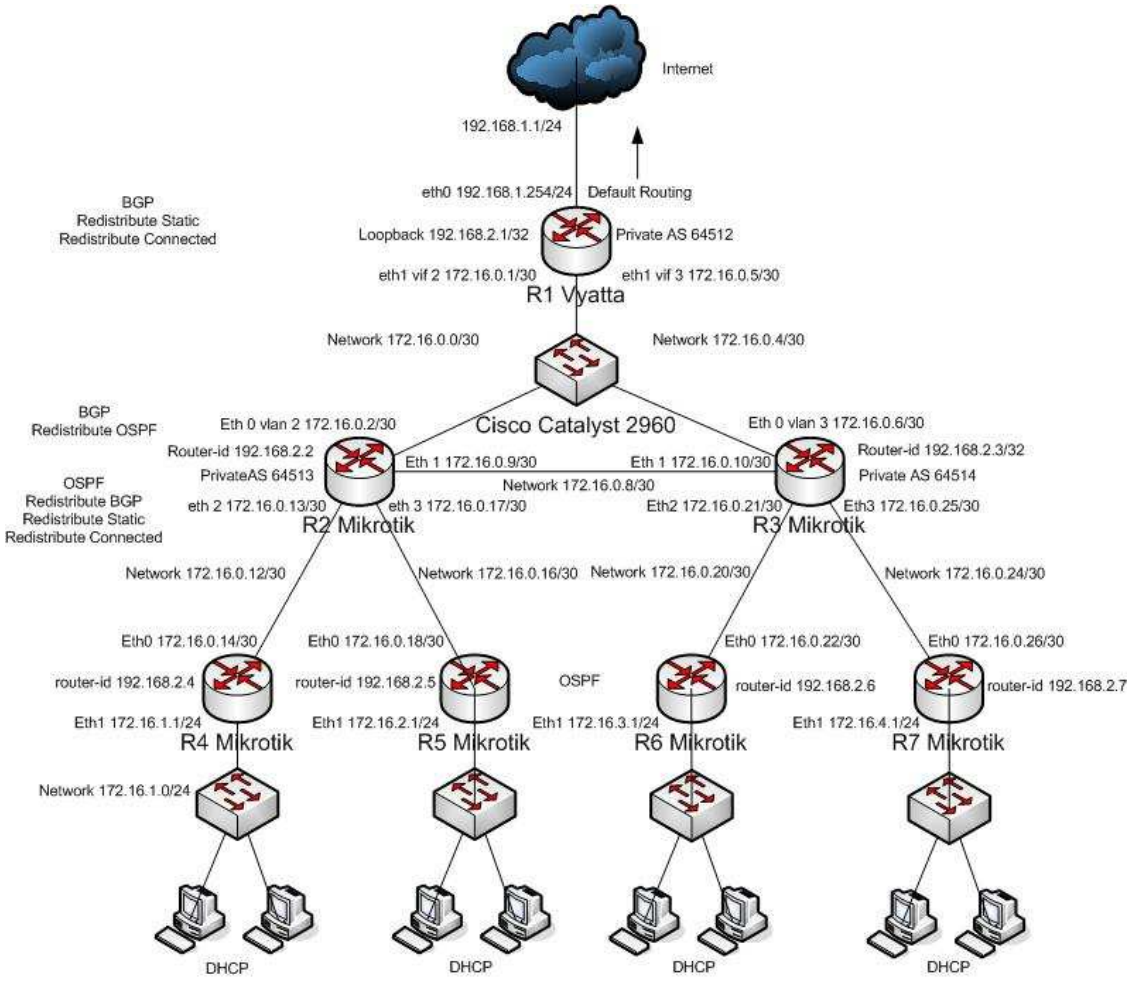
Permodelan routing BGP sederhana menggunakan Vyatta dan Mikrotik dengan Private AS pada Jaringan Intranet

BGP atau Border Gateway Protocol routing Protocol yang menghubungkan antar AS (autonomous System) yang sama IBGP (Interior Border Gateway Protocol) atau antar AS yang berbeda EBGP (Exterior Border Gateway Protocol). BGP telah terbukti scalable, stabil dan menyediakan mekanisme yang diperlukan untuk mendukung routing yang kompleks. Pada permodelan kali ini kita akan menggunakan BGP dengan redistribute OSPF dan untuk Autonomous System Number yang dipergunakan maka kita akan menggunakan Private AS 64512 sampai 65534 yang dapat digunakan untuk tujuan pribadi seperti halnya Private IP address.

TOPOLOGI



SKEMA PENGALAMATAN

Router	AS	Router-id	Interface			
			Eth0	Eth1	Eth2	Eth3
R1	64512	192.168.2.1	192.168.1.254/24	vif 2 172.16.0.1/30 vif 3 172.16.0.5/30	-	-
R2	64513	192.168.2.2	vlan 2 172.16.0.1/30	172.16.0.9/30	172.16.0.13/30	172.16.0.17/30
R3	64514	192.168.2.3	vlan 3 172.16.0.5/30	172.16.0.10/30	172.16.0.21/30	172.16.0.25/30
R4	-	192.168.2.4	172.16.0.14/30	172.16.1.1/24	-	-
R5	-	192.168.2.5	172.16.0.18/30	172.16.2.1/24	-	-
R6	-	192.168.2.6	172.16.0.22/30	172.16.3.1/24	-	-
R7	-	192.168.2.7	172.16.0.26/30	172.16.4.1/24		

KONFIGURASI

R1 Vyatta

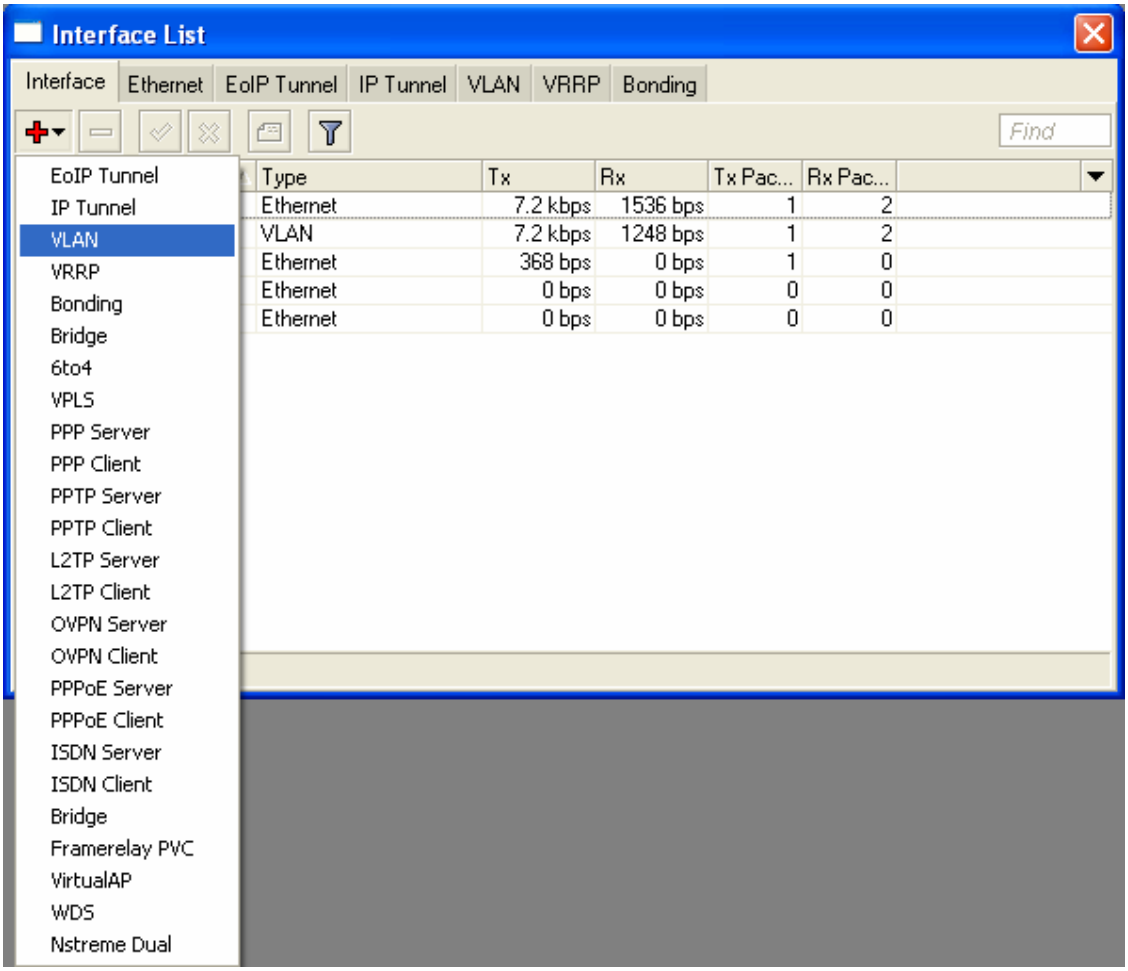
Pada R1 Vyatta, masuk ke console, set interface, NAT, BGP, redistribute connected dan redistribute static.

```
vyatta@vyatta:~$ configure
[edit]
vyatta@vyatta# set interfaces ethernet eth0 address 192.168.1.254/24
[edit]
vyatta@vyatta# set interfaces ethernet eth1 vif 2 address 172.16.0.1/30
[edit]
vyatta@vyatta# set interfaces ethernet eth1 vif 3 address 172.16.0.5/30
[edit]
vyatta@vyatta# set interfaces loopback lo address 192.168.2.1/32
[edit]
vyatta@vyatta# set protocols static route 0.0.0.0/0 next-hop 192.168.1.1
[edit]
vyatta@vyatta# set service nat rule 1 outbound-interface eth0
[edit]
vyatta@vyatta# set service nat rule 1 type masquerade
[edit]
vyatta@vyatta# set protocols bgp 64512 parameters router-id 192.168.2.1
[edit]
vyatta@vyatta# set protocols bgp 64512 network 172.16.0.0/30
[edit]
vyatta@vyatta# set protocols bgp 64512 network 172.16.0.4/30
[edit]
vyatta@vyatta# set protocols bgp 64512 neighbor 172.16.0.2 remote-as 64513
[edit]
vyatta@vyatta# set protocols bgp 64512 neighbor 172.16.0.6 remote-as 64514
[edit]
vyatta@vyatta# set protocols bgp 64512 redistribute connected
[edit]
```

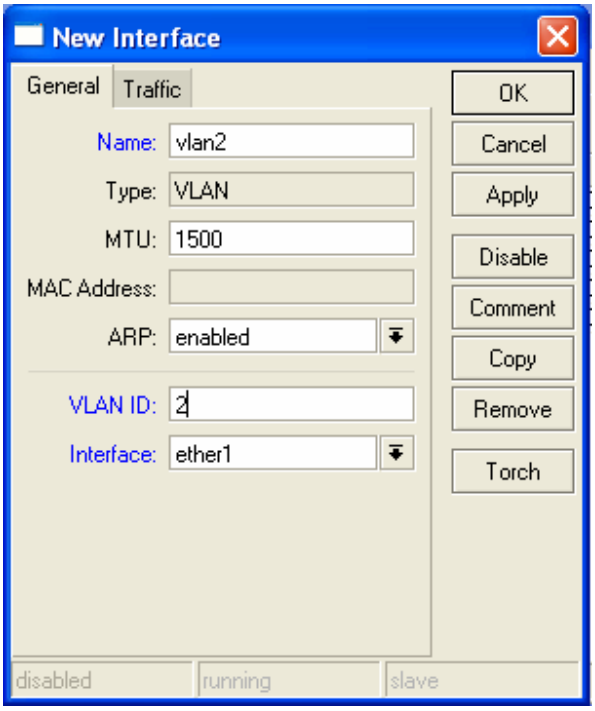
```
vyatta@vyatta# set protocols bgp 64512 redistribute static
[edit]
vyatta@vyatta# commit
[edit]
vyatta@vyatta# save
Saving configuration to '/opt/vyatta/etc/config/config.boot'...
Done
[edit]
vyatta@vyatta#
```

R2 Mikrotik

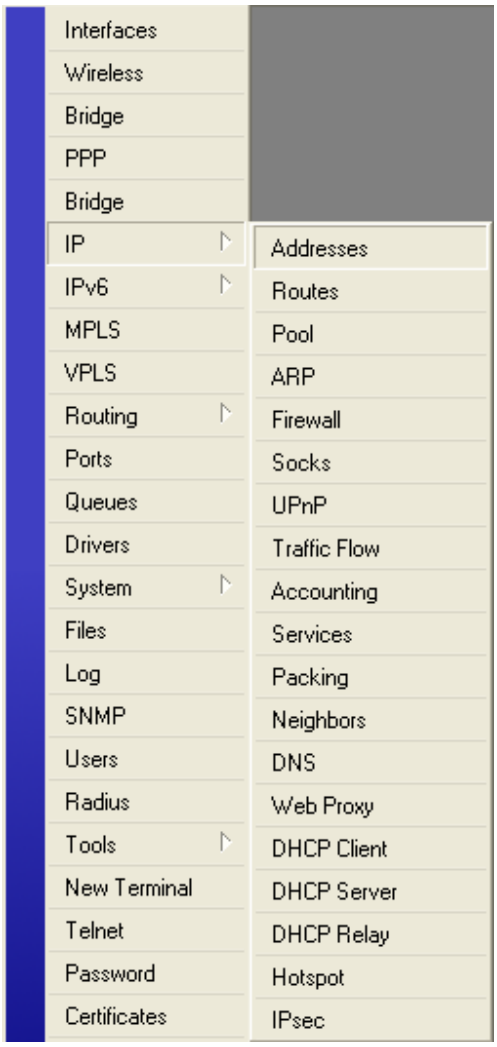
Masuk melalui Winbox atau SSH, untuk memudahkan saya sarankan menggunakan winbox. Buat Interface VLAN



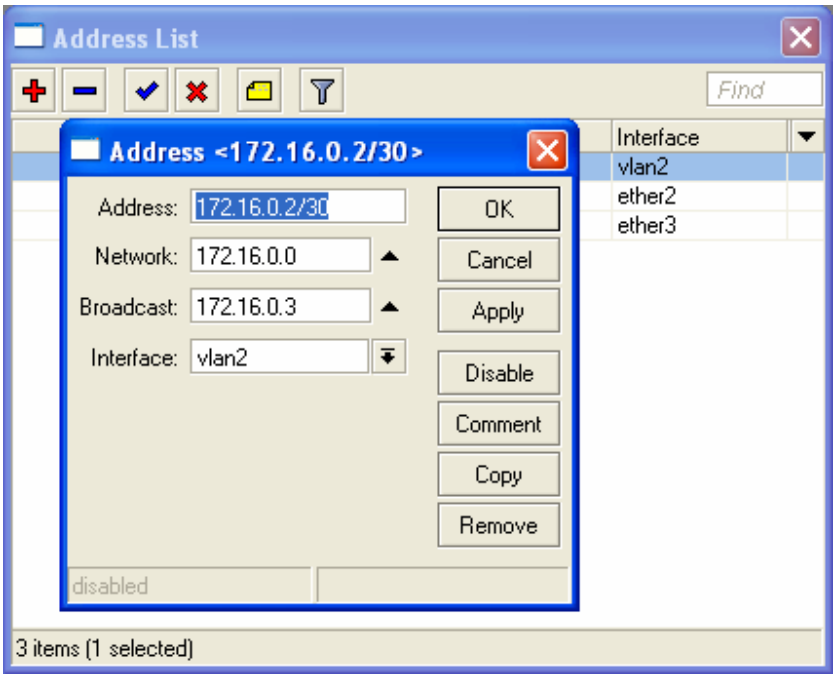
Untuk nama anda bisa menggunakan sembarang nama yang anda sukai, tetapi untuk VLAN ID kita beri No. 2 karena kita akan membuat interface ini bisa terhubung dengan vif 2 pada Vyatta, ini ada kaitannya dengan dengan masalah encapsulation dot1q atau tagging frame vlan.



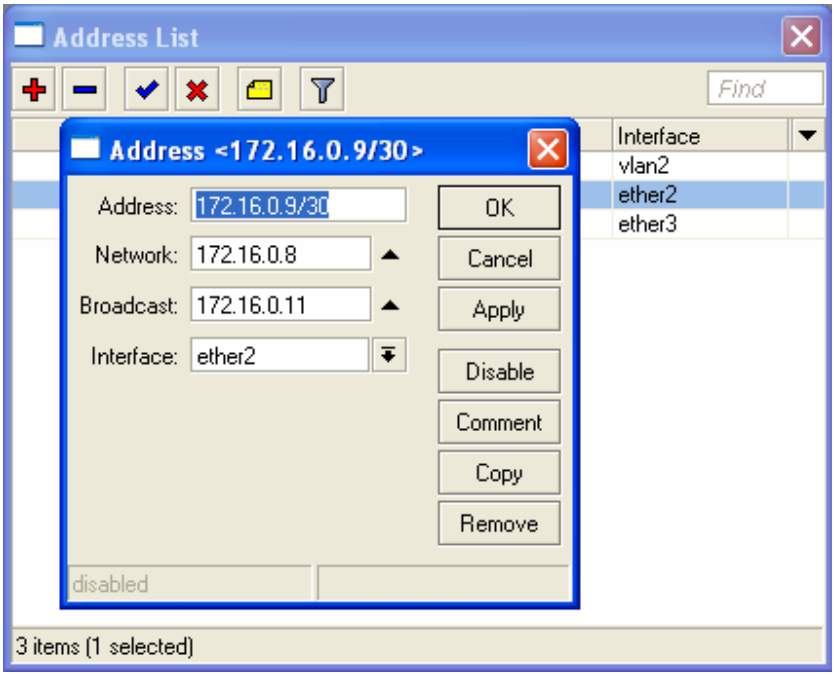
Langkah berikutnya berikan IP address sesuai dengan skema pengalamatan pada tabel diatas.

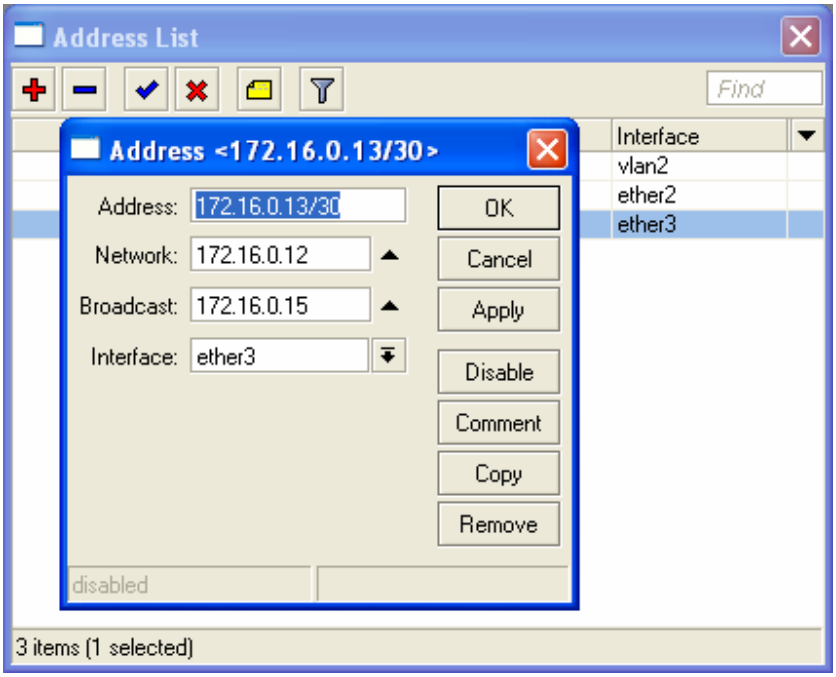


Perhatikan IP Address tersebut kita berikan pada interface apa.

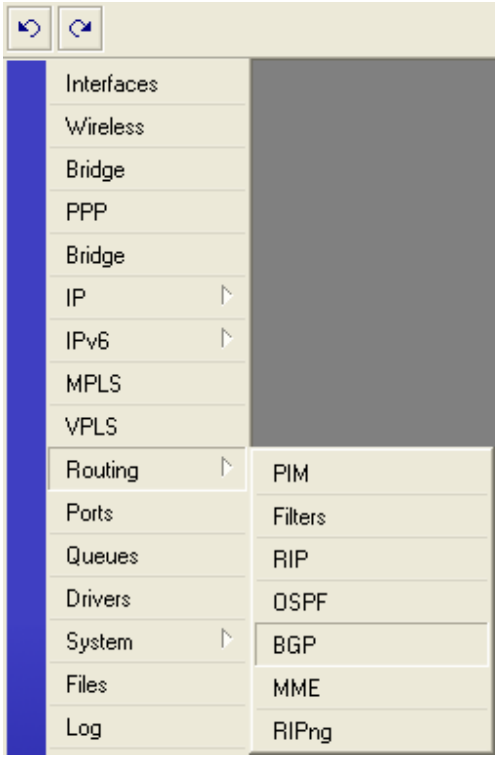


Ulangi langkah sebelumnya untuk ether2 dan ether3

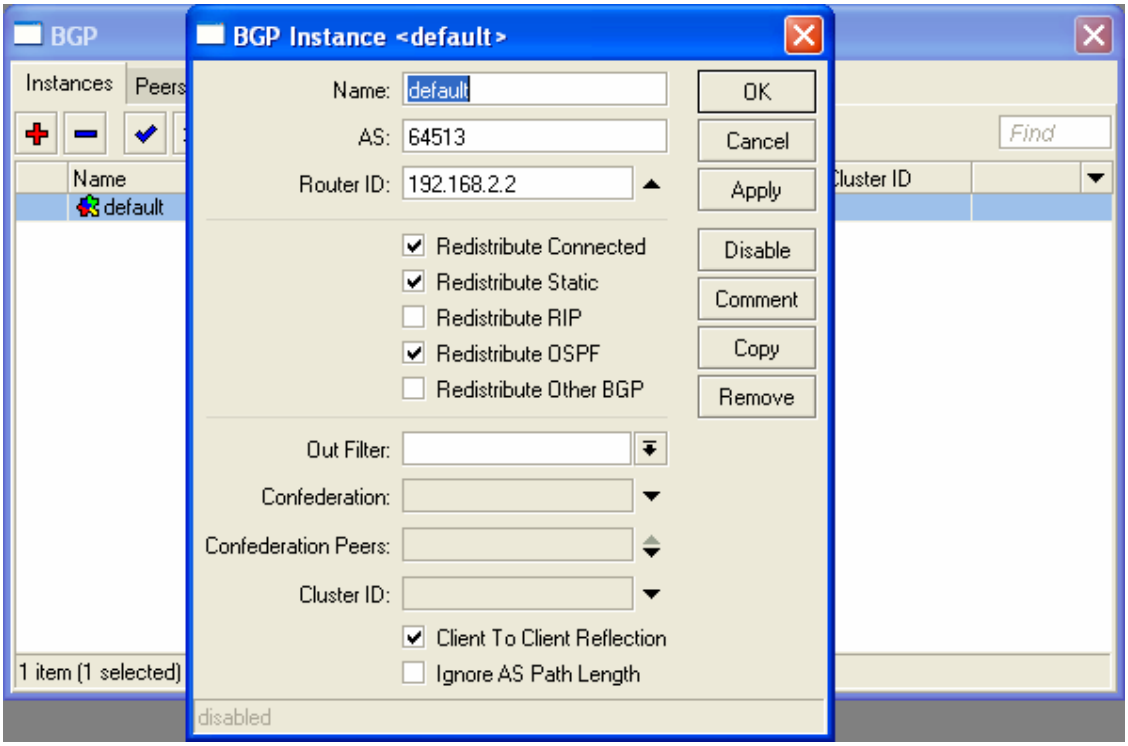




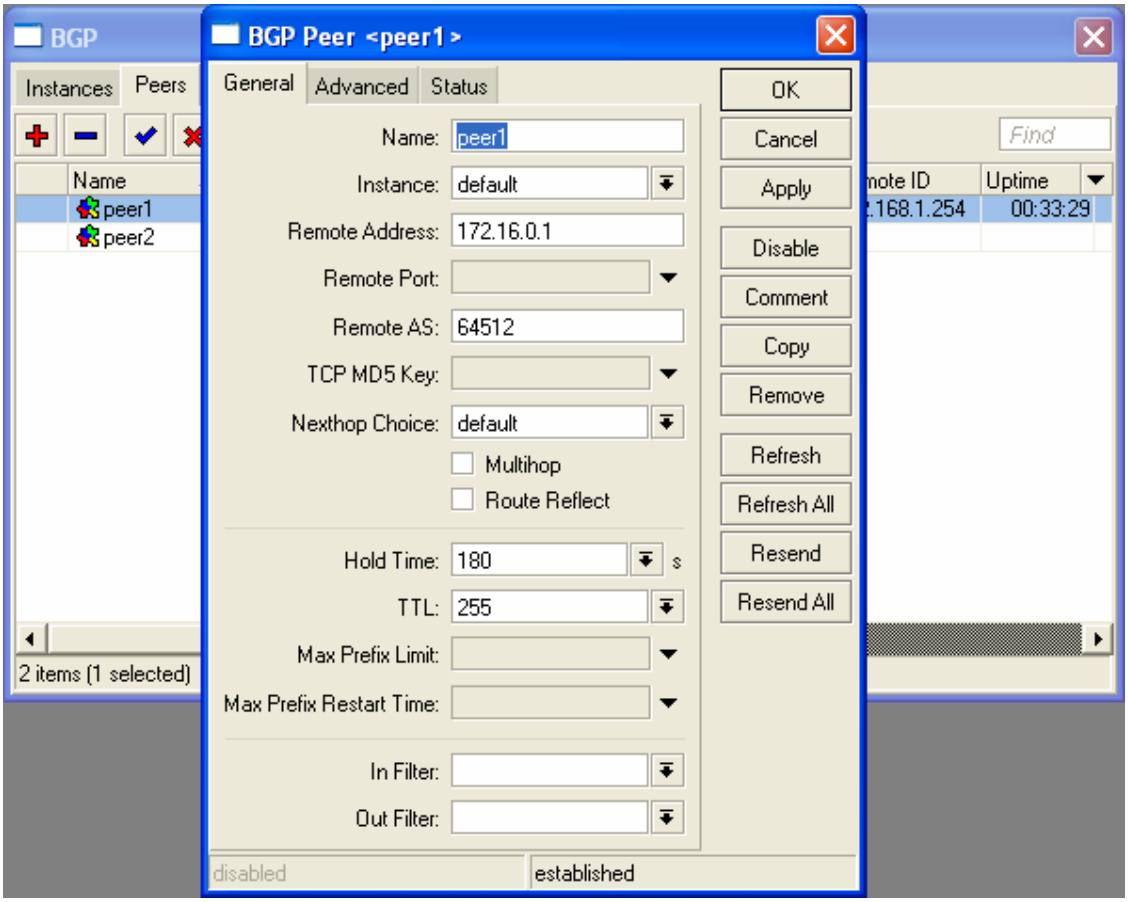
Set routing BGP

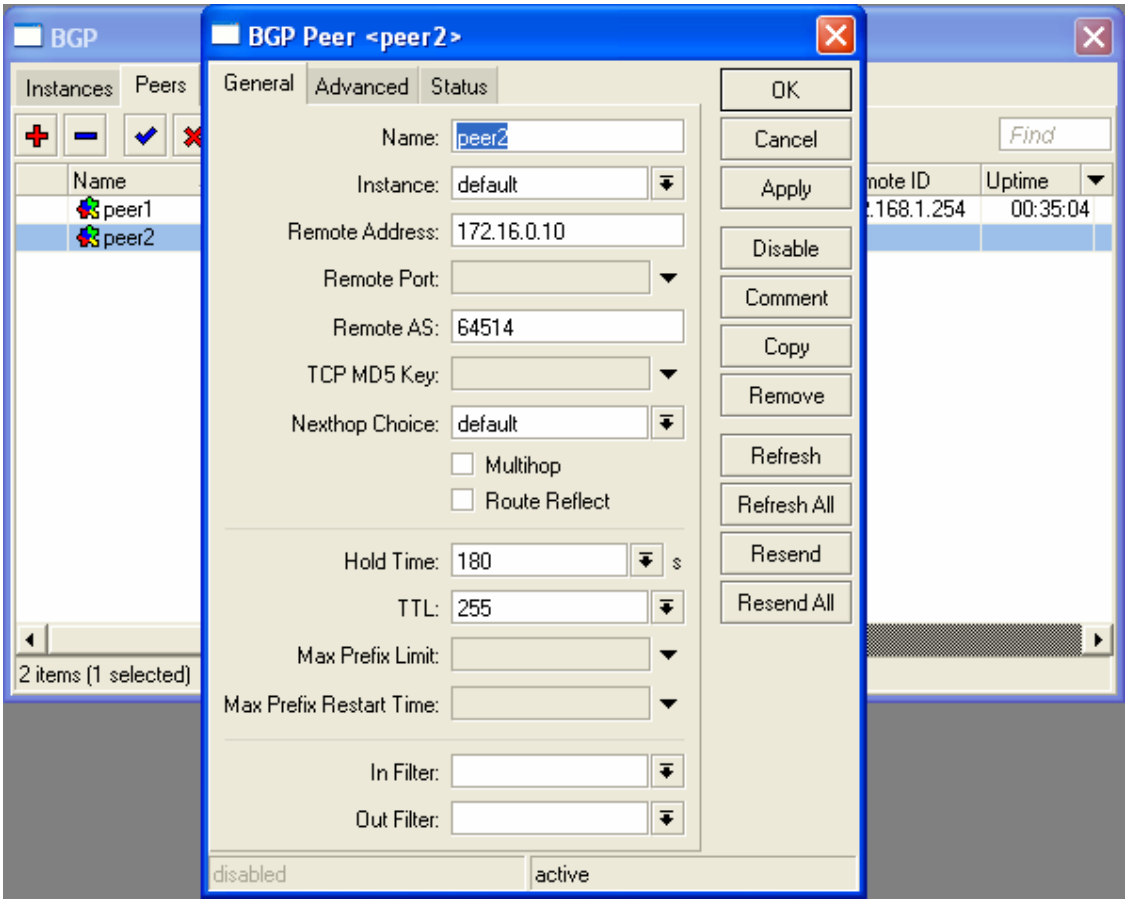


Berikan AS, router-id dan tandai redistribute seperti gambar dibawah

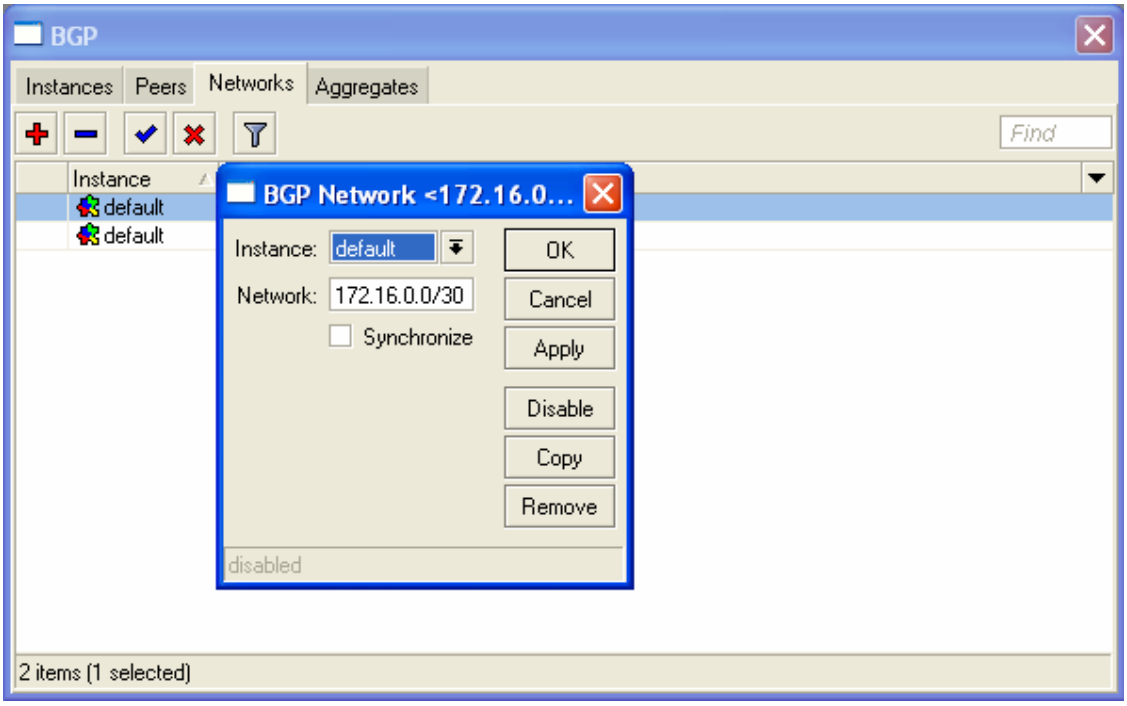


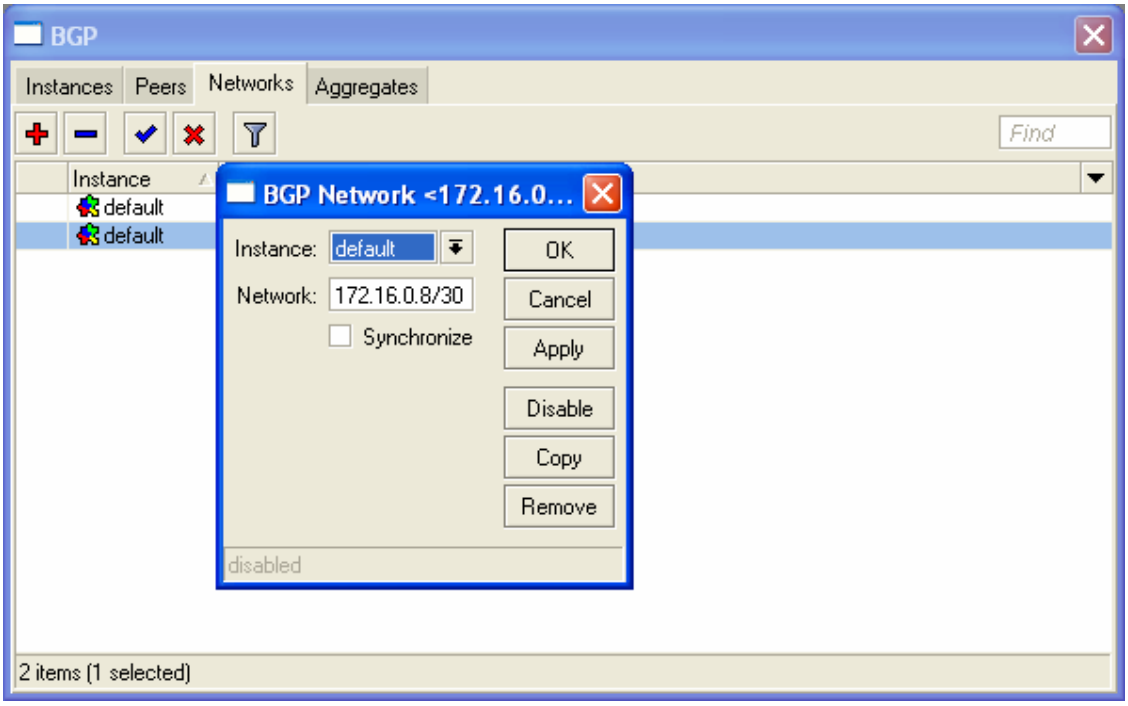
Buat BGP peer sesuai dengan IP address dan AS pada router neighbor.



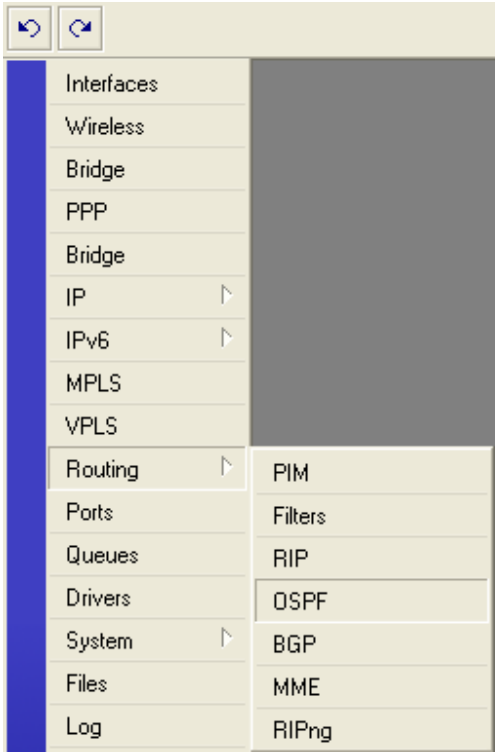

BGP
Instances
Peers
Name
peer1
peer2
2 items (1 selected)
BGP Peer <peer2>
General
Advanced
Status
Name: peer2
Instance: default
Remote Address: 172.16.0.10
Remote Port:
Remote AS: 64514
TCP MD5 Key:
Nexthop Choice: default
Multihop
Route Reflect
Hold Time: 180 s
TTL: 255
Max Prefix Limit:
Max Prefix Restart Time:
In Filter:
Out Filter:
disabled
active
OK
Cancel
Apply
Disable
Comment
Copy
Remove
Refresh
Refresh All
Resend
Resend All
Find
Uptime
00:35:04

Buat Alamat Network yang menggunakan BGP

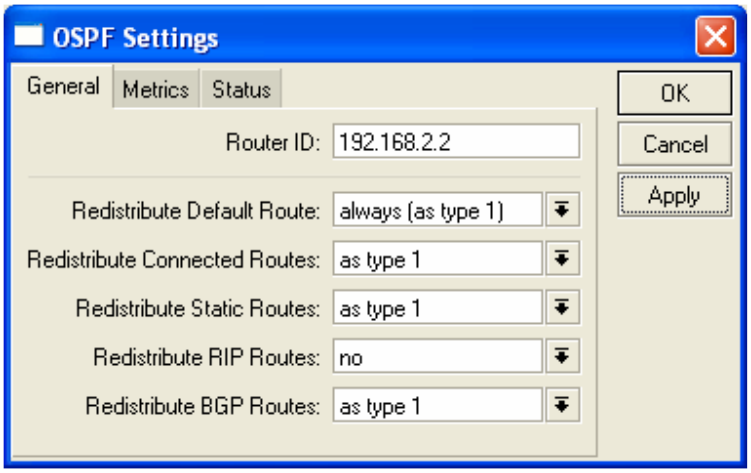




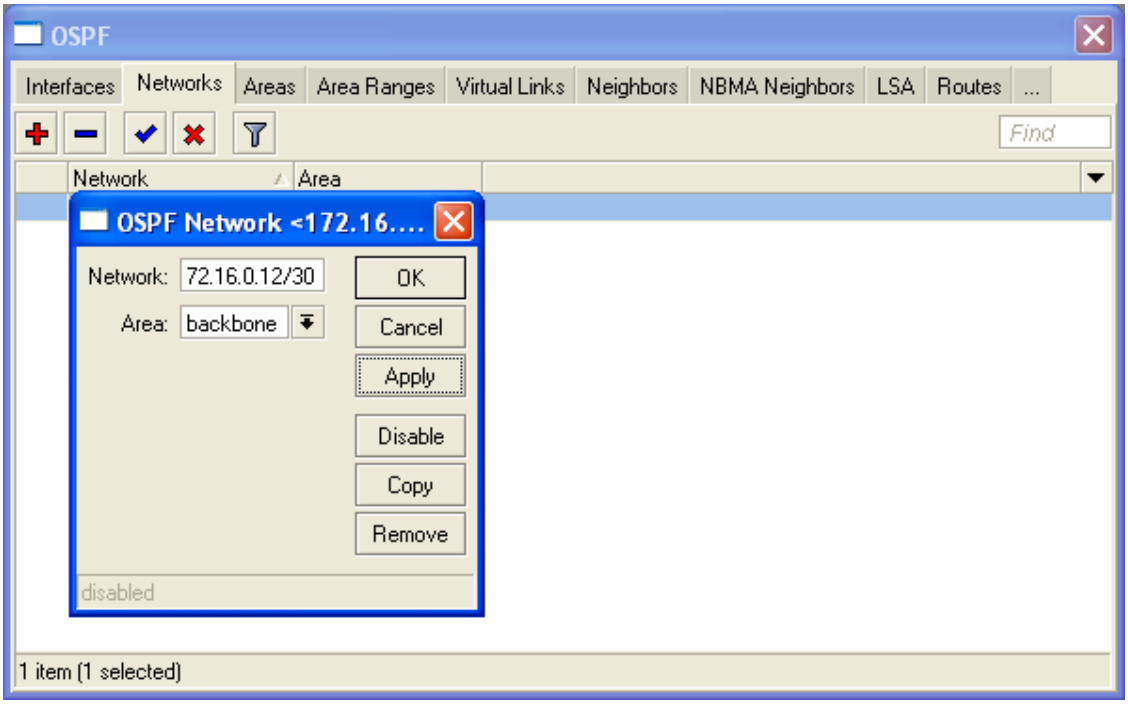
Set routing OSPF untuk interface berikutnya



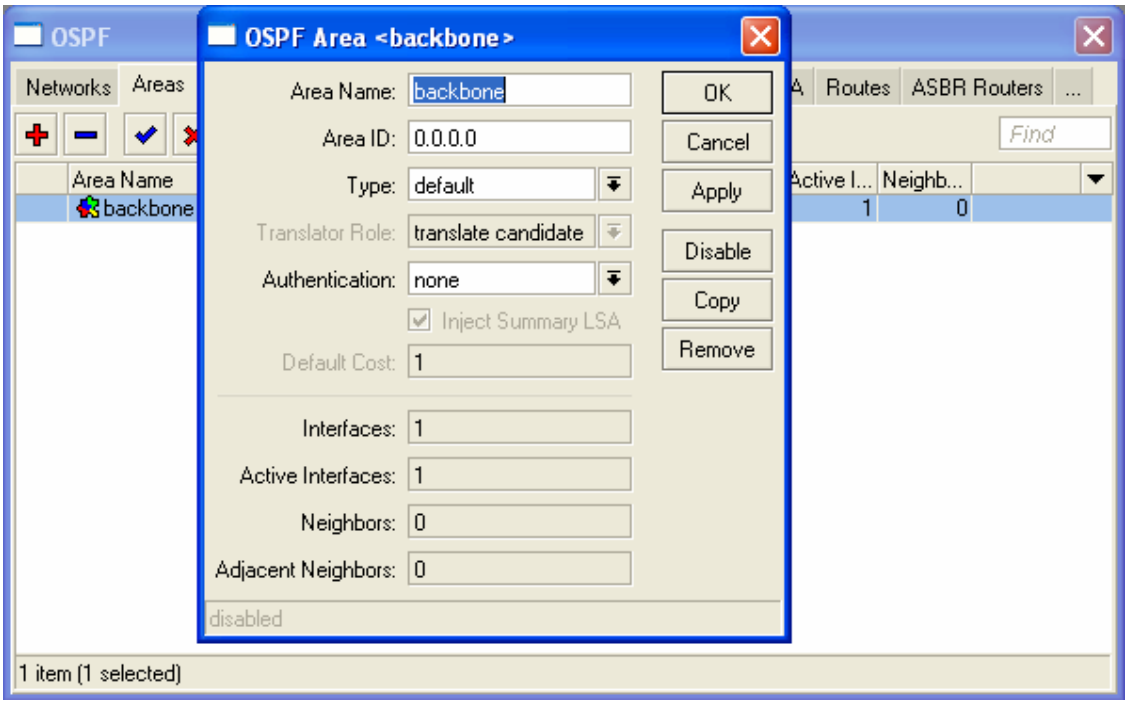
Berikan router-id dan tandai redistribute seperti pada gambar dibawah.



Set Alamat Network yang akan menggunakan OSPF.

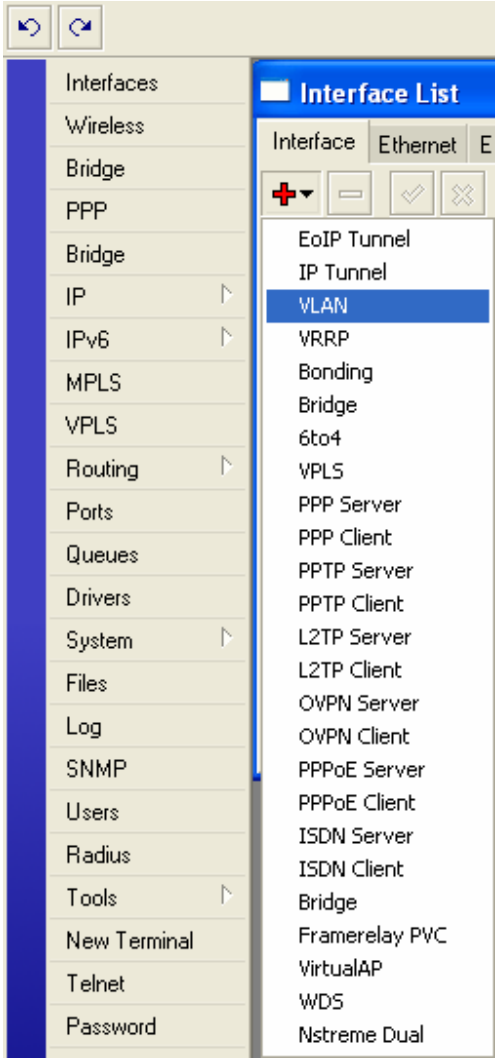


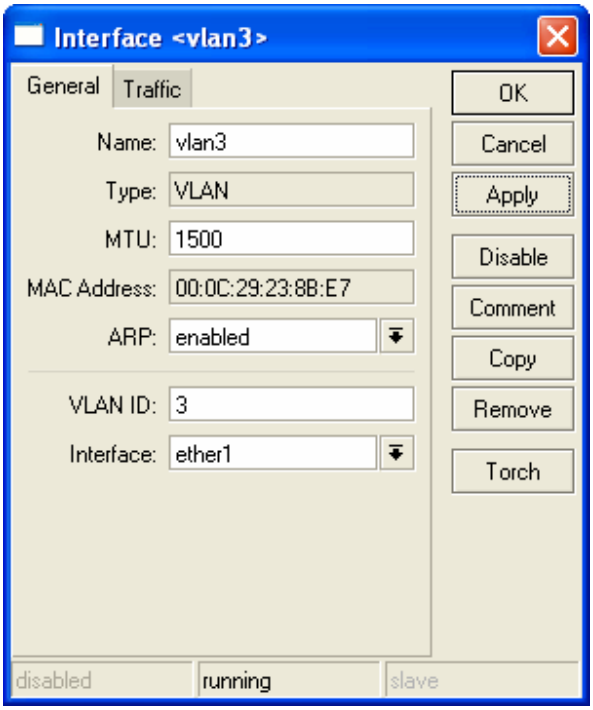
Untuk OSPF area kita bisa menggunakan area default yaitu dengan nama backbone dan Area ID 0.0.0.0, kecuali anda ingin membuat area baru, mungkin nanti bisa anda lakukan sebagai pengembangan atau routing OSPF dengan area yang berbeda.

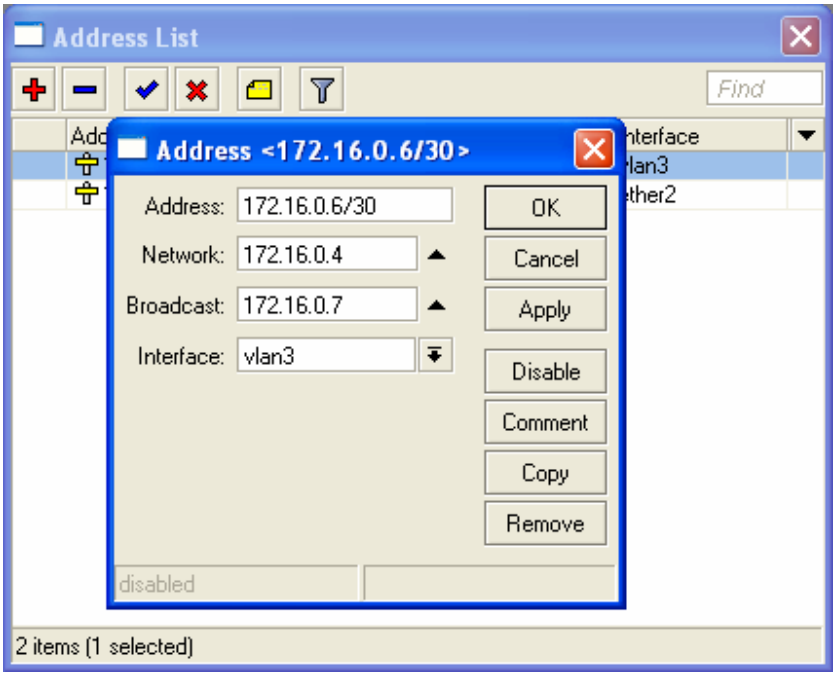


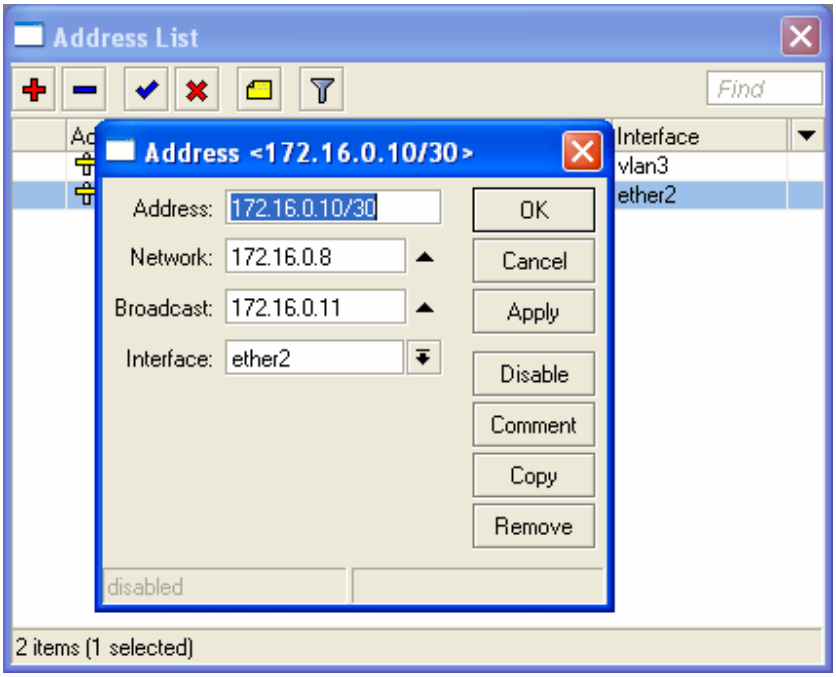
R3 Mikrotik

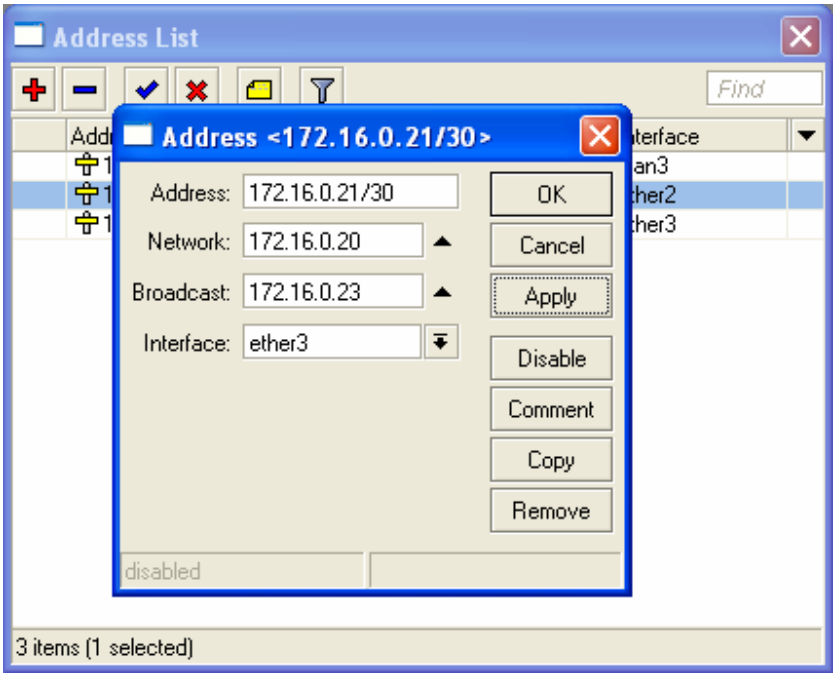
Langkah ini sama persis dengan R2, tinggal meyesuaikan No Vlan, IP address, BGP

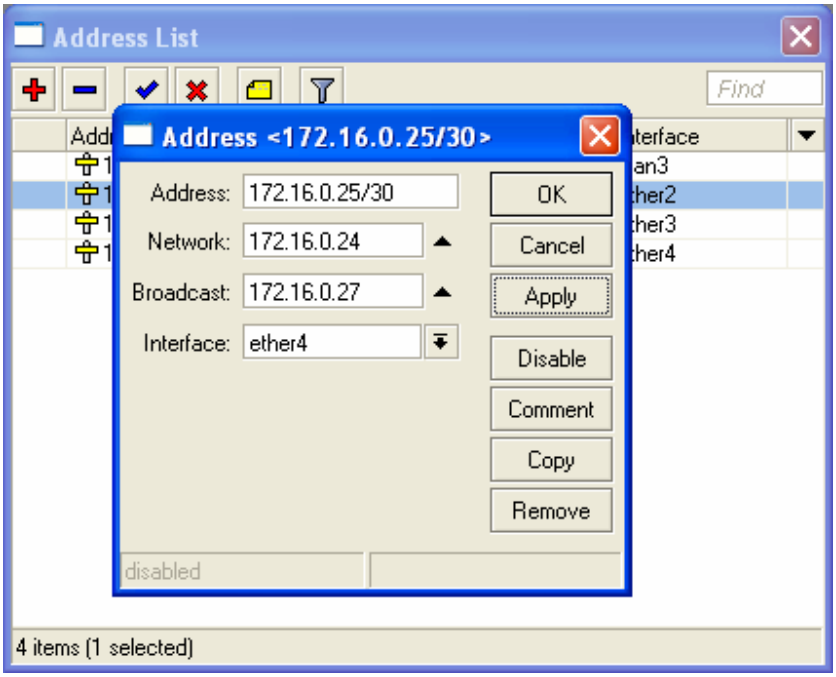


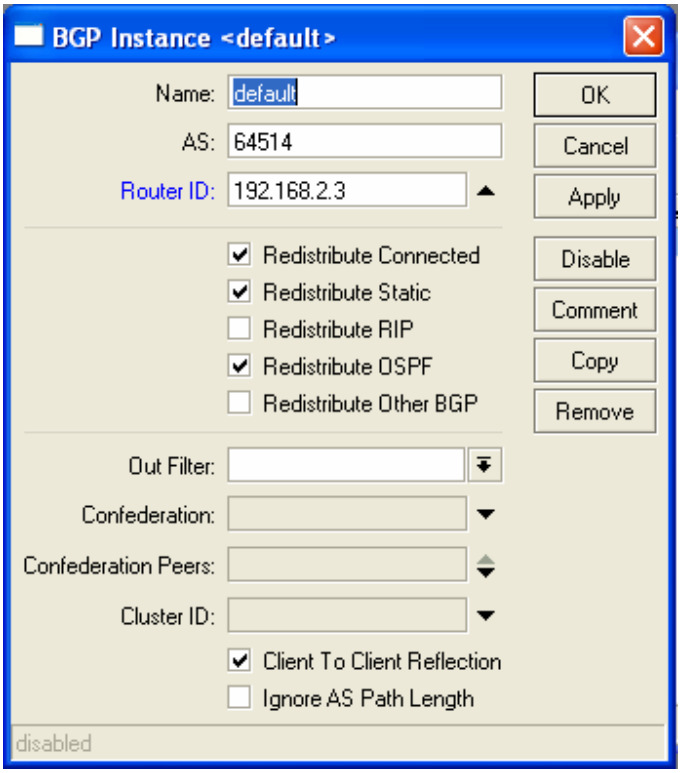

Interface <vlan3>
General
Traffic
OK
Cancel
Apply
Disable
Comment
Copy
Remove
Torch
Name: vlan3
Type: VLAN
MTU: 1500
MAC Address: 00:0C:29:23:8B:E7
ARP: enabled
VLAN ID: 3
Interface: ether1
disabled
running
slave

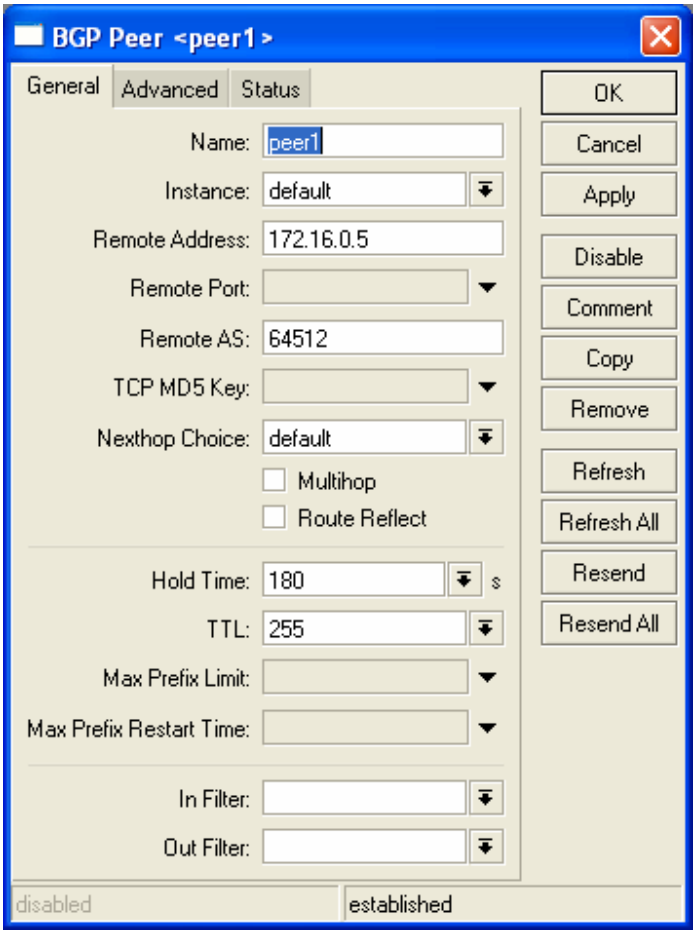

Address List
Find
Address <172.16.0.6/30>
Address: 172.16.0.6/30
Network: 172.16.0.4
Broadcast: 172.16.0.7
Interface: vlan3
OK
Cancel
Apply
Disable
Comment
Copy
Remove
disabled
2 items (1 selected)

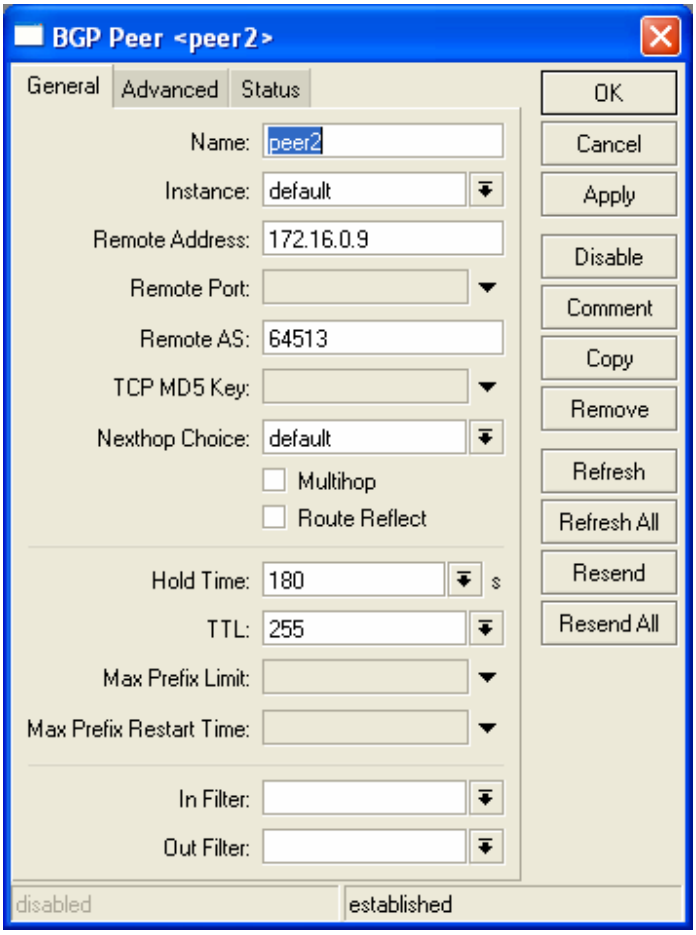

Address List
Find
Interface
vlan3
ether2
Address <172.16.0.10/30>
Address: 172.16.0.10/30
Network: 172.16.0.8
Broadcast: 172.16.0.11
Interface: ether2
OK
Cancel
Apply
Disable
Comment
Copy
Remove
disabled
2 items (1 selected)


Address List
Find
Address <172.16.0.21/30>
Address: 172.16.0.21/30
Network: 172.16.0.20
Broadcast: 172.16.0.23
Interface: ether3
OK
Cancel
Apply
Disable
Comment
Copy
Remove
disabled
3 items (1 selected)


Address List
Find
Address <172.16.0.25/30>
Address: 172.16.0.25/30
Network: 172.16.0.24
Broadcast: 172.16.0.27
Interface: ether4
OK
Cancel
Apply
Disable
Comment
Copy
Remove
disabled
4 items (1 selected)

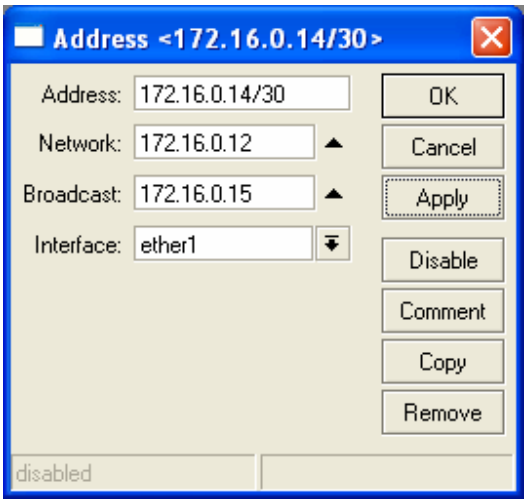

BGP Instance <default>
Name: default
AS: 64514
Router ID: 192.168.2.3
Redistribute Connected
Redistribute Static
Redistribute RIP
Redistribute OSPF
Redistribute Other BGP
Out Filter:
Confederation:
Confederation Peers:
Cluster ID:
Client To Client Reflection
Ignore AS Path Length
OK
Cancel
Apply
Disable
Comment
Copy
Remove
disabled

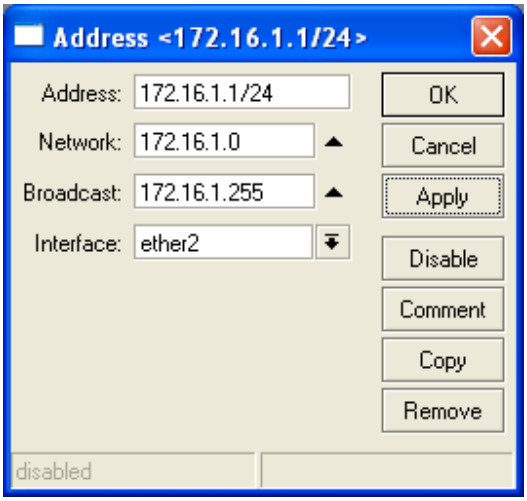

BGP Peer <peer1>
General
Advanced
Status
Name: peer1
Instance: default
Remote Address: 172.16.0.5
Remote Port:
Remote AS: 64512
TCP MD5 Key:
Nexthop Choice: default
Multihop
Route Reflect
Hold Time: 180 s
TTL: 255
Max Prefix Limit:
Max Prefix Restart Time:
In Filter:
Out Filter:
OK
Cancel
Apply
Disable
Comment
Copy
Remove
Refresh
Refresh All
Resend
Resend All
disabled
established


BGP Peer <peer2>
General
Advanced
Status
Name: peer2
Instance: default
Remote Address: 172.16.0.9
Remote Port:
Remote AS: 64513
TCP MD5 Key:
Nexthop Choice: default
Multihop
Route Reflect
Hold Time: 180 s
TTL: 255
Max Prefix Limit:
Max Prefix Restart Time:
In Filter:
Out Filter:
OK
Cancel
Apply
Disable
Comment
Copy
Remove
Refresh
Refresh All
Resend
Resend All
disabled
established

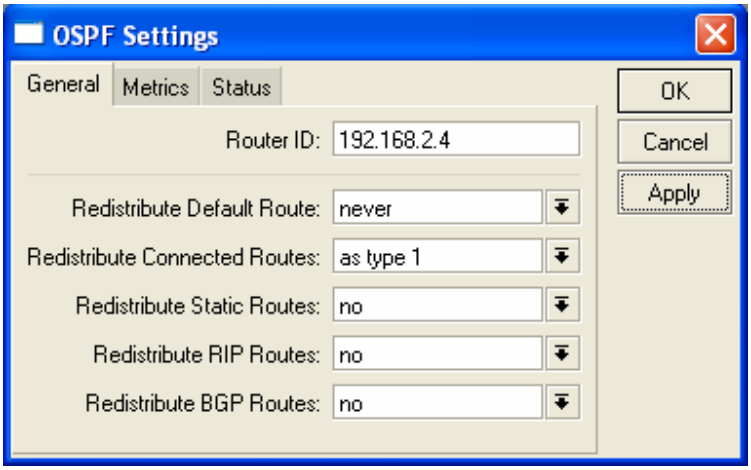
R4 Mikrotik

Setting IP address pada masing-masing interface.

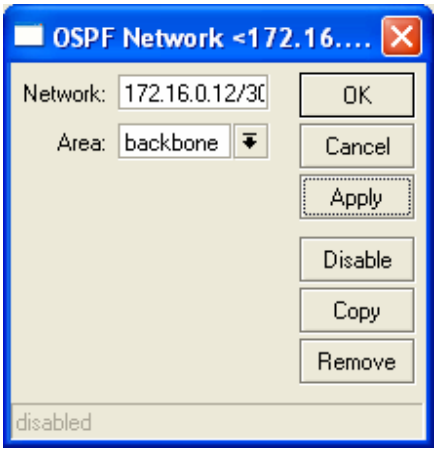


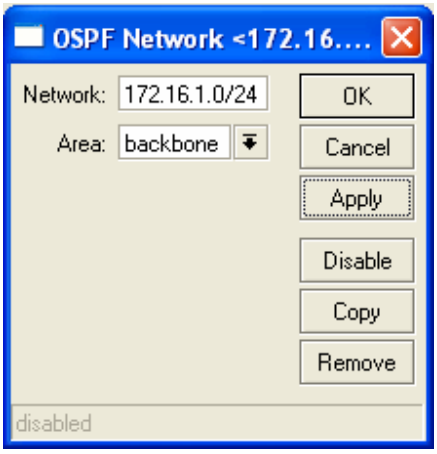


Pilih routing OSPF pada menu, set router-id dan redistribute seperti gambar dibawah.

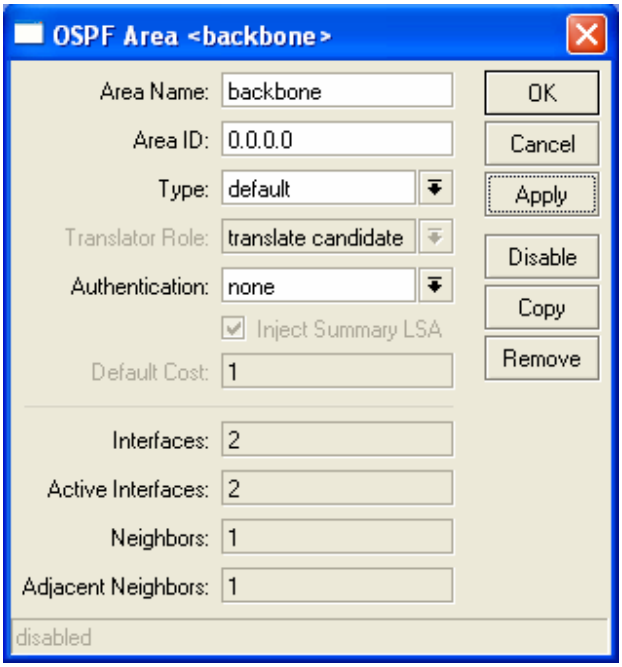


Set alamat network yang akan menggunakan OSPF.

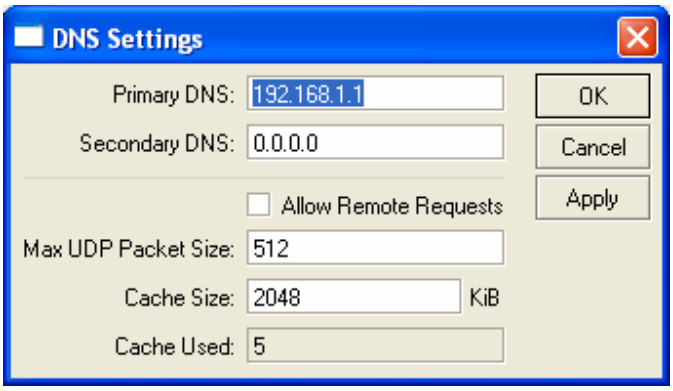




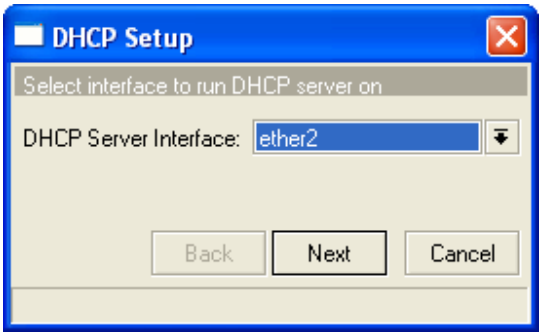
Unutk OSPF area gunakan default.

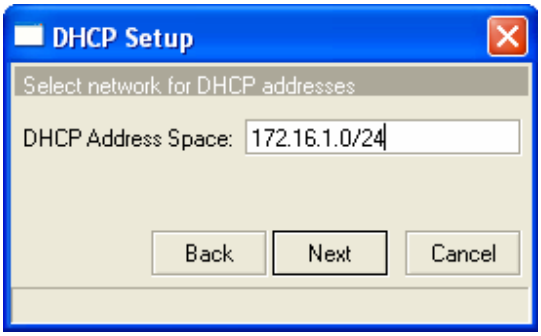


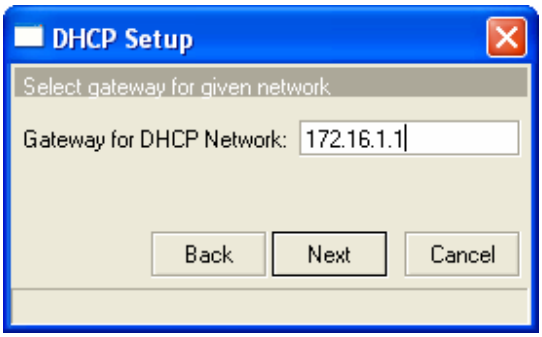
Set DNS yang nanti akan dipergunakan oleh client yang menggunakan DHCP

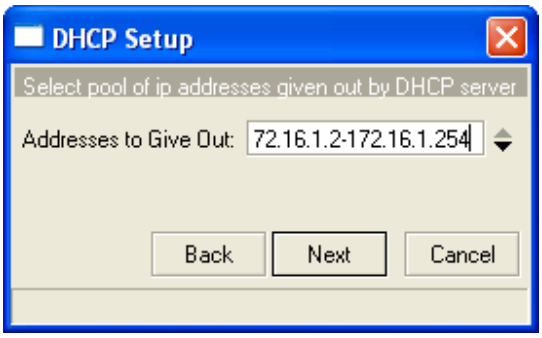


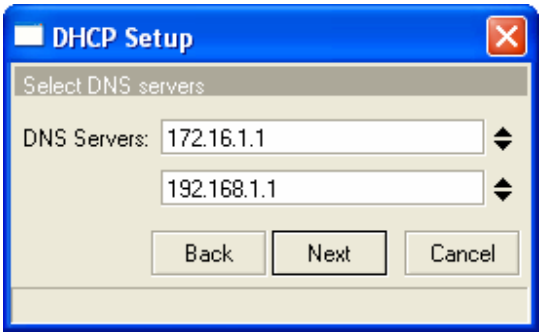
Set DHCP

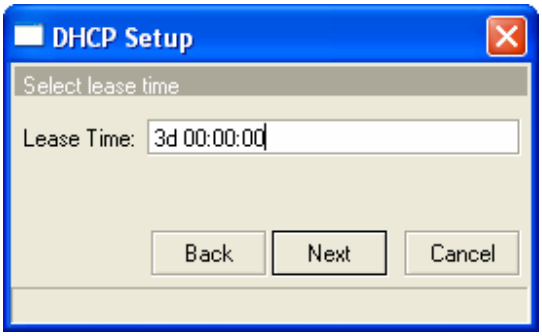



DHCP Setup
Select network for DHCP addresses
DHCP Address Space:
172.16.1.0/24
Back
Next
Cancel


DHCP Setup
Select gateway for given network
Gateway for DHCP Network:
172.16.1.1
Back
Next
Cancel

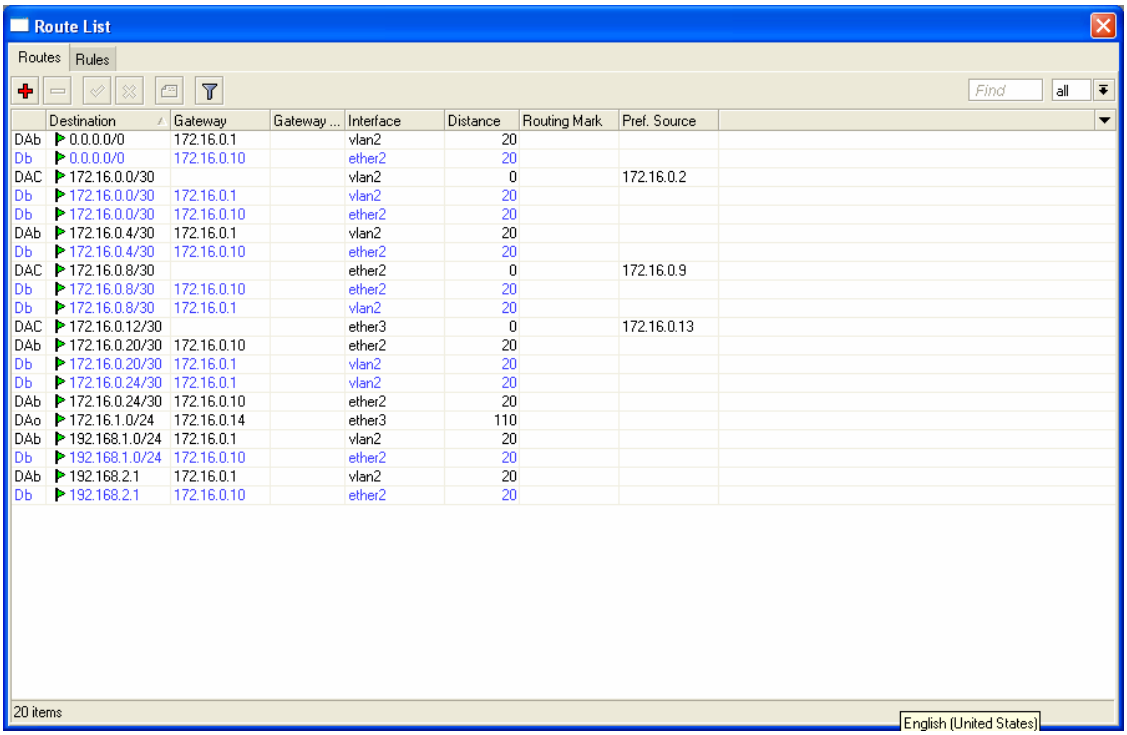

DHCP Setup
Select pool of ip addresses given out by DHCP server
Addresses to Give Out:
72.16.1.2-172.16.1.254
Back
Next
Cancel


DHCP Setup
Select DNS servers
DNS Servers:
172.16.1.1
192.168.1.1
Back
Next
Cancel



R2 Mikrotik

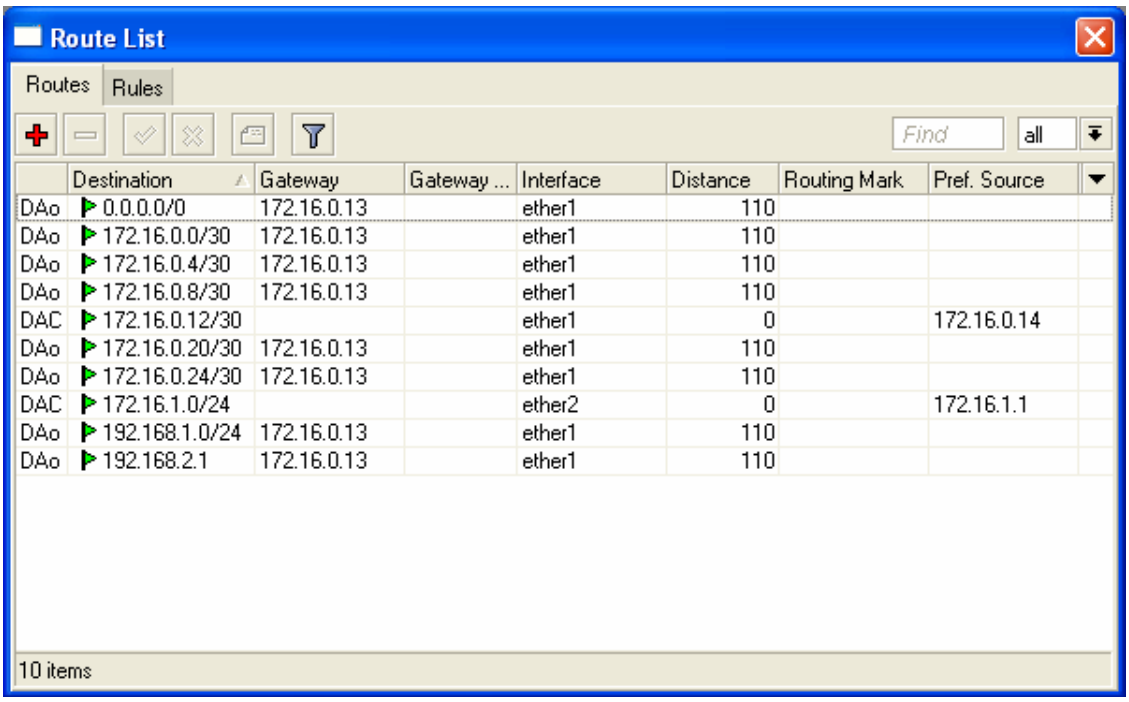
Pilih IP route, maka akan terlihat routing tabel yang terbentuk baik melalui BGP maupun OSPF



	Destination	Gateway	Gateway ...	Interface	Distance	Routing Mark	Pref. Source
DAb	0.0.0.0/0	172.16.0.1		vlan2	20		
Db	0.0.0.0/0	172.16.0.10		ether2	20		
DAC	172.16.0.0/30			vlan2	0		172.16.0.2
Db	172.16.0.0/30	172.16.0.1		vlan2	20		
Db	172.16.0.0/30	172.16.0.10		ether2	20		
DAb	172.16.0.4/30	172.16.0.1		vlan2	20		
Db	172.16.0.4/30	172.16.0.10		ether2	20		
DAC	172.16.0.8/30			ether2	0		172.16.0.9
Db	172.16.0.8/30	172.16.0.10		ether2	20		
Db	172.16.0.8/30	172.16.0.1		vlan2	20		
DAC	172.16.0.12/30			ether3	0		172.16.0.13
DAb	172.16.0.20/30	172.16.0.10		ether2	20		
Db	172.16.0.20/30	172.16.0.1		vlan2	20		
Db	172.16.0.24/30	172.16.0.1		vlan2	20		
DAb	172.16.0.24/30	172.16.0.10		ether2	20		
DAo	172.16.1.0/24	172.16.0.14		ether3	110		
DAb	192.168.1.0/24	172.16.0.1		vlan2	20		
Db	192.168.1.0/24	172.16.0.10		ether2	20		
DAb	192.168.2.1	172.16.0.1		vlan2	20		
Db	192.168.2.1	172.16.0.10		ether2	20		

R4 Mikrotik

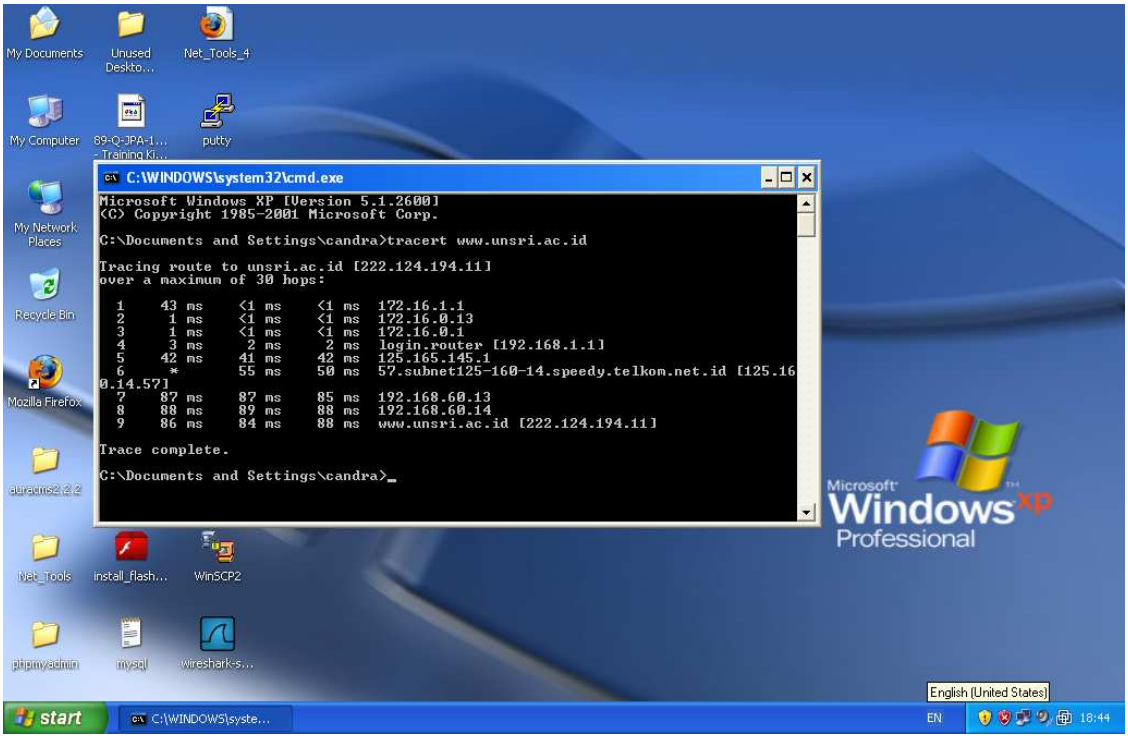
Pilih IP route, maka akan terlihat routing tabel yang terbentuk oleh OSPF termasuk yang di-redistribute oleh BGP



	Destination	Gateway	Gateway ...	Interface	Distance	Routing Mark	Pref. Source
DAo	0.0.0.0/0	172.16.0.13		ether1	110		
DAo	172.16.0.0/30	172.16.0.13		ether1	110		
DAo	172.16.0.4/30	172.16.0.13		ether1	110		
DAo	172.16.0.8/30	172.16.0.13		ether1	110		
DAC	172.16.0.12/30			ether1	0		172.16.0.14
DAo	172.16.0.20/30	172.16.0.13		ether1	110		
DAo	172.16.0.24/30	172.16.0.13		ether1	110		
DAC	172.16.1.0/24			ether2	0		172.16.1.1
DAo	192.168.1.0/24	172.16.0.13		ether1	110		
DAo	192.168.2.1	172.16.0.13		ether1	110		

Client

Pada client, set interface untuk mendapatkan IP dari DHCP server pada R4 Mikrotik, lakukan tracert untuk melihat route yang ditempuh oleh packet dalam mencapai destination, misal: tracert www.unsri.ac.id.



Buka web browser dan akses ke salah satu web, misalnya http://www.unsri.ac.id

Untuk router yang lain bisa anda lakukan sendiri dengan cara yang sama.