Workshop IPv6 on MikroTik

Apjii – Postel

25 November 2009

Jakarta

Introduction

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Overview IPv6

Apa itu IPv6 ?

- ✓ Disebut juga IPng (IP Next Generation)
- ✓ Panjang bit 128 bit
- ✓ Banyak IP yang tersedia $2^{128} = 3.4 \times 10^{38}$
- ✓ Pengganti IPv4 dengan permasalahan dasar "alokasi IPv4 yang mulai habis"
- ✓ Direkomendasikan IETF dengan RFC 1752

Pengalamatan IPv6

- Panjang 128 bit dituliskan dalam bentuk hexadesimal yang masing-masing terdiri dari 16 bit yang dipisah dengan tanda titik dua " : ", contoh ⇒ **3FFE:501:4819:2000:210:F3FF:F303:4D0**
- Contoh penulisan yang lain

  3FFE:0:0:0:201:F3FF:F303:4D0 dapat ditulis 3FFE::201:F3FF:F303:4D0

  0:0:0:0:0:0:0:1 menjadi ::1

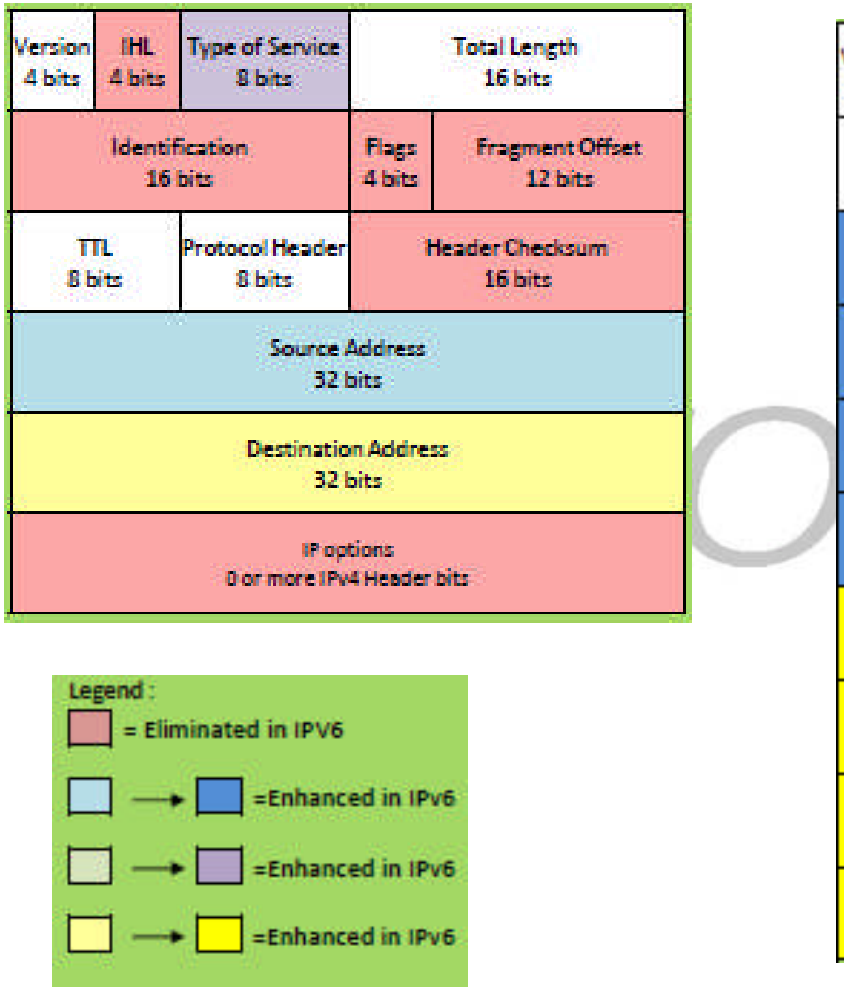
Alamat IPv6 –Unicast Address

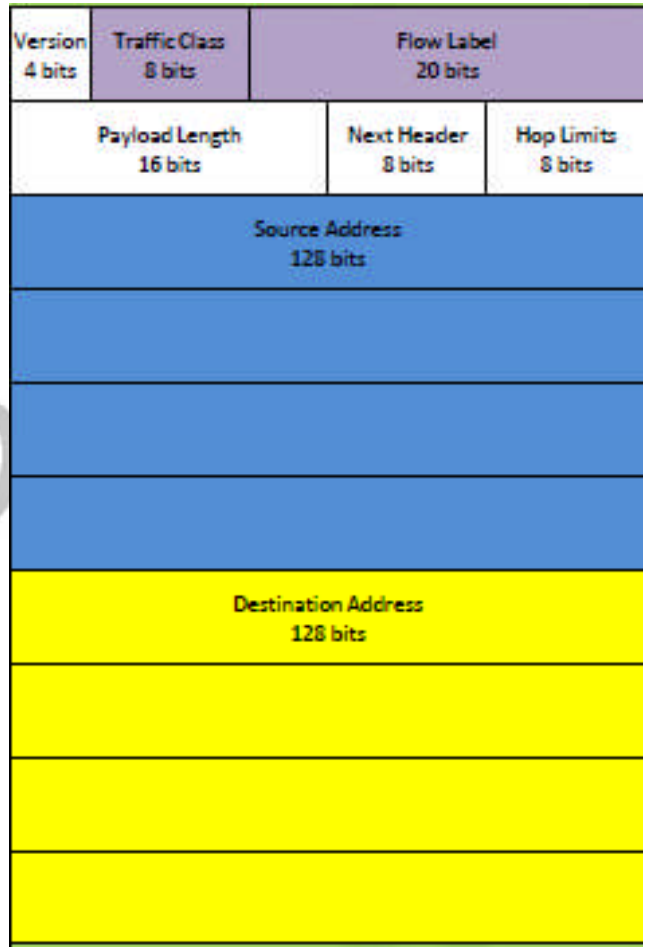
- Link-Local Address (fe80::/10)
  - Used to communicate between other ipv6 interfaces in the same network link.
  - hanya valid pada single link.
  - Auto assigned
  - Tidak dirouting di Internet.
- Global Address
  - Dapat dirouting ke Internet

IPv6 Addressing –Global Unicast Address

- Global Routing Prefix (48 bit)
  - Alamat site , contoh. 2404:1b8
  - Didesain oleh struktur hirarki dari RIRs and ISPs
- Subnet ID (16 bit)
  - Nomor identifikasi subnet dalam site
  - Digunakan admin untuk membuat struktur internal jaringan sesuai kebutuhan.
- Interface ID (64 bit)
  - Identitas unik dari interface tertentu (host)

Perbandingan Header IPv4 dan IPv6





IPv6 Autoconfiguration

- Menggunakan Link-Local untuk berkomunikasi dengan perangkat lain dalam link yang sama.
- Support Plug and Play
- tidak ada manual configuration pada client side
- Minimal router configuration
- Stateless – tidak membutuhkan DHCP server
- Statefull – membutuhkan DHCP Server (berjalan pada DHCPv6)

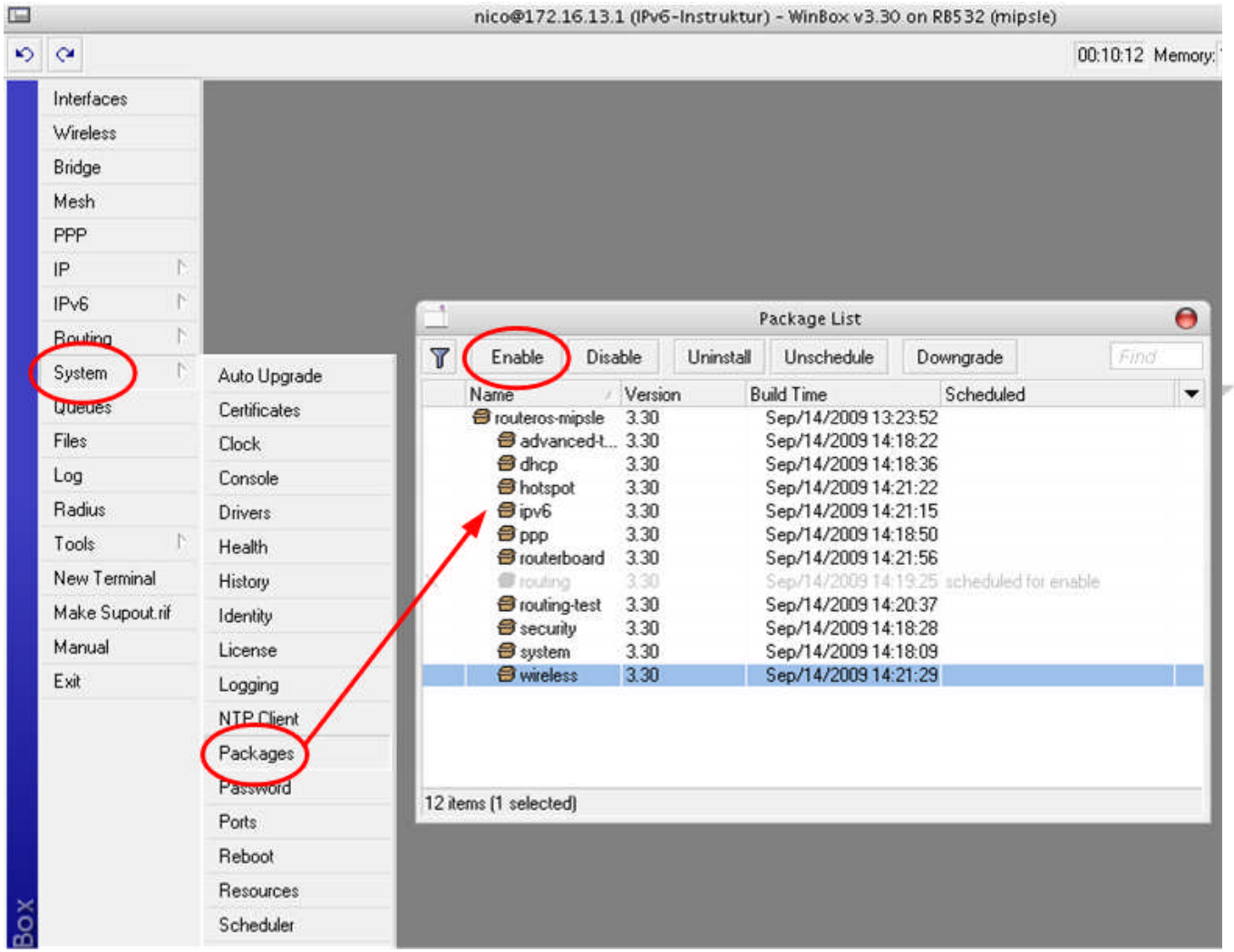
Fitur IPv6 dalam RouterOS

- MikroTikIPv6 mendukung (RouterOS v3.x / 4.x):
  - static addressing and routing;
  - router advertisement daemon (for address autoconfiguration)
  - dynamic routing: BGP+, OSPFv3, and RIPngprotocols
  - DNS name servers;
  - 6in4 (SIT) tunnels;
  - telnet , ping and traceroute;
  - web proxy;
  - sniffer and fetch tools;

Fitur IPv6 dalam RouterOS

- Fitur yang tidak didukung RouterOS sbb:
  - DHCPv6;
  - all PPP (Point-to-point protocols);
  - IPSEC;
  - SSH, FTP, API, Winbox access;
  - queues;
  - automatic tunnel creation;
  - policy routing;
  - multicast routing;
  - MPLS;
  - torch, netwatch, bandwidth test dan tools lainnya;

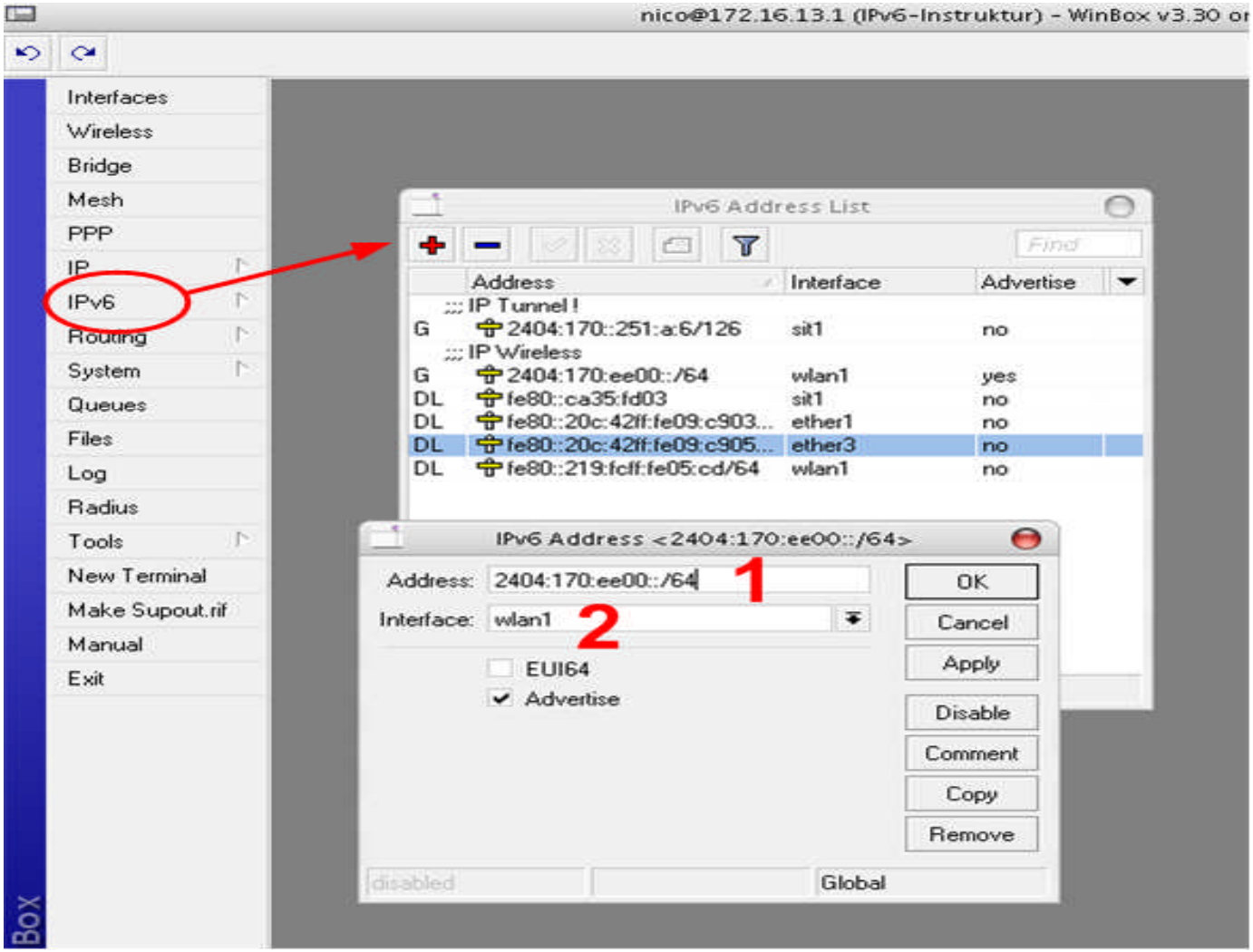
Setup IPv6 di RouterOS



Workshop !

- Aktifkan fitur IPv6 di router masing-masing.
- Reboot router anda.
- Pastikan fitur IPv6 apakah sudah aktif.

Static Addressing



Static Address by Console

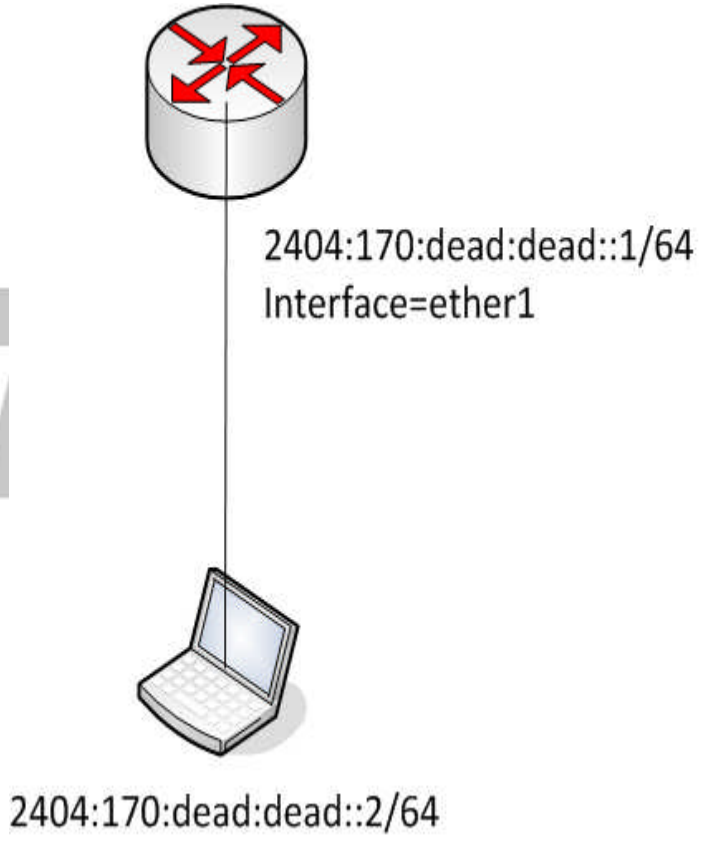
- **ipv6 address add** address= 2404:170:dead:dead::1/64 interface=wlan1 advertise=yes

- [nico@IPv6-Instruktur] > ipv6 address print
  Flags: X - disabled, I - invalid, D - dynamic, G - global, L - link-local

#	ADDRESS	INTERFACE	ADVERTISE
0	G ;;; IP Tunnel !		
	2404:170::251:a:6/126	sit1	no
1	G ;;; IP Wireless		
	2404:170:dead:dead::1/64	wlan1	yes
2	DL fe80::ca35:fd03/128	sit1	no
3	DL fe80::20c:42ff:fe09:c903/64	ether1	no
4	DL fe80::219:fcff:fe05:cd/64	wlan1	no

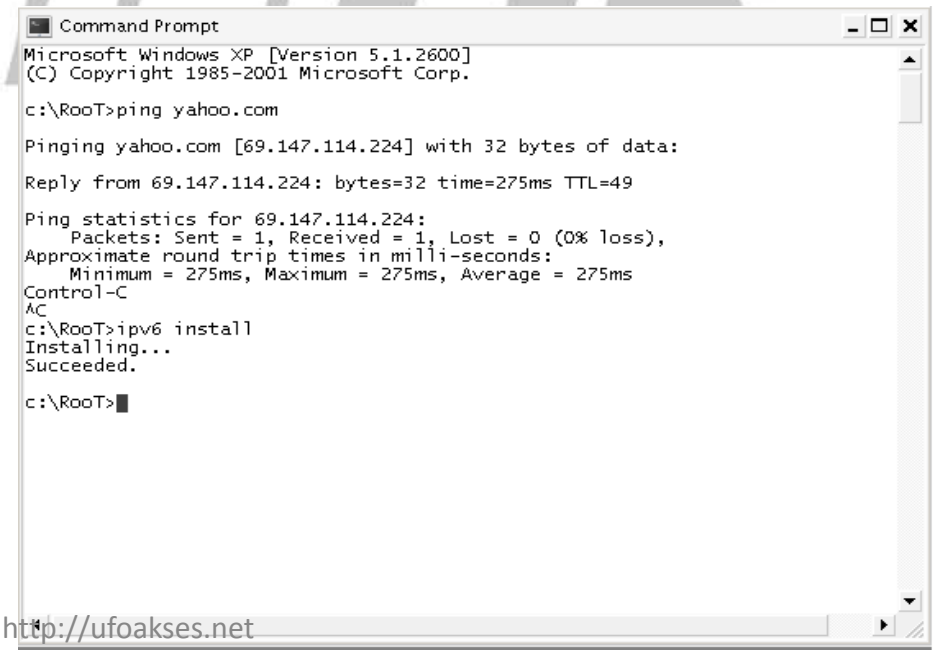
Workshop !

- Tambahkan static ip address IPv6 2404:170:dead:dead::1/64 pada router.
- Tambahkan static ip address IPv6 2404:170:dead:dead::2/64 pada Laptop.
- Cek ping dari laptop dan router !



Static address di XP

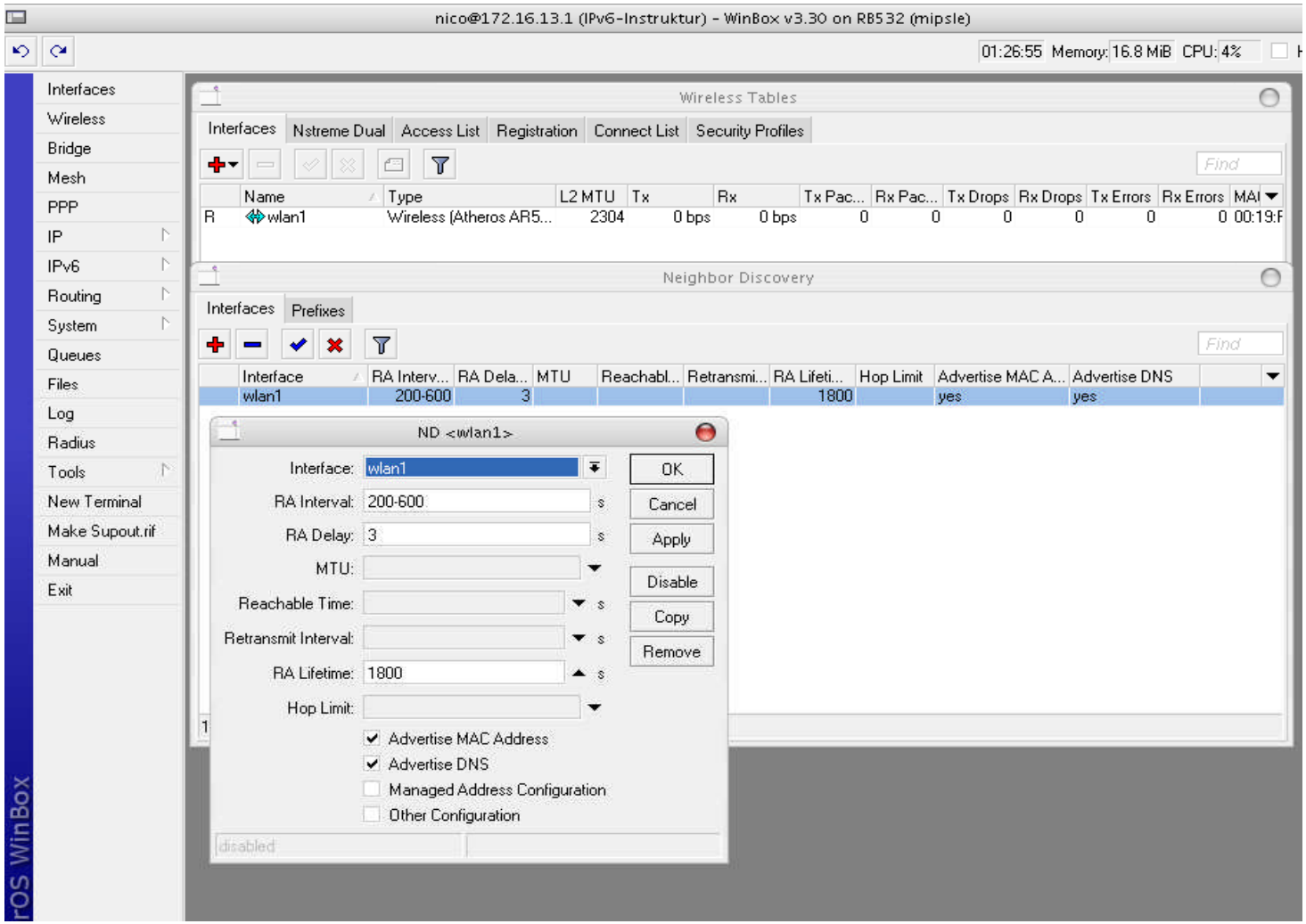
- Install IPv6 di CMD
- Dapat menggunakan netsh tool untuk membuat statik address di XP.
  - netsh
  - Interface ipv6 add address “Local address network” 2404:170:dead:dead::2
  - exit



Network Discovery Protocol (nd)

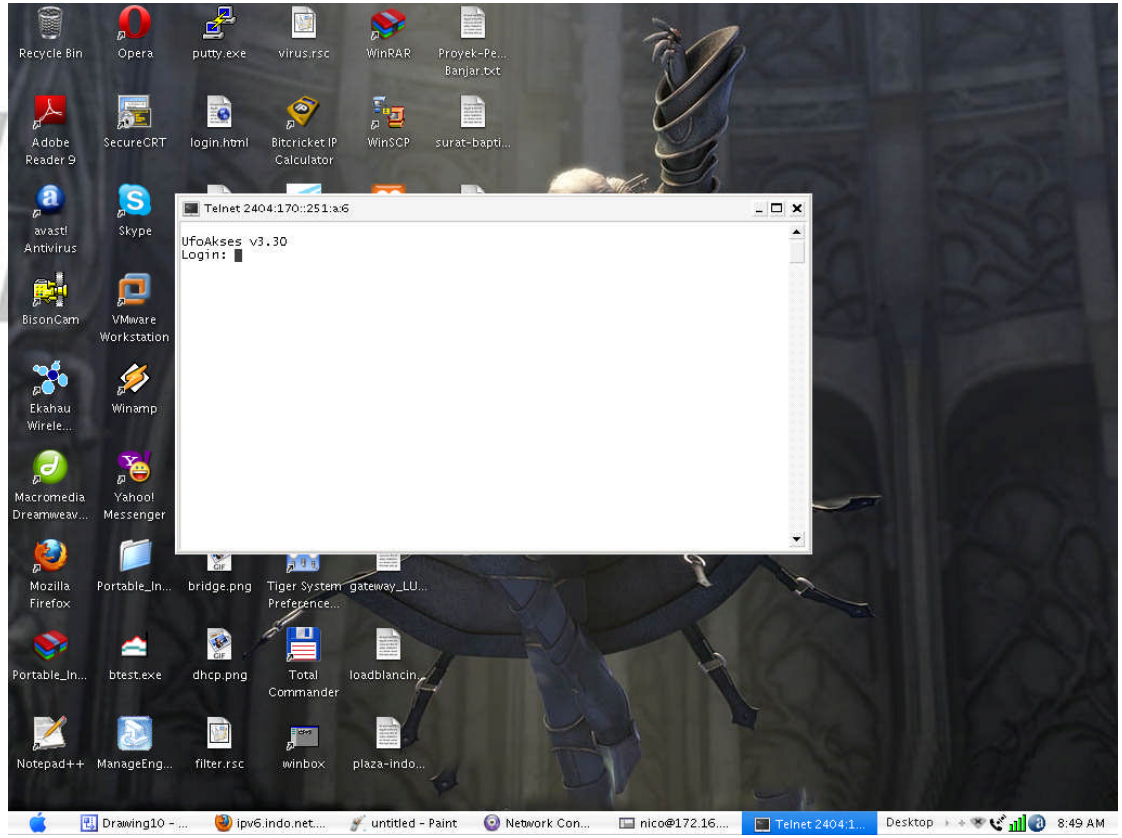
- Menggantikan fungsi ARP di IPv4.
- Bertanggungjawab pada penemuan node lain dalam link.
- Menentukan alamat link layer node lain.
- Menemukan router lain.
- Mempertahankan reachability informasi tentang jalur aktif lainnya pada node tetangga.
- Digunakan dalam alamat autoconfiguration.

ND Protocol di RouterOS



Remote akses RouterOS

- Hanya berlaku dengan metode telnet
- Contoh :
  - telnet 2404:170::251:a:6/

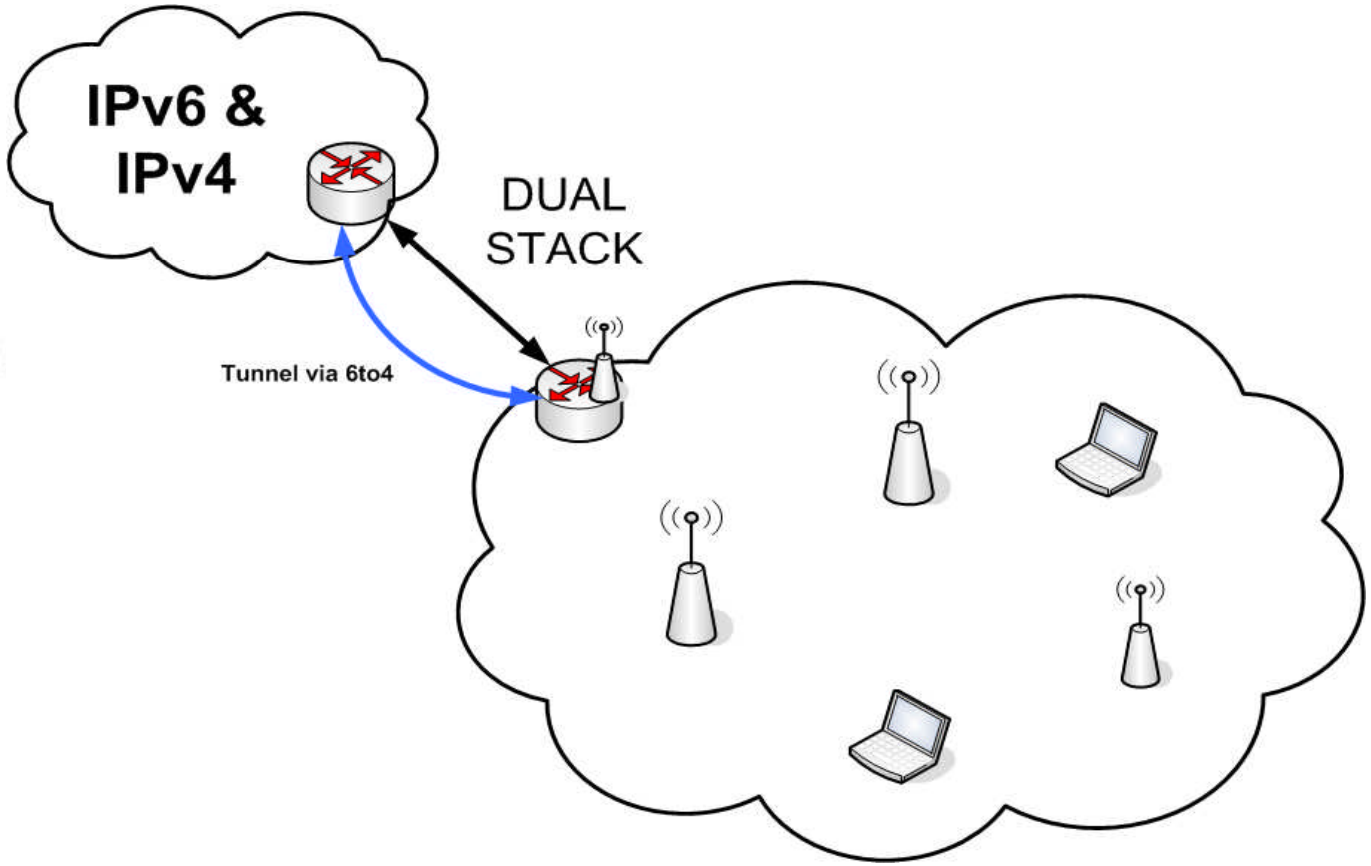


Workshop !

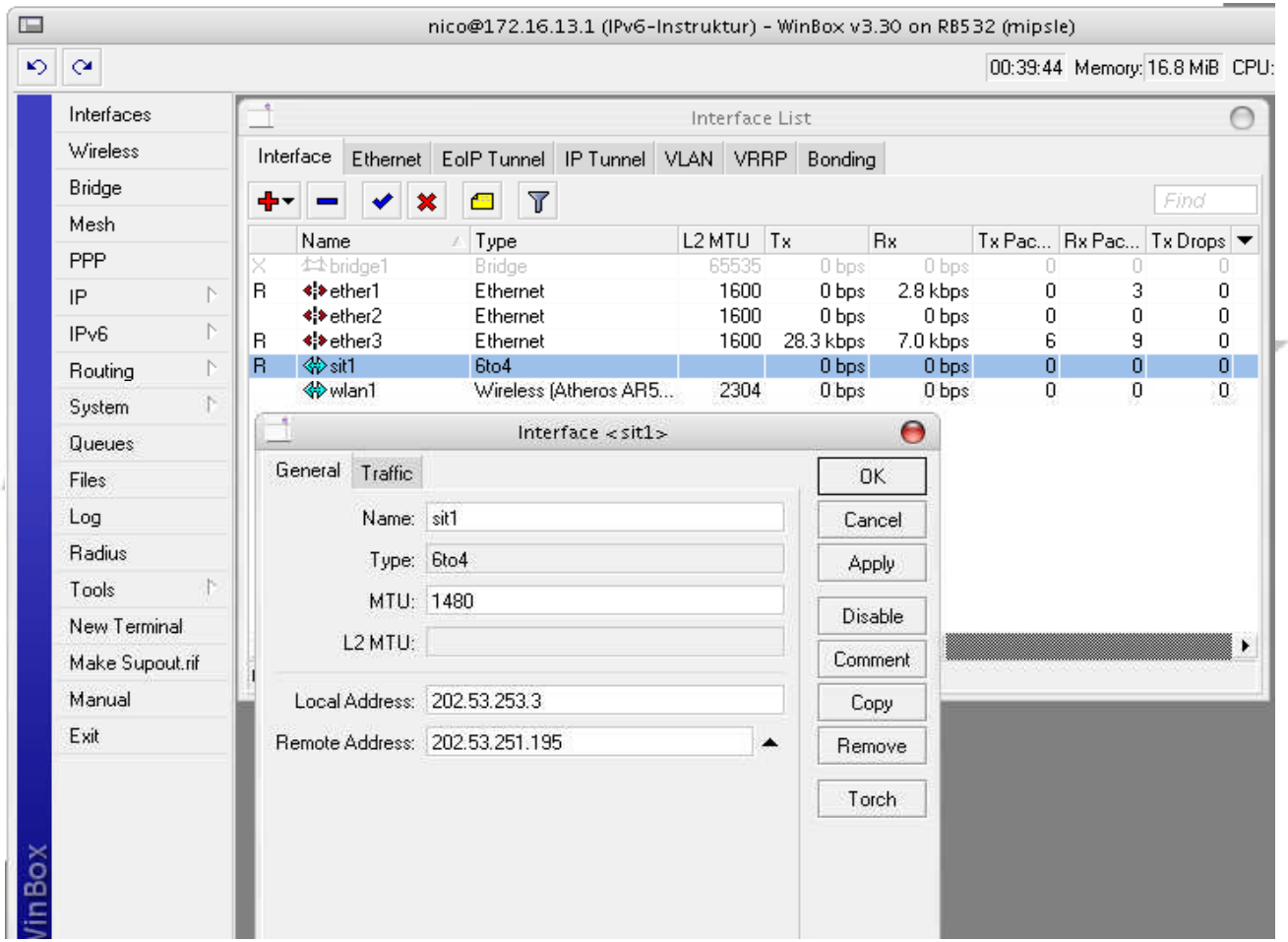
- Pinglah router anda dengan IPv6 yang telah dibuat.
- Gunakan telnet untuk remote akses ke dalam router.
- Explore router dengan metode CLI

Metode Transisi IPv6

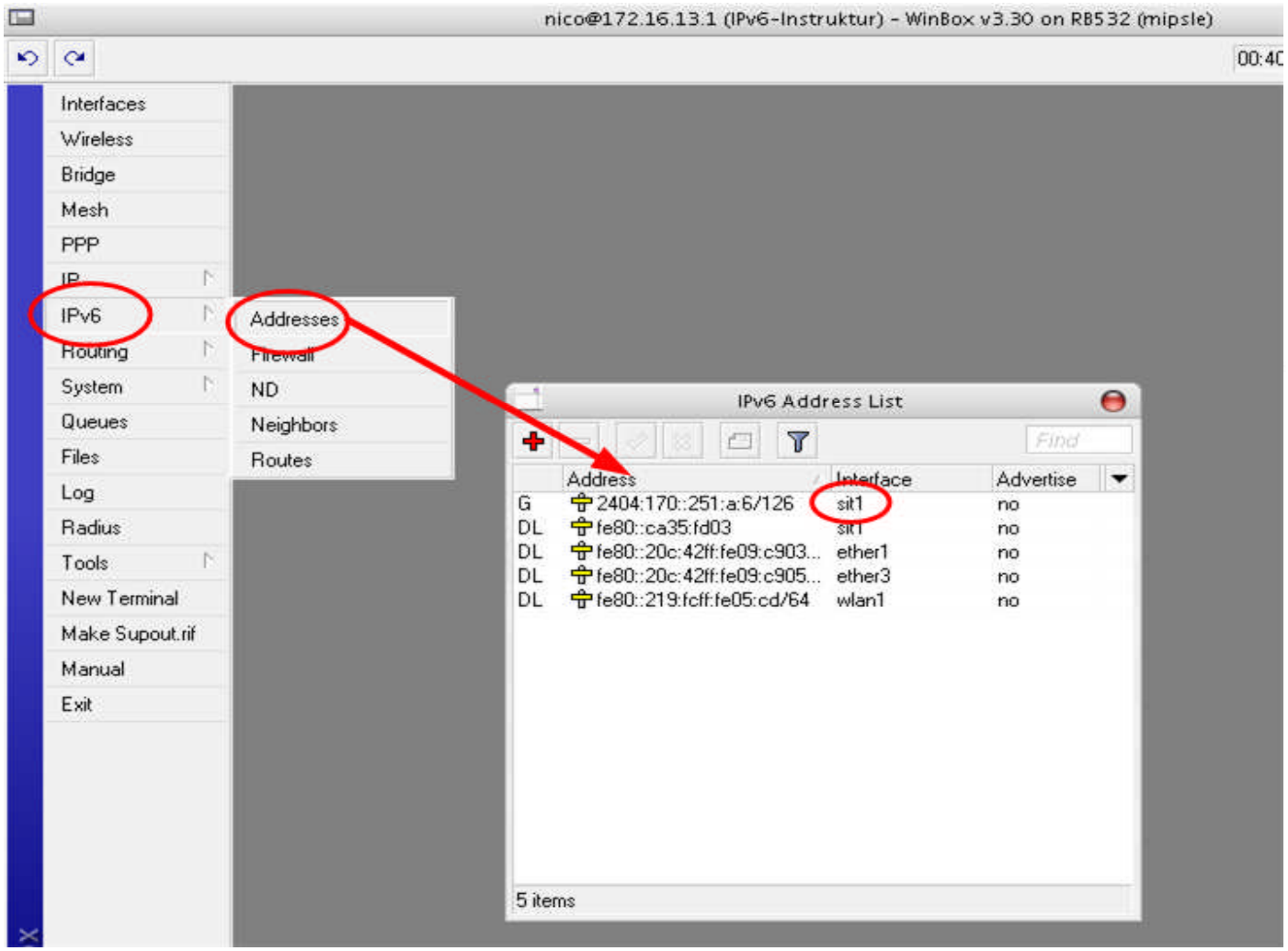
- Dual Stack



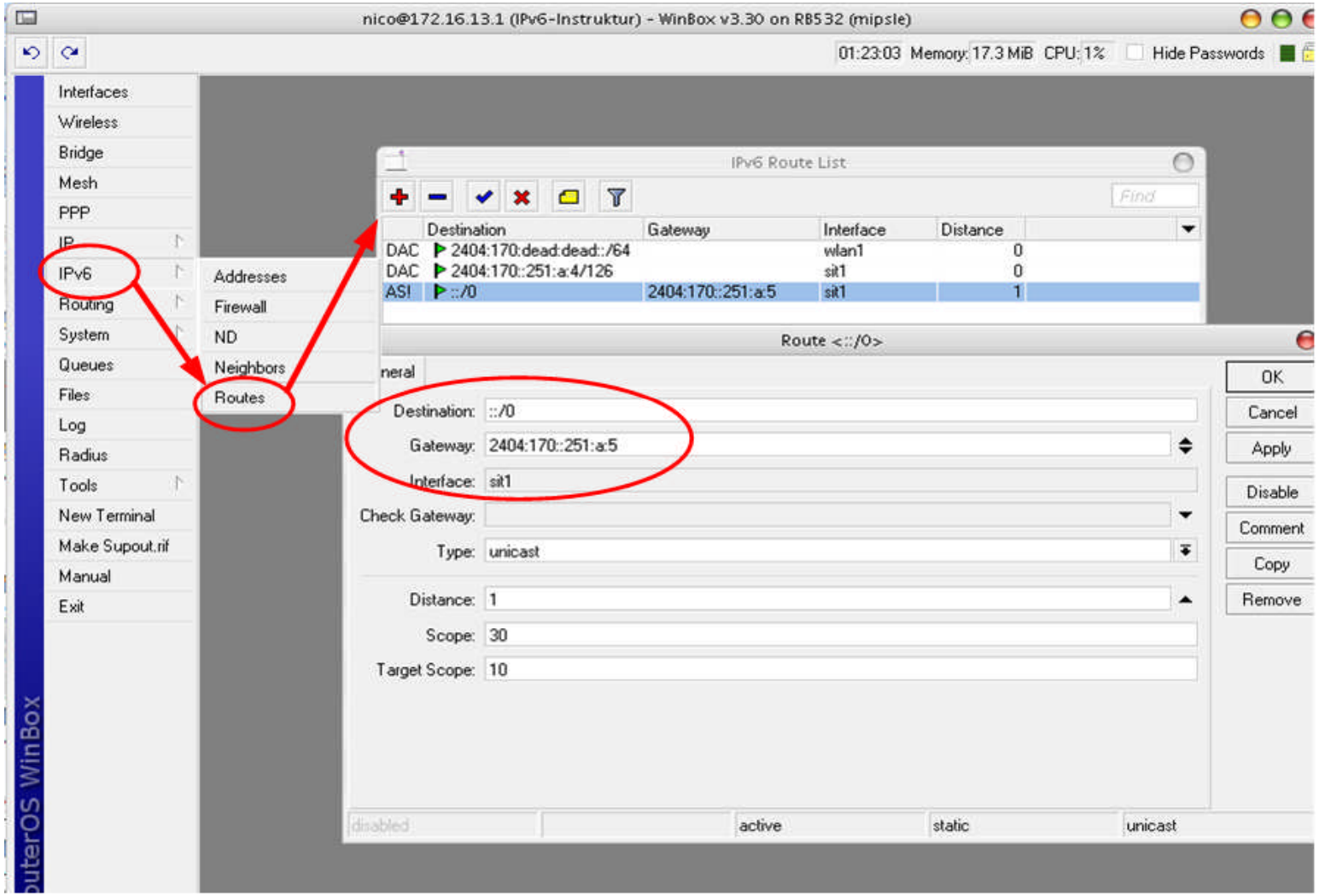
Create Tunnel Interface 6to4



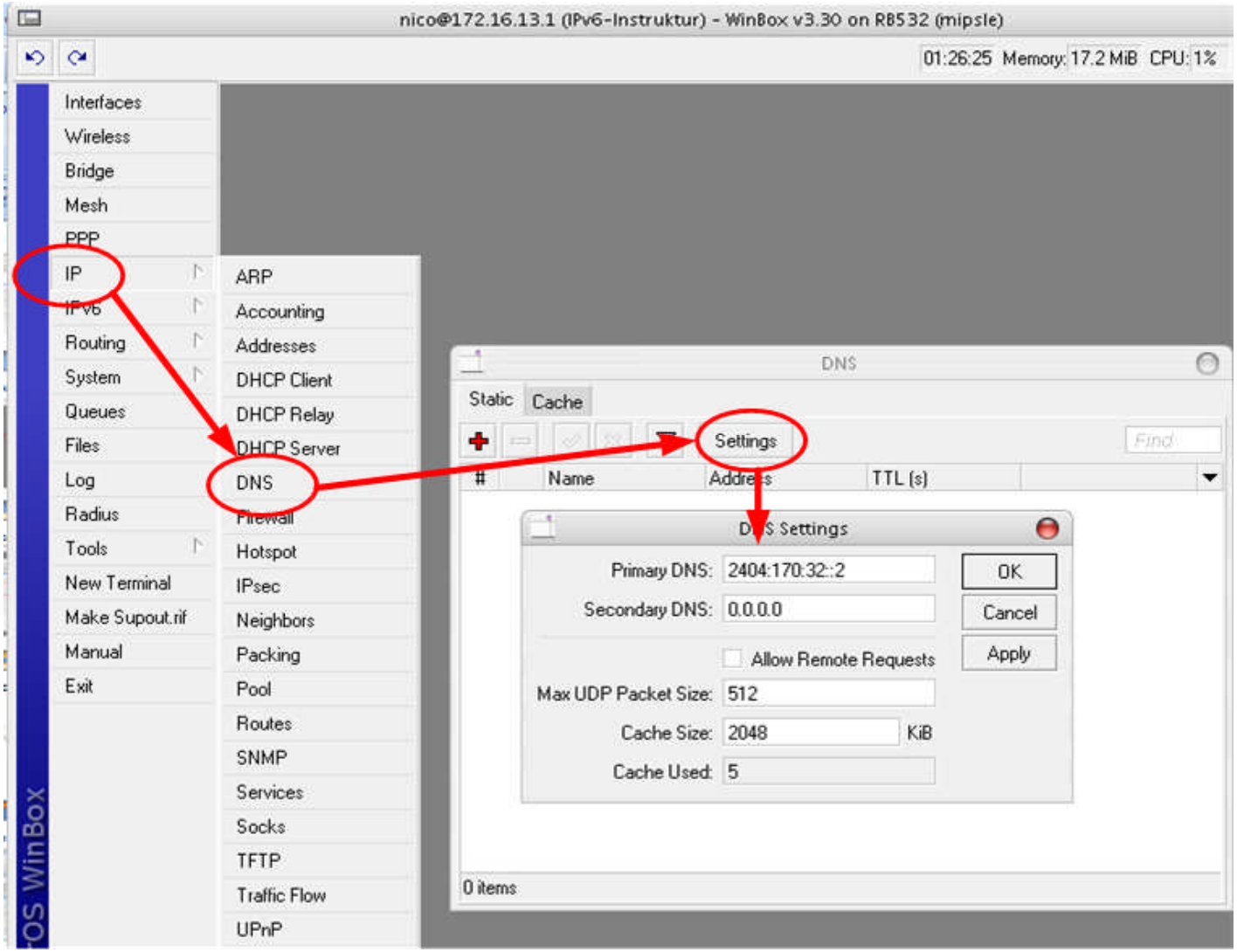
Tambahkan IPv6 Address



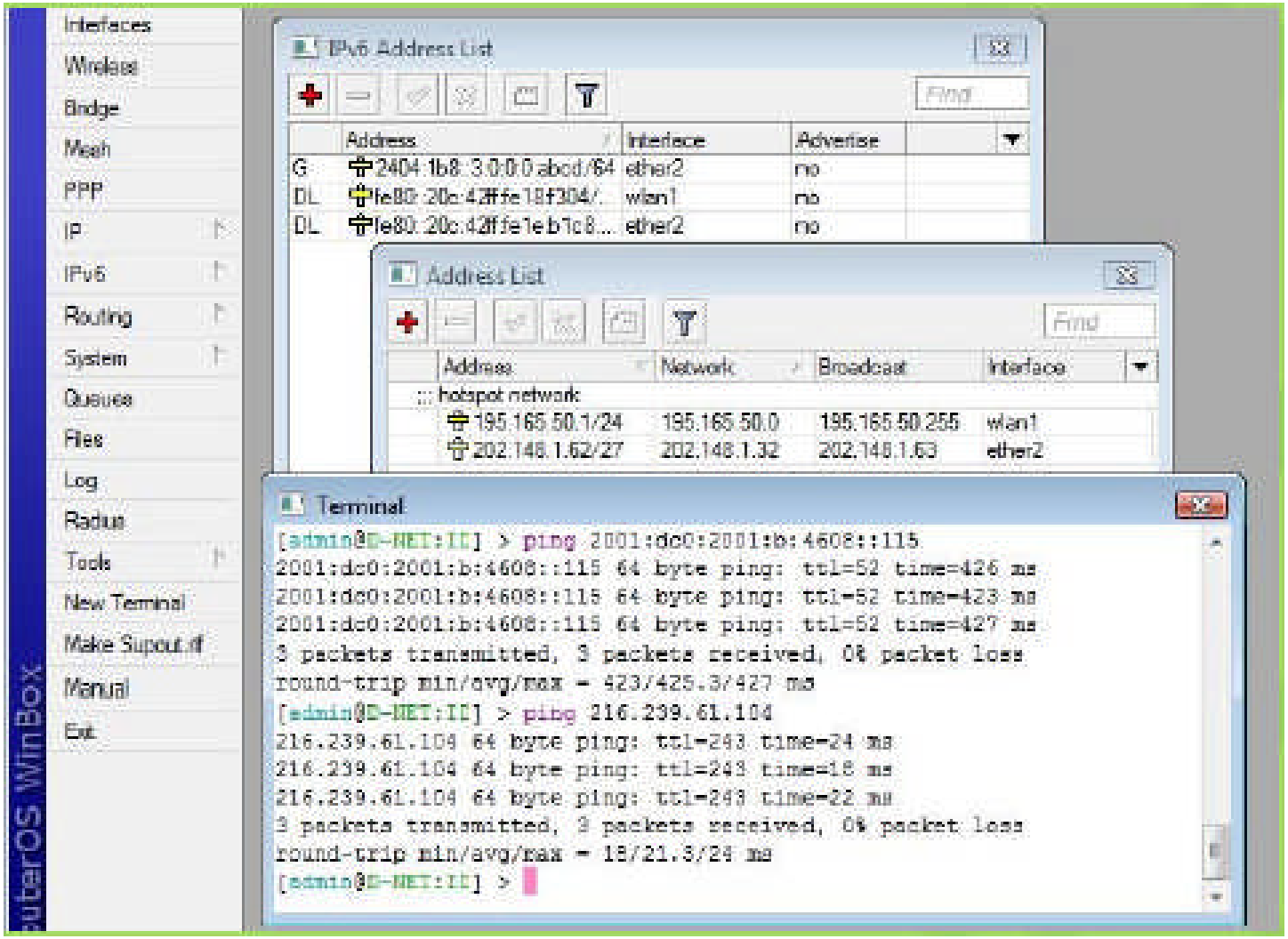
Gateway IPv6



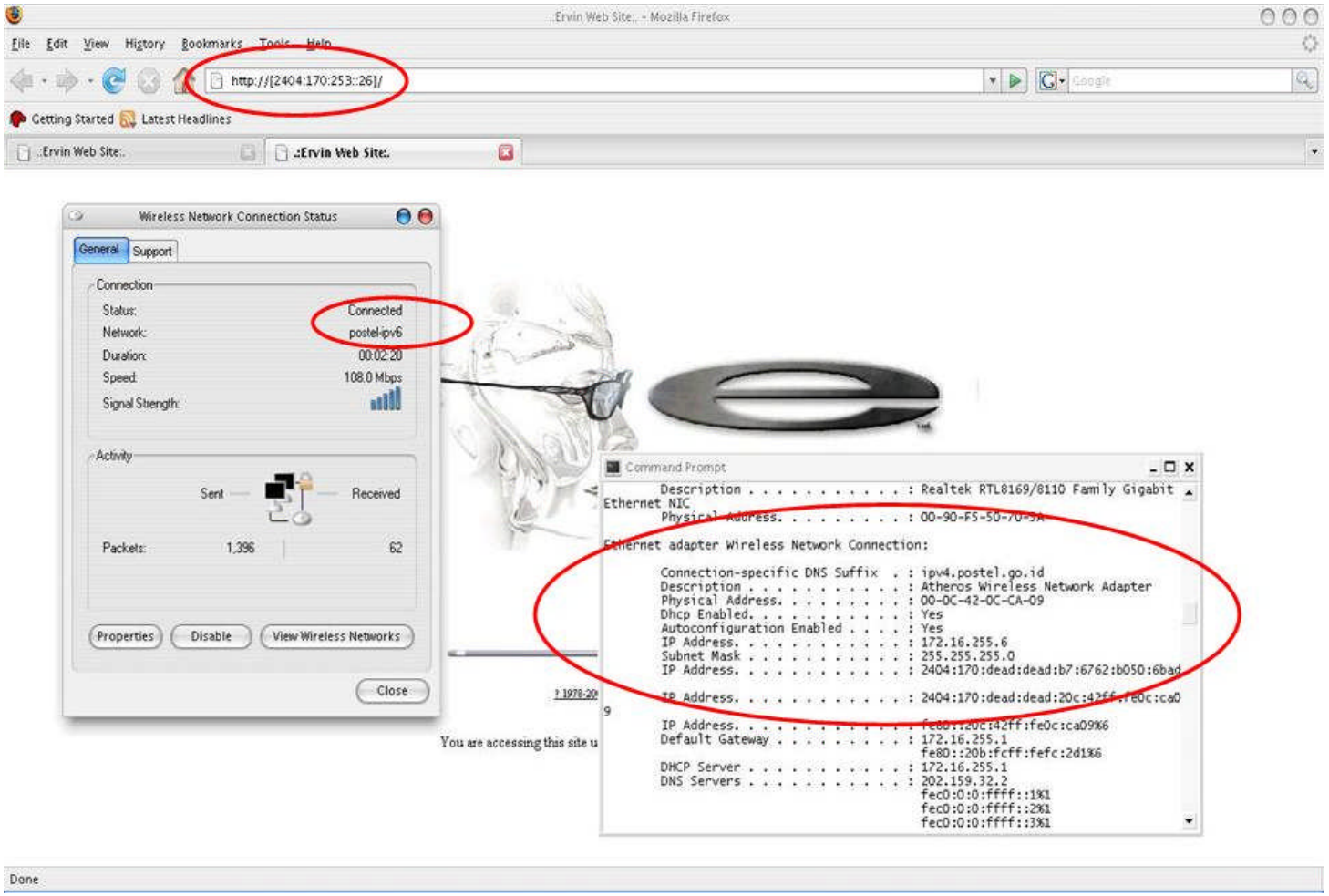
DNS IPv6


nico@172.16.13.1 (IPv6-Instruktur) - WinBox v3.30 on RB532 (mipsle)
01:26:25 Memory: 17.2 MiB CPU: 1%
Interfaces
Wireless
Bridge
Mesh
PPP
IP
IPv6
Routing
System
Queues
Files
Log
Radius
Tools
New Terminal
Make Supout.rif
Manual
Exit
ARP
Accounting
Addresses
DHCP Client
DHCP Relay
DHCP Server
DNS
Firewall
Hotspot
IPsec
Neighbors
Packing
Pool
Routes
SNMP
Services
Socks
TFTP
Traffic Flow
UPnP
OS WinBox
DNS
Static
Cache
Settings
Find
#
Name
Address
TTL (s)
DNS Settings
Primary DNS: 2404:170:32::2
Secondary DNS: 0.0.0.0
Allow Remote Requests
Max UDP Packet Size: 512
Cache Size: 2048 KiB
Cache Used: 5
OK
Cancel
Apply
0 items

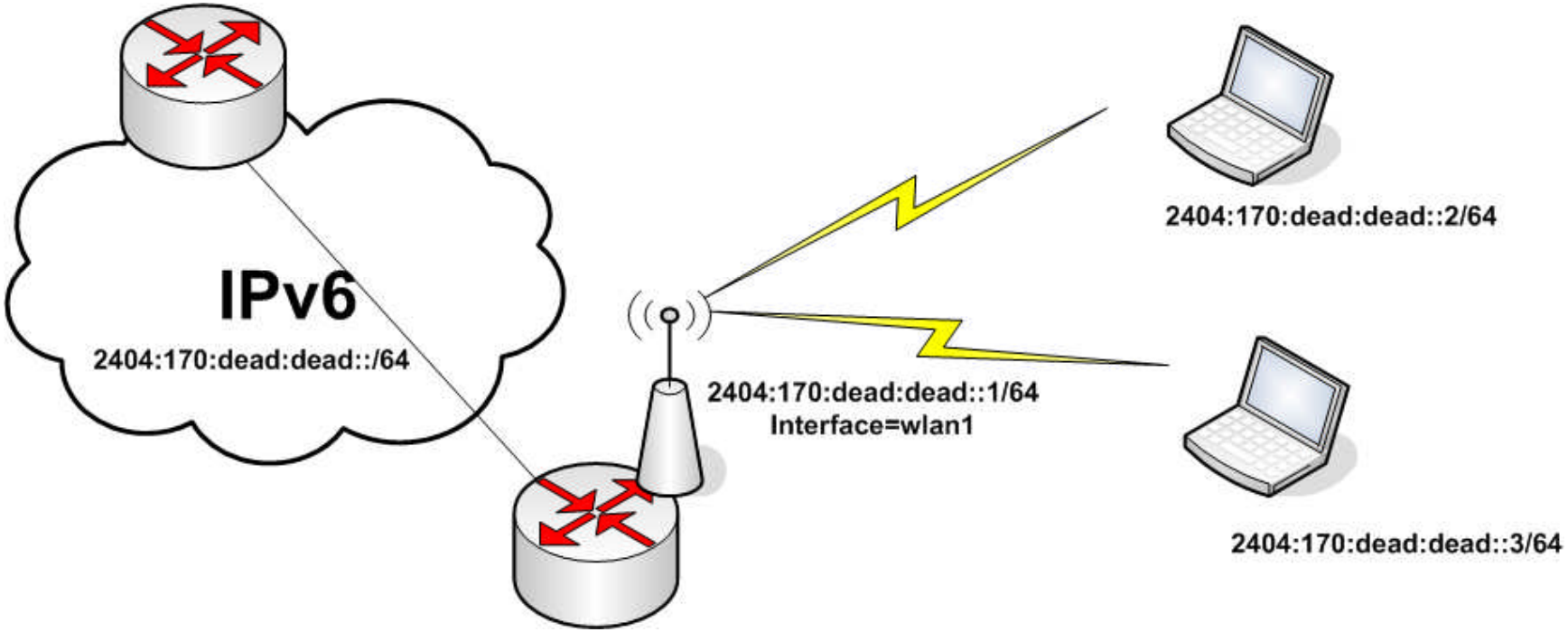
Contoh Dual Stack !



Akses Browser !

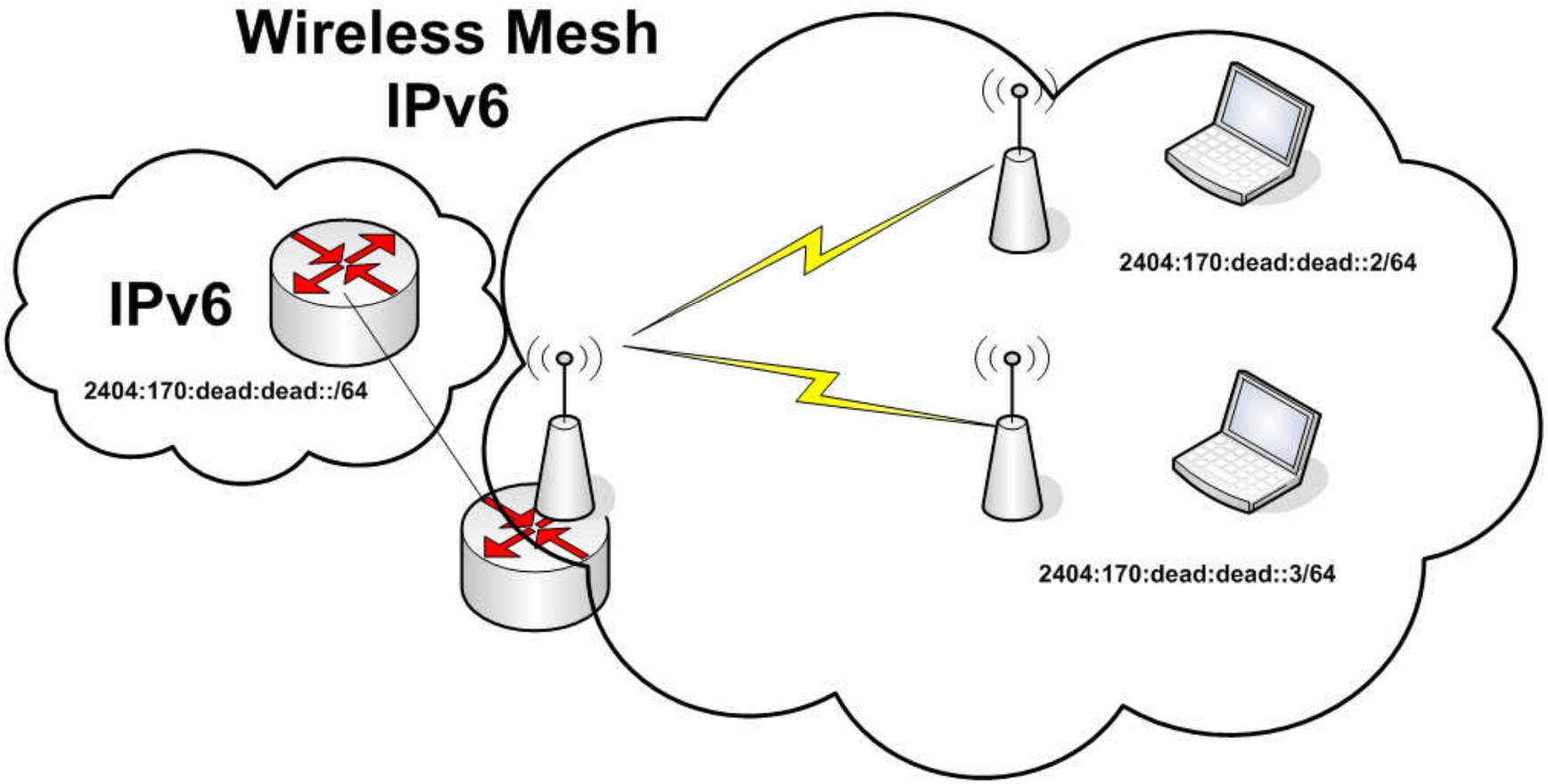


Native Network !



- Jaringan Yang terhubung langsung dengan backbone IPv6

Study case !


Wireless Mesh
IPv6
IPv6
2404:170:dead:dead::/64
2404:170:dead:dead::2/64
2404:170:dead:dead::3/64

Solution !

- Native network
- Stateless configuration
- Create Wlan & WDS
- Create Bridge
- Enable RSTP
- Menggunakan IPv6 Addressing

Thank You !