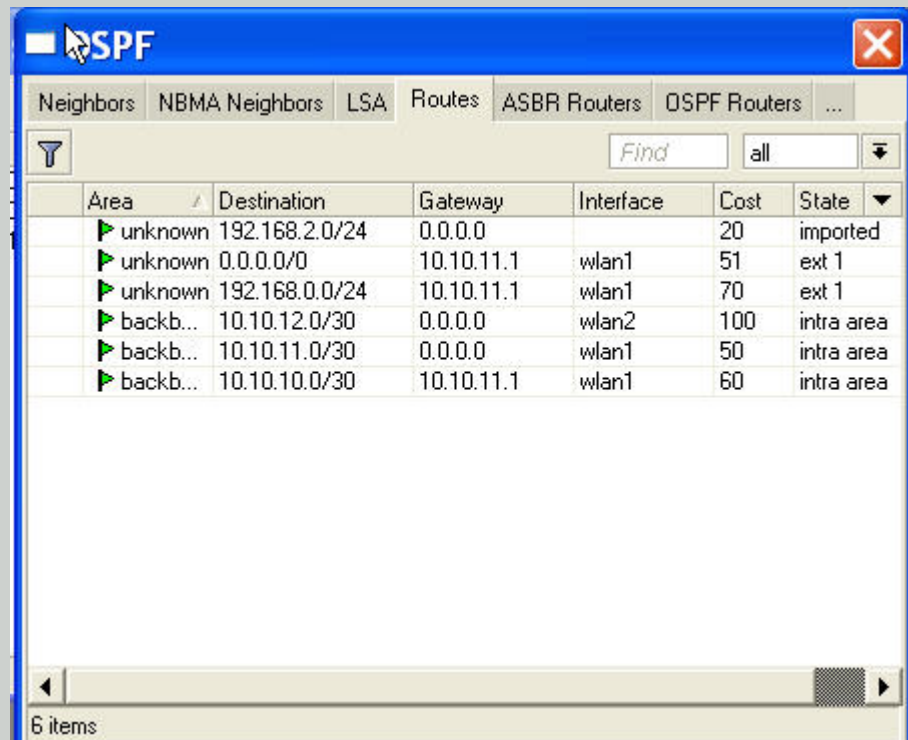
- OSPF network 1



- OSPF network 2

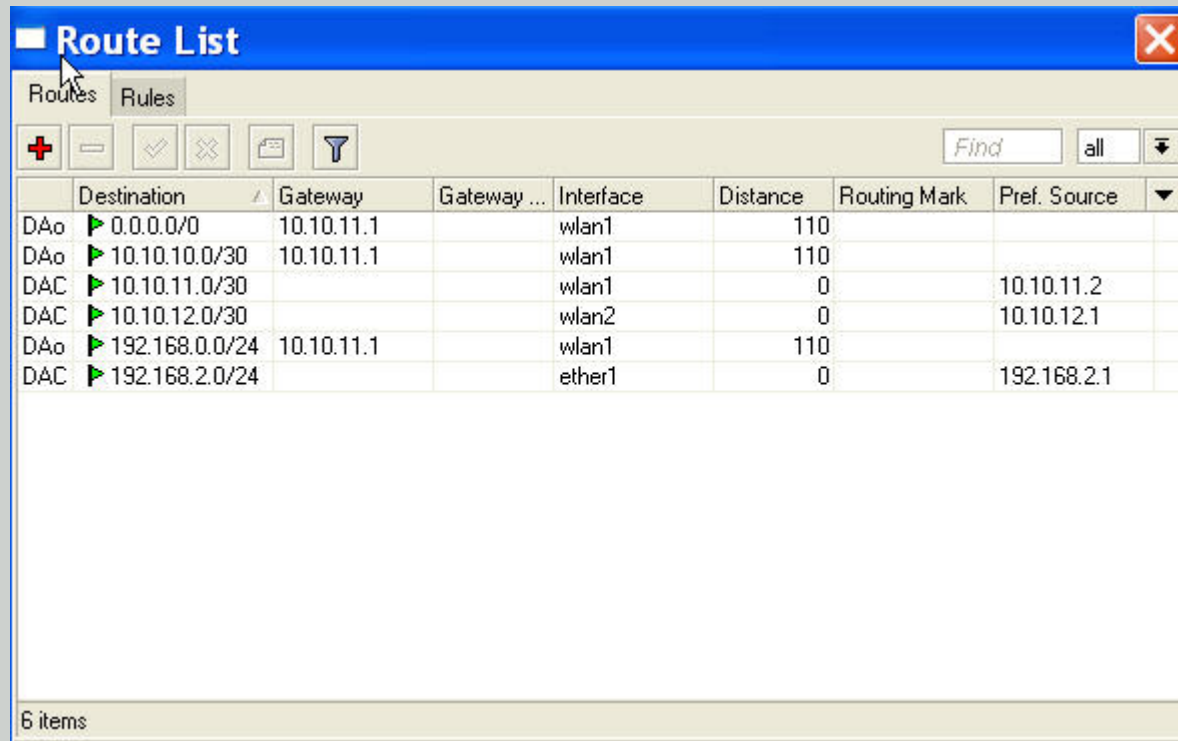


- OSPF routes



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

- Route list



	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