LAPORAN PRAKTIKUM KONFIGURASI JARINGAN

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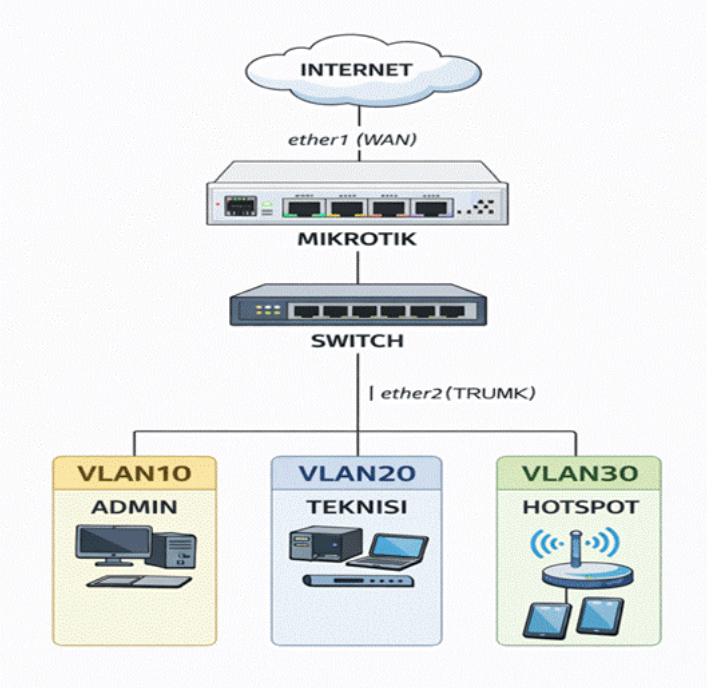
PESANTREN TEKNOLOGI INFORMASI DAN KOMUNIKASI
CREATES FUTURE SKILLED PROFESSIONALS
2026

Judul Tugas : **Konfigurasi Jaringan Mikrotik Berbasis VLAN dan Hotspot**
Tugas saya sebagai *Junior Technician* adalah merancang bangun dan mengkonfigurasi **Jaringan ADMIN** digunakan oleh staf tata usaha, memiliki akses penuh ke seluruh jaringan **Jaringan TEKNISI** digunakan oleh teknisi/lab IT, hanya diperbolehkan akses ke internet teknisi **Jaringan HOTSPOT (SISWA)** digunakan oleh siswa melalui WiFi, Harus login menggunakan username & password

Dengan Opsi konfigurasi sebagai berikut:

1. Menggunakan **Router Mikrotik** sebagai pusat pengelolaan
2. Menggunakan **VLAN (10, 20, 30)** untuk segmentasi jaringan
3. Menggunakan **1 jalur trunk** ke switch
4. Menggunakan **DHCP Server** untuk tiap VLAN
5. Menggunakan **NAT** untuk akses internet
6. Menggunakan **Firewall** untuk pembatasan akses

Topologi Jaringan



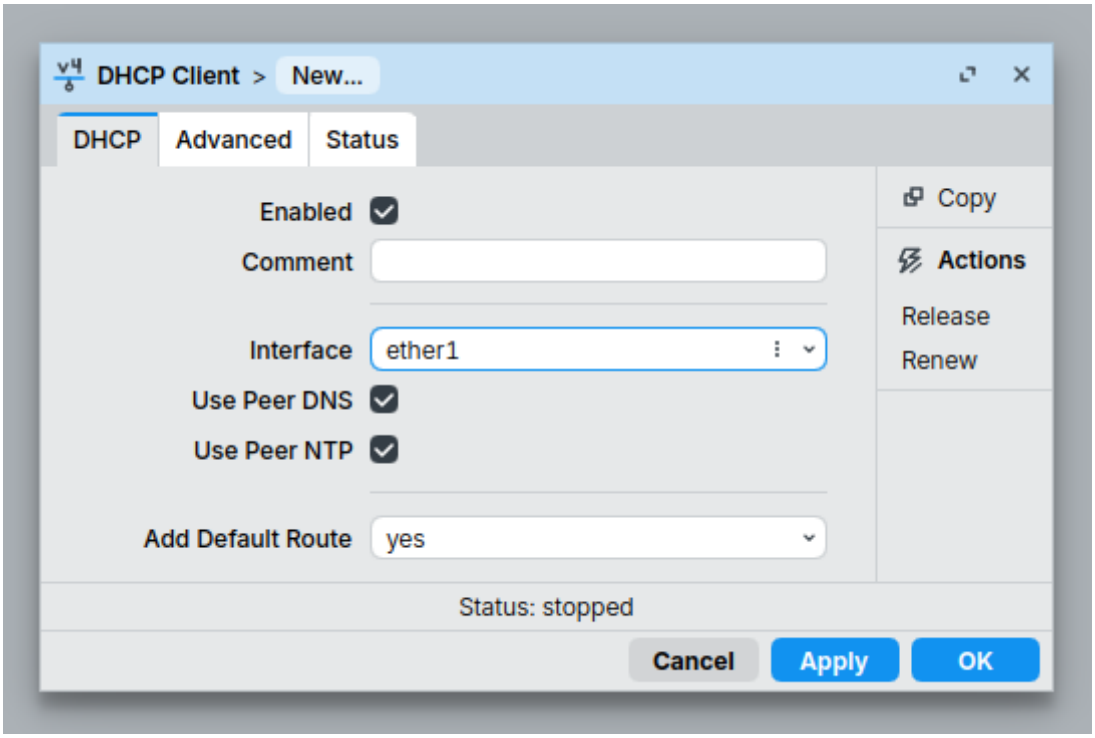
1. Internet terhubung ke Mikrotik melalui **ether1 (WAN)**
2. Mikrotik terhubung ke switch melalui **ether2 (trunk)**
3. Switch mendistribusikan jaringan ke:
    - VLAN 10 → ADMIN
    - VLAN 20 → TEKNISI
    - VLAN 30 → HOTSPOT

Berikut adalah langkah-langkah dan perintah Terminal (CLI) Mikrotik:

1. Konfigurasi Internet (WAN)

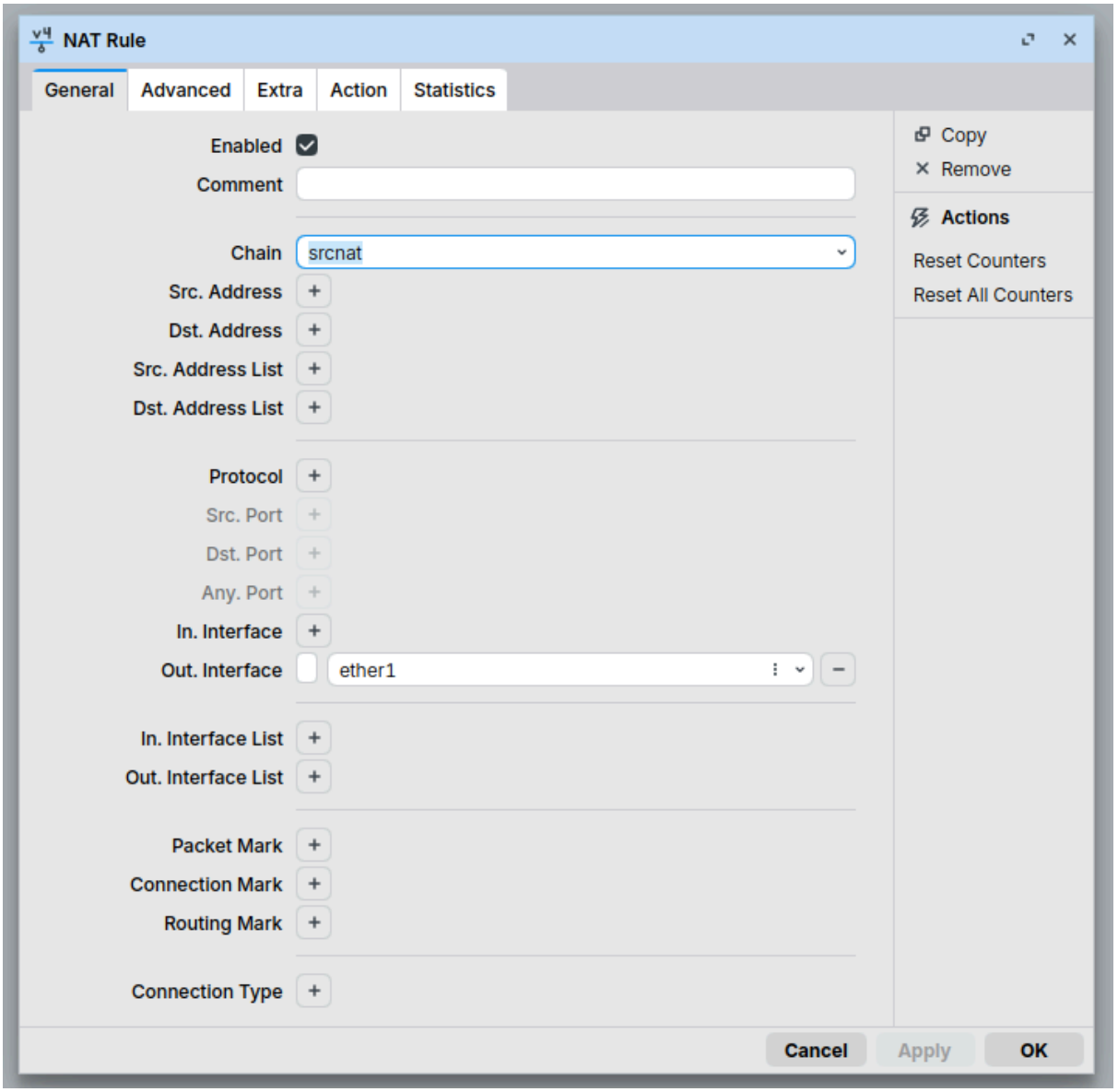
Kita asumsikan `ether1` terhubung ke sumber internet yang memberikan IP secara otomatis (DHCP).

IP→ DHCP Client → New → Interface: ether1 → Use Peer DNS & NTP: yes → Add Default Route: yes → Apply → OK



#NAT supaya bisa internetan

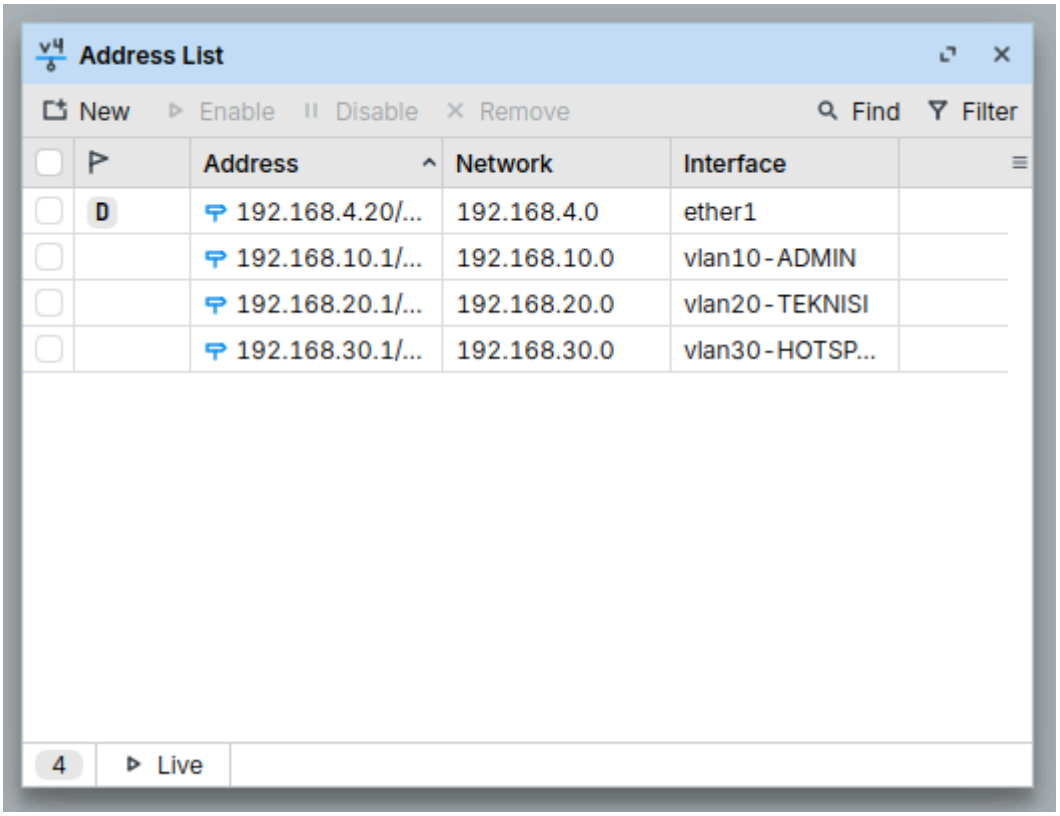
IP → Firewall → NAT → New → General →Chain: srcnat → Out. Interface: ether1 → Action: masquerade



2. IP ADDRESS

Menambahkan IP untuk VLAN10-ADMIN, VLAN20-TEKNISI, VLAN30-HOTSPOT

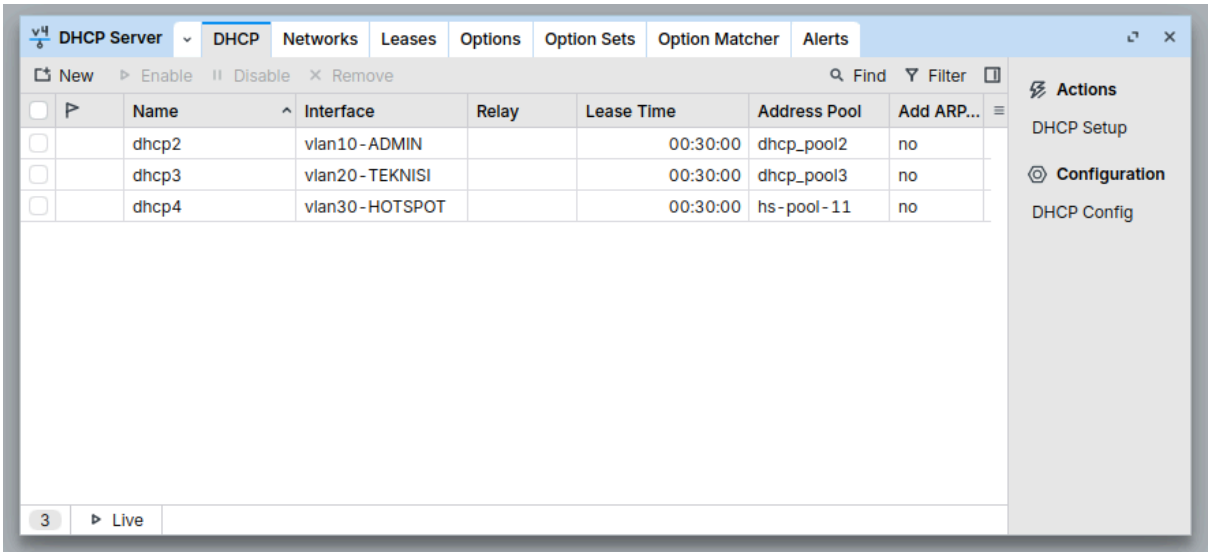
IP→Addresses→New→Address: 192.168.10.1/24→Interface: vlan10-ADMIN→Apply→OK
tambahkan IP untuk vlan20 & vlan30 dengan cara yang sama



3. DHCP Server

layanan jaringan yang secara otomatis menetapkan alamat IP, subnet mask, default gateway, dan DNS ke perangkat (client)

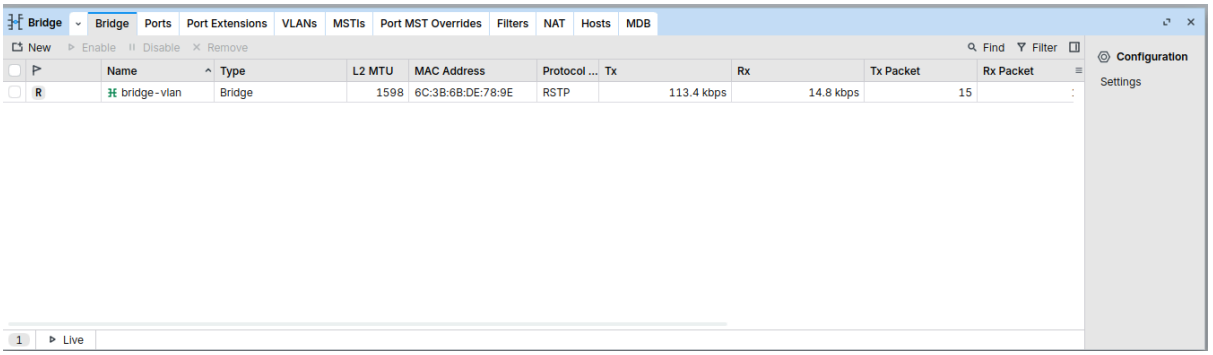
IP→DHCP Server→DHCP Setup→DHCP Server Interface: vlan10-ADMIN→Next sampai selesai
ulangi juga untuk vlan20-TEKNISI & vlan30-HOTSPOT



4. Bridge

fitur RouterOS yang menggabungkan dua atau lebih interface (ethernet, wireless, VLAN) menjadi satu segmen jaringan logis (satu subnet IP), membuat router berfungsi layaknya *switch*

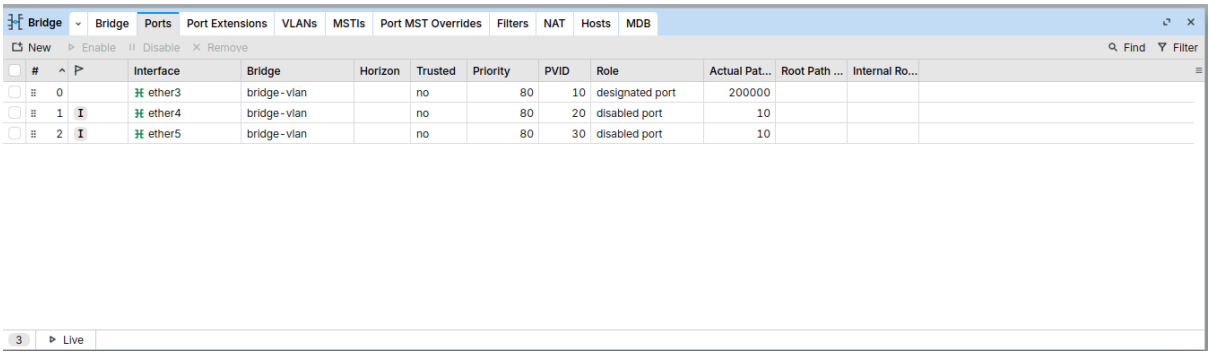
Bridge→New→Name: bridge-vlan→VLAN→VLAN Filtering: yes



aktifkan filtering-nya
/interface bridge set bridge-vlan vlan-filtering=yes

Buat port bridge untuk ether3, ether4, ether5
Bridge→Ports→New→Interface: ether3→Bridge: bridge-vlan→PVID: 10→Apply→OK

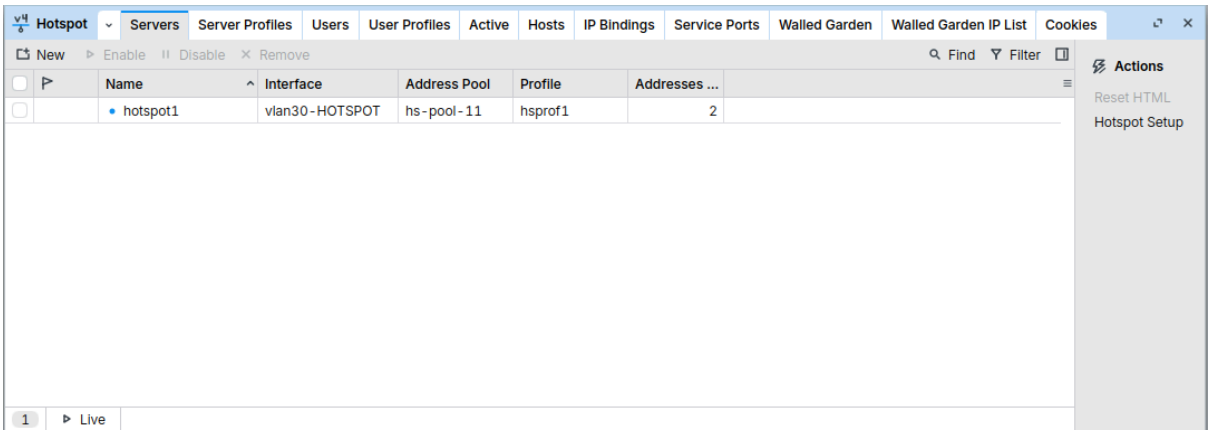
Buatkan juga untuk ether4, PVID: 20 & ether5, PVID: 30



5. Hotspot

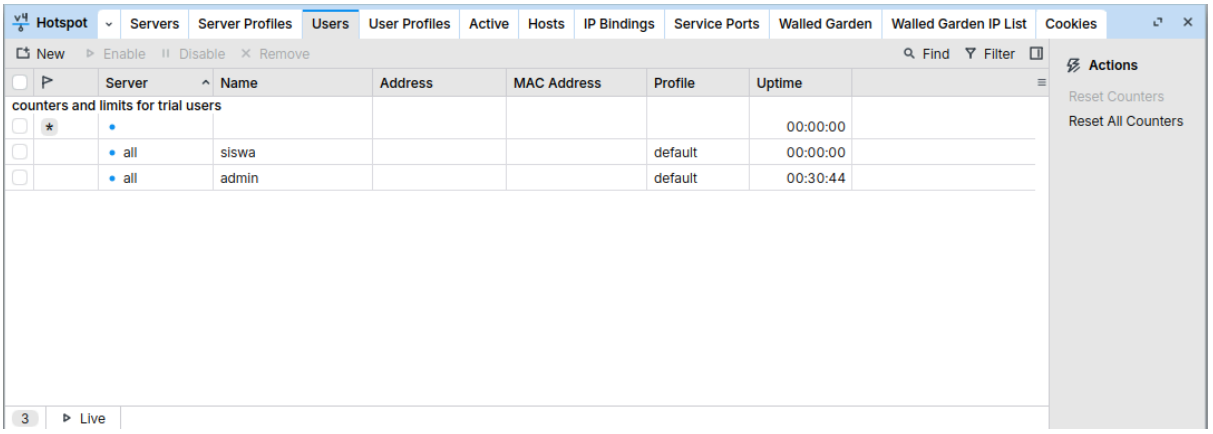
fitur sistem autentikasi pada router Mikrotik yang memungkinkan pengguna (client) terhubung ke jaringan melalui WiFi/Ethernet dengan memasukkan *username* dan *password* di halaman *login* (captive portal)

IP→Hotspot→Hotspot Setup→Interface: vlan30-HOTSPOT→Next hingga DNS Server: 8.8.8.8→DNS Name: (bebas)--> OK

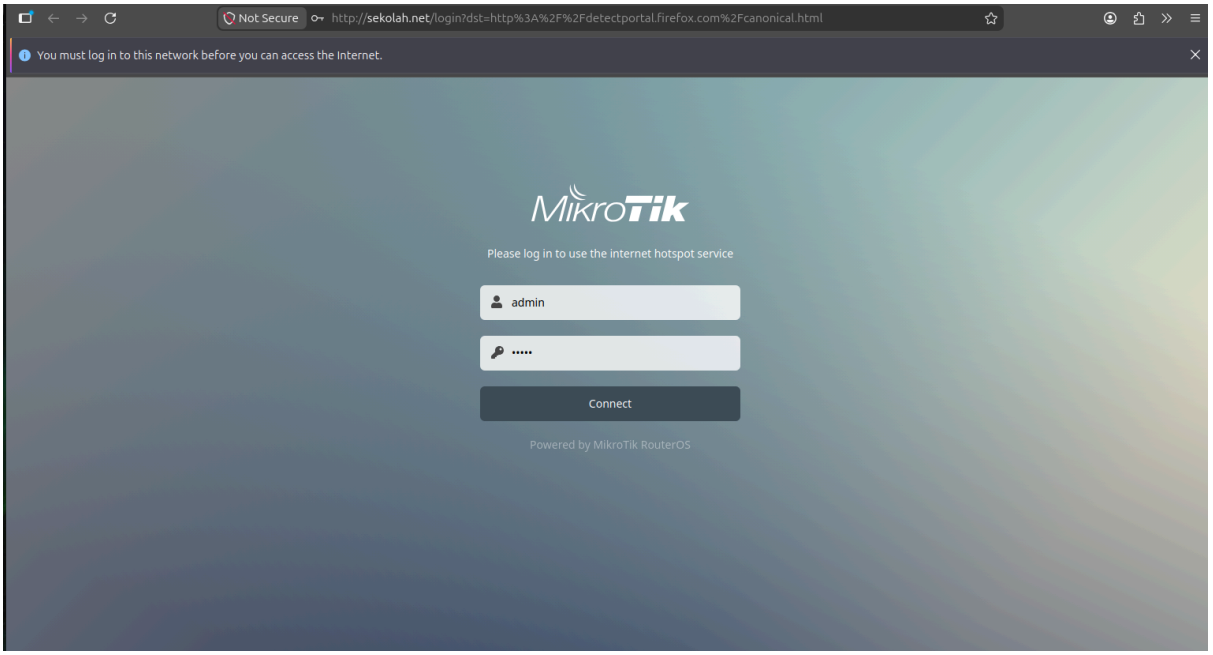


Menambah user dalam hotspot yaitu user: admin, password: (bebas), profile: default. buatkan juga untuk user: siswa dengan cara yang sama

IP→Hotspot→Users→New→Name: admin→password: (bebas)--> Profile: default

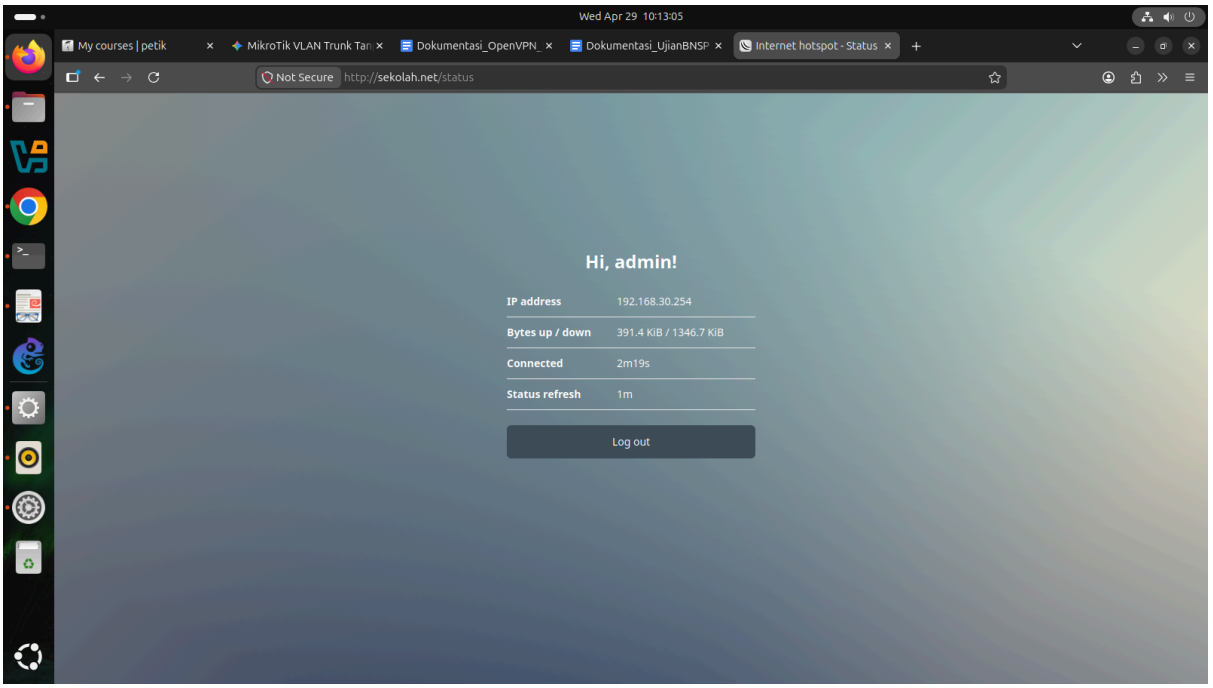


Tampilan Hotspot:



Contoh:
user: admin
password: admin

Hasilnya:

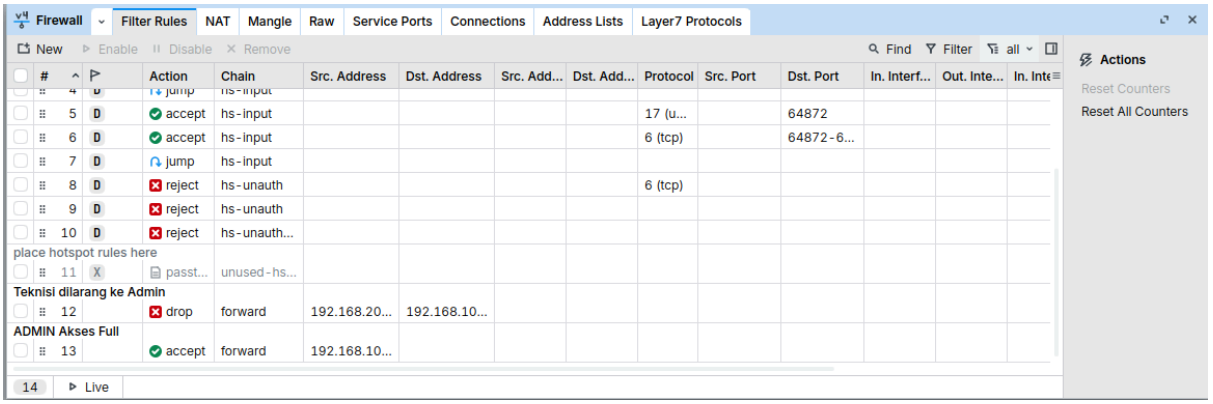


6. Firewall (Aturan Akses)

Instruksi: ADMIN bisa akses semua, TEKNISI dilarang akses ADMIN.

Admin: IP→Firewall→Filter Rules→Chain: forward→Src. Address: 192.168.10.0/24→Action: accept→Apply→OK

Teknisi: IP→Firewall→Filter Rules→Chain: forward→Src. Address: 192.168.20.0/24→Dst. Address: 192.168.10.0/24→Action: drop→Apply→OK

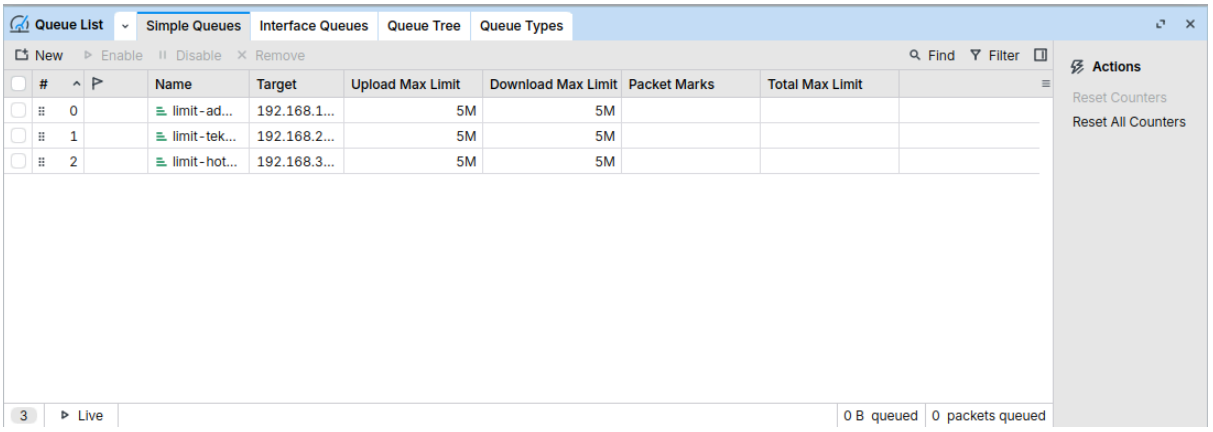


7. Queue

fitur manajemen bandwidth (Quality of Service - QoS) di RouterOS yang digunakan untuk mengatur, membatasi, atau memprioritasi lalu lintas data jaringan berdasarkan IP, subnet, protokol, atau port

Limitasi Bandwidth 5Mbps per jaringan
Queues→Simple Queues→New→Name: limit-admin→Target: 192.168.10.0/24→Max Limit: 5M/5M→Apply→OK

tambahkan untuk teknisi dan hotspot dengan batas kecepatan yang berbeda



8. Ping (cek koneksi) & Troubleshooting

Hasil dari vlan10-ADMIN, IP: 192.168.10.2/24

```
pc-6@pc-6:~$ ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host noprefixroute
       valid_lft forever preferred_lft forever
2: enp2s0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    link/ether 18:c0:4d:ca:88:23 brd ff:ff:ff:ff:ff:ff
    inet 192.168.10.2/24 brd 192.168.10.255 scope global dynamic noprefixroute enp2s0
       valid_lft 1222sec preferred_lft 1222sec
3: virbr0: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc noqueue state DOWN group default qlen 1000
    link/ether 52:54:00:82:d4:c3 brd ff:ff:ff:ff:ff:ff
    inet 192.168.122.1/24 brd 192.168.122.255 scope global virbr0
       valid_lft forever preferred_lft forever
4: lxcbr0: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc noqueue state DOWN group default qlen 1000
    link/ether 00:16:3e:00:00:00 brd ff:ff:ff:ff:ff:ff
    inet 10.0.3.1/24 brd 10.0.3.255 scope global lxcbr0
       valid_lft forever preferred_lft forever
5: docker0: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc noqueue state DOWN group default
    link/ether 7a:56:3b:e7:4c:11 brd ff:ff:ff:ff:ff:ff
    inet 172.17.0.1/16 brd 172.17.255.255 scope global docker0
       valid_lft forever preferred_lft forever
pc-6@pc-6:~$ ping google.com
PING forcesafesearch.google.com (216.239.38.120) 56(84) bytes of data.
64 bytes from any-in-2678.1e100.net (216.239.38.120): icmp_seq=1 ttl=112 time=23.7 ms
64 bytes from any-in-2678.1e100.net (216.239.38.120): icmp_seq=2 ttl=112 time=24.0 ms
64 bytes from any-in-2678.1e100.net (216.239.38.120): icmp_seq=3 ttl=112 time=23.7 ms
64 bytes from any-in-2678.1e100.net (216.239.38.120): icmp_seq=4 ttl=112 time=23.4 ms
64 bytes from any-in-2678.1e100.net (216.239.38.120): icmp_seq=5 ttl=112 time=23.7 ms
^C
--- forcesafesearch.google.com ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4004ms
rtt min/avg/max/mdev = 23.380/23.684/23.954/0.183 ms
```

TEKNISI tidak bisa melakukan Ping/Akses ke ADMIN

```
pc-6@pc-6:~$ ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host noprefixroute
       valid_lft forever preferred_lft forever
2: enp2s0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    link/ether 18:c0:4d:ca:88:23 brd ff:ff:ff:ff:ff:ff
    inet 192.168.20.2/24 brd 192.168.20.255 scope global dynamic noprefixroute enp2s0
       valid_lft 1790sec preferred_lft 1790sec
3: virbr0: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc noqueue state DOWN group default qlen 1000
    link/ether 52:54:00:82:d4:c3 brd ff:ff:ff:ff:ff:ff
    inet 192.168.122.1/24 brd 192.168.122.255 scope global virbr0
       valid_lft forever preferred_lft forever
4: lxcbr0: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc noqueue state DOWN group default qlen 1000
    link/ether 00:16:3e:00:00:00 brd ff:ff:ff:ff:ff:ff
    inet 10.0.3.1/24 brd 10.0.3.255 scope global lxcbr0
       valid_lft forever preferred_lft forever
5: docker0: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc noqueue state DOWN group default
    link/ether 7a:56:3b:e7:4c:11 brd ff:ff:ff:ff:ff:ff
    inet 172.17.0.1/16 brd 172.17.255.255 scope global docker0
       valid_lft forever preferred_lft forever
pc-6@pc-6:~$ ping 192.168.10.2
PING 192.168.10.2 (192.168.10.2) 56(84) bytes of data.
^C
--- 192.168.10.2 ping statistics ---
29 packets transmitted, 0 received, 100% packet loss, time 28652ms
```

Hasil dari vlan20-TEKNISI, IP: 192.168.20.2/24

```
pc-6@pc-6:~$ ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host noprefixroute
       valid_lft forever preferred_lft forever
2: enp2s0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    link/ether 18:c0:4d:ca:88:23 brd ff:ff:ff:ff:ff:ff
    inet 192.168.20.2/24 brd 192.168.20.255 scope global dynamic noprefixroute enp2s0
       valid_lft 1617sec preferred_lft 1617sec
3: virbr0: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc noqueue state DOWN group default qlen 1000
    link/ether 52:54:00:82:d4:c3 brd ff:ff:ff:ff:ff:ff
    inet 192.168.122.1/24 brd 192.168.122.255 scope global virbr0
       valid_lft forever preferred_lft forever
4: lxcbr0: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc noqueue state DOWN group default qlen 1000
    link/ether 00:16:3e:00:00:00 brd ff:ff:ff:ff:ff:ff
    inet 10.0.3.1/24 brd 10.0.3.255 scope global lxcbr0
       valid_lft forever preferred_lft forever
5: docker0: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc noqueue state DOWN group default
    link/ether 7a:56:3b:e7:4c:11 brd ff:ff:ff:ff:ff:ff
    inet 172.17.0.1/16 brd 172.17.255.255 scope global docker0
       valid_lft forever preferred_lft forever
pc-6@pc-6:~$ ping google.com
PING forcesafesearch.google.com (216.239.38.120) 56(84) bytes of data.
64 bytes from any-in-2678.1e100.net (216.239.38.120): icmp_seq=1 ttl=112 time=23.8 ms
64 bytes from any-in-2678.1e100.net (216.239.38.120): icmp_seq=2 ttl=112 time=21.3 ms
64 bytes from any-in-2678.1e100.net (216.239.38.120): icmp_seq=3 ttl=112 time=17.3 ms
64 bytes from any-in-2678.1e100.net (216.239.38.120): icmp_seq=4 ttl=112 time=21.2 ms
64 bytes from any-in-2678.1e100.net (216.239.38.120): icmp_seq=6 ttl=112 time=22.5 ms
64 bytes from any-in-2678.1e100.net (216.239.38.120): icmp_seq=7 ttl=112 time=20.5 ms
^C
--- forcesafesearch.google.com ping statistics ---
7 packets transmitted, 6 received, 14.2857% packet loss, time 6008ms
rtt min/avg/max/mdev = 17.265/21.095/23.813/2.024 ms
```