



**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

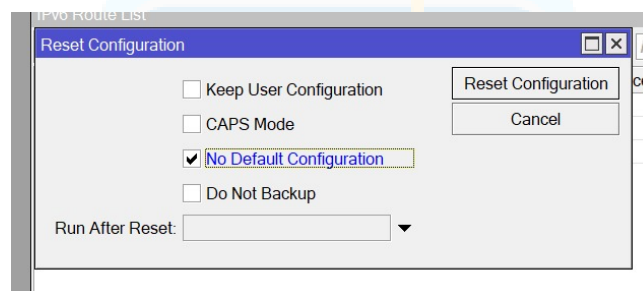
Alat yang Digunakan Selama Praktikum

- 2 Router Mikrotik dengan interface wireless
- 2 Laptop/PC
- Winbox
- Kabel LAN

1.1 Wireless Point to Point

1. Reset konfigurasi masing-masing router:

- Buka Winbox, login ke router menggunakan MAC address.
- Masuk ke menu **System > Reset Configuration**.
- Centang **No Default Configuration**, lalu klik **Reset Configuration**.



Gambar 1: Reset Router

2. Login ke router menggunakan Winbox menggunakan MAC address. Login dengan user: admin, password: kosong (default).

3. Aktifkan interface wlan1 pada kedua router:

- Masuk ke menu **Wireless**, klik wlan1, kemudian klik ikon panah biru untuk mengaktifkan.

4. Konfigurasi Wireless:

• Router A:

- Mode: bridge
- SSID: Kelompok15PointToPoint

• Router B:

- Mode: station
- Klik **Scan**, pilih wlan1, cari SSID dari Router A, klik Connect.

Interface <wlan1>

General Wireless HT WDS Nstreme NV2 Advanced Status ...

Mode: station

Band: 2GHz-B/G

Channel Width: 20MHz

Frequency: 2412 MHz

SSID: MikroTik

Scan List: default

Wireless Protocol: any

Security Profile: default

☒ Default Authenticate

OK

Cancel

Apply

Disable

Comment

Advanced Mode

Torch

WPS Accept

WPS Client

Setup Repeater

Scan...

Freq. Usage...

Align...

Sniff...

Snooper...

Reset Configuration

Gambar 2: Konfigurasi Station

Scanner (Running)

Interface: *wlan1*

☐ Background Scan

Start
Stop
Close
Connect
New Window

	Address	SSID	Channel	Signal...	Noise ...	Signal...	Radio Name	RouterO...	
ARB	CC:2D:E0:98:AA:3D	PointToPo...	2412/20...	-51	-95	44	CC2DE098AA3D	6.42.1	
ARB	64:D1:54:FA:E9:69	PointToPo...	2412/20...	-55	-95	40	64D154FAE969	6.42.1	
ARB	CC:2D:E0:98:AA:BF	Kelompok...	2412/20...	-29	-95	66	CC2DE098AABF	6.42.1	
AP	22:71:27:6E:13:13	Y!	2412/20...	-60	-95	35			
AP	E8:10:98:AB:79:E0	myITS-WiFi	2412/20...	-74	-95	21			
AP	E8:10:98:AB:79:E1	eduroam	2412/20...	-76	-95	19			
AP	E8:10:98:AB:79:E3	myITS-Wi...	2412/20...	-73	-95	22			
AP	18:62:E4:3F:78:C7	SMA3006...	2412/20...	-80	-95	15			
AP	E8:10:98:AB:79:E2		2412/20...	-74	-95	21			
AP	A8:5B:F7:09:D0:43	myITS-Wi...	2437/20...	-77	-95	18			
AP	A8:5B:F7:09:67:71	eduroam	2462/20...	-72	-95	23			
AP	A8:5B:F7:09:67:70	myITS-WiFi	2462/20...	-72	-95	23			
AP	A8:5B:F7:09:67:72		2462/20...	-69	-95	26			
AP	A8:5B:F7:09:67:73	myITS-Wi...	2462/20...	-71	-95	24			
AP	74:AC:B9:03:CC:45	DTE-Rem...	2462/20...	-80	-95	15			

15 items (1 selected)

Gambar 3: Scan Jaringan Wireless

5. Tambahkan IP Address pada interface *wlan1*:

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

Tambahkan IP Address pada *ether2* untuk koneksi ke laptop:

- **Router A:** 192.168.20.1/24
- **Router B:** 192.168.30.1/24

Address List

+ - ✓ ✗ [Icon] [Icon] Find

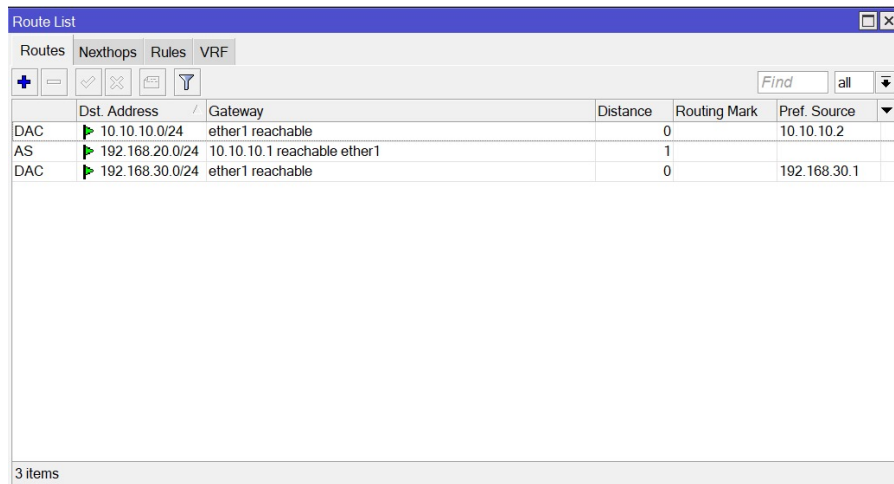
	Address	Network	Interface
+	10.10.10.2/24	10.10.10.0	<i>wlan1</i>
+	192.168.30.1/24	192.168.30.0	<i>ether2</i>

2 items

Gambar 4: Address List Router

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

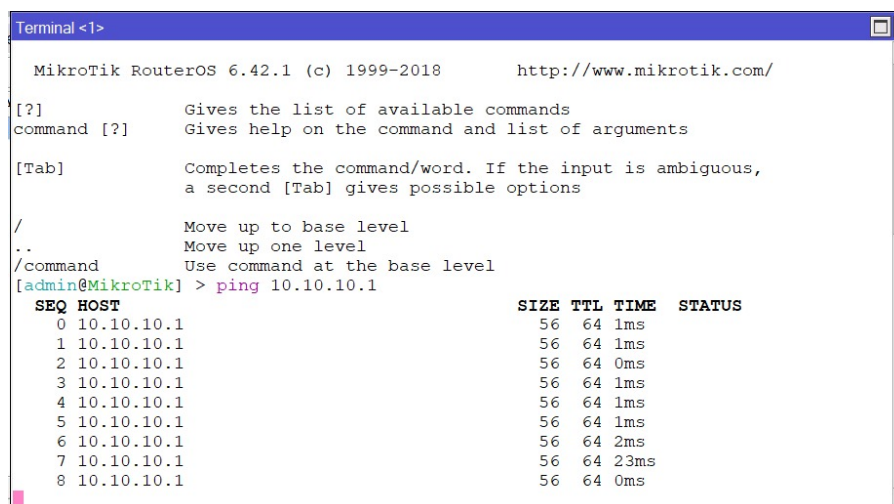


	Dst. Address	Gateway	Distance	Routing Mark	Pref. Source
DAC	10.10.10.0/24	ether1 reachable	0		10.10.10.2
AS	192.168.20.0/24	10.10.10.1 reachable ether1	1		
DAC	192.168.30.0/24	ether1 reachable	0		192.168.30.1

Gambar 5: Routing List Router

7. Uji koneksi antar router:

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



```
MikroTik RouterOS 6.42.1 (c) 1999-2018      http://www.mikrotik.com/

[?]          Gives the list of available commands
command [?]  Gives help on the command and list of arguments

[Tab]        Completes the command/word. If the input is ambiguous,
              a second [Tab] gives possible options

/            Move up to base level
..           Move up one level
/command     Use command at the base level
[admin@MikroTik] > ping 10.10.10.1

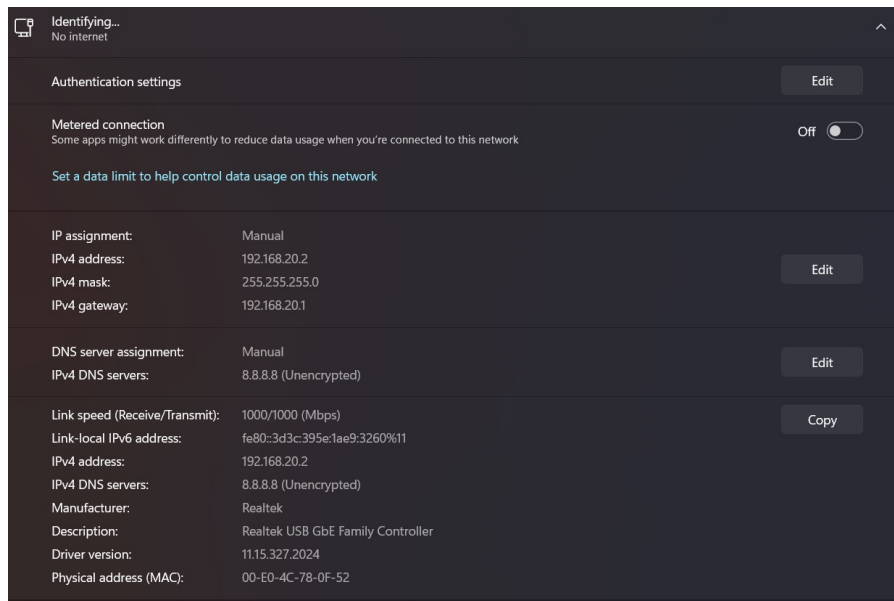
  SEQ HOST                      SIZE TTL TIME  STATUS
    0 10.10.10.1                  56  64 1ms
    1 10.10.10.1                  56  64 1ms
    2 10.10.10.1                  56  64 0ms
    3 10.10.10.1                  56  64 1ms
    4 10.10.10.1                  56  64 1ms
    5 10.10.10.1                  56  64 1ms
    6 10.10.10.1                  56  64 2ms
    7 10.10.10.1                  56  64 23ms
    8 10.10.10.1                  56  64 0ms
```

Gambar 6: Tes Ping Antar Router

8. Konfigurasi IP Address di laptop (static manual):

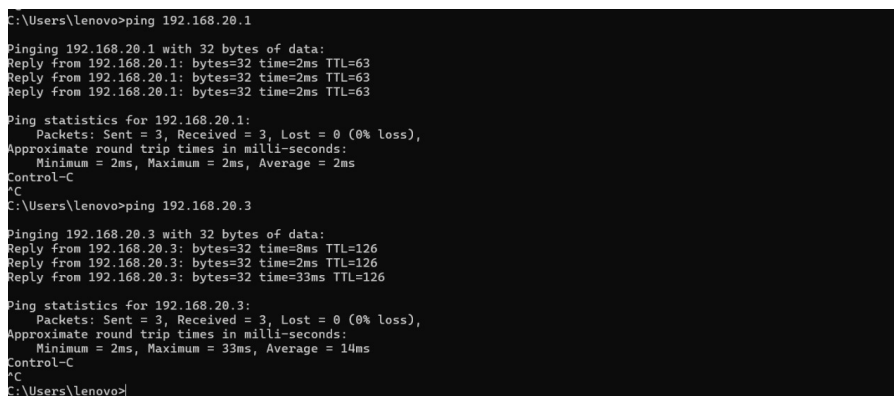
- **Laptop A (Router A):**

- IP Address: 192.168.20.3
- 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



Gambar 7: Setting IP Laptop

9. Uji koneksi dari Laptop B ke Laptop A dengan perintah **ping 192.168.20.3** dan sebaliknya dari Laptop A ke Laptop B. Jika berhasil, maka konfigurasi Wireless Point to Point telah selesai dan berhasil.



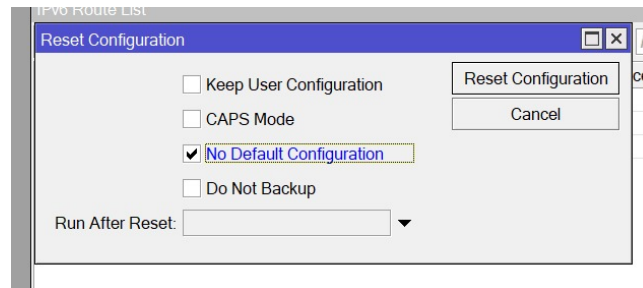
Gambar 8: Tes Ping Antar Laptop

1.2 Wireless Point to Multipoint

1. Reset konfigurasi masing-masing router:

- Buka Winbox, login ke router menggunakan MAC address.

- Masuk ke menu **System > Reset Configuration**.
- Centang **No Default Configuration**, lalu klik **Reset Configuration**.



Gambar 9: Reset Router

2. Login ke router menggunakan Winbox (MAC address). Username: admin, password: kosong (default).
3. Aktifkan interface wlan1:
 - Masuk ke menu **Wireless**, pilih wlan1, klik ikon panah biru untuk mengaktifkan.
4. Konfigurasi Wireless:
 - **Router A (Sebagai AP Bridge):**
 - Mode: ap bridge
 - SSID: Kelompok15PointToMultipoint
 - **Router B (Sebagai Station Bridge):**
 - Mode: station bridge
 - Klik **Scan**, pilih wlan1, cari SSID dari Router A, klik Connect.

Interface <wlan1>

General Wireless HT WDS Nstreme NV2 Advanced Status ...

Mode: station bridge

Band: 2GHz-B/G

Channel Width: 20MHz

Frequency: 2412 MHz

SSID: Kelompok_15_PTP

Scan List: default

Wireless Protocol: any

Security Profile: default

☒ Default Authenticate

OK
Cancel
Apply
Disable
Comment
Advanced Mode
Torch
WPS Accept
WPS Client
Setup Repeater
Scan...
Freq. Usage...
Align...
Sniff...
Snooper...
Reset Configuration

Gambar 10: Konfigurasi Station Bridge Router

Scanner (Running)

Interface: wlan1

☐ Background Scan

Start
Stop
Close
Connect
New Window

	Address	SSID	Channel	Signal...	Noise ...	Signal...	Radio Name	RouterO...
ARB	CC:2D:E0:98:AA:3D	PointToPo...	2412/20...	-51	-95	44	CC2DE098AA3D	6.42.1
ARB	64:D1:54:FA:E9:69	PointToPo...	2412/20...	-55	-95	40	64D154FAE969	6.42.1
ARB	CC:2D:E0:98:AA:BF	Kelompok...	2412/20...	-29	-95	66	CC2DE098AABF	6.42.1
AP	22:71:27:6E:13:13	Y!	2412/20...	-60	-95	35		
AP	E8:10:98:AB:79:E0	myITS-WiFi	2412/20...	-74	-95	21		
AP	E8:10:98:AB:79:E1	eduroam	2412/20...	-76	-95	19		
AP	E8:10:98:AB:79:E3	myITS-Wi...	2412/20...	-73	-95	22		
AP	18:62:E4:3F:78:C7	SMA3006...	2412/20...	-80	-95	15		
AP	E8:10:98:AB:79:E2		2412/20...	-74	-95	21		
AP	A8:5B:F7:09:D0:43	myITS-Wi...	2437/20...	-77	-95	18		
AP	A8:5B:F7:09:67:71	eduroam	2462/20...	-72	-95	23		
AP	A8:5B:F7:09:67:70	myITS-WiFi	2462/20...	-72	-95	23		
AP	A8:5B:F7:09:67:72		2462/20...	-69	-95	26		
AP	A8:5B:F7:09:67:73	myITS-Wi...	2462/20...	-71	-95	24		
AP	74:AC:B9:03:CC:45	DTE-Rem...	2462/20...	-80	-95	15		

15 items (1 selected)

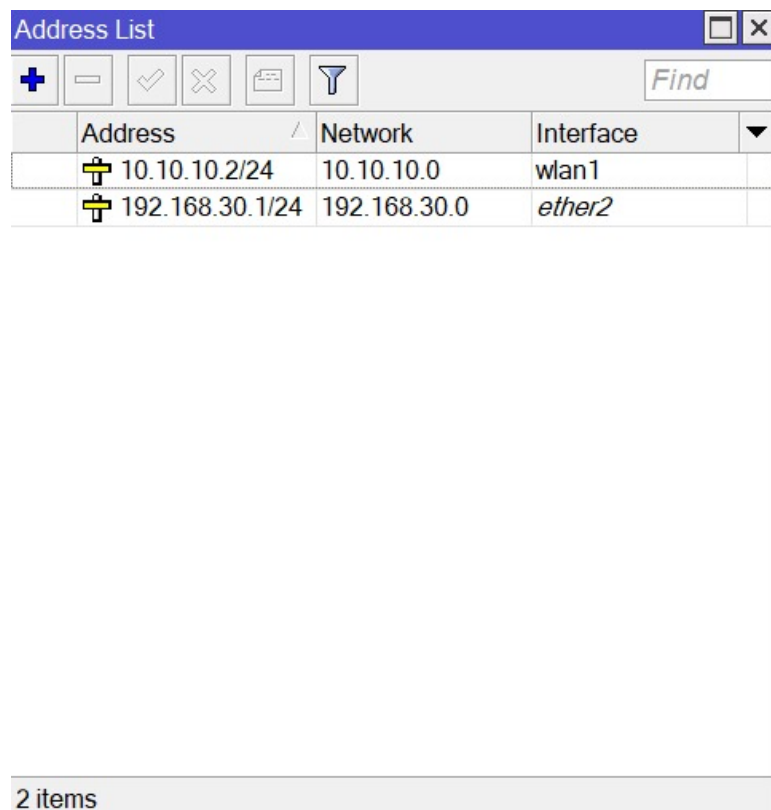
Gambar 11: Scan Jaringan Wireless

5. Tambahkan IP Address pada interface wlan1:

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

Tambahkan IP Address pada ether2:

- **Router A:** 192.168.20.1/24
- **Router B:** 192.168.30.1/24



Gambar 12: Setting IP Address

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

	Dst Address	Gateway	Distance	Routing Mark	Pref. Source
DAC	10.10.10.0/24	ether1 reachable	0		10.10.10.2
AS	192.168.20.0/24	10.10.10.1 reachable ether1	1		
DAC	192.168.30.0/24	ether1 reachable	0		192.168.30.1

3 items

Gambar 13: Konfigurasi Routing Statis

7. Uji koneksi antar router menggunakan ping:

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

```

MikroTik RouterOS 6.42.1 (c) 1999-2018      http://www.mikrotik.com/

[?]          Gives the list of available commands
command [?]  Gives help on the command and list of arguments

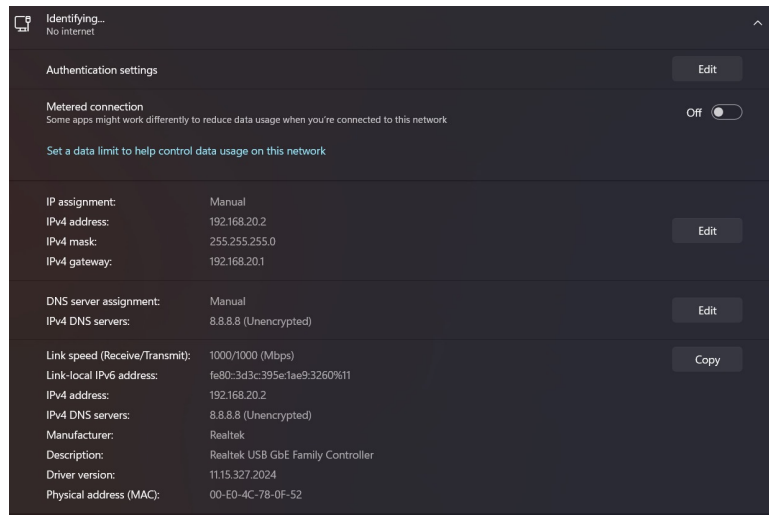
[Tab]        Completes the command/word. If the input is ambiguous,
              a second [Tab] gives possible options

/            Move up to base level
..          Move up one level
/command     Use command at the base level
[admin@MikroTik] > ping 10.10.10.1
  SEQ HOST                      SIZE TTL TIME  STATUS
    0 10.10.10.1                  56  64 0ms
    1 10.10.10.1                  56  64 0ms
    2 10.10.10.1                  56  64 0ms
    3 10.10.10.1                  56  64 0ms
    4 10.10.10.1                  56  64 16ms
    5 10.10.10.1                  56  64 0ms
    6 10.10.10.1                  56  64 1ms
  
```

Gambar 14: Ping Antar Router

8. Konfigurasi IP Address secara manual pada laptop:

- **Laptop A (terhubung ke Router A):**
 - IP Address: 192.168.20.2
 - Gateway: 192.168.20.1
 - DNS: 8.8.8.8
- **Laptop B (terhubung ke Router B):**
 - IP Address: 192.168.30.2
 - Gateway: 192.168.30.1
 - DNS: 8.8.8.8



Gambar 15: Setting IP Laptop

9. Uji koneksi dari Laptop A ke Laptop B dan sebaliknya:

- Ping dari 192.168.20.2 ke 192.168.30.2
- Ping dari 192.168.30.2 ke 192.168.20.2

```
C:\Users\lenovo>ping 192.168.20.1
Pinging 192.168.20.1 with 32 bytes of data:
Reply from 192.168.20.1: bytes=32 time=2ms TTL=63
Reply from 192.168.20.1: bytes=32 time=2ms TTL=63
Reply from 192.168.20.1: bytes=32 time=2ms TTL=63

Ping statistics for 192.168.20.1:
    Packets: Sent = 3, Received = 3, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 2ms, Maximum = 2ms, Average = 2ms
Control-C
^C
C:\Users\lenovo>ping 192.168.20.3
Pinging 192.168.20.3 with 32 bytes of data:
Reply from 192.168.20.3: bytes=32 time=8ms TTL=126
Reply from 192.168.20.3: bytes=32 time=2ms TTL=126
Reply from 192.168.20.3: bytes=32 time=33ms TTL=126

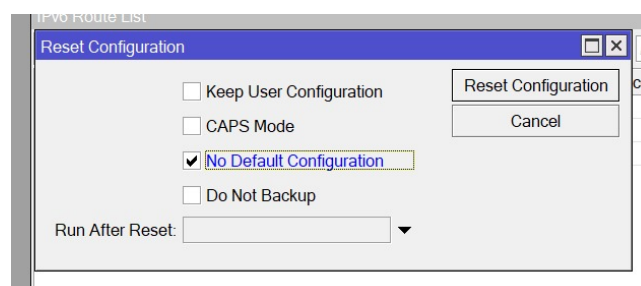
Ping statistics for 192.168.20.3:
    Packets: Sent = 3, Received = 3, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 2ms, Maximum = 33ms, Average = 14ms
Control-C
^C
C:\Users\lenovo>
```

Gambar 16: Ping Antar Laptop

1.3 Wireless Bridge

1. Reset konfigurasi masing-masing router:

- Buka Winbox, login ke router menggunakan MAC address.
- Masuk ke menu **System > Reset Configuration**.
- Centang **No Default Configuration**, lalu klik **Reset Configuration**.



Gambar 17: Reset Router

2. Login ke router menggunakan Winbox:

- Gunakan MAC address atau IP default.
- Username: admin, password: kosong (default).

3. Aktifkan interface wlan1:

- Masuk ke menu **Wireless > Wifi Interfaces**.
- Pilih wlan1, klik ikon panah biru untuk mengaktifkan.

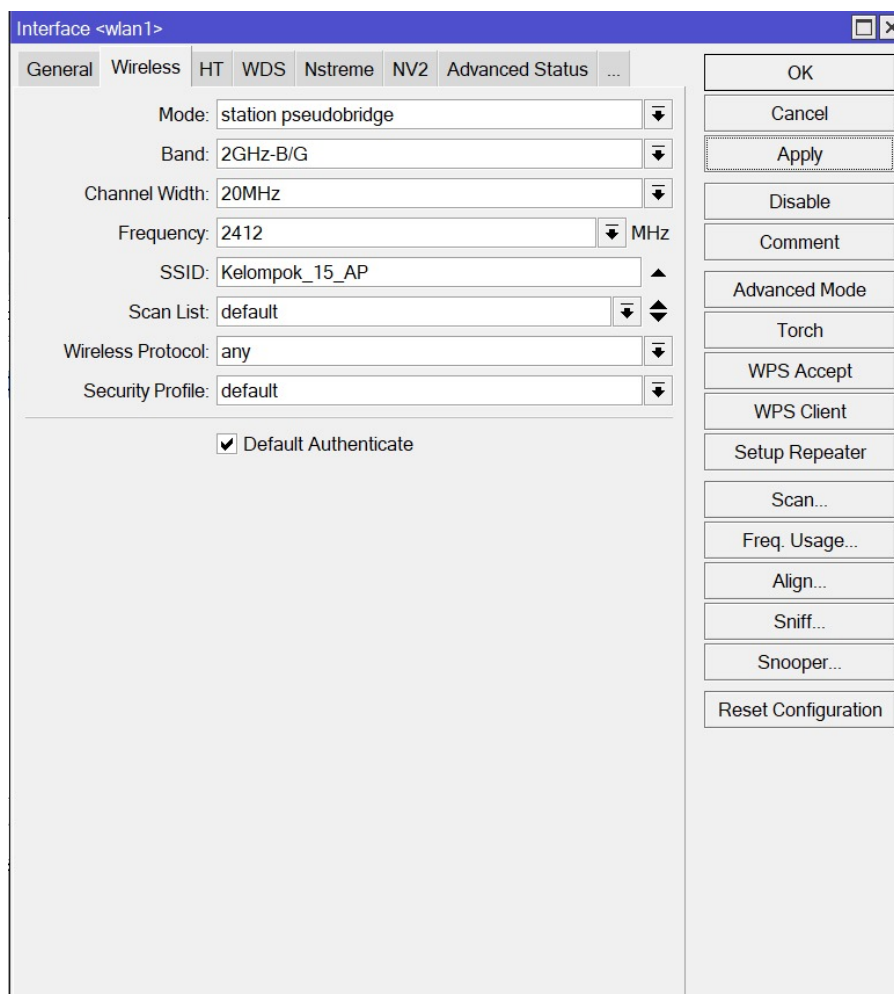
4. Konfigurasi Wireless:

• Router A:

- Mode: bridge
- SSID: 15KelompokWirelessBridge

• Router B:

- Mode: station pseudobridge
- Klik **Scan**, pilih interface wlan1, cari SSID dari Router A, klik Connect.



Gambar 18: Konfigurasi Station Pseudobridge

Scanner (Running)									
Interface: wlan1								Start	
<input type="checkbox"/> Background Scan								Stop	
								Close	
								Connect	
								New Window	
	Address	SSID	Channel	Signal...	Noise ...	Signal...	Radio Name	RouterO...	
ARB	CC:2D:E0:98:AA:3D	PointToPo...	2412/20...	-51	-95	44	CC2DE098AA3D	6.42.1	
ARB	64:D1:54:FA:E9:69	PointToPo...	2412/20...	-55	-95	40	64D154FAE969	6.42.1	
ARB	CC:2D:E0:98:AA:BF	Kelompok...	2412/20...	-29	-95	66	CC2DE098AABF	6.42.1	
AP	22:71:27:6E:13:13	Y!	2412/20...	-60	-95	35			
AP	E8:10:98:AB:79:E0	myITS-WiFi	2412/20...	-74	-95	21			
AP	E8:10:98:AB:79:E1	eduroam	2412/20...	-76	-95	19			
AP	E8:10:98:AB:79:E3	myITS-Wi...	2412/20...	-73	-95	22			
AP	18:62:E4:3F:78:C7	SMA3006...	2412/20...	-80	-95	15			
AP	E8:10:98:AB:79:E2		2412/20...	-74	-95	21			
AP	A8:5B:F7:09:D0:43	myITS-Wi...	2437/20...	-77	-95	18			
AP	A8:5B:F7:09:67:71	eduroam	2462/20...	-72	-95	23			
AP	A8:5B:F7:09:67:70	myITS-WiFi	2462/20...	-72	-95	23			
AP	A8:5B:F7:09:67:72		2462/20...	-69	-95	26			
AP	A8:5B:F7:09:67:73	myITS-Wi...	2462/20...	-71	-95	24			
AP	74:AC:B9:03:CC:45	DTE-Rem...	2462/20...	-80	-95	15			
15 items (1 selected)									

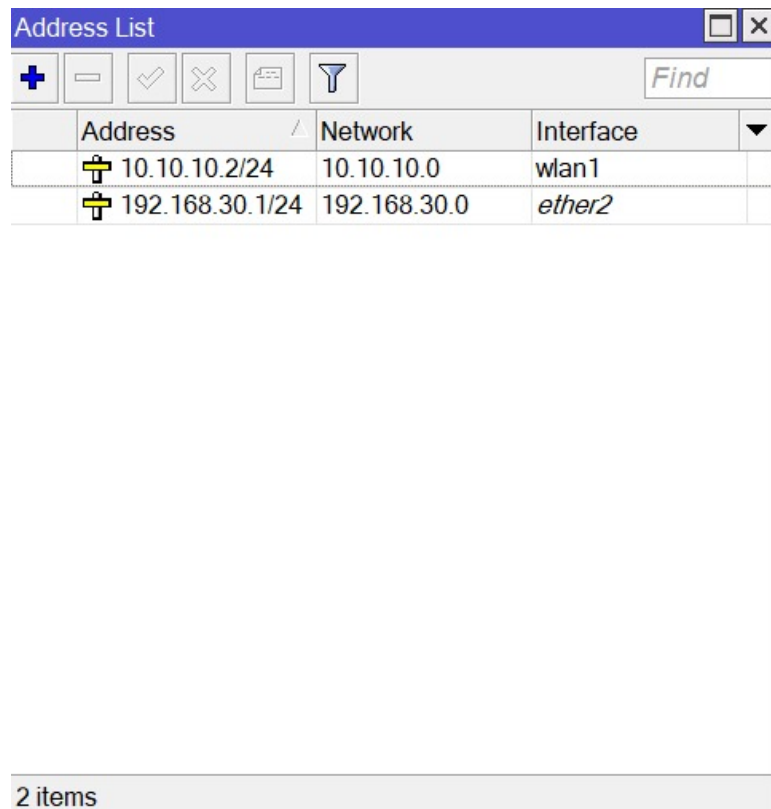
Gambar 19: Scan Jaringan Wireless

5. Konfigurasi IP Address pada wlan1:

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

6. Konfigurasi IP Address pada ether2 (LAN):

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



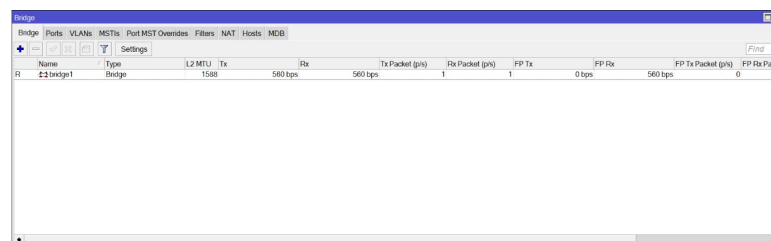
Address	Network	Interface
10.10.10.2/24	10.10.10.0	wlan1
192.168.30.1/24	192.168.30.0	ether2

2 items

Gambar 20: IP Address untuk WLAN dan LAN

7. Tambahkan Bridge pada kedua router:

- Masuk ke menu **Bridge**, klik tombol +, beri nama bridge1.

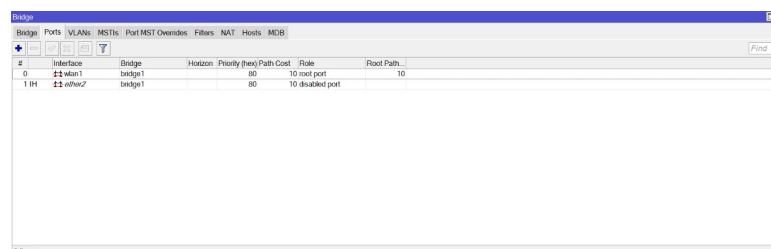


Name	Type	L2 MTU	Tx	Rx	Tx Packet (pps)	Rx Packet (pps)	FP Tx	FP Rx	FP Tx Packet (pps)	FP Rx Packet (pps)
bridge1	Bridge	1500	560 tps	560 tps	1	1	0 tps	560 tps	0	0

Gambar 21: Menambahkan Bridge

- Masuk ke tab **Ports**, tambahkan interface:

- wlan1
- ether2



#	Interface	Bridge	Horizon	Priority (bits)	Path Cost	Role	Root Path
0	wlan1	bridge1	80	10	root port	10	
1	ether2	bridge1			disabled port		

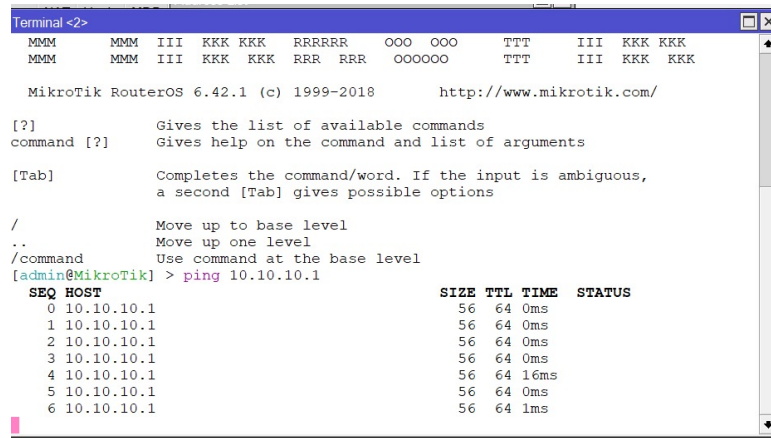
2 items

Gambar 22: Menambahkan Port ke Bridge

- Gunakan bridge1 sebagai bridge.

8. Uji koneksi antar router:

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



```
Terminal <2>
MMM   MMM   III   KKK KKK   RRRRRR   OOO OOO   TTT   III   KKK KKK
MMM   MMM   III   KKK KKK   RRR RRR   OOOOOO   TTT   III   KKK KKK

MikroTik RouterOS 6.42.1 (c) 1999-2018      http://www.mikrotik.com/

[?]          Gives the list of available commands
command [?]  Gives help on the command and list of arguments

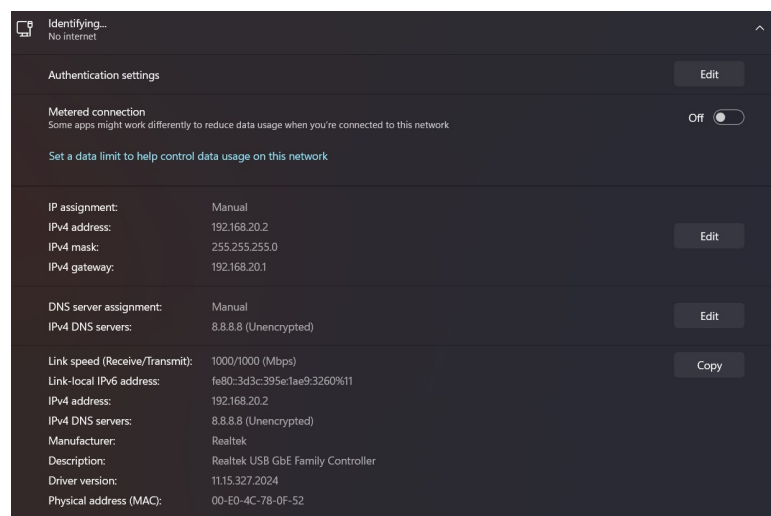
[Tab]        Completes the command/word. If the input is ambiguous,
              a second [Tab] gives possible options

/            Move up to base level
./           Move up one level
/command     Use command at the base level
[admin@MikroTik] > ping 10.10.10.1
  SEQ HOST                      SIZE TTL TIME  STATUS
    0 10.10.10.1                 56  64 0ms   success
    1 10.10.10.1                 56  64 0ms   success
    2 10.10.10.1                 56  64 0ms   success
    3 10.10.10.1                 56  64 0ms   success
    4 10.10.10.1                 56  64 16ms  success
    5 10.10.10.1                 56  64 0ms   success
    6 10.10.10.1                 56  64 1ms   success
```

Gambar 23: Tes Ping Antar Router

9. Konfigurasi IP Address di laptop:

- **Laptop A (terhubung ke Router A):**
 - IP Address: 192.168.10.5
 - Gateway: 192.168.10.2
 - DNS: 8.8.8.8
- **Laptop B (terhubung ke Router B):**
 - IP Address: 192.168.10.7
 - Gateway: 192.168.10.3
 - DNS: 8.8.8.8



Gambar 24: Setting IP pada Laptop

10. Uji koneksi antar laptop:

- Dari Laptop A, ping ke 192.168.10.7
- Dari Laptop B, ping ke 192.168.10.5

```
C:\Users\lenovo>ping 192.168.20.1

Pinging 192.168.20.1 with 32 bytes of data:
Reply from 192.168.20.1: bytes=32 time=2ms TTL=63
Reply from 192.168.20.1: bytes=32 time=2ms TTL=63
Reply from 192.168.20.1: bytes=32 time=2ms TTL=63

Ping statistics for 192.168.20.1:
    Packets: Sent = 3, Received = 3, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 2ms, Maximum = 2ms, Average = 2ms
Control-C
^C
C:\Users\lenovo>ping 192.168.20.3

Pinging 192.168.20.3 with 32 bytes of data:
Reply from 192.168.20.3: bytes=32 time=8ms TTL=126
Reply from 192.168.20.3: bytes=32 time=2ms TTL=126
Reply from 192.168.20.3: bytes=32 time=33ms TTL=126

Ping statistics for 192.168.20.3:
    Packets: Sent = 3, Received = 3, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 2ms, Maximum = 33ms, Average = 14ms
Control-C
^C
C:\Users\lenovo>
```

Gambar 25: Tes Ping Antar Laptop

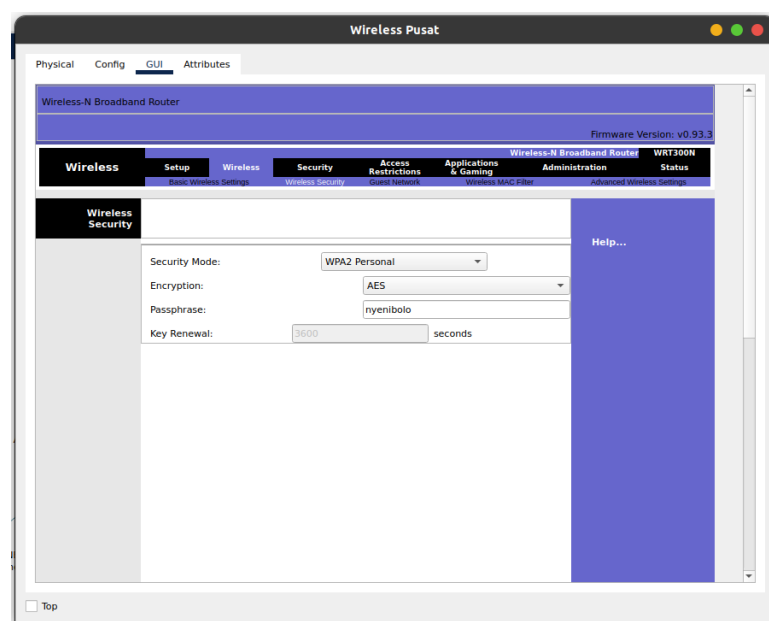
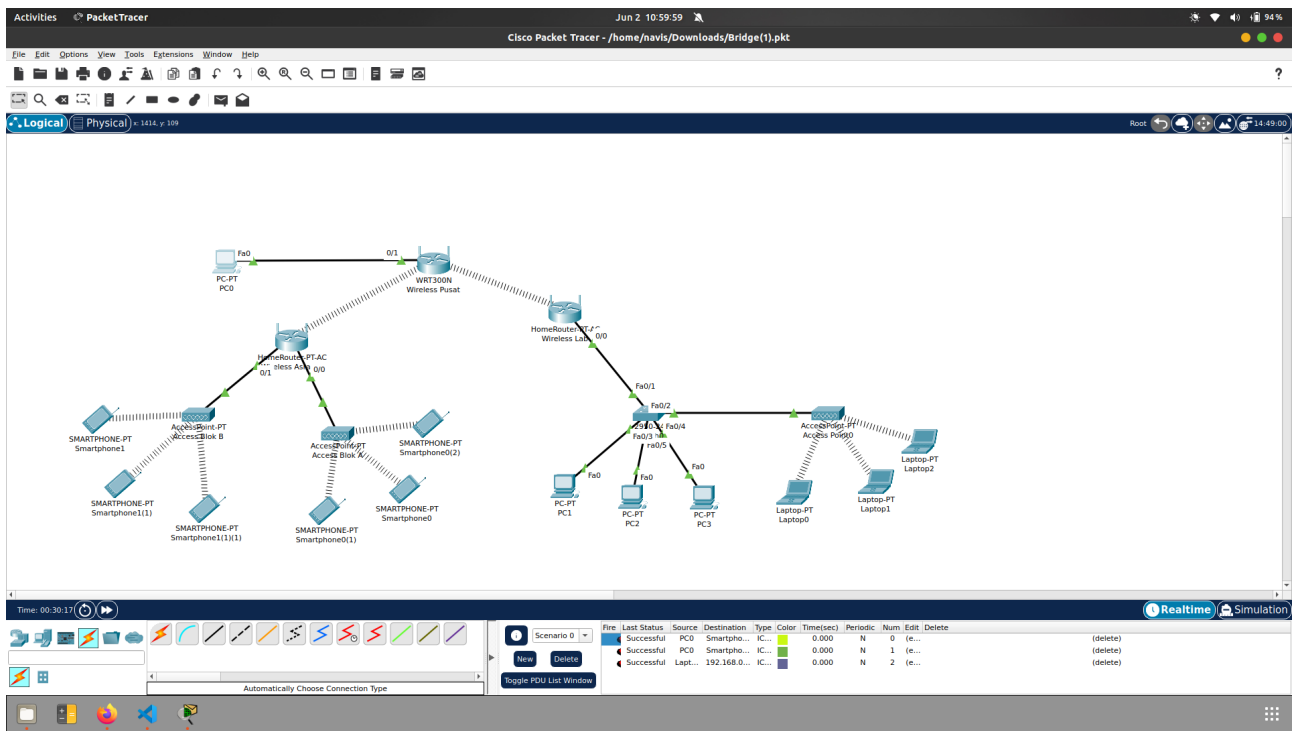
2 Analisis Hasil Percobaan

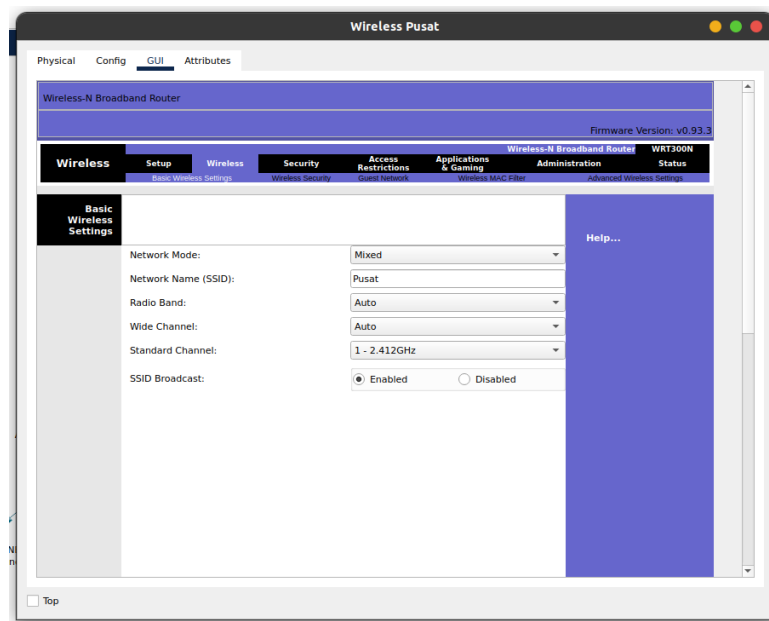
Berdasarkan hasil percobaan yang telah dilakukan, seluruh konfigurasi Wireless Point to Point, Wireless Point to Multipoint, dan Wireless Bridge berhasil dijalankan dengan baik sesuai tujuan masing-masing. Pada konfigurasi Point to Point, komunikasi antar dua router berjalan lancar dengan konfigurasi sederhana namun hanya mendukung dua perangkat, sehingga tidak cocok untuk jaringan yang lebih kompleks. Sementara itu, pada konfigurasi Point to Multipoint, router A sebagai Access Point berhasil melayani koneksi dari router-router client secara simultan, menunjukkan fleksibilitas yang tinggi dan cocok untuk topologi jaringan skala kecil hingga menengah. Adapun pada Wireless Bridge, dengan penggabungan interface wlan dan ether ke dalam satu bridge, komunikasi antar perangkat di jaringan yang berbeda dapat dilakukan seolah-olah berada dalam satu LAN, tanpa perlu konfigurasi routing tambahan, yang memberikan kemudahan namun memiliki risiko broadcast storm jika tidak dikelola dengan baik. Seluruh pengujian ping antar router maupun antar laptop menunjukkan konektivitas yang stabil dan tanpa packet loss, yang menandakan bahwa setiap konfigurasi berhasil diimplementasikan dengan benar.

3 Hasil Tugas Modul

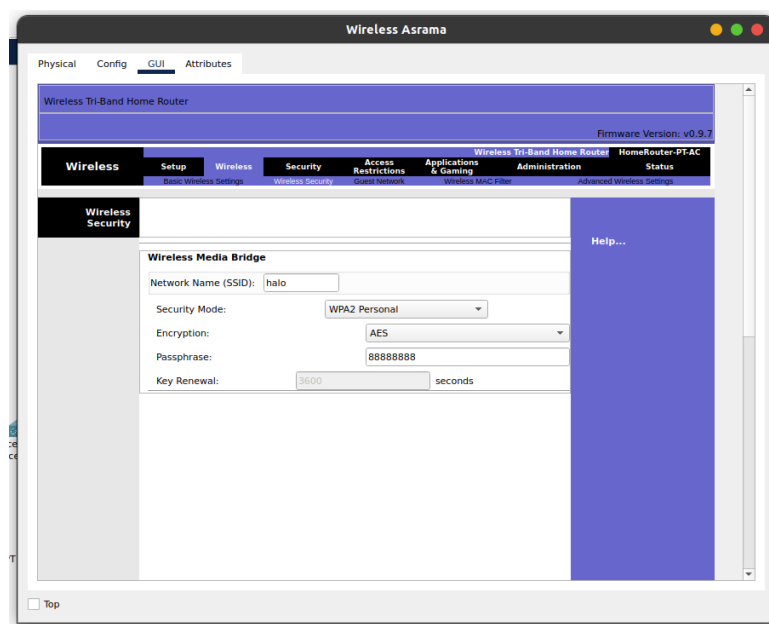
Simulasikan jaringan wireless antara tiga gedung:

- Gedung Pusat
- Gedung Lab
- Gedung Asrama (Hubungkan dua bagian dalam Gedung Asrama (Blok A dan Blok B) menggunakan Wireless Bridge Point-to-Point.)

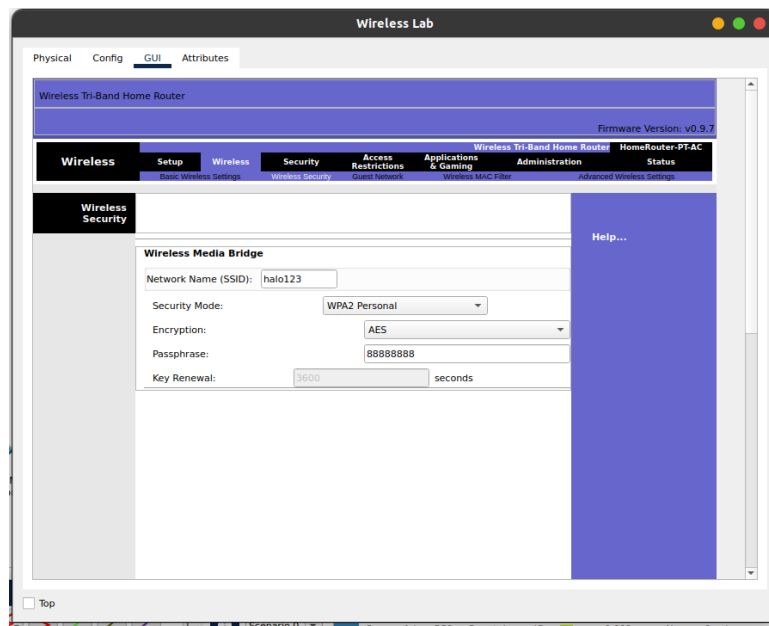




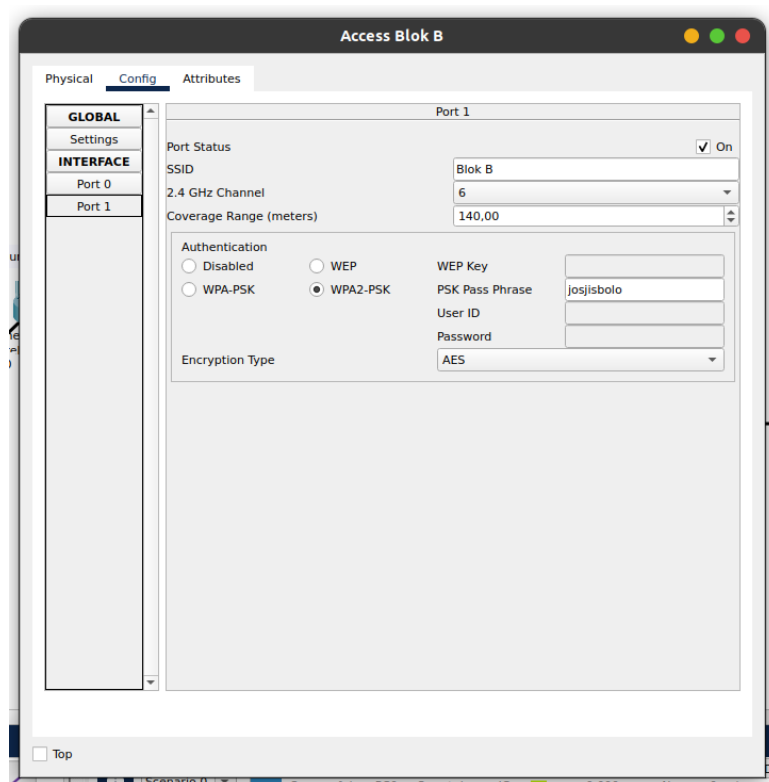
Gambar 28: Setting Wireless Gedung Pusat



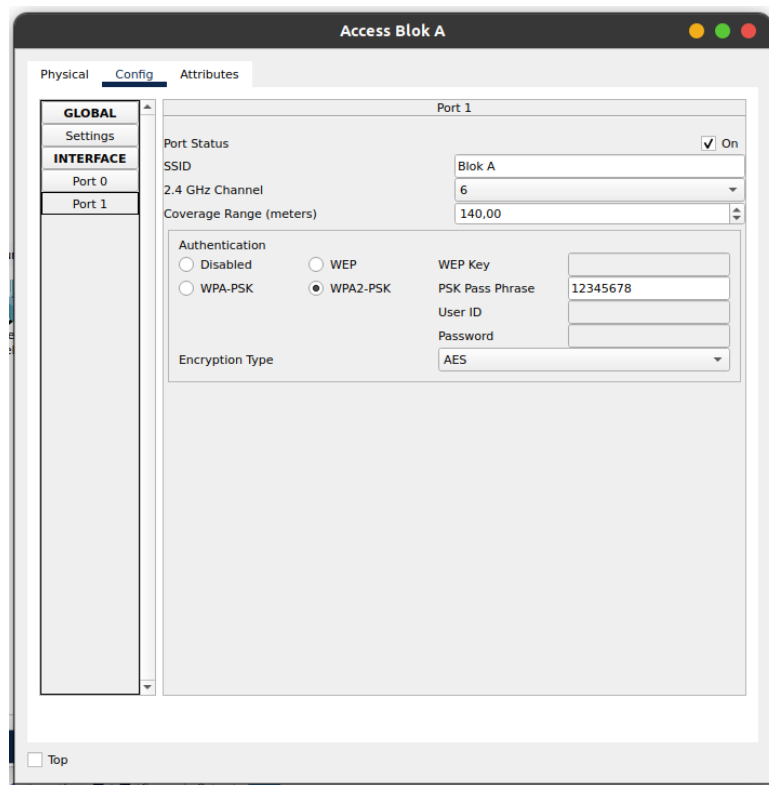
Gambar 29: Setting Wireless Gedung Asrama



Gambar 30: Setting Wireless Gedung Lab



Gambar 31: Setting Wireless Blok B Gedung Asrama



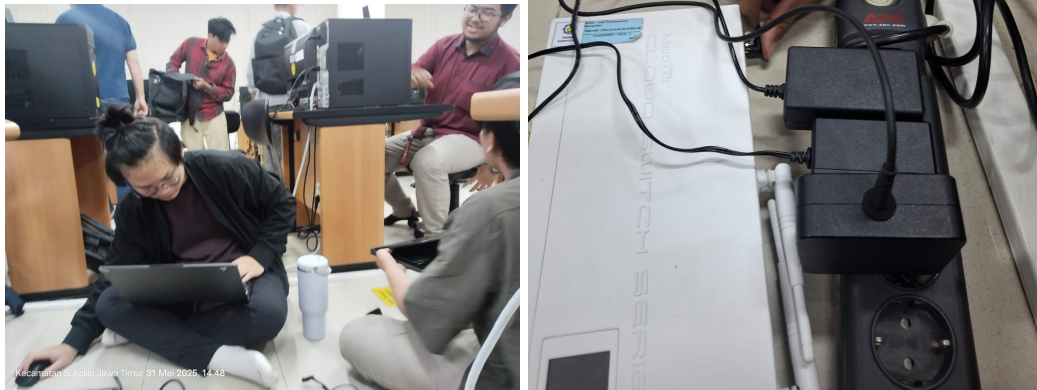
Gambar 32: Setting Wireless Blok A Gedung Asrama

4 Kesimpulan

Dari hasil percobaan jaringan wurelles, dapat disimpulkan bahwa ketiga metode konfigurasi jaringan nirkabel Point to Point, Point to Multipoint, dan Wireless Bridge berhasil diimplementasikan dan masing-masing memiliki keunggulan sesuai kebutuhan topologi jaringan. Semua pengujian koneksi menunjukkan hasil yang sukses tanpa gangguan.

5 Lampiran

5.1 Dokumentasi saat praktikum



Gambar 33: Dokumentasi saat praktikum