Laboratorium
Multimedia dan Internet of Things
Departemen Teknik Komputer
Institut Teknologi Sepuluh Nopember

Laporan Akhir
Praktikum Jaringan Komputer

Jaringan Wireless

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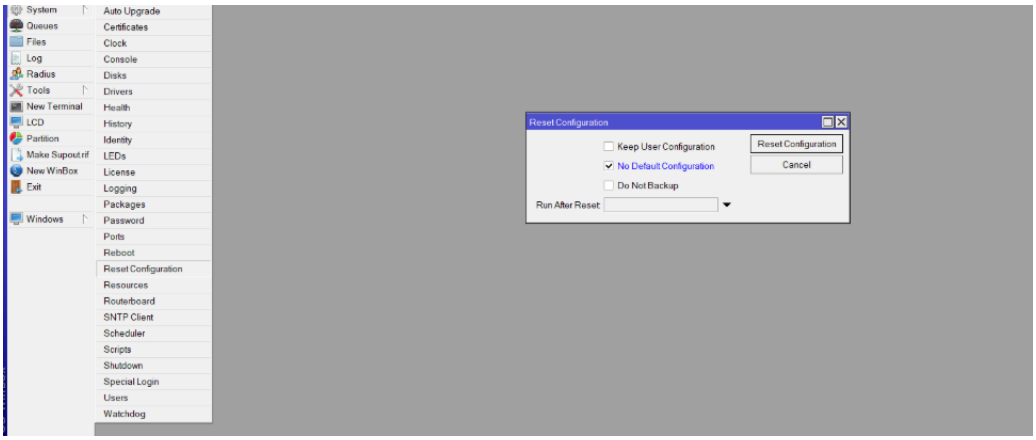
2025

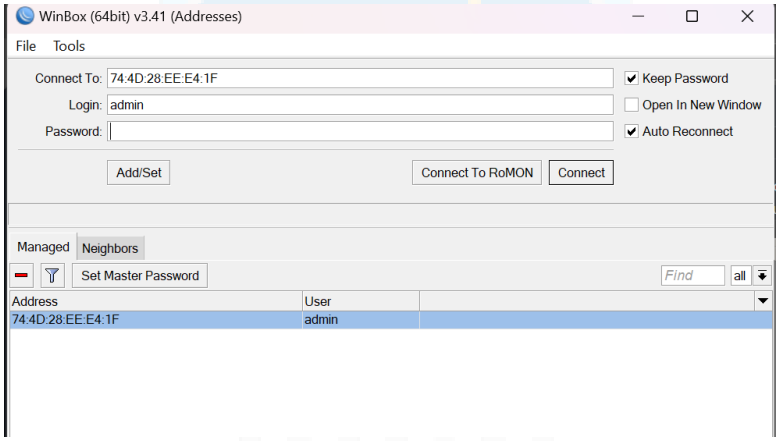
1 Langkah-Langkah Percobaan

1.1 Wireless Point to Point

1. Reset Router melalui Winbox pada menu System -> Reset Configuration

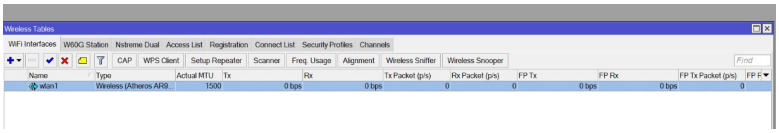


2. Login ke router melalui Winbox dalam keadaan tidak ada password kemudian klik "connect"



3. Aktifkan Interface Wireless (wlan1)

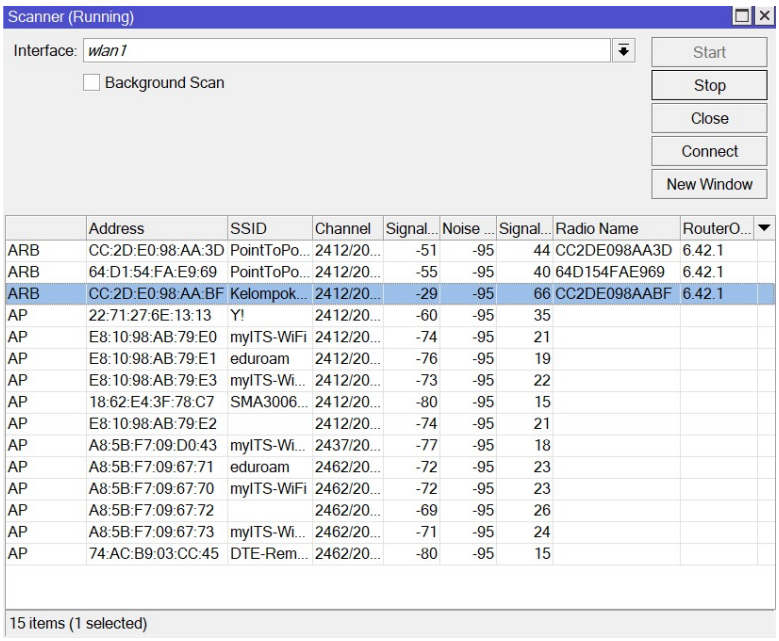
   - Buka **Wireless → WiFi Interfaces**.
   - Pilih **wlan1**, klik ikon panah biru untuk mengaktifkan.



4. Konfigurasi Wireless

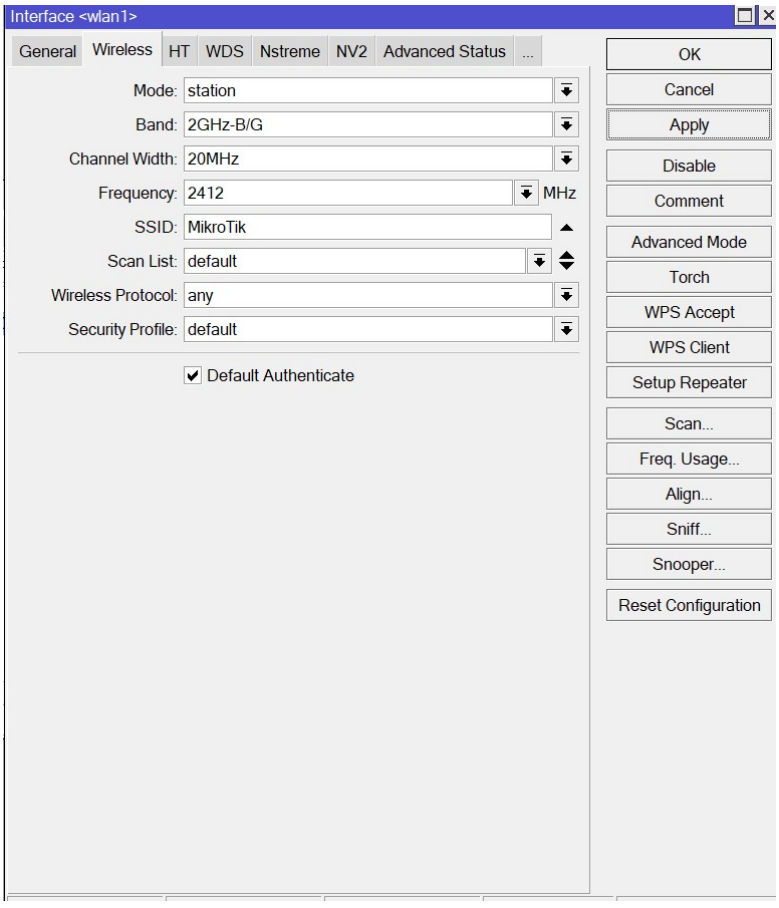
   (a) **Router A**

   - Klik dua kali **wlan1**, masuk ke tab **Wireless**.
   - Mode: **Bridge**
   - SSID: `Kelompok_15_PTP` (bebas)



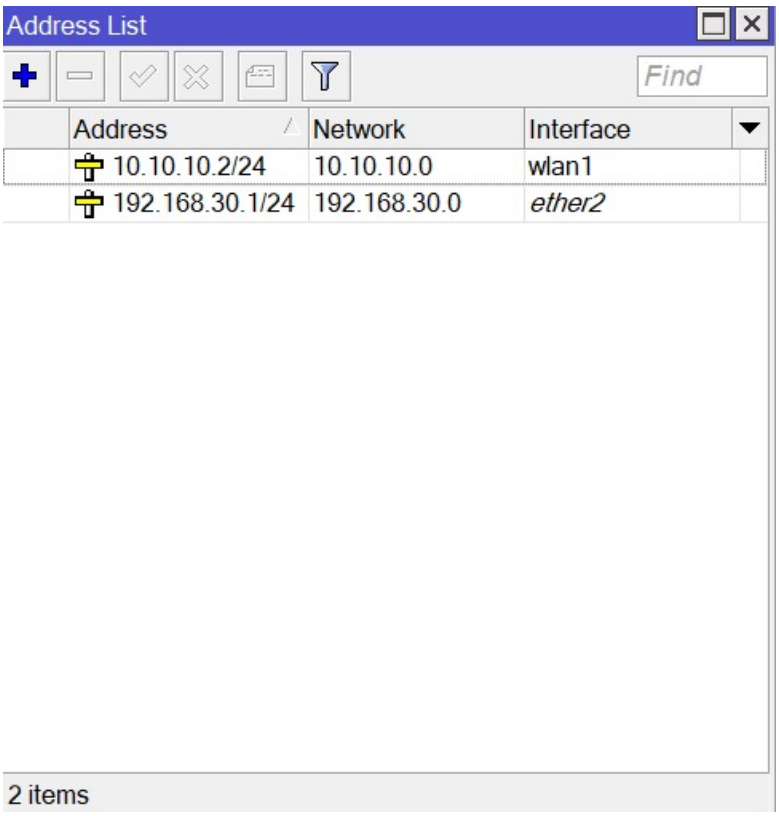
(b) **Router B**

- Klik dua kali **wlan1**, masuk ke tab **Wireless**.
- Mode: **Station**
- Klik tombol **Scan**, pilih **wlan1**, cari SSID Router A dan klik **Connect**.

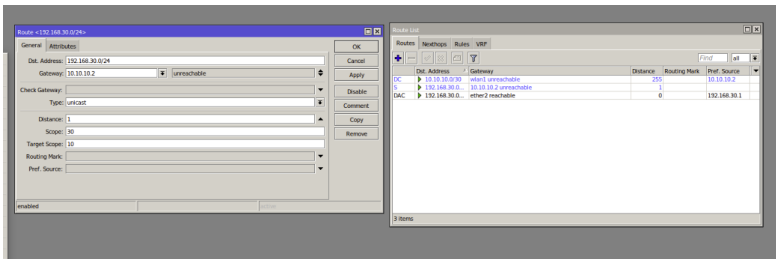


5. • Set IP Address pada wlan1
   – Router A: `10.10.10.1/29`
   – Router B: `10.10.10.2/29`

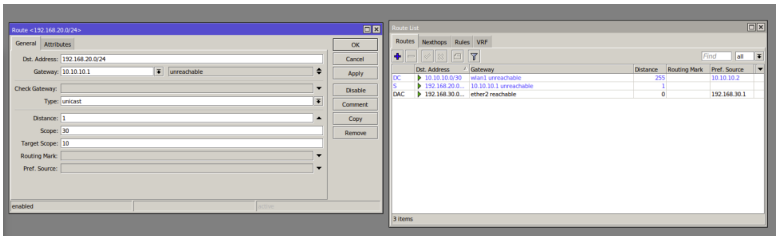
- Set IP Address untuk LAN (ether2)
  - Router A: `192.168.20.1/24`
  - Router B: `192.168.30.1/24`



6. Konfigurasi Routing Statis
   - Router A:
     - Dst. Address: `192.168.30.0/24`
     - Gateway: `10.10.10.2`

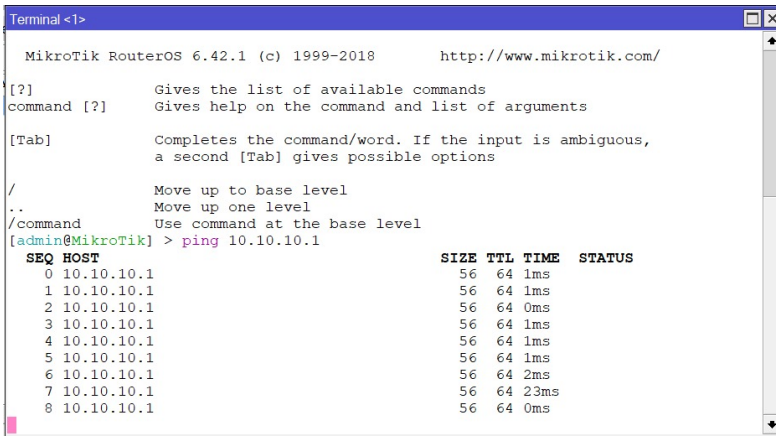


   - Router B:
     - Dst. Address: `192.168.20.0/24`
     - Gateway: `10.10.10.1`



7. Uji Koneksi Antar Router

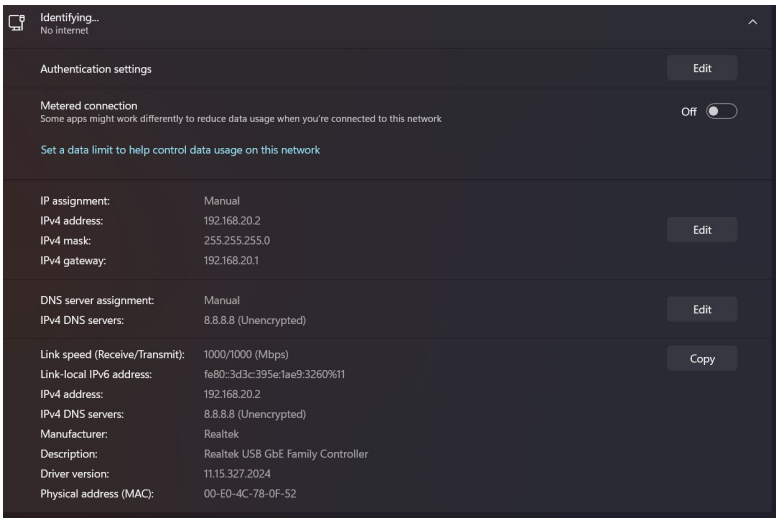
   - Dari Router A: `ping 10.10.10.2`
   - Dari Router B: `ping 10.10.10.1`



8. Set IP Static pada Laptop

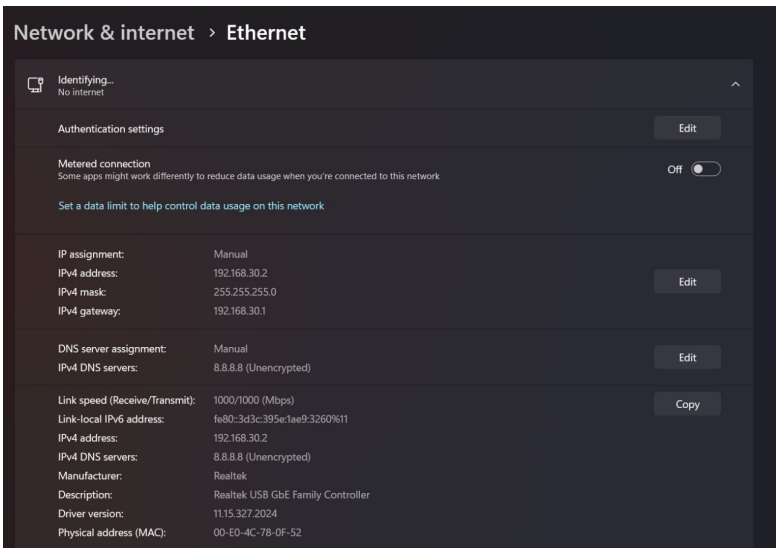
   (a) **Laptop A (Router A)**

   - IP: `192.168.20.2`
   - Gateway: `192.168.20.1`
   - DNS: `8.8.8.8`

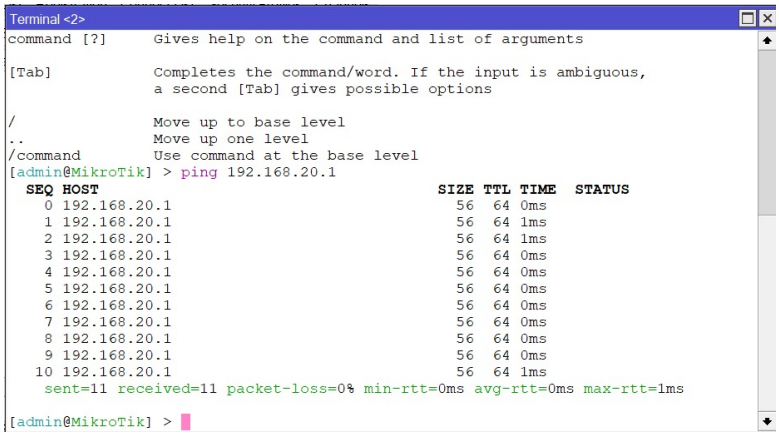


   (b) **Laptop B (Router B)**

   - IP: `192.168.30.2`
   - Gateway: `192.168.30.1`
   - DNS: `8.8.8.8`

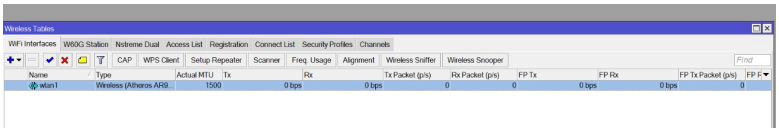


9. Uji Koneksi Antar Laptop
   Lakukan PING dari Laptop A ke Laptop B. Jika berhasil, maka konfigurasi jaringan dan routing telah berjalan dengan benar.



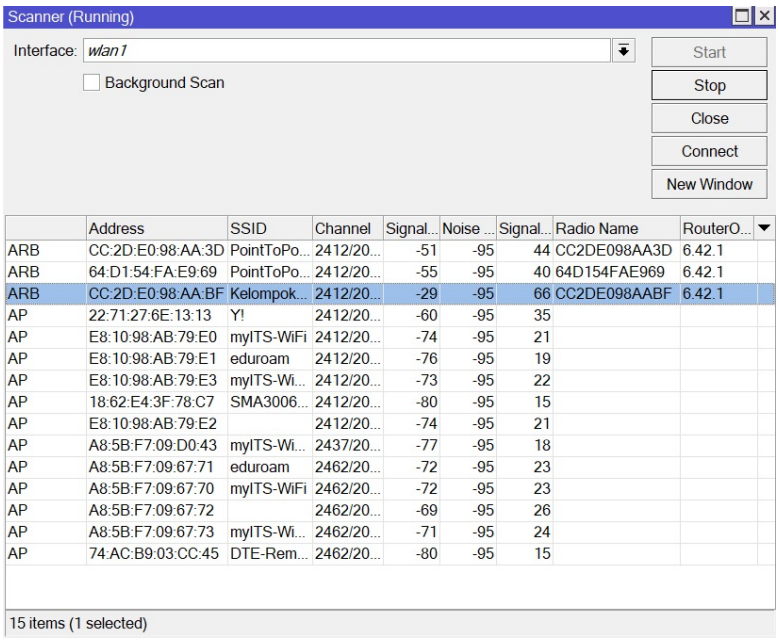
1.2 Wireless Point to Multipoint

1. **Mengaktifkan Interface Wireless (wlan1)**
   Buka menu **Wireless → WiFi Interface** melalui Winbox. Pilih interface **wlan1**, kemudian klik ikon panah biru untuk mengaktifkan interface tersebut.



2. **Konfigurasi Wireless pada Router A**
   Klik dua kali pada interface **wlan1**, lalu masuk ke tab **Wireless** dan atur sebagai berikut:

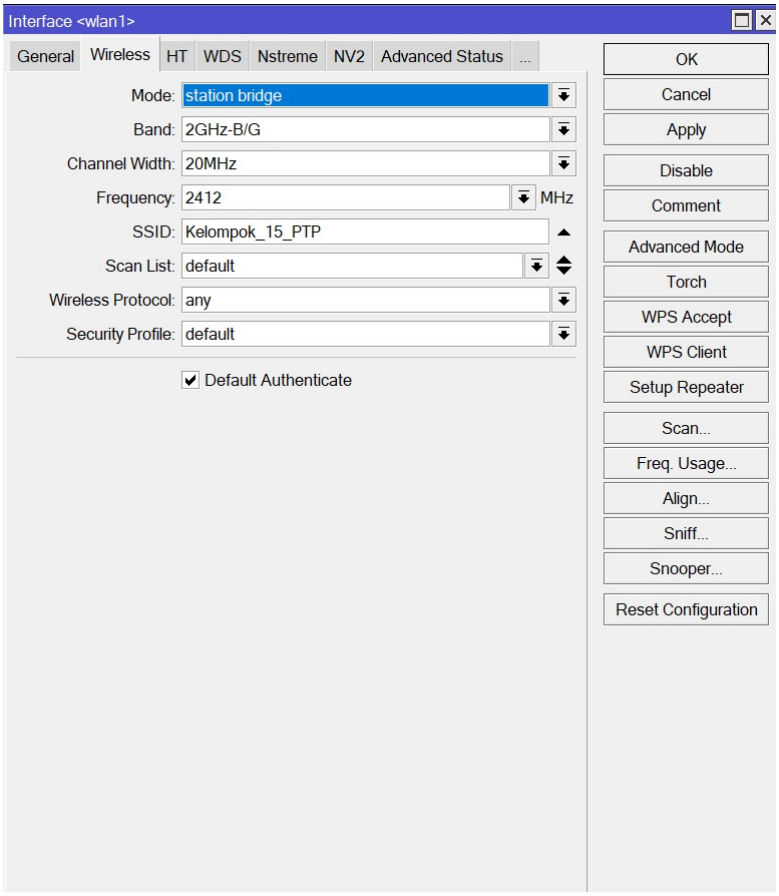
   - Mode: `ap bridge`
   - SSID: `PointToMultipoint_No[Kelompok]_APP_Bridge` (bebas)



3. **Konfigurasi Wireless pada Router B**
   Klik dua kali interface **wlan1**, lalu masuk ke tab **Wireless** dan ubah:

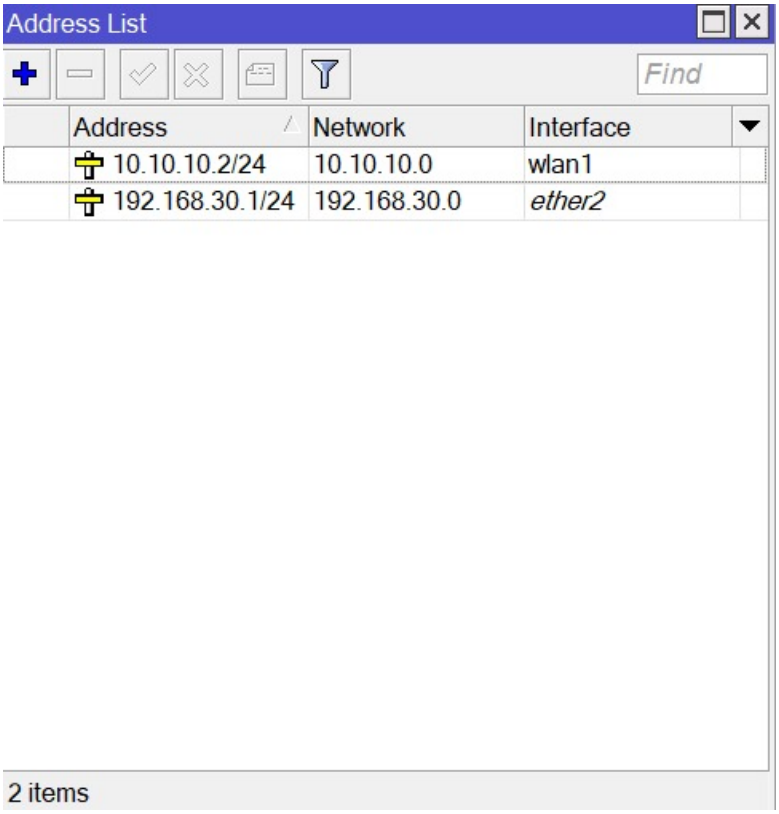
   - Mode: `station bridge`

   Selanjutnya, klik tombol **Scan**, pilih interface **wlan1**, cari SSID dari Router A, lalu klik **Connect**.



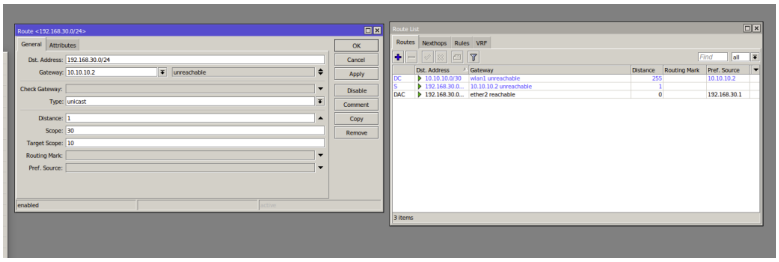
4. • **Konfigurasi Alamat IP untuk Interface wlan1**
   Tambahkan alamat IP pada interface **wlan1**:

  - Router A: `10.10.10.1/29`
  - Router B: `10.10.10.2/29`
- **Konfigurasi Alamat IP untuk LAN (ether2)**
  Tambahkan IP address pada interface **ether2** sebagai koneksi ke laptop:
  - Router A: `192.168.20.1/24`
  - Router B: `192.168.30.1/24`

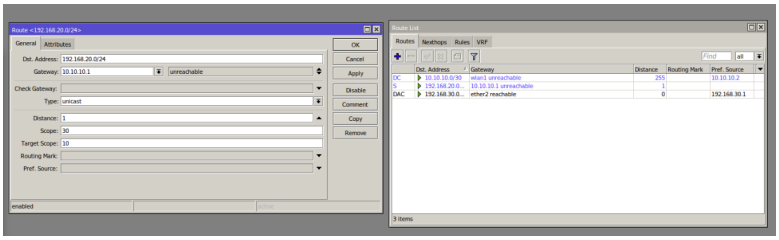


5. **Menambahkan Routing Statis**
   Setelah semua interface mendapatkan IP address, lakukan konfigurasi routing statis sebagai berikut:

   - Router A:
     - Destination Address: `192.168.30.0/24`
     - Gateway: `10.10.10.2`

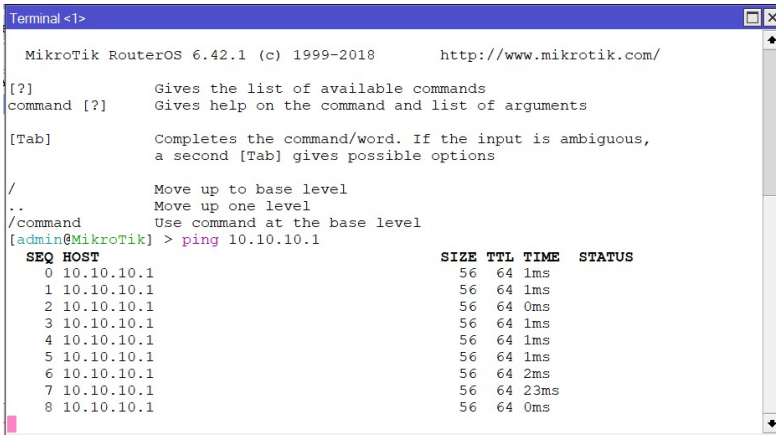


   - Router B:
     - Destination Address: `192.168.20.0/24`
     - Gateway: `10.10.10.1`



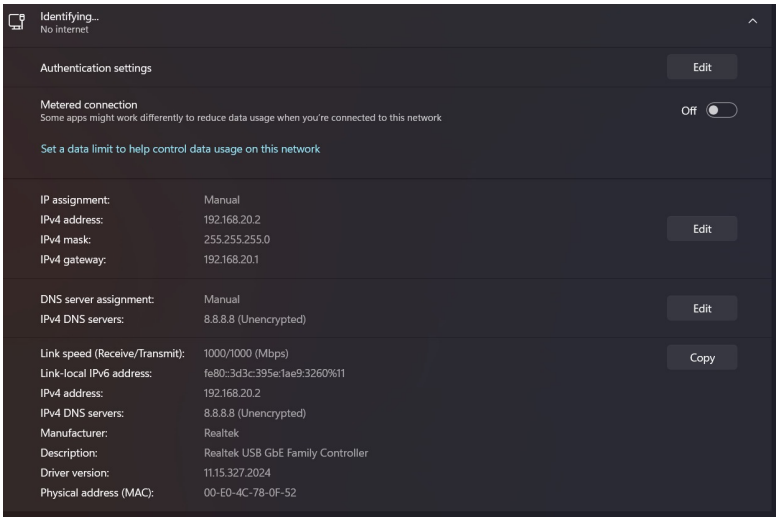
6. **Uji Koneksi Antar-Router**

   - Dari Router A: buka terminal dan jalankan perintah `ping 10.10.10.2`
   - Dari Router B: jalankan `ping 10.10.10.1`



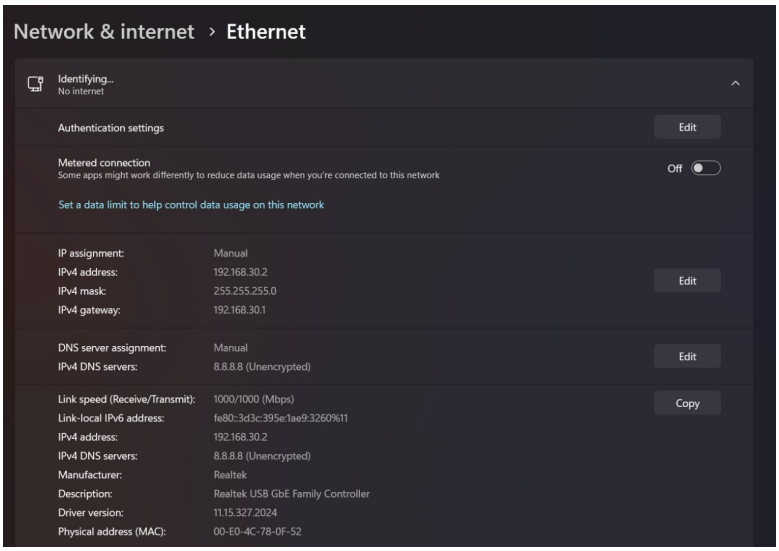
7. **Konfigurasi IP Static di Laptop**
   Atur alamat IP secara manual pada laptop yang terhubung ke masing-masing router:

   - Laptop A (Router A):
     - IP Address: `192.168.20.2`
     - Gateway: `192.168.20.1`
     - DNS: `8.8.8.8`

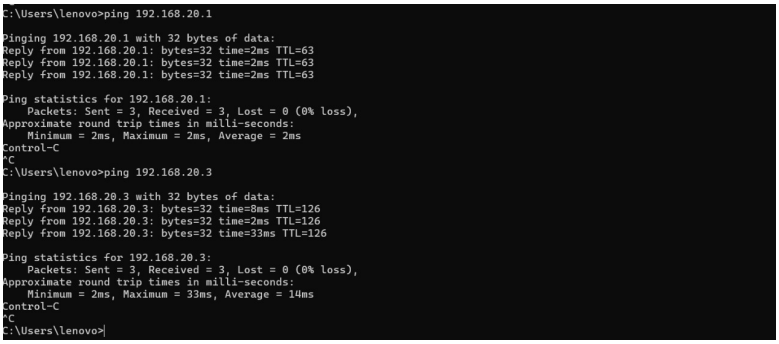


   - Laptop B (Router B):
     - IP Address: `192.168.30.2`

- Gateway: `192.168.30.1`
- DNS: `8.8.8.8`

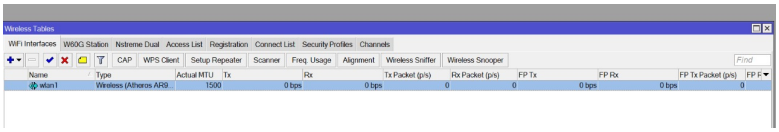


8. **Uji Koneksi Antar-Laptop**
   Lakukan ping dari Laptop A ke Laptop B. Jika ping berhasil, maka koneksi antar-router dan routing telah dikonfigurasi dengan benar.



1.3 Wireless Bridge

1. **Mengaktifkan Interface Wireless wlan1**
   Buka aplikasi Winbox, lalu akses menu **Wireless → WiFi Interface**. Pilih interface **wlan1**, kemudian klik ikon panah biru untuk mengaktifkannya.



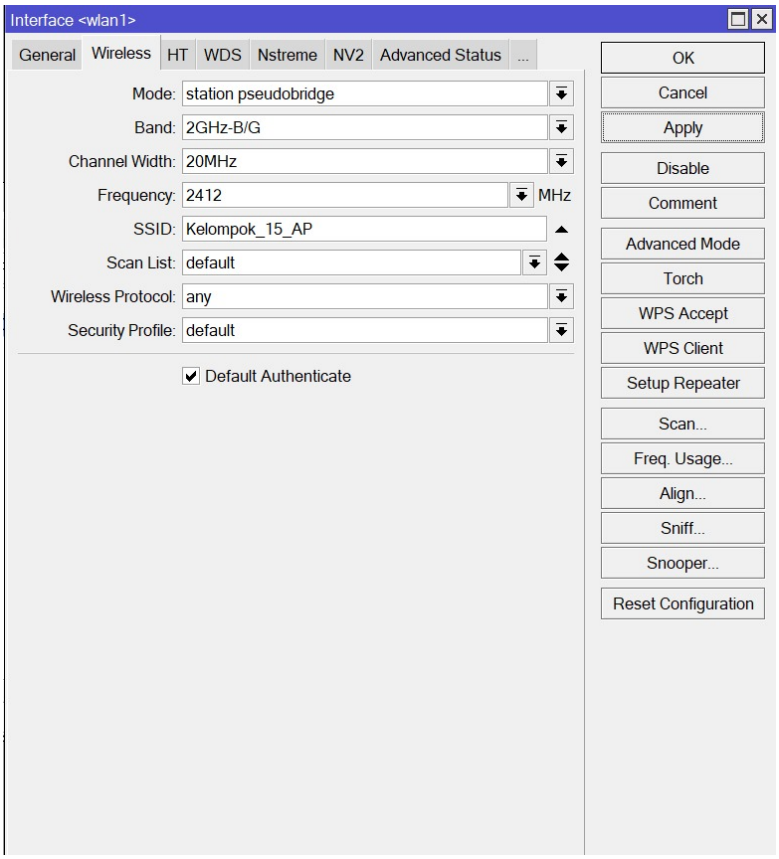
2. **Pengaturan Wireless di Router A**
   Klik dua kali pada **wlan1**, kemudian masuk ke tab **Wireless**. Atur parameter berikut:

   - Mode: `bridge`
   - SSID: `WirelessBridge_No[Kelompok]_AltText` (bebas)

3. **Pengaturan Wireless di Router B**
   Pada Router B, klik dua kali **wlan1**, lalu buka tab **Wireless** dan atur:

- Mode: `station pseudobridge`

Tekan tombol **Scan**, pilih interface **wlan1**, cari jaringan dengan SSID Router A, dan klik **Connect**.

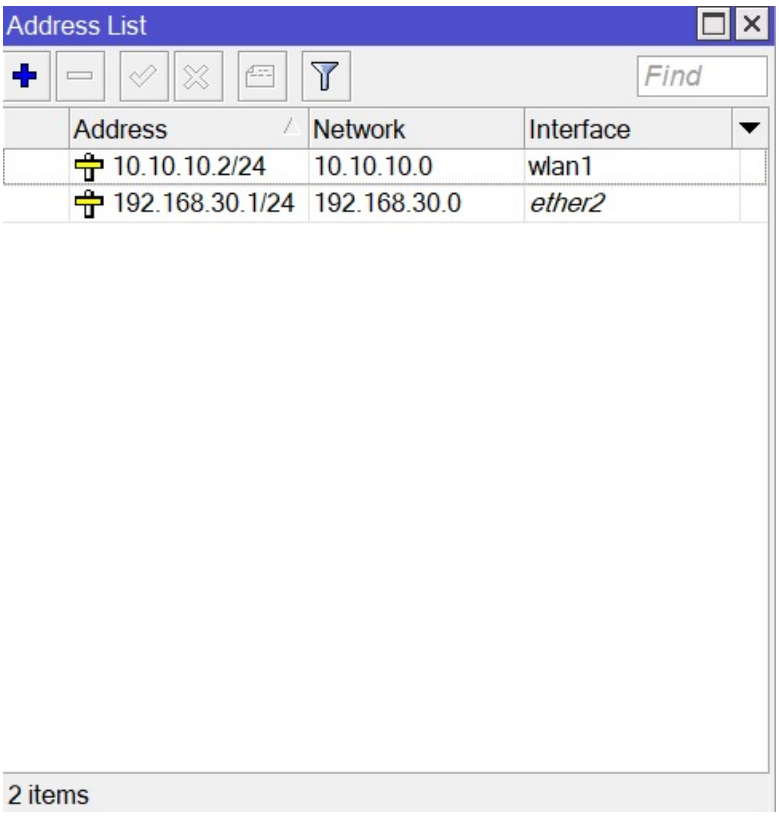


4. **Pemberian Alamat IP pada wlan1**
   Tambahkan alamat IP untuk masing-masing interface **wlan1**:

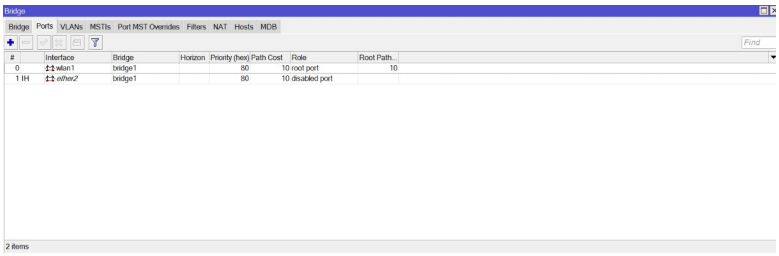
   - Router A: `10.10.10.1/29`
   - Router B: `10.10.10.2/29`

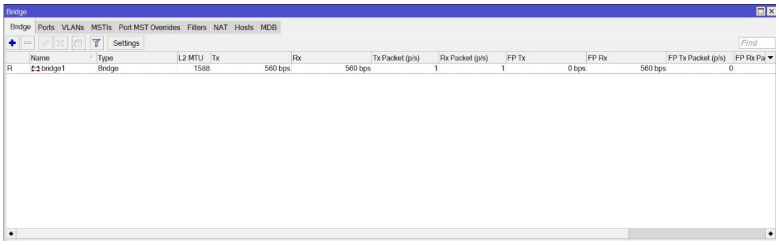
   Konfigurasi IP untuk LAN (ether2)
   Tambahkan alamat IP ke interface **ether2** untuk koneksi ke laptop:

   - Router A: `192.168.10.2/24`
   - Router B: `192.168.10.3/24`



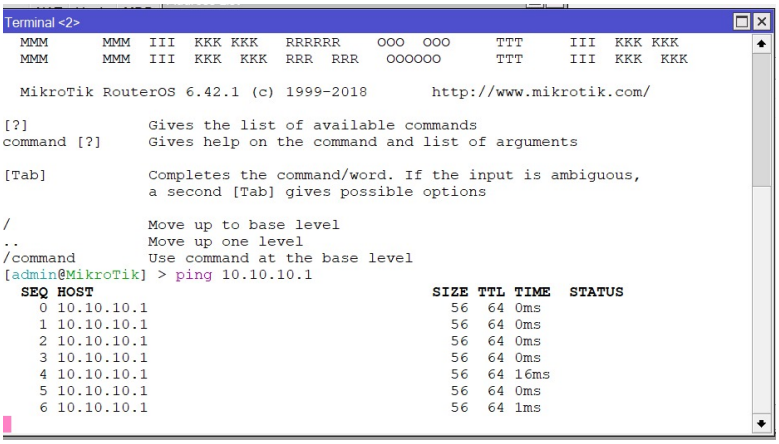
5. **Membuat Bridge pada Router A dan B**
   Klik menu **Bridge**, kemudian klik tombol + untuk menambahkan bridge baru (misalnya: `bridge1`). Setelah itu, masuk ke tab **Ports**, lalu tambahkan **wlan1** dan **ether2** ke dalam bridge yang telah dibuat.





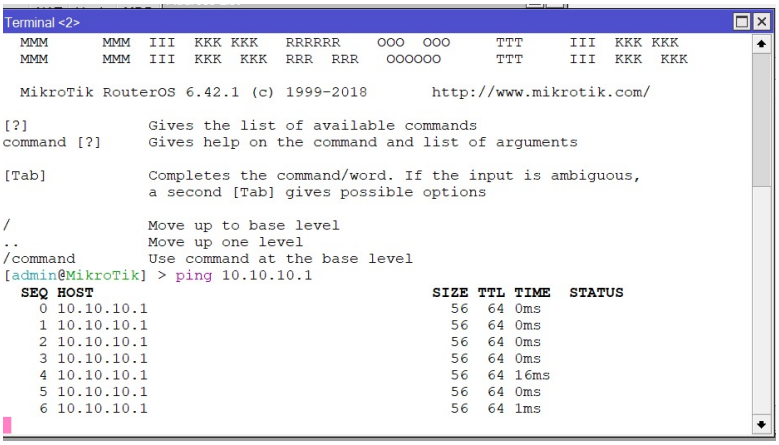
6. **Uji Koneksi Antar-Router**
   Buka terminal di masing-masing router untuk melakukan uji koneksi:

   - Dari Router A: `ping 10.10.10.2`
   - Dari Router B: `ping 10.10.10.1`

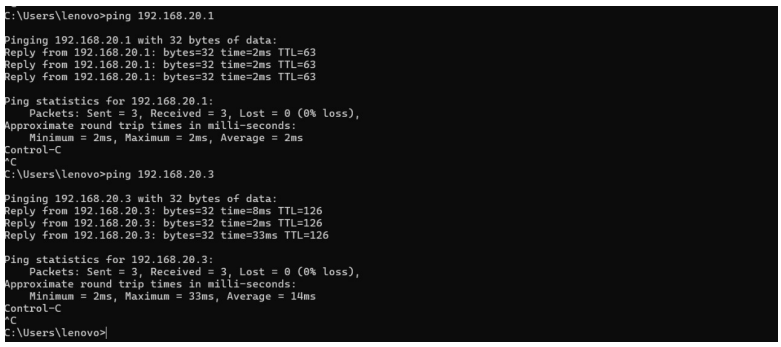


7. **Konfigurasi IP Statis pada Laptop**
   Atur IP address secara manual pada masing-masing laptop:

   - Laptop yang terhubung ke Router A:
     - IP Address: `192.168.10.5`
     - Gateway: `192.168.10.2`
     - DNS: `8.8.8.8`
   - Laptop yang terhubung ke Router B:
     - IP Address: `192.168.10.7`
     - Gateway: `192.168.10.3`
     - DNS: `8.8.8.8`



8. **Uji Koneksi Antar-Laptop**
   Lakukan tes `ping` dari laptop A ke laptop B. Jika koneksi berhasil, maka konfigurasi bridge dan pseudobridge telah berfungsi dengan baik. Pastikan langkah konfigurasi dilakukan pada kedua sisi (Router A dan Router B) secara menyeluruh.



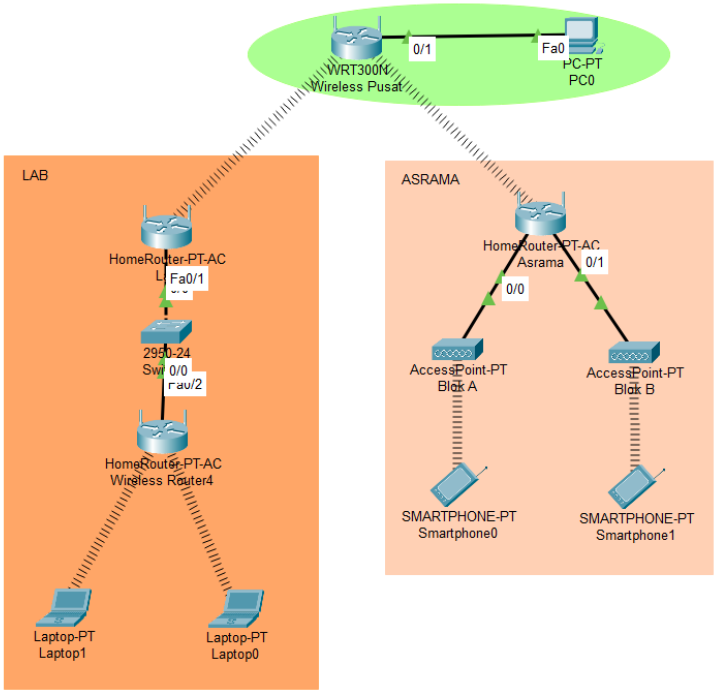
2 Analisis Hasil Percobaan

Selama praktikum, konfigurasi jaringan wireless antar-router menggunakan perangkat Mikrotik berhasil dilakukan dengan beberapa variasi mode, yaitu Bridge–Station, AP Bridge–Station Bridge, serta Bridge–Station Pseudobridge. Masing-masing mode memiliki perbedaan dalam cara kerja dan kemampuan bridging. Mode Bridge–Station cocok untuk koneksi dasar antar-router dengan jalur komunikasi satu arah, sedangkan AP Bridge–Station Bridge lebih fleksibel karena memungkinkan jaringan berfungsi seolah berada dalam satu segmen. Mode Station Pseudobridge digunakan sebagai alternatif bridging, meskipun tidak mendukung komunikasi penuh antar-MAC address. Pada setiap router, IP address ditetapkan secara manual baik pada interface wireless (wlan1) maupun pada port LAN (ether2), sehingga jalur komunikasi antara router dan laptop dapat terbentuk dengan baik. Selain itu, pembuatan bridge yang menggabungkan wlan1 dan ether2 berperan penting dalam menyatukan dua interface ke dalam satu jaringan. Routing statis kemudian ditambahkan untuk memastikan masing-masing jaringan lokal di kedua router dapat saling berkomunikasi. Dari hasil uji ping antar-router dan antar-laptop, terlihat bahwa koneksi berjalan lancar tanpa hambatan, menandakan bahwa seluruh konfigurasi telah dilakukan dengan tepat dan sistem bekerja sebagaimana mestinya.

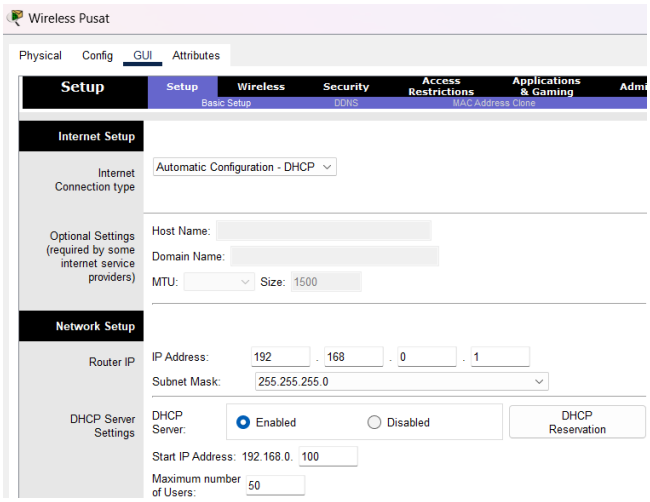
3 Hasil Tugas Modul

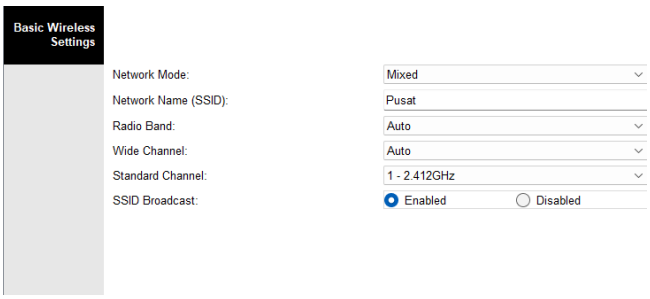
1. Simulasikan jaringan wireless antara tiga gedung:
    - Gedung Pusat
    - Gedung Lab
    - Gedung Asrama (Hubungkan dua bagian dalam Gedung Asrama (Blok A dan Blok B) menggunakan Wireless Bridge Point-to-Point.)

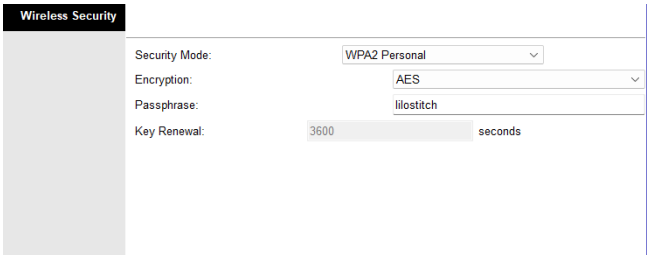
    Menggunakan Point-to-Multipoint (PTMP) di Cisco Packet Tracer.


WRT300N
Wireless Pusat
0/1
Fa0
PC-PT
PC0
LAB
HomeRouter-PT-AC
Fa0/1
2950-24
0/0
Fa0/2
HomeRouter-PT-AC
Wireless Router4
Laptop-PT
Laptop1
Laptop-PT
Laptop0
ASRAMA
HomeRouter-PT-AC
Asrama
0/1
0/0
Access Point-PT
Blok A
Access Point-PT
Blok B
SMARTPHONE-PT
Smartphone0
SMARTPHONE-PT
Smartphone1

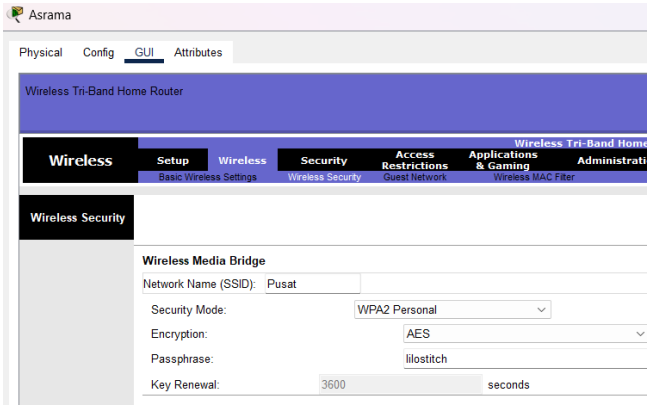
- PUSAT

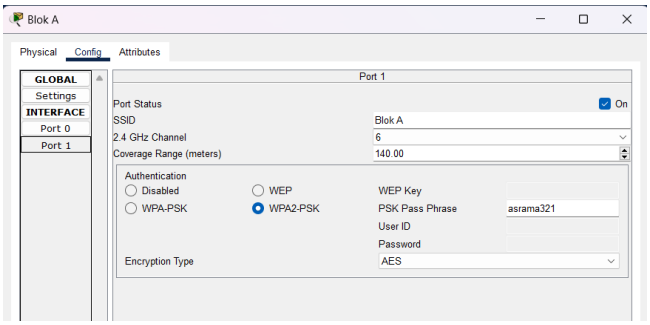

Wireless Pusat
Physical
Config
GUI
Attributes
Setup
Setup
Wireless
Security
Access Restrictions
Applications & Gaming
Basic Setup
DDNS
MAC Address Clone
Internet Setup
Internet Connection type
Automatic Configuration - DHCP
Optional Settings (required by some internet service providers)
Host Name:
Domain Name:
MTU:
Size:
1500
Network Setup
Router IP
IP Address:
192 . 168 . 0 . 1
Subnet Mask:
255.255.255.0
DHCP Server Settings
DHCP Server:
Enabled
Disabled
DHCP Reservation
Start IP Address: 192.168.0.
100
Maximum number of Users:
50

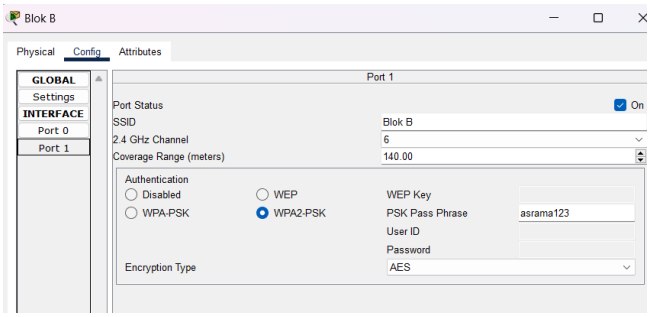

Basic Wireless Settings
Network Mode:
Mixed
Network Name (SSID):
Pusat
Radio Band:
Auto
Wide Channel:
Auto
Standard Channel:
1 - 2.412GHz
SSID Broadcast:
Enabled
Disabled

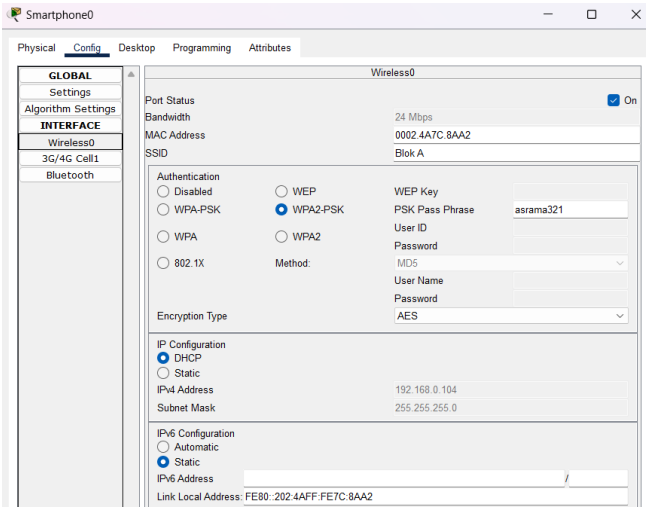

Wireless Security
Security Mode:
WPA2 Personal
Encryption:
AES
Passphrase:
lilostitch
Key Renewal:
3600
seconds

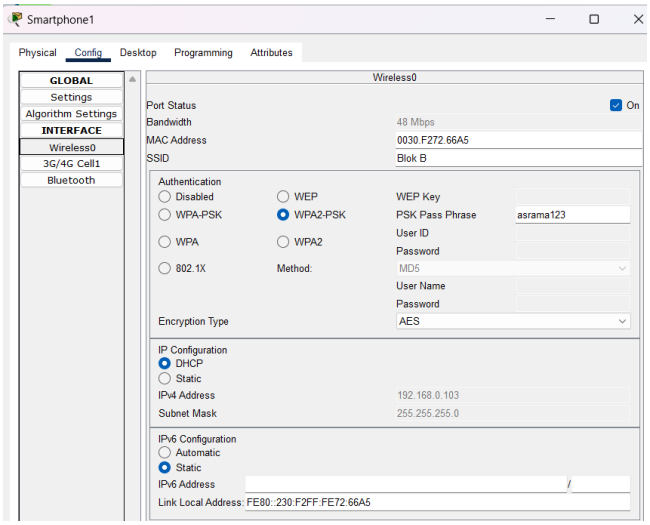
- ASRAMA


Asrama
Physical
Config
GUI
Attributes
Wireless Tri-Band Home Router
Wireless
Setup
Wireless
Security
Access Restrictions
Applications & Gaming
Basic Wireless Settings
Wireless Security
Guest Network
Wireless MAC Filter
Wireless Security
Wireless Media Bridge
Network Name (SSID):
Pusat
Security Mode:
WPA2 Personal
Encryption:
AES
Passphrase:
lilostitch
Key Renewal:
3600
seconds

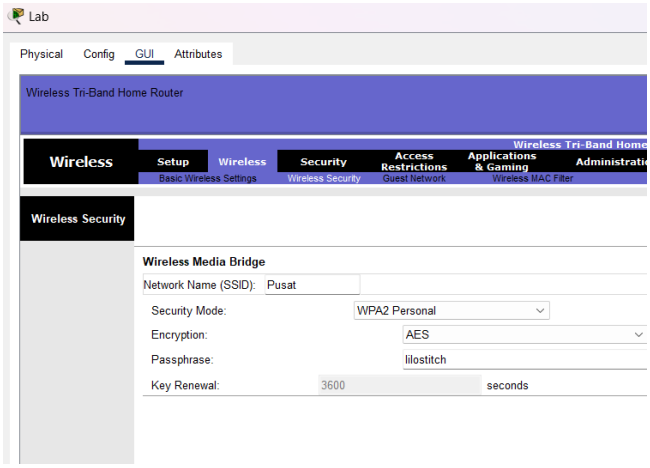

Blok A
Physical
Config
Attributes
GLOBAL
Settings
INTERFACE
Port 0
Port 1
Port 1
Port Status
On
SSID
Blok A
2.4 GHz Channel
6
Coverage Range (meters)
140.00
Authentication
Disabled
WEP
WPA-PSK
WPA2-PSK
WEP Key
PSK Pass Phrase
asrama321
User ID
Password
Encryption Type
AES

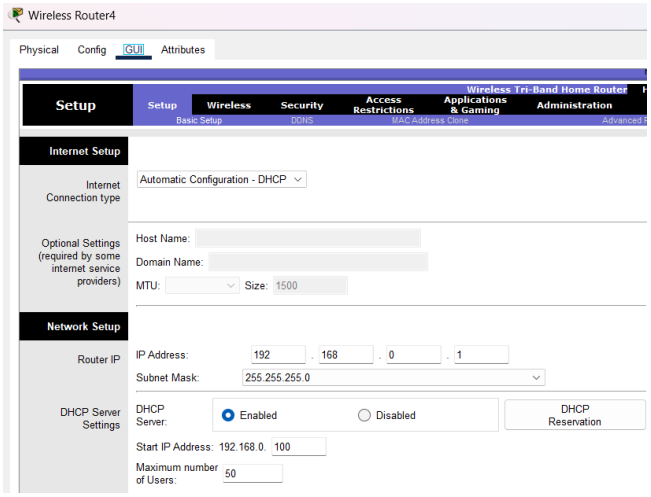

Blok B
Physical
Config
Attributes
GLOBAL
Settings
INTERFACE
Port 0
Port 1
Port 1
Port Status
On
SSID
Blok B
2.4 GHz Channel
6
Coverage Range (meters)
140.00
Authentication
Disabled
WEP
WPA-PSK
WPA2-PSK
WEP Key
PSK Pass Phrase
asrama123
User ID
Password
Encryption Type
AES

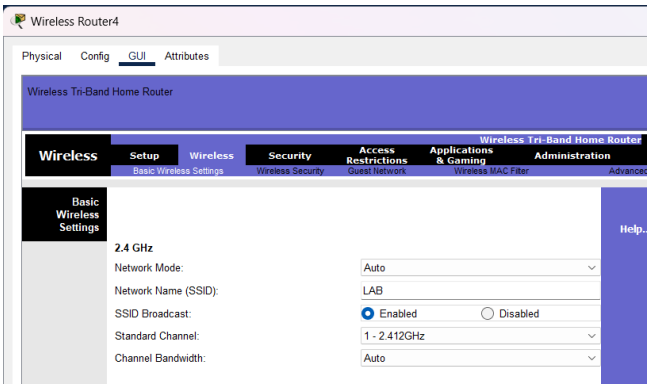

Smartphone0
Physical
Config
Desktop
Programming
Attributes
GLOBAL
Settings
Algorithm Settings
INTERFACE
Wireless0
3G/4G Cell1
Bluetooth
Wireless0
Port Status
On
Bandwidth
24 Mbps
MAC Address
0002.4A7C.8AA2
SSID
Blok A
Authentication
Disabled
WEP
WEP Key
WPA-PSK
WPA2-PSK
PSK Pass Phrase
asrama321
User ID
WPA
WPA2
Password
802.1X
Method:
MD5
User Name
Password
Encryption Type
AES
IP Configuration
DHCP
Static
IPv4 Address
192.168.0.104
Subnet Mask
255.255.255.0
IPv6 Configuration
Automatic
Static
IPv6 Address
Link Local Address: FE80::202:4AFF:FE7C:8AA2

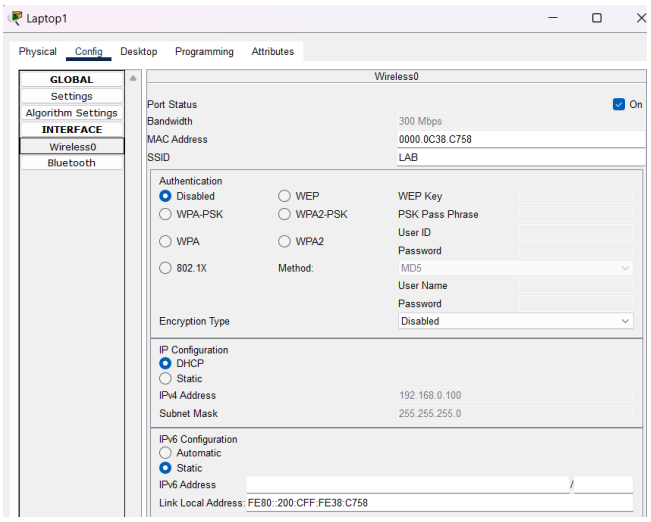

Smartphone1
Physical
Config
Desktop
Programming
Attributes
GLOBAL
Settings
Algorithm Settings
INTERFACE
Wireless0
3G/4G Cell1
Bluetooth
Wireless0
Port Status
On
Bandwidth
48 Mbps
MAC Address
0030.F272.66A5
SSID
Blok B
Authentication
Disabled
WEP
WEP Key
WPA-PSK
WPA2-PSK
PSK Pass Phrase
asrama123
User ID
WPA
WPA2
Password
802.1X
Method:
MD5
User Name
Password
Encryption Type
AES
IP Configuration
DHCP
Static
IPv4 Address
192.168.0.103
Subnet Mask
255.255.255.0
IPv6 Configuration
Automatic
Static
IPv6 Address
Link Local Address: FE80::230:F2FF:FE72:66A5

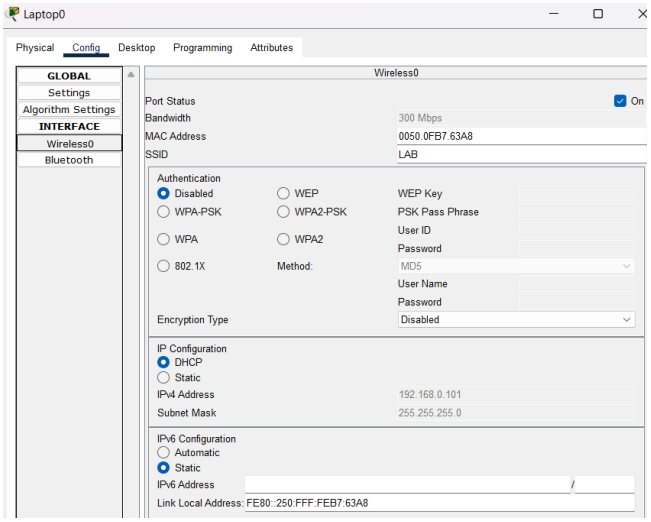
- LAB


Lab
Physical
Config
GUI
Attributes
Wireless Tri-Band Home Router
Wireless
Setup
Wireless
Security
Access Restrictions
Applications & Gaming
Administrati
Basic Wireless Settings
Wireless Security
Guest Network
Wireless MAC Filter
Wireless Security
Wireless Media Bridge
Network Name (SSID):
Pusat
Security Mode:
WPA2 Personal
Encryption:
AES
Passphrase:
lilostitch
Key Renewal:
3600
seconds


Wireless Router4
Physical
Config
GUI
Attributes
Setup
Wireless Tri-Band Home Router
Setup
Wireless
Security
Access Restrictions
Applications & Gaming
Administration
Basic Setup
DDNS
MAC Address Clone
Internet Setup
Internet Connection type
Automatic Configuration - DHCP
Optional Settings (required by some internet service providers)
Host Name:
Domain Name:
MTU:
Size:
1500
Network Setup
Router IP
IP Address:
192
168
0
1
Subnet Mask:
255.255.255.0
DHCP Server Settings
DHCP Server:
Enabled
Disabled
DHCP Reservation
Start IP Address:
192.168.0.
100
Maximum number of Users:
50


Wireless Router4
Physical
Config
GUI
Attributes
Wireless Tri-Band Home Router
Wireless
Setup
Wireless
Security
Access Restrictions
Applications & Gaming
Administration
Basic Wireless Settings
Wireless Security
Guest Network
Wireless MAC Filter
Basic Wireless Settings
Help...
2.4 GHz
Network Mode:
Auto
Network Name (SSID):
LAB
SSID Broadcast:
Enabled
Disabled
Standard Channel:
1 - 2.412GHz
Channel Bandwidth:
Auto


Laptop1
Physical
Config
Desktop
Programming
Attributes
GLOBAL
Settings
Algorithm Settings
INTERFACE
Wireless0
Bluetooth
Wireless0
Port Status
On
Bandwidth
300 Mbps
MAC Address
0000.0C38.C758
SSID
LAB
Authentication
Disabled
WEP
WEP Key
WPA-PSK
WPA2-PSK
PSK Pass Phrase
WPA
WPA2
User ID
Password
802.1X
Method:
MD5
User Name
Password
Encryption Type
Disabled
IP Configuration
DHCP
Static
IPv4 Address
192.168.0.100
Subnet Mask
255.255.255.0
IPv6 Configuration
Automatic
Static
IPv6 Address
Link Local Address:
FE80::200:CFF:FE38:C758

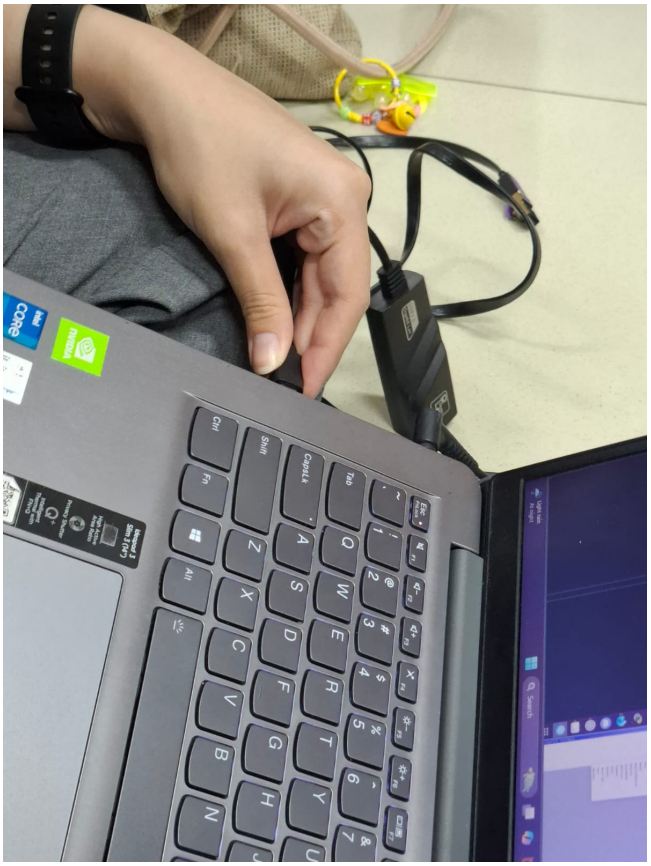


4 Kesimpulan

Berdasarkan hasil percobaan, dapat disimpulkan bahwa perangkat Mikrotik sangat fleksibel dalam membangun koneksi jaringan wireless antar-router. Penggunaan mode wireless yang tepat, seperti Bridge, Station, maupun Station Bridge, sangat menentukan jenis dan fleksibilitas koneksi antar-router yang diinginkan. Konfigurasi IP statis, penambahan bridge, dan penerapan routing statis menjadi komponen penting untuk memastikan komunikasi antar jaringan berjalan dengan baik. Praktikum ini memberikan pemahaman menyeluruh tentang bagaimana membangun koneksi point-to-point maupun point-to-multipoint secara efisien, serta pentingnya memahami topologi jaringan dan pemetaan IP untuk menghindari konflik dan kegagalan koneksi. Dengan konfigurasi yang benar, jaringan dapat dibangun secara stabil dan dapat mendukung komunikasi data antar perangkat dengan lancar.

5 Lampiran

5.1 Dokumentasi saat praktikum



Gambar 1: Dokumentasi Telah Melakukan Praktikum