Hướng dẫn sử dụng Router MikroTik (Phần 2)

**

Nội dung tổng quan:

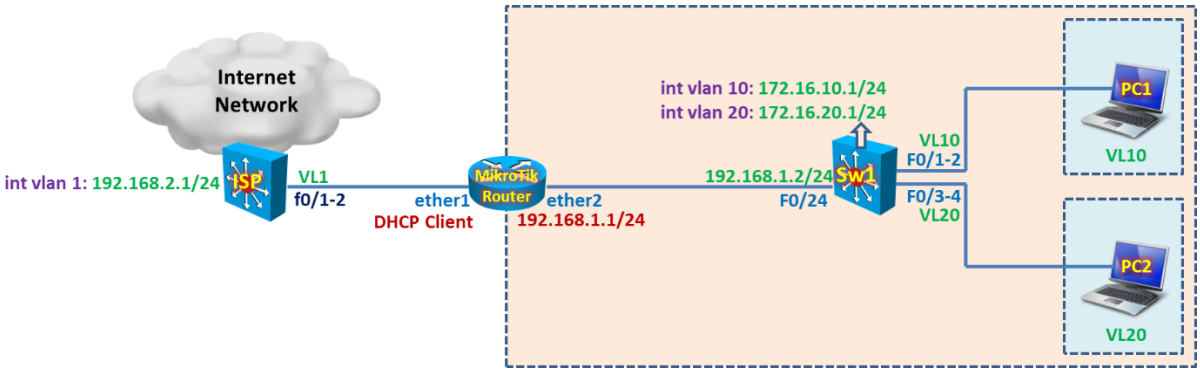
- Phần 13. Các công cụ quản trị trên Router MikroTik.
    - Phần 13.1. Công cụ Ping trên Router MikroTik.
    - Phần 13.2. Tính năng Cable Test trên Router MikroTik.
    - Phần 13.3. Thống kê lưu lượng trên các Interface của Router MikroTik.
    - Phần 13.4. Kiểm tra số lượng kết nối thời gian thực trên Router MikroTik.
    - Phần 13.5. Giám sát lưu lượng theo thời gian thực trên các Interface của Router MikroTik.
    - Phần 13.6. Kiểm tra tài nguyên Resource trên Router MikroTik.
    - Phần 13.7. Kiểm tra kết nối Session hiện tại và Maximum Session trên Router MikroTik.
    - Phần 13.8. Backup và Restore cấu hình Router MikroTik.
    - Phần 13.9. Giám sát thông tin các thiết bị đầu cuối thông qua tính năng IP Neighbor (CDP) trên thiết bị Router MikroTik.
    - Phần 13.10. Khởi tạo tài khoản User cho phép đăng nhập vào thiết bị Router MikroTik.
    - Phần 13.11. Thiết lập giao thức đồng bộ hóa thời gian NTP trên thiết bị Router MikroTik.
    - Phần 13.12. Xóa cấu hình và khởi động lại Router MikroTik với cấu hình trắng.
    - Phần 13.13. Tính năng IP Scan cho phép quét danh sách địa chỉ IP và MAC của các thiết bị trên hạ tầng mạng.
- Phần 14. Công nghệ dự phòng Gateway VRRP trên Router MikroTik.
- Phần 15. Cấu hình các dịch vụ mở rộng trên Router MikroTik.
    - Phần 15.1. Cấu hình dịch vụ DNS Proxy và DNS Server trên Router MikroTik.
    - Phần 15.2. Cấu hình tính năng Dynamic DNS trên Router MikroTik.
    - Phần 15.3. Chặn tất cả người dùng không được phép truy cập tới các Website có nội dung đồi trụy sử dụng Norton DNS Server.
    - Phần 15.4. Chặn User cụ thể không được phép truy cập tới các Website có nội dung đồi trụy sử dụng Norton DNS Server.
- Phần 16. Cấu hình IPv6 trên Router MikroTik.
    - Phần 16.1. Gán địa chỉ IPv6 trên cổng giao tiếp Interface của Router MikroTik.
- Phần 17. Nâng cấp RouterOS trên Router MikroTik.
    - Phần 17.1. Tìm hiểu tổng quan về các gói cài đặt trên Router MikroTik.
    - Phần 17.2. Kiểm tra thông tin RouterOS Version hiện tại trên Router MikroTik.
    - Phần 17.3. Kiểm tra và tải RouterOS phiên bản mới nhất cho Router MikroTik.
    - Phần 17.4. Tiến hành nâng cấp RouterOS cho Router MikroTik.
    - Phần 17.5. Tiến hành khởi động lại Router MikroTik.
    - Phần 17.6. Cài đặt các gói Extra packages cho Router MikroTik.

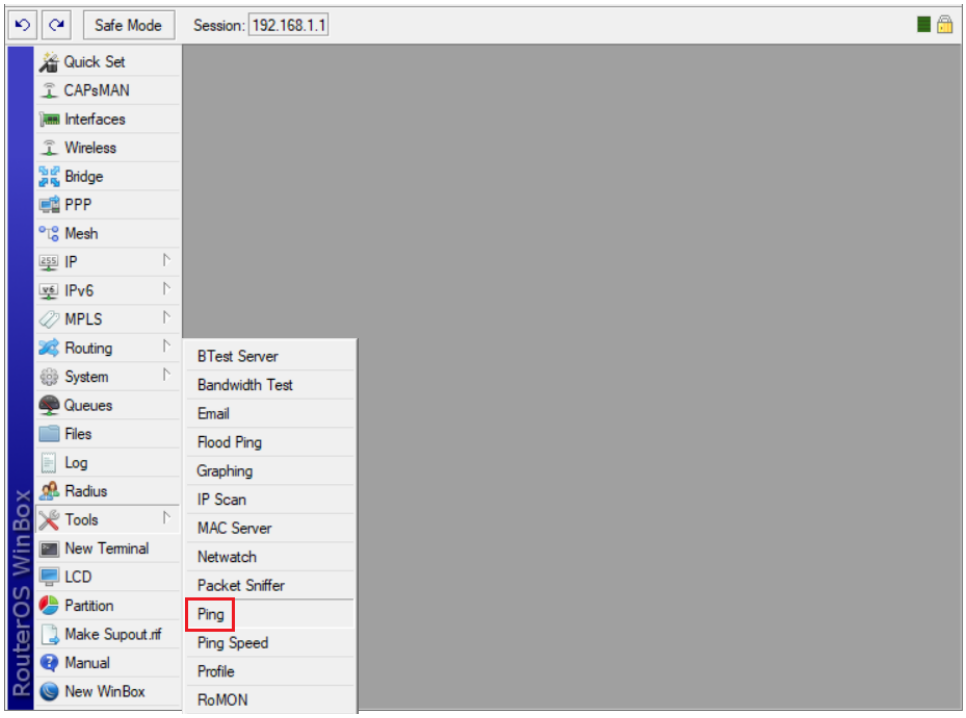
        - **Phần 17.6.1.** Tìm hiểu tổng quan về các gói Extra packages trên Router MikroTik.
        - **Phần 17.6.2.** Cài đặt gói user-manager trên Router MikroTik.
- **Phần 18.** Cấu hình tính năng WiFi trên Router MikroTik.
    - **Phần 18.1**. Cấu hình Router MikroTik phát SSID đầu tiên.
    - **Phần 18.2**. Hiệu chỉnh chuẩn bảo mật mạng không dây trên Router MikroTik.
    - **Phần 18.3**. Hiệu chỉnh công xuất phát dBm trên Router MikroTik.
    - **Phần 18.4.** Cấu hình tính năng Wifi Hotspot trên Router MikroTik.
- **Phần 19**. Cấu hình RADIUS Server trên Router MikroTik.
    - **Phần 19.1**. Cài đặt gói UserManager và các công cụ quản trị RADIUS Server trên Router MikroTik.
    - **Phần 19.2**. Cấu hình RADIUS Server với vai trò xác thực tập trung các thiết bị mạng Cisco Device trên Router MikroTik.
    - **Phần 19.3.** Khởi tạo cùng lúc nhiều tài khoản End User và mã Vouchers cho dịch vụ Hotspot trên RADIUS Server cài đặt trên Router MikroTik.
- **Phần 20**. Giám sát hoạt động của Router MikroTik.
    - **Phần 20.1**. Kích hoạt SNMP trên Router MikroTik.
    - **Phần 20.2.** Giám sát lưu lượng trên các cổng giao tiếp của Router MikroTik.
    - **Phần 20.3.** Reset mật khẩu Password trên Router MikroTik.
    - **Phần 20.4.** Thiết lập thời gian khởi động Router MikroTik.
    - **Phần 20.5.** Giám sát kết nối Internet và các thiết bị trên hạ tầng mạng bằng tính năng Netwatch trên Router MikroTik và tự động gửi Email khi có sự cố phát sinh.
    - **Phần 20.6.** Tính năng gửi Email trên Router MikroTik khi có sự cố phát sinh.
    - **Phần 20.7.** Tính năng giám sát và phân tích lưu lượng Torch trên Router MikroTik.
    - **Phần 20.8.** Thiết lập tính năng Traffic Monitor cảnh báo khi tốc độ Download vượt quá 5M.
    - **Phần 20.9.** Giám sát và thống kê lưu lượng Download trên Router MikroTik bằng công cụ Graphing.

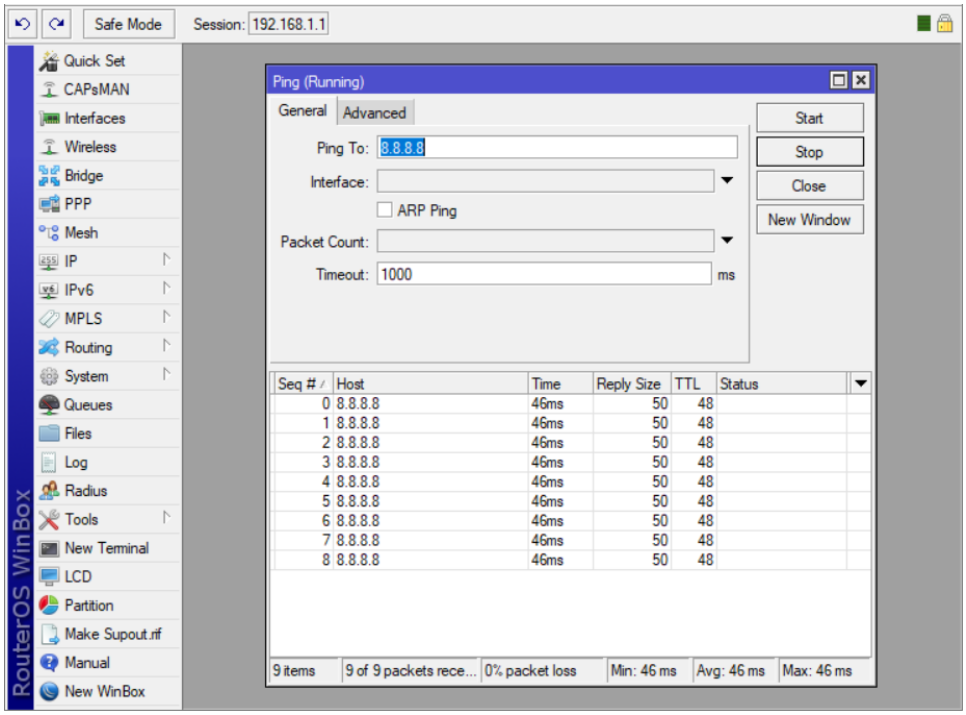
Nội dung chi tiết:

Phần 13. Các công cụ quản trị trên Router MikroTik.

Phần 13.1. Công cụ Ping trên Router MikroTik.


Internet
Network
int vlan 1: 192.168.2.1/24
ISP
VL1
f0/1-2
ether1
DHCP Client
MikroTik
Router
ether2
192.168.1.1/24
int vlan 10: 172.16.10.1/24
int vlan 20: 172.16.20.1/24
192.168.1.2/24
F0/24
Sw1
VL10
F0/1-2
F0/3-4
VL20
PC1
VL10
PC2
VL20


Safe Mode
Session: 192.168.1.1
Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Mesh
IP
IPv6
MPLS
Routing
System
Queues
Files
Log
Radius
Tools
New Terminal
LCD
Partition
Make Supout.rif
Manual
New WinBox
RouterOS WinBox
BTest Server
Bandwidth Test
Email
Flood Ping
Graphing
IP Scan
MAC Server
Netwatch
Packet Sniffer
Ping
Ping Speed
Profile
RoMON



Ping bằng giao diện CLI.

- Nhấn tổ hợp phím Ctrl+C để ngắt tiến trình Ping.

```
[admin@MikroTik] > ping 8.8.8.8
  SEQ HOST                                     SIZE TTL TIME  STATUS
    0 8.8.8.8                                    56  45 37ms
    1 8.8.8.8                                    56  45 37ms
    2 8.8.8.8                                    56  45 37ms
    sent=3 received=3 packet-loss=0% min-rtt=37ms avg-rtt=37ms max-rtt=37ms

[admin@MikroTik] >
```

Phần 13.2. Tính năng Cable Test trên Router MikroTik.

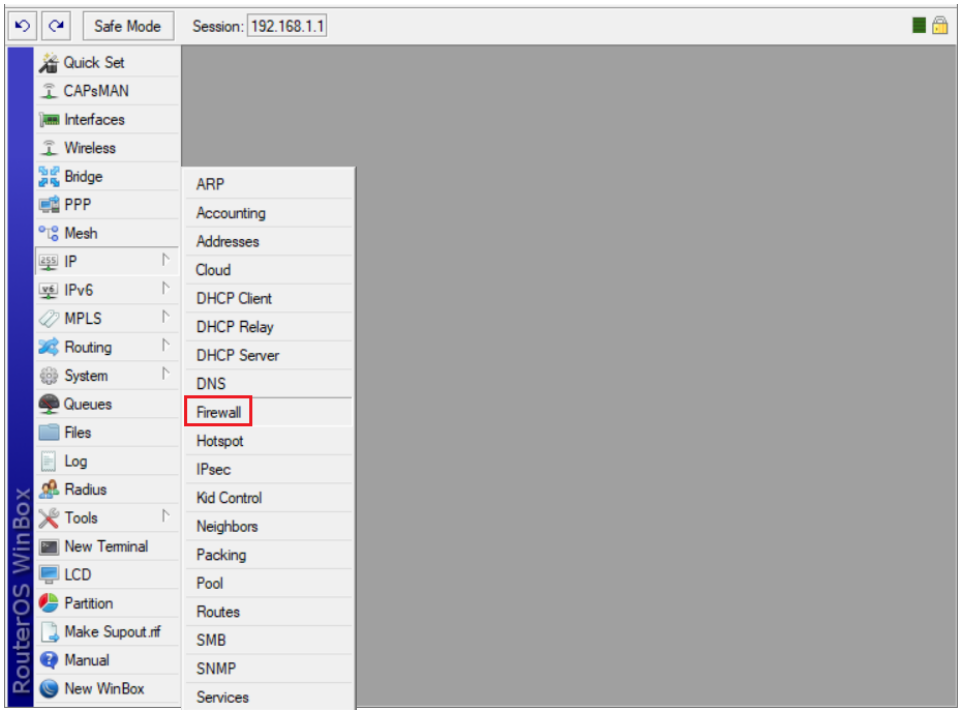
```
 [admin@MikroTik] > interface ethernet cable-test ether2
    name: ether2
  status: link-ok

[admin@MikroTik] >
```

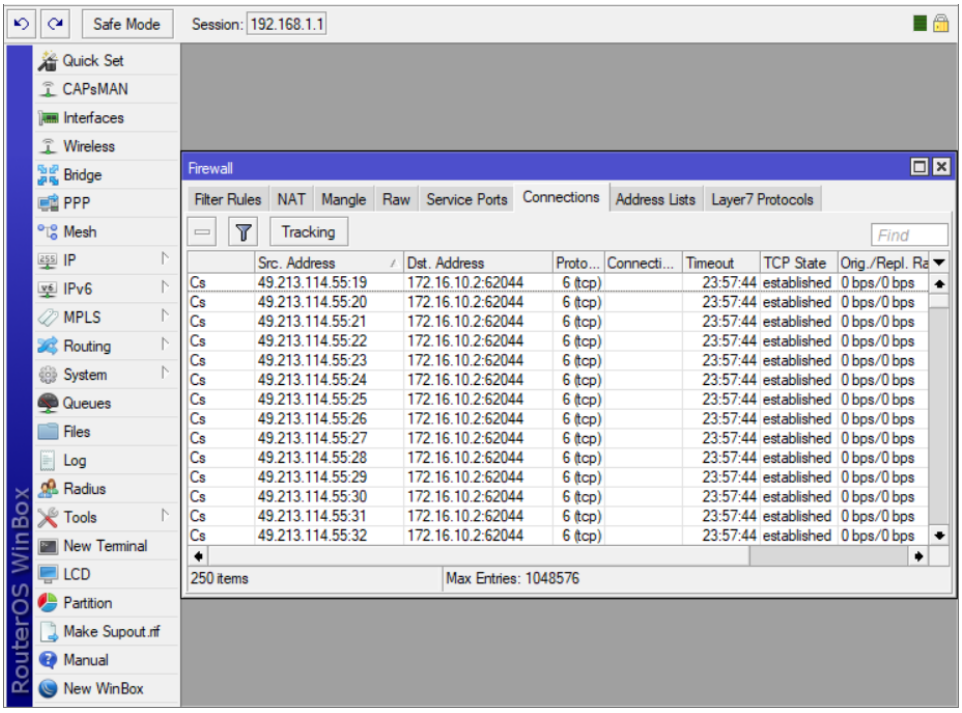
Phần 13.3. Thống kê lưu lượng trên các Interface của Router MikroTik.

```
[admin@MikroTik] > /interface ethernet print stats
                      name:      ether1      ether2 ether3 ether4 ether5 ether6 ether7 ether8 ether9 ether10 ether11     ether12
           driver-rx-byte:  325 489 033 112 444 664       0       0       0       0       0       0       0        0  7 637 721
         driver-rx-packet:      453 769     200 089       0       0       0       0       0       0       0        0     31 633
           driver-tx-byte:  113 834 442 281 015 281       0       0       0       0       0       0       0        0 29 154 666
         driver-tx-packet:      198 958     285 232       0       0       0       0       0       0       0        0     36 038
                 rx-bytes:  327 304 109 113 245 020       0       0       0       0       0       0       0        0  7 764 253
               rx-packet:      453 769     200 089       0       0       0       0       0       0       0        0     31 633
            rx-too-short:            0           0       0       0       0       0       0       0       0        0          0
                   rx-64:       79 452      46 586       0       0       0       0       0       0       0        0      2 590
              rx-65-127:       67 173      56 568       0       0       0       0       0       0       0        0     20 512
             rx-128-255:       50 878       8 889       0       0       0       0       0       0       0        0      2 195
             rx-256-511:       42 191       7 999       0       0       0       0       0       0       0        0      1 832
            rx-512-1023:       15 661      14 853       0       0       0       0       0       0       0        0      1 917
           rx-1024-1518:      198 414      65 194       0       0       0       0       0       0       0        0      2 587
            rx-1519-max:            0           0       0       0       0       0       0       0       0        0          0
            rx-too-long:            0           0       0       0       0       0       0       0       0        0          0
           rx-broadcast:       99 367       1 430       0       0       0       0       0       0       0        0        162
              rx-pause:            0           0       0       0       0       0       0       0       0        0          0
```

```
                 rx-multicast:       55 598       6 274      0      0      0      0      0      0      0      0      0      8 347
                  rx-fcs-error:            0           0      0      0      0      0      0      0      0      0      0          0
                rx-align-error:            0           0      0      0      0      0      0      0      0      0      0          0
                  rx-overflow:            0           0      0      0      0      0      0      0      0      0      0          0
               rx-length-error:            0           0      0      0      0      0      0      0      0      0      0          0
                 rx-code-error:            0           1      0      0      0      0      0      0      0      0      0          0
                    rx-jabber:            0           0      0      0      0      0      0      0      0      0      0          0
    rx-ip-header-checksum-error:            0           0      0      0      0      0      0      0      0      0      0          0
          rx-tcp-checksum-error:            0           0      0      0      0      0      0      0      0      0      0          0
          rx-udp-checksum-error:            0           0      0      0      0      0      0      0      0      0      0          0
                     tx-bytes:  114 904 107 282 327 929      0      0      0      0      0      0      0      0      0 29 311 178
                    tx-packet:      198 958     285 232      0      0      0      0      0      0      0      0      0     36 038
                        tx-64:       44 997      29 056      0      0      0      0      0      0      0      0      0      5 444
                    tx-65-127:       55 456      36 248      0      0      0      0      0      0      0      0      0      6 857
                   tx-128-255:       11 201       9 749      0      0      0      0      0      0      0      0      0      2 122
                   tx-256-511:        9 047      10 074      0      0      0      0      0      0      0      0      0      2 022
                  tx-512-1023:       10 457      16 496      0      0      0      0      0      0      0      0      0      1 463
                 tx-1024-1518:       67 800     183 609      0      0      0      0      0      0      0      0      0     18 130
                  tx-1519-max:            0           0      0      0      0      0      0      0      0      0      0          0
                 tx-broadcast:          505         734      0      0      0      0      0      0      0      0      0        204
                     tx-pause:            0           0      0      0      0      0      0      0      0      0      0          0
                 tx-multicast:        1 006         900      0      0      0      0      0      0      0      0      0        421
                  tx-underrun:            0           0      0      0      0      0      0      0      0      0      0          0
        tx-excessive-collision:            0           0      0      0      0      0      0      0      0      0      0          0
         tx-multiple-collision:            0           0      0      0      0      0      0      0      0      0      0          0
           tx-single-collision:            0           0      0      0      0      0      0      0      0      0      0          0
                  tx-deferred:            0           0      0      0      0      0      0      0      0      0      0          0
             tx-late-collision:            0           0      0      0      0      0      0      0      0      0      0          0
                  tx-fcs-error:            0           0      0      0      0      0      0      0      0      0      0          0
        tx-carrier-sense-error:            0           0      0      0      0      0      0      0      0      0      0          0
[admin@MikroTik] >
```

Phần 13.4. Kiểm tra số lượng kết nối thời gian thực trên Router MikroTik.

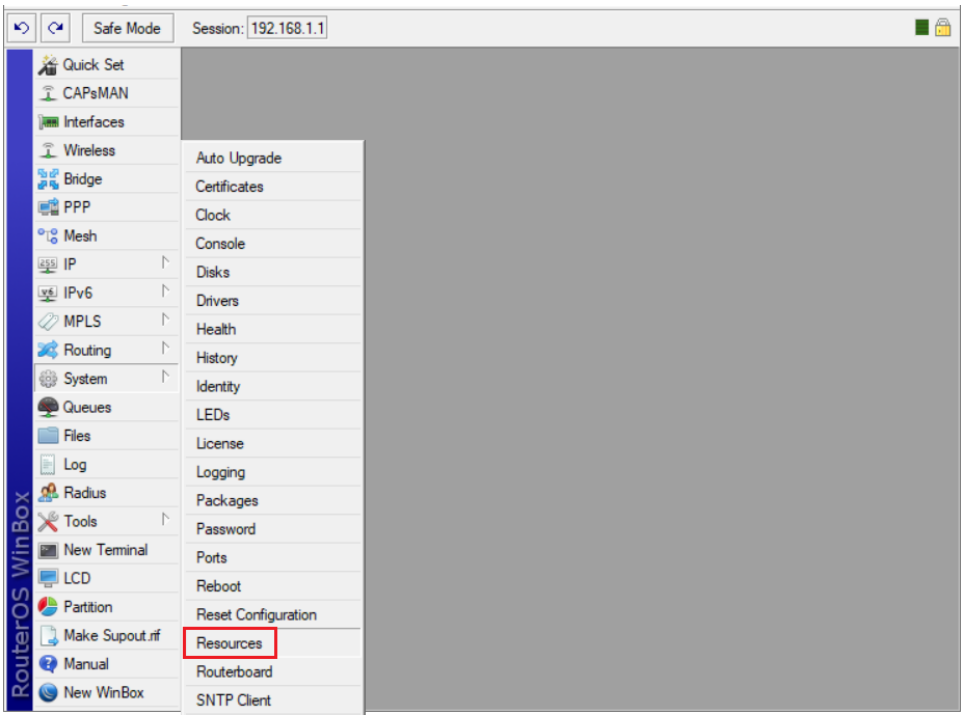


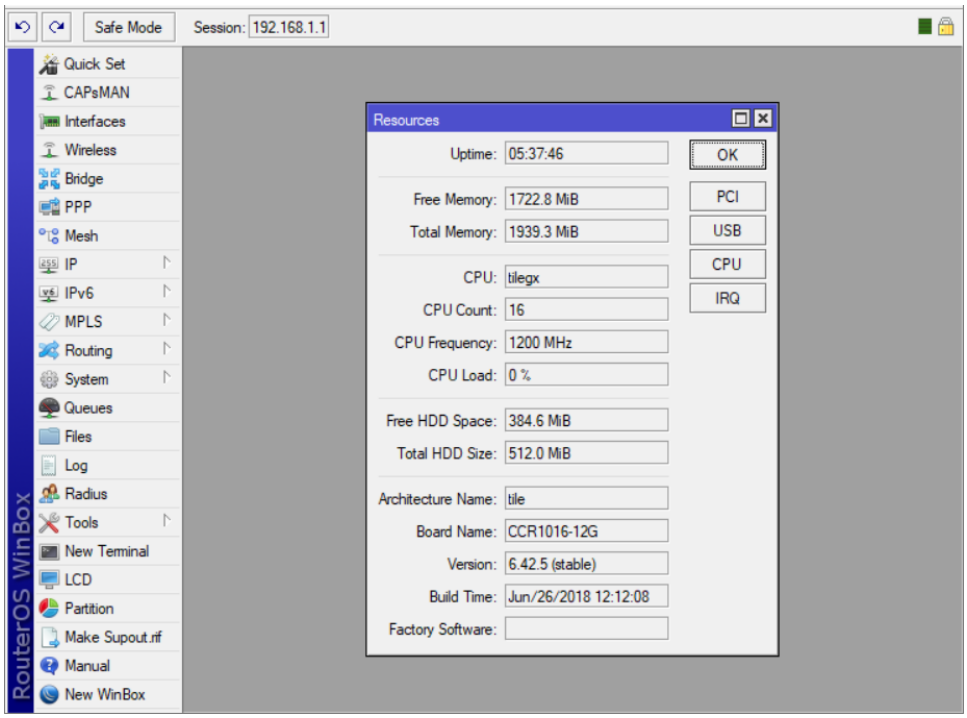


Phần 13.5. Giám sát lưu lượng theo thời gian thực trên các Interface của Router MikroTik.

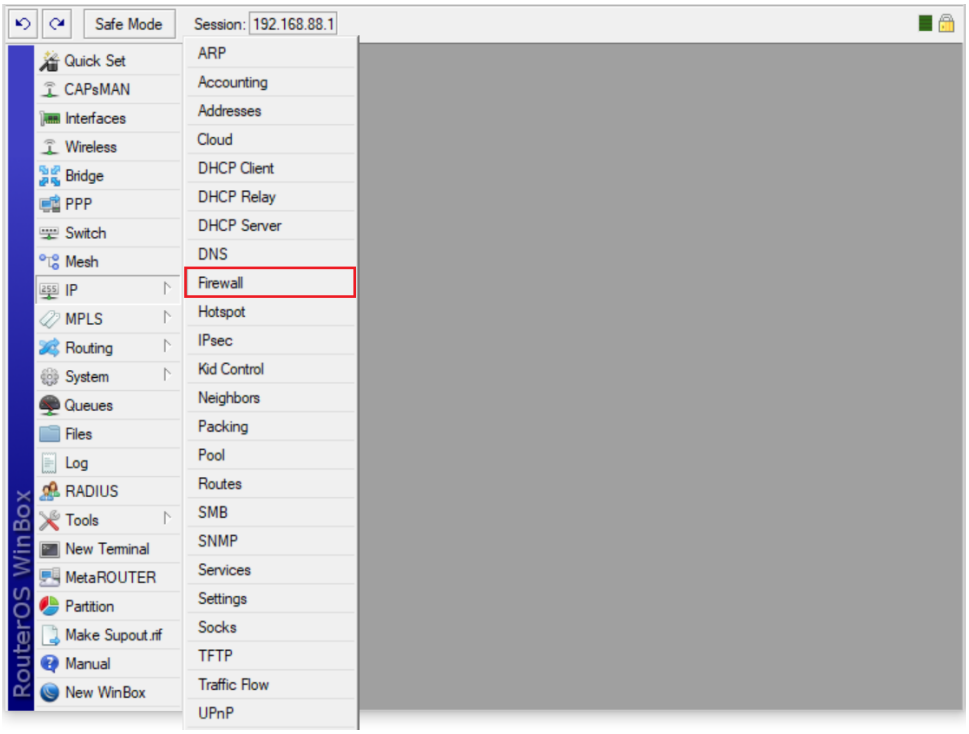
```
[admin@MikroTik] > interface monitor-traffic
interface: ether1
                          name:     ether1
        rx-packets-per-second:          9
           rx-bits-per-second:   23.5kbps
     fp-rx-packets-per-second:          9
        fp-rx-bits-per-second:   23.5kbps
          rx-drops-per-second:          0
         rx-errors-per-second:          0
        tx-packets-per-second:          5
           tx-bits-per-second:   29.8kbps
     fp-tx-packets-per-second:          5
        fp-tx-bits-per-second:   29.8kbps
          tx-drops-per-second:          0
    tx-queue-drops-per-second:          0
         tx-errors-per-second:          0

[admin@MikroTik] >
```

Phần 13.6. Kiểm tra tài nguyên Resource trên Router MikroTik.



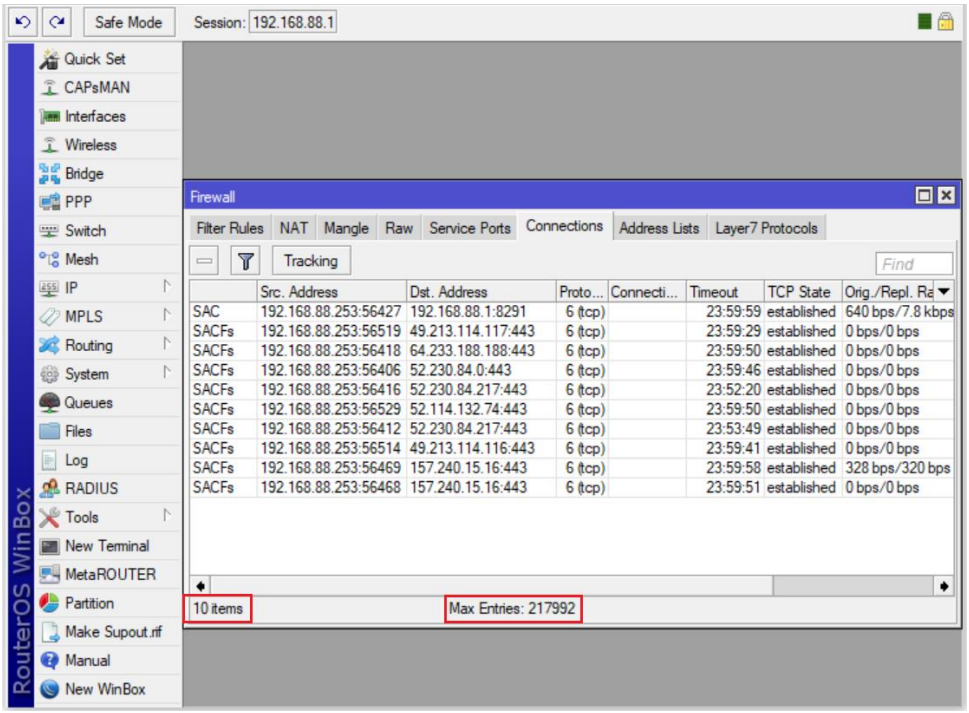


Phần 13.7. Kiểm tra kết nối Session hiện tại và Maximum Session trên Router MikroTik.

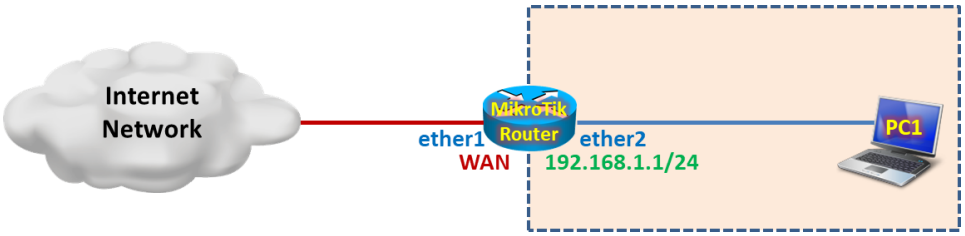


Thông tin phiên kết nối Session trên Router MikroTik.

- **10 items**: số lượng phiên Session hiện tại trên thiết bị.
- **Max Entries**: 217922 > số lượng phiên Session tối đa mà thiết bị hỗ trợ.

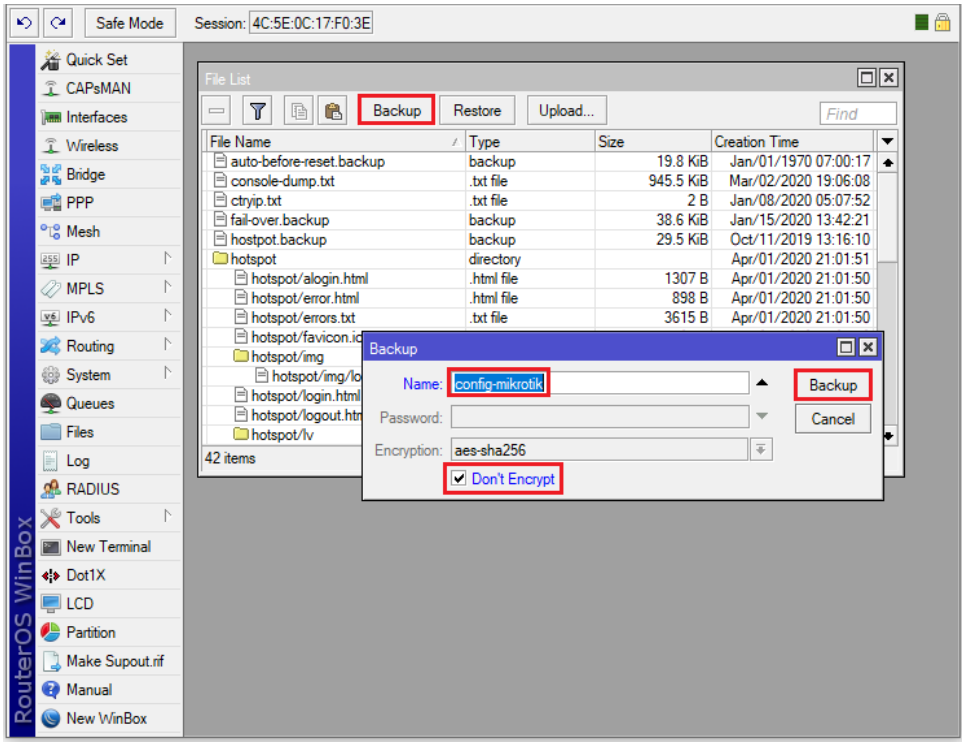


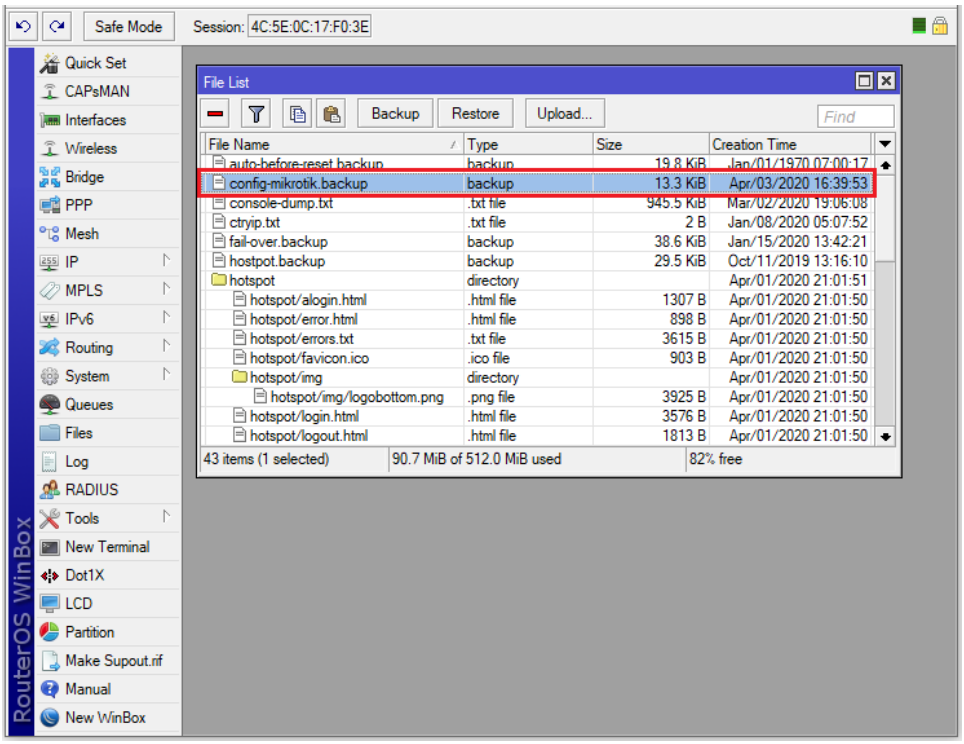
Phần 13.8. Backup và Restore cấu hình Router MikroTik.



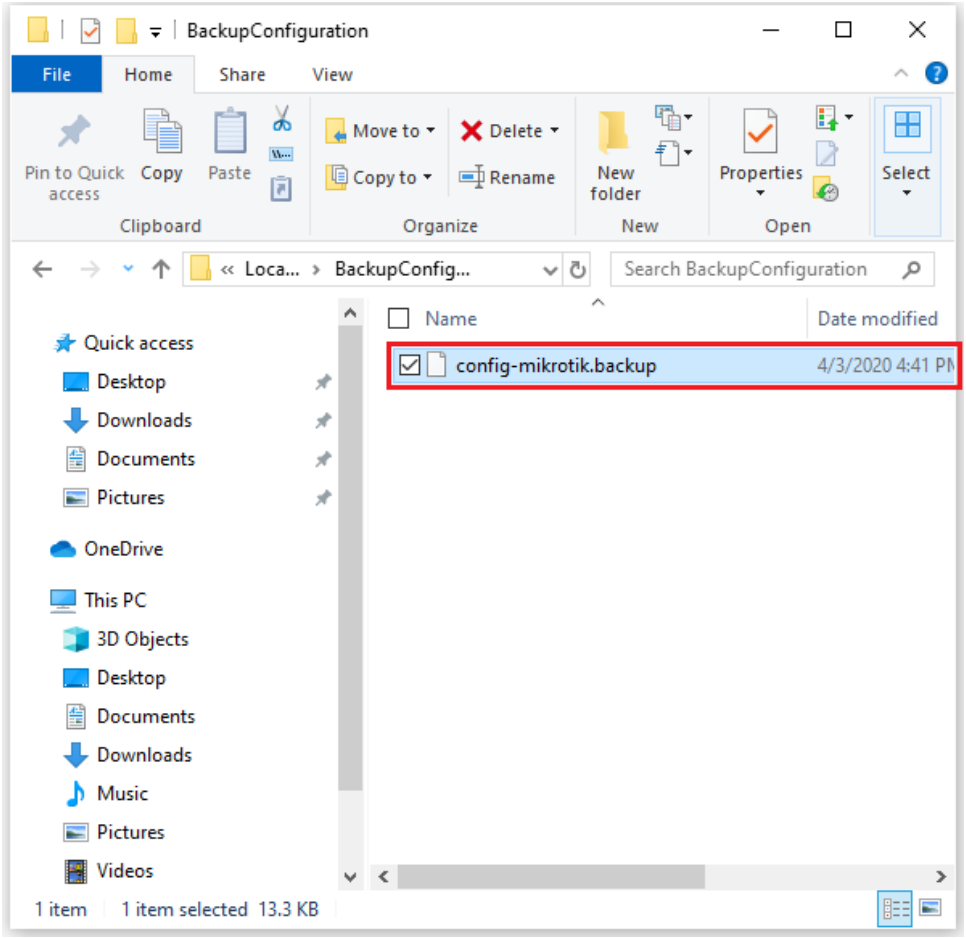
Có 2 loại file backup:

- .backup
  - Hỗ trợ password
  - Không thể hiệu chỉnh
  - Chỉ hỗ trợ restore trên cùng model
- .rsc
  - Không cần mật khẩu
  - Có thể hiệu chỉnh file
  - Hỗ trợ restore trên các dòng model khác nhau
  - Chỉ có thể export hoặc import bằng CLI
  - Nếu trước đó thiết bị có file cấu hình thì phương thức import cấu hình này sẽ không khả thi, thiết bị sẽ báo lỗi.

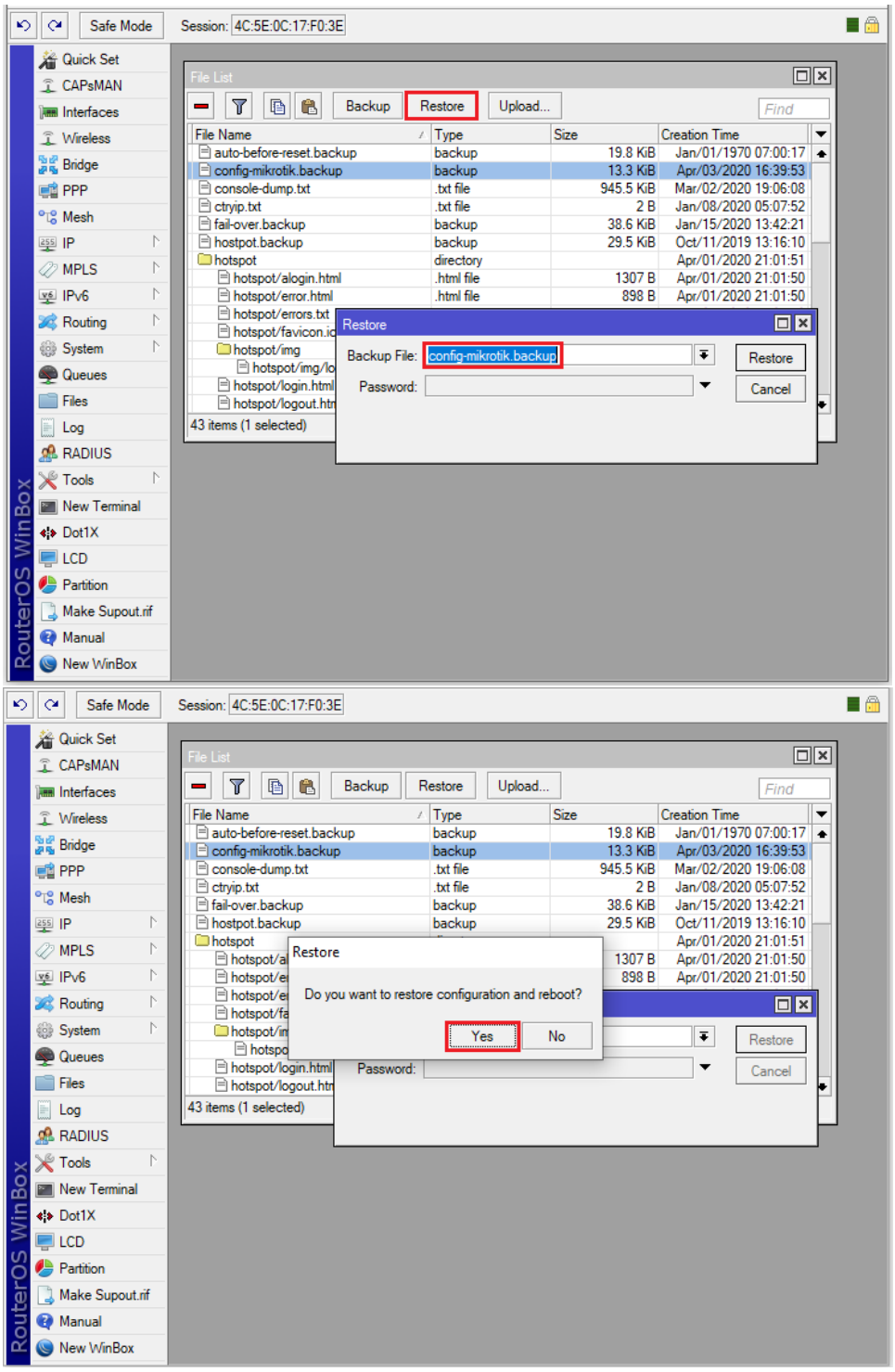




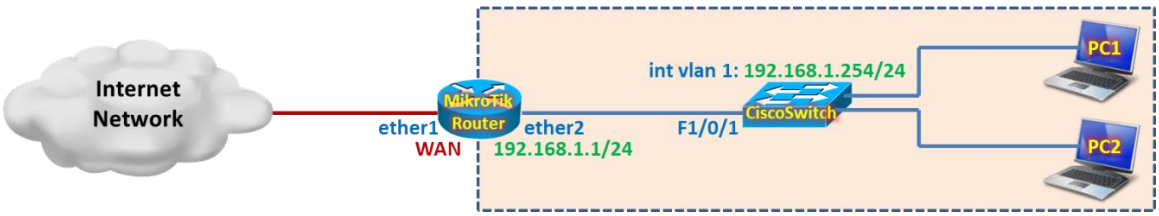
Kéo file cấu hình về máy tính của người quản trị.



Backup lại cấu hình Router MikroTik.



Phần 13.9. Giám sát thông tin các thiết bị đầu cuối thông qua tính năng IP Neighbor (CDP) trên thiết bị Router MikroTik.



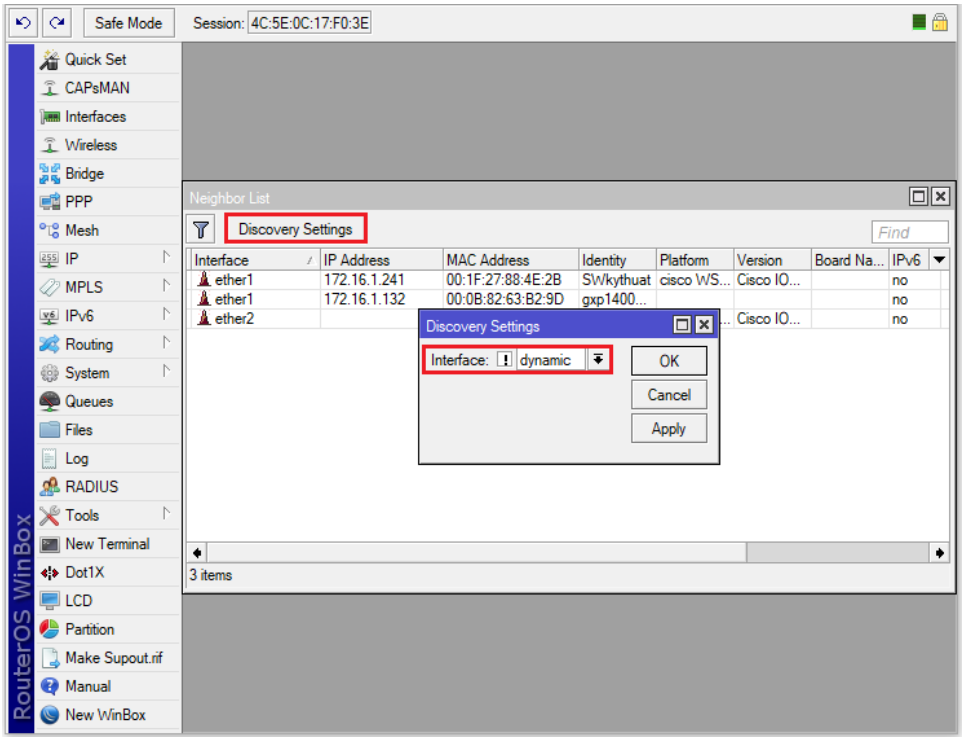
Đảm bảo giao thức CDP đang được kích hoạt trên Router MikroTik.

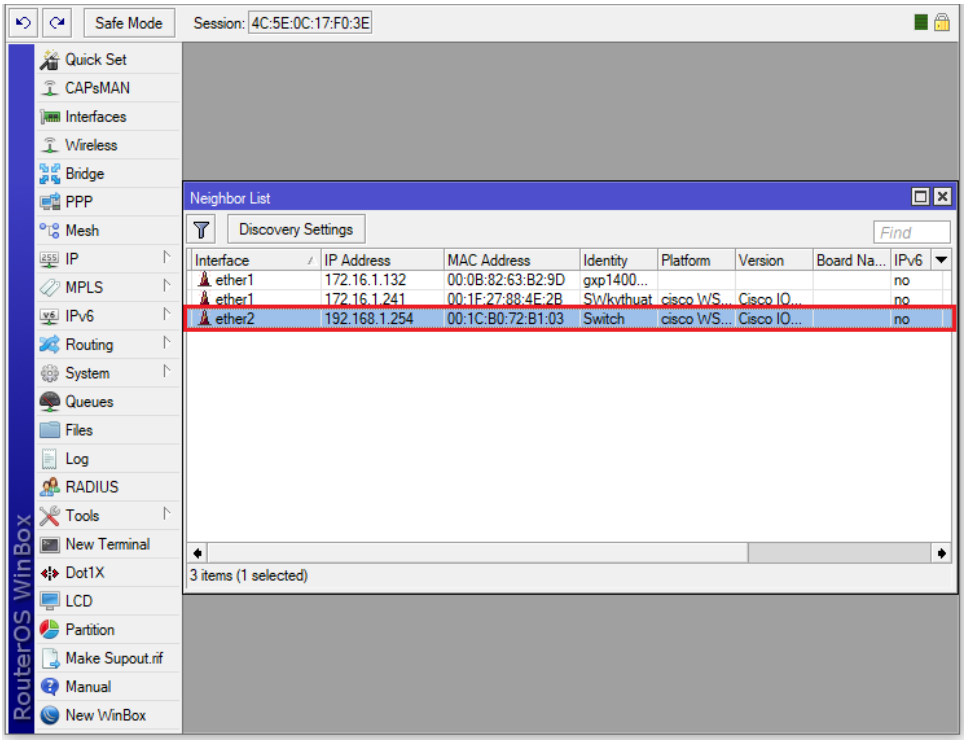
```
[admin@MikroTik] >
/ip neighbor discovery-settings set discover-interface-list=!dynamic
```

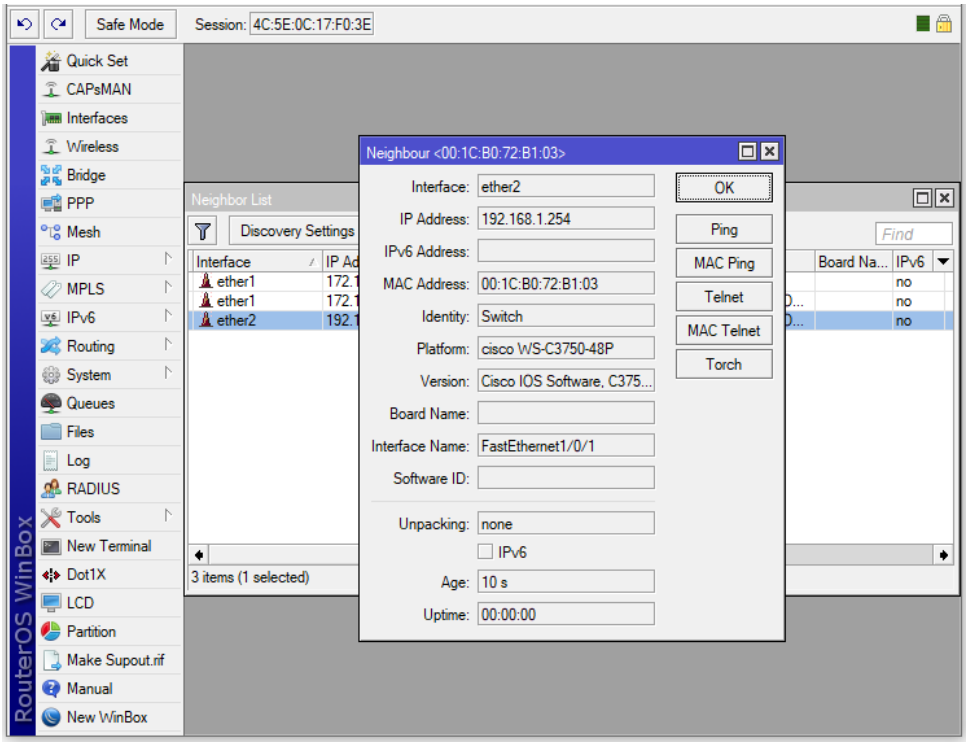
```
[admin@MikroTik] > /ip neighbor discovery-settings print
  discover-interface-list: !dynamic
[admin@MikroTik] >
```

```
[admin@MikroTik] > /ip neighbor print
 # INTERFACE ADDRESS                                MAC-ADDRESS       IDENTITY
 0 ether1    172.16.1.132                           00:0B:82:63:B2:9D gxp1400...
 1 ether1    172.16.1.241                           00:1F:27:88:4E:2B SWkythuat
 2 ether2    192.168.1.254                          00:1C:B0:72:B1:03 CiscoSw...
[admin@MikroTik] >
```

```
[admin@MikroTik] > /ip neighbor print detail
 0 interface=ether1 address=172.16.1.132 address4=172.16.1.132
   mac-address=00:0B:82:63:B2:9D identity="gxp1400_000b8263b29d" platform=""
   version="" unpack=none age=23s interface-name="eth0"
   system-description="GXP1400 1.0.5.32" system-caps=bridge,telephone
   system-caps-enabled=bridge,telephone

 1 interface=ether1 address=172.16.1.241 address4=172.16.1.241
   mac-address=00:1F:27:88:4E:2B identity="SWkythuat"
   platform="cisco WS-C2960-48TT-L"
   version="Cisco IOS Software, C2960 Software (C2960-LANBASEK9-M), Version
        15.0(2)SE4, RELEASE SOFTWARE (fc1)\nTechnical Support:
        http://www.cisco.com/techsupport\nCopyright (c) 1986-2013 by Cisco
        Systems, Inc.\nCompiled Wed 26-Jun-13 02:49 by prod_rel_team"
   unpack=none age=6s interface-name="FastEthernet0/43" system-caps=""
   system-caps-enabled=""

 2 interface=ether2 address=192.168.1.254 address4=192.168.1.254
   mac-address=00:1C:B0:72:B1:03 identity="CiscoSwitch"
   platform="cisco WS-C3750-48P"
   version="Cisco IOS Software, C3750 Software (C3750-ADVIPSERVICESK9-M), Version
        12.2(25)SEE4, RELEASE SOFTWARE (fc1)\nCopyright (c) 1986-2007 by Cisco
        Systems, Inc.\nCompiled Mon 16-Jul-07 03:24 by myl"
   unpack=none age=10s interface-name="FastEthernet1/0/1" system-caps=""
   system-caps-enabled=""
[admin@MikroTik] >
```


Safe Mode
Session: 4C:5E:0C:17:F0:3E
Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Mesh
IP
MPLS
IPv6
Routing
System
Queues
Files
Log
RADIUS
Tools
New Terminal
Dot1X
LCD
Partition
Make Supout.rif
Manual
New WinBox
RouterOS WinBox
Neighbor List
Discovery Settings
Find
Interface
IP Address
MAC Address
Identity
Platform
Version
Board Na...
IPv6
ether1 172.16.1.241 00:1F:27:88:4E:2B SWkythuat cisco WS... Cisco IO... no
ether1 172.16.1.132 00:0B:82:63:B2:9D gxp1400... no
ether2 Cisco IO... no
Discovery Settings
Interface: dynamic
OK
Cancel
Apply
3 items


Safe Mode
Session: 4C:5E:0C:17:F0:3E
Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Mesh
IP
MPLS
IPv6
Routing
System
Queues
Files
Log
RADIUS
Tools
New Terminal
Dot1X
LCD
Partition
Make Supout.rif
Manual
New WinBox
RouterOS WinBox
Neighbor List
Discovery Settings
Find
Interface
IP Address
MAC Address
Identity
Platform
Version
Board Na...
IPv6
ether1 172.16.1.132 00:0B:82:63:B2:9D gxp1400... no
ether1 172.16.1.241 00:1F:27:88:4E:2B SWkythuat cisco WS... Cisco IO... no
ether2 192.168.1.254 00:1C:B0:72:B1:03 Switch cisco WS... Cisco IO... no
3 items (1 selected)



Kiểm tra thông tin CDP trên Cisco Switch.

```
Switch# show cdp neighbors
Capability Codes: R - Router, T - Trans Bridge, B - Source Route Bridge
                  S - Switch, H - Host, I - IGMP, r - Repeater, P - Phone

Device ID            Local Intrfce         Holdtme    Capability     Platform    Port ID
MikroTik             Fas 1/0/1             64                R        MikroTik   ether2
Switch#
```

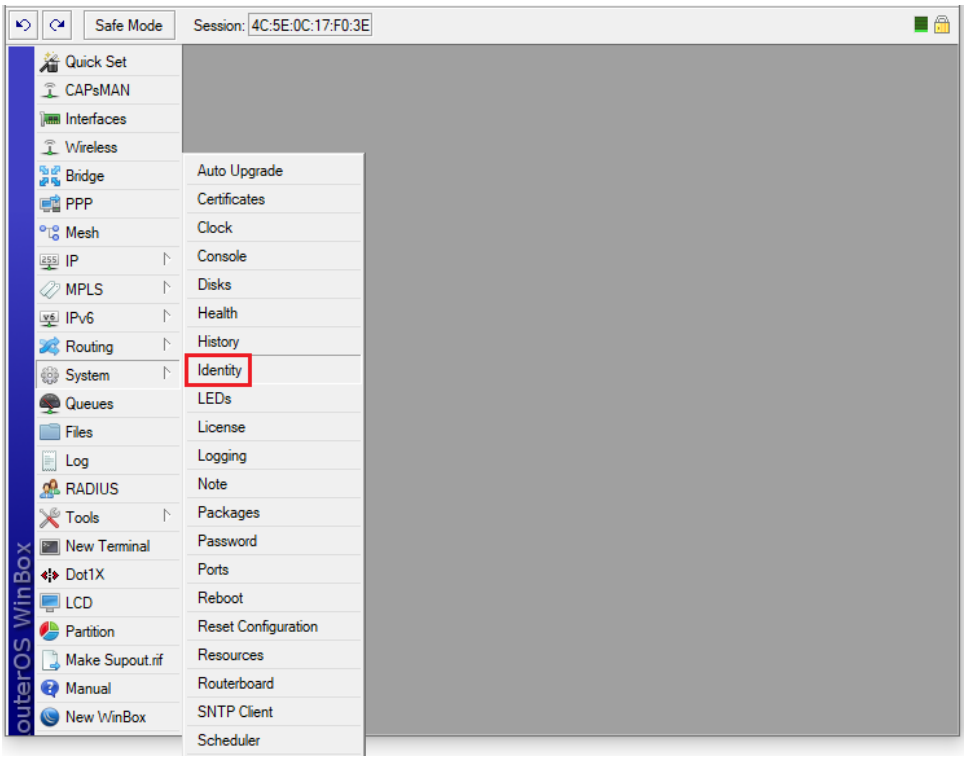
```
Switch# show cdp entry MikroTik
-------------------------
Device ID: MikroTik
Entry address(es):
  IP address: 192.168.1.1
Platform: MikroTik,  Capabilities: Router
Interface: FastEthernet1/0/1,  Port ID (outgoing port): ether2
Holdtime : 82 sec

Version :
6.46.4 (stable)

advertisement version: 1
Management address(es):

Switch#
```

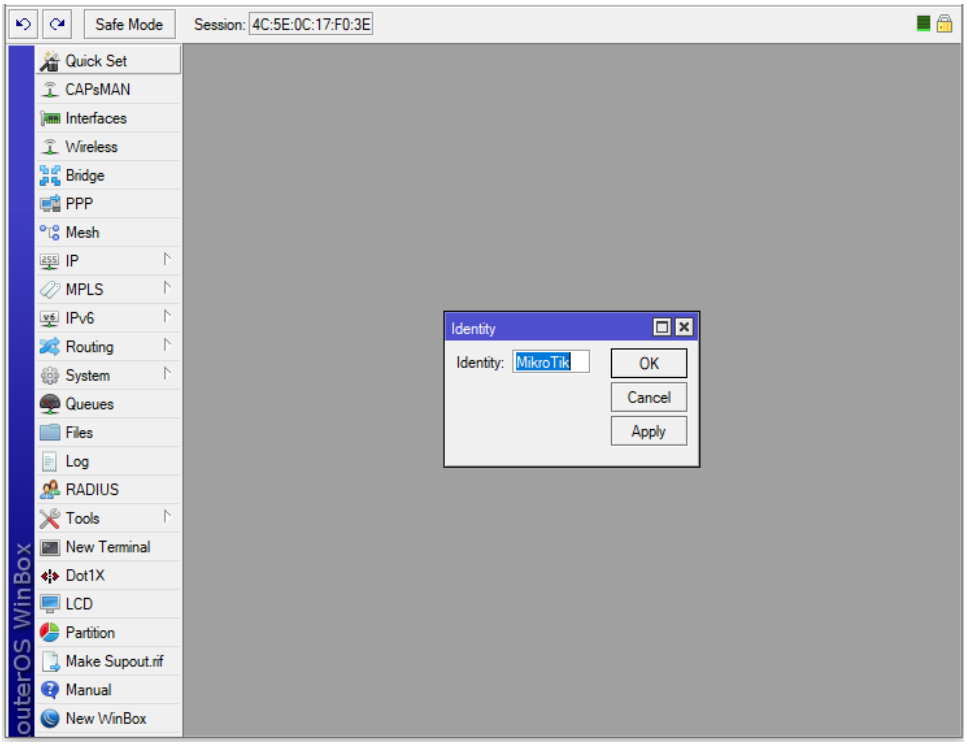
Xác định hostname trên Router MikroTik.

```
[admin@MikroTik] > /system identity print
  name: MikroTik
```

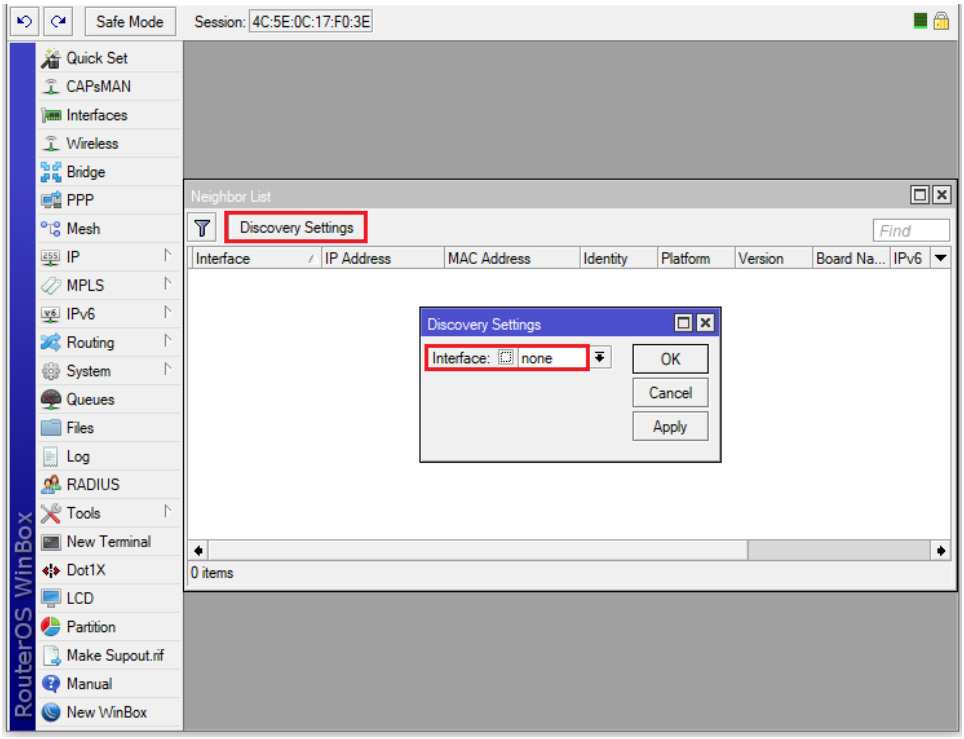
```
[admin@MikroTik] >
```

```
[admin@MikroTik] >
/system identity set name=MikroTik
```

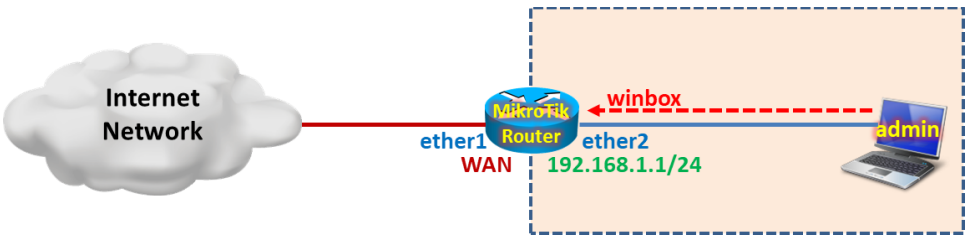




Tắt giao thức CDP trên Router MikroTik.



Phần 13.10. Khởi tạo tài khoản User cho phép đăng nhập vào thiết bị Router MikroTik.



Tổng quan các bước thực hiện:

- **Bước 1.** Cấu hình cơ bản trên thiết bị Router MikroTik.
- **Bước 2.** Thiết lập mật khẩu cho tài khoản mặc định admin.
- **Bước 3.** Thiết lập tài khoản subadmin chỉ cho phép Monitor và không được quyền cấu hình thiết bị Router MikroTik.
- **Bước 4.** Khảo sát quá trình Login của tài khoản subadmin.

Các bước thực hiện chi tiết:

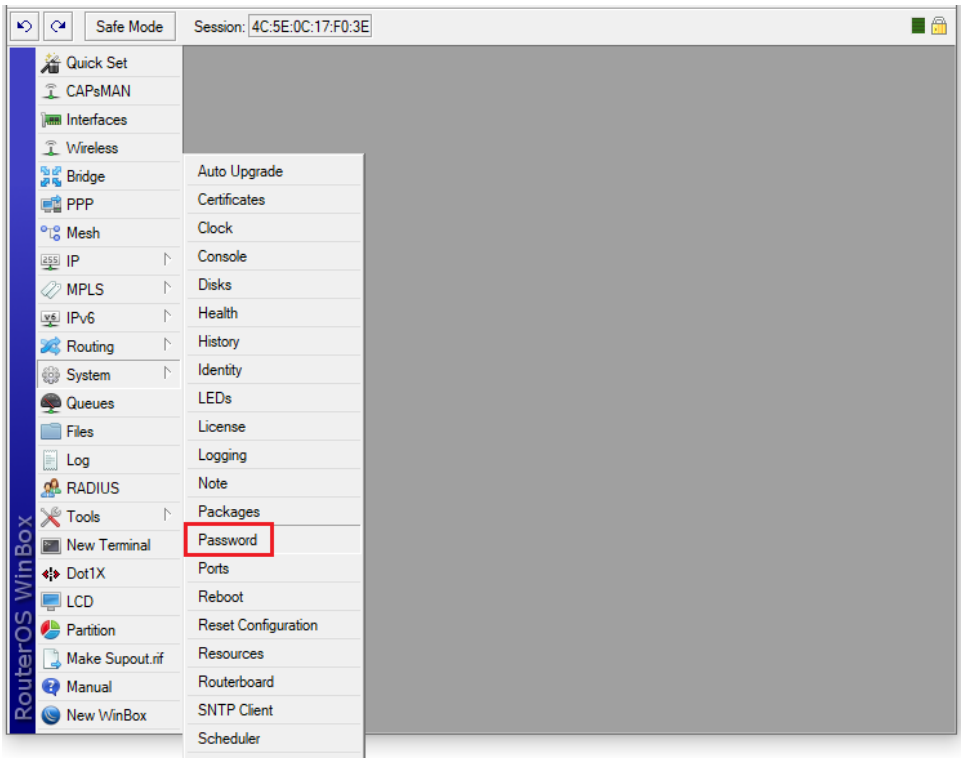
Bước 1. Cấu hình cơ bản trên thiết bị Router MikroTik.

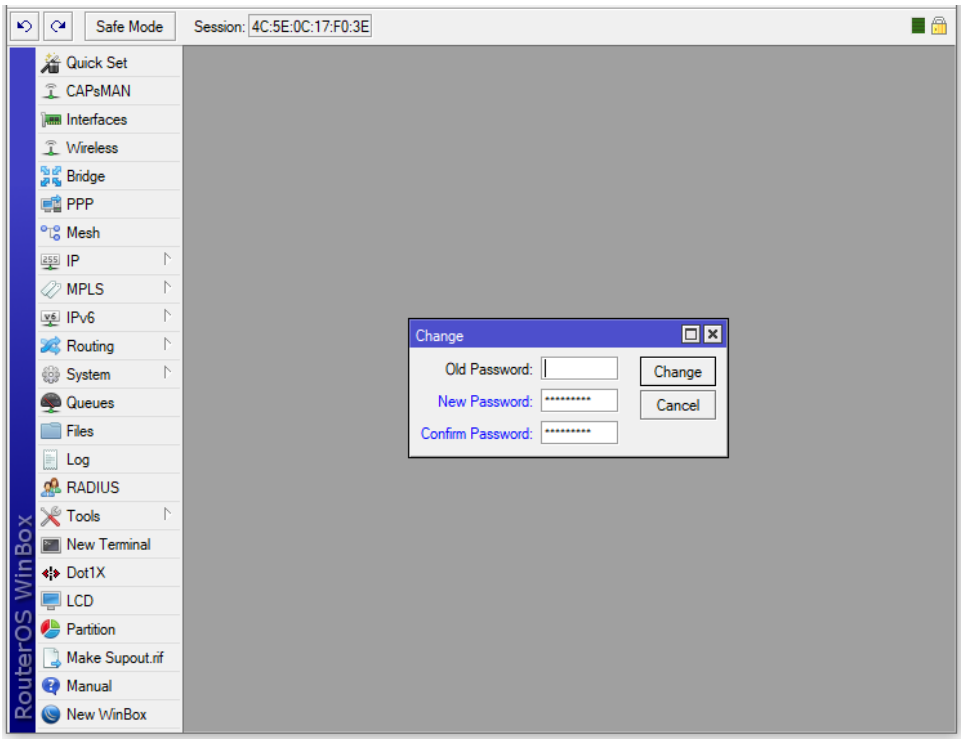
```
[admin@MikroTik]>
/ip address add address=192.168.1.1/24 interface=ether2
/ip dhcp-client add interface=ether1 disabled=no add-default-route=yes

/ip firewall nat add chain=srcnat action=masquerade out-interface=ether1
```

```
/ip pool add name=PoolLAN ranges=192.168.1.10-192.168.1.100
/ip dhcp-server network add address=192.168.1.0/24 gateway=192.168.1.1 dns-server=8.8.4.4
/ip dhcp-server add name=DHCPserv interface=ether2 address-pool=PoolLAN disabled=no
```

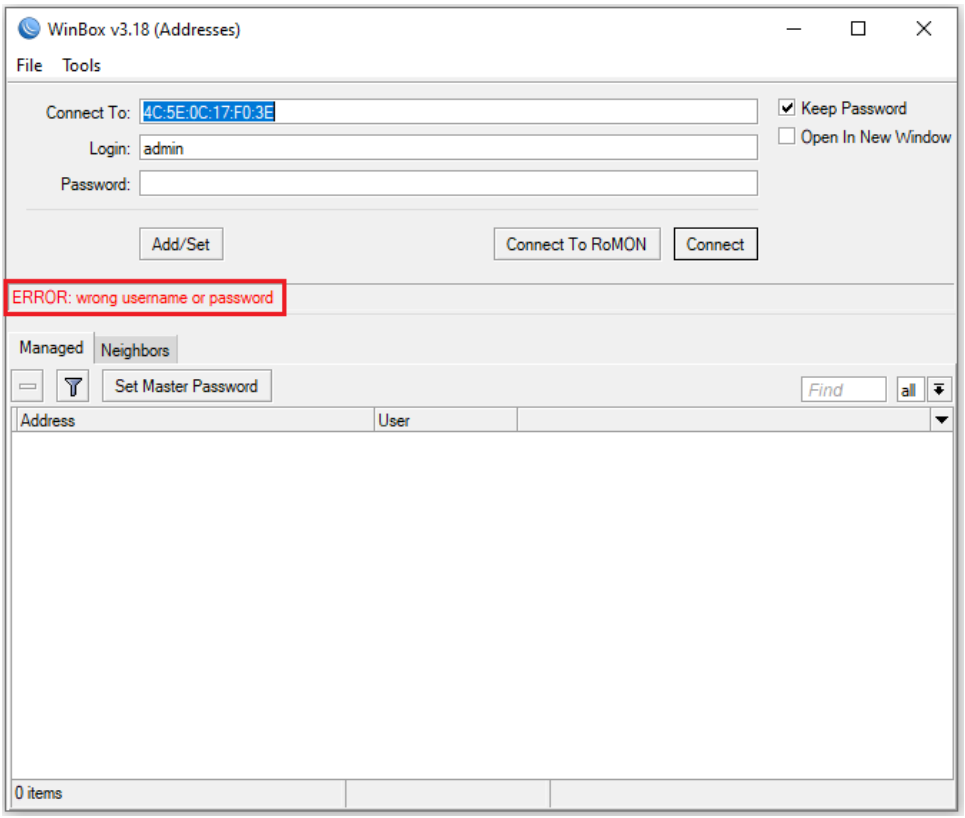
Bước 2. Thiết lập mật khẩu cho tài khoản mặc định admin.

- <blank> đổi thành **mobile24h**.

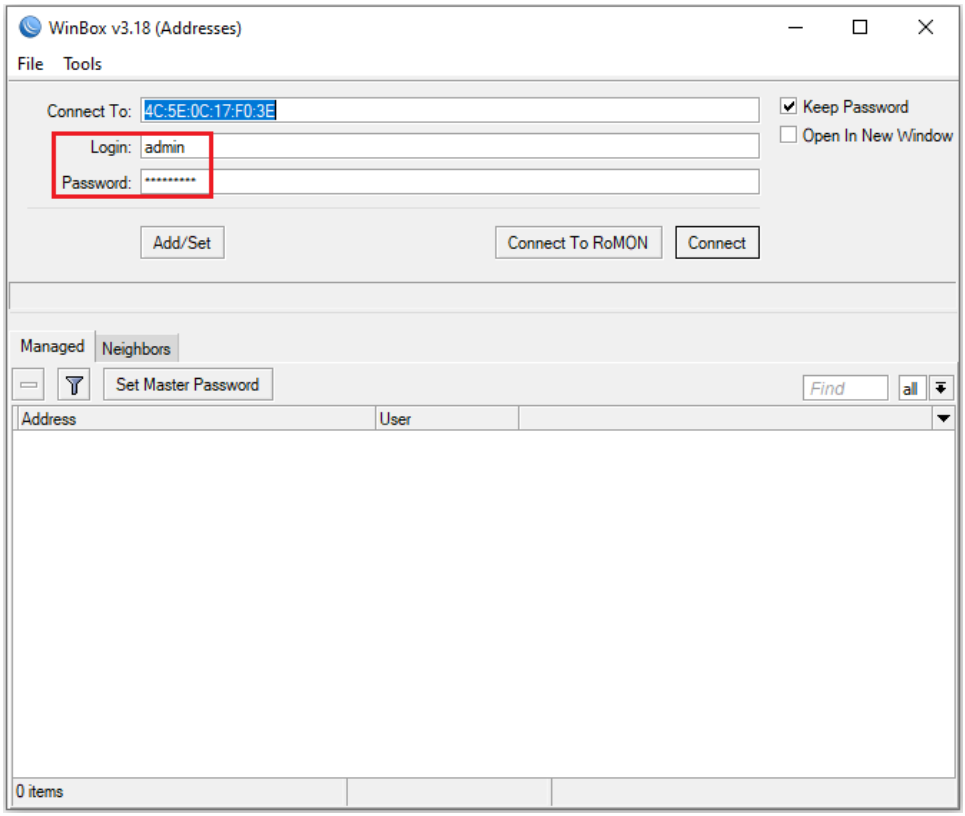




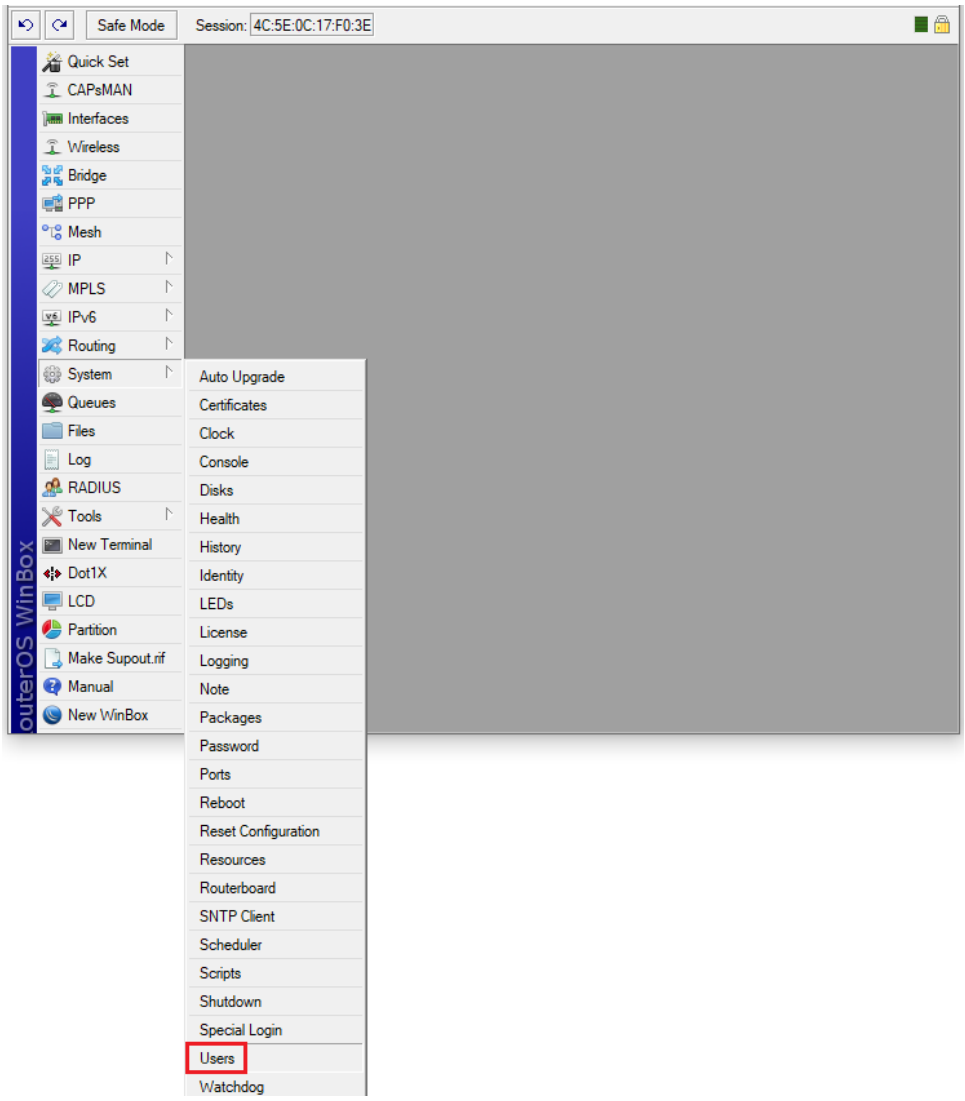
Lúc này không thể đăng nhập vào Router MikroTik bằng tài khoản admin với password là rỗng nữa.

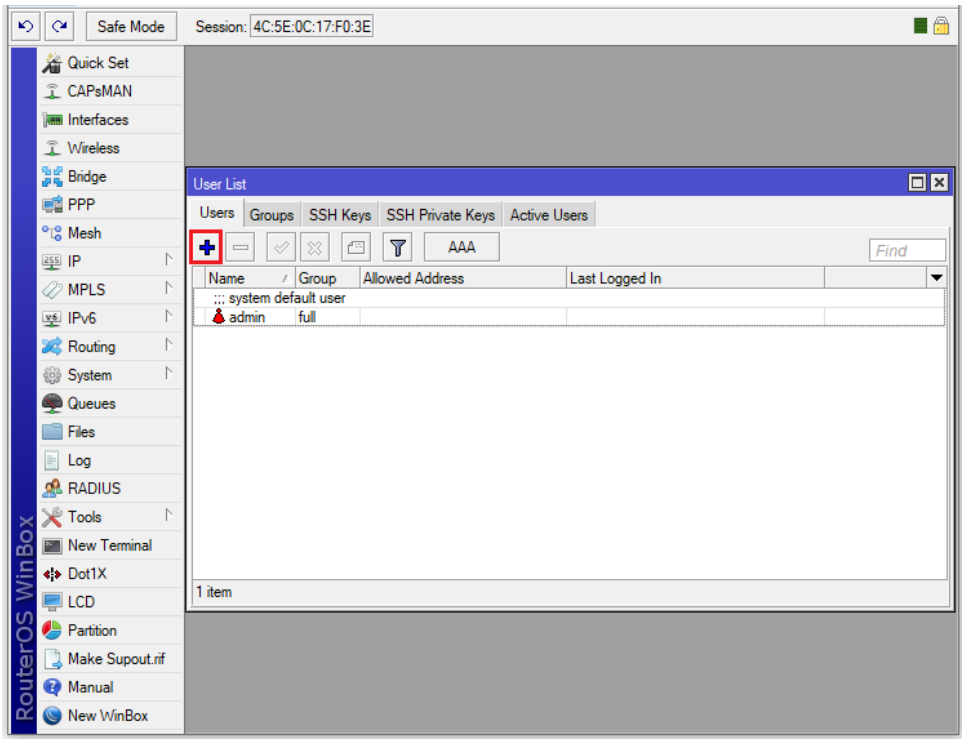


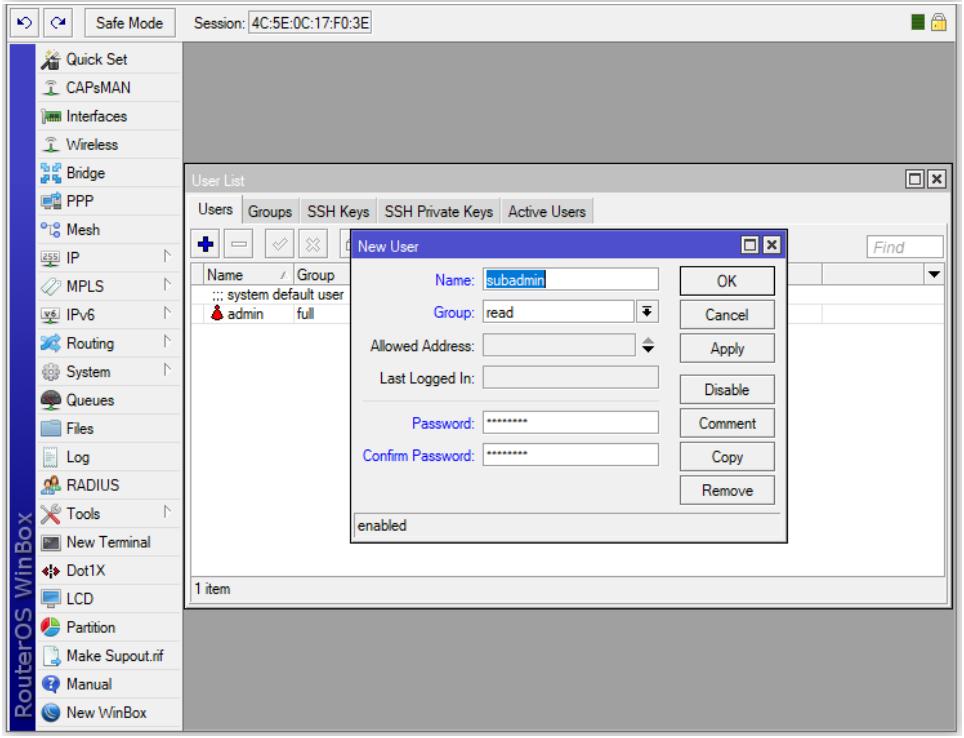
Đăng nhập vào Router MikroTik bằng tài khoản admin/mobile24h.

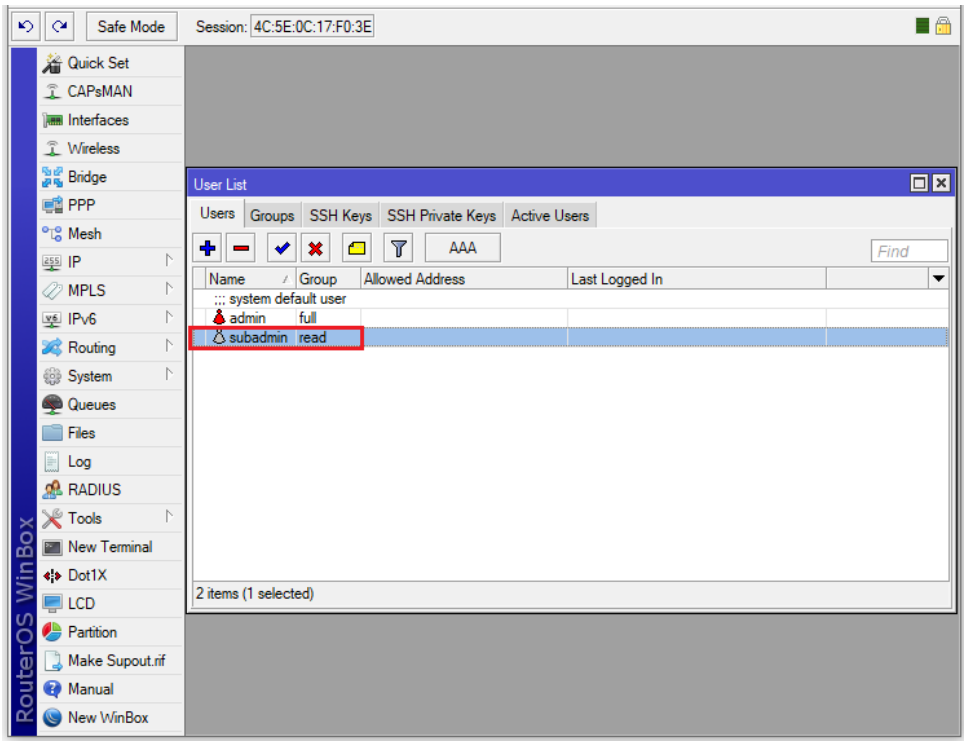


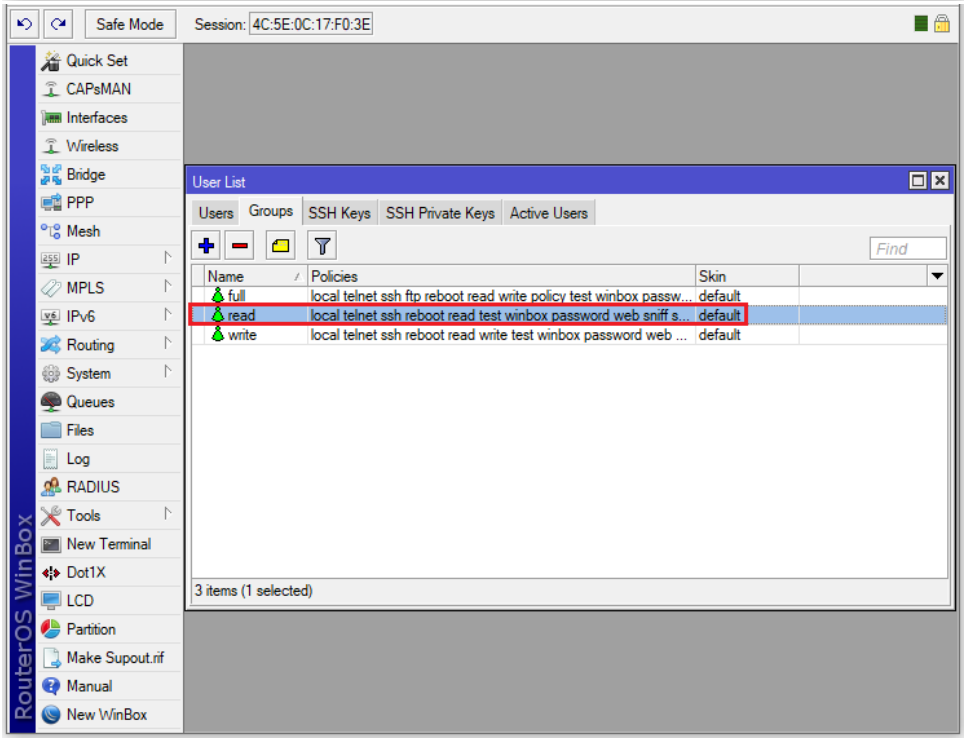
Bước 3. Thiết lập tài khoản subadmin chỉ cho phép Monitor và không được quyền cấu hình thiết bị Router MikroTik.

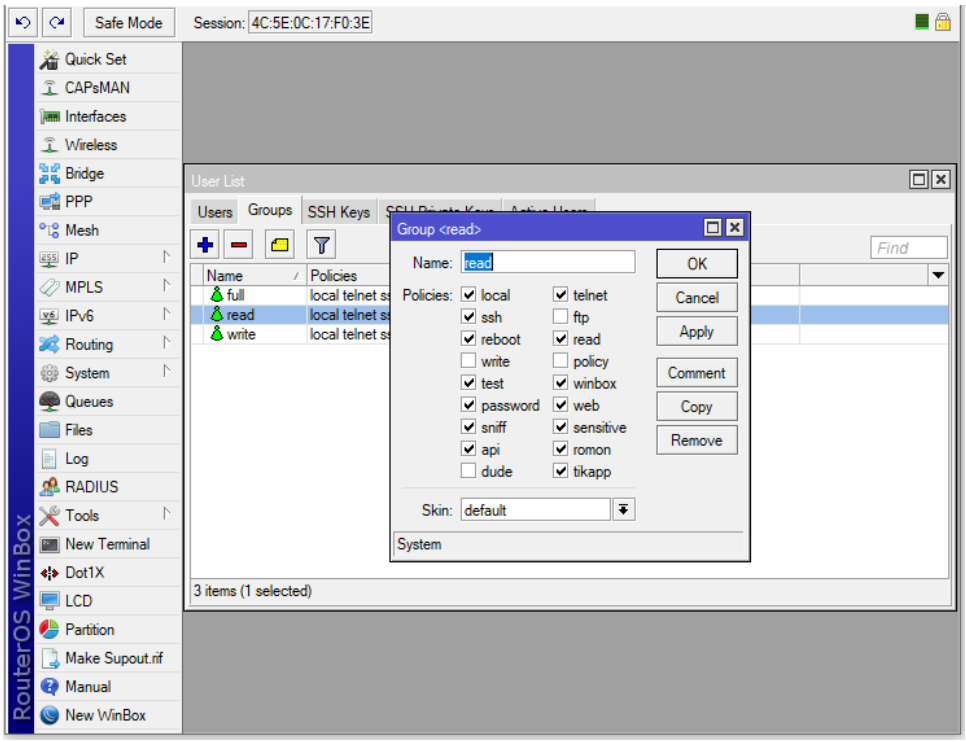

Safe Mode
Session: 4C:5E:0C:17:F0:3E
RouterOS WinBox
Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Mesh
IP
MPLS
IPv6
Routing
System
Queues
Files
Log
RADIUS
Tools
New Terminal
Dot1X
LCD
Partition
Make Supout.rif
Manual
New WinBox
Auto Upgrade
Certificates
Clock
Console
Disks
Health
History
Identity
LEDs
License
Logging
Note
Packages
Password
Ports
Reboot
Reset Configuration
Resources
Routerboard
SNTP Client
Scheduler
Scripts
Shutdown
Special Login
Users
Watchdog


Safe Mode
Session: 4C:5E:0C:17:F0:3E
Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Mesh
IP
MPLS
IPv6
Routing
System
Queues
Files
Log
RADIUS
Tools
New Terminal
Dot1X
LCD
Partition
Make Supout.rif
Manual
New WinBox
RouterOS WinBox
User List
Users
Groups
SSH Keys
SSH Private Keys
Active Users
AAA
Find
Name
Group
Allowed Address
Last Logged In
::: system default user
admin
full
1 item

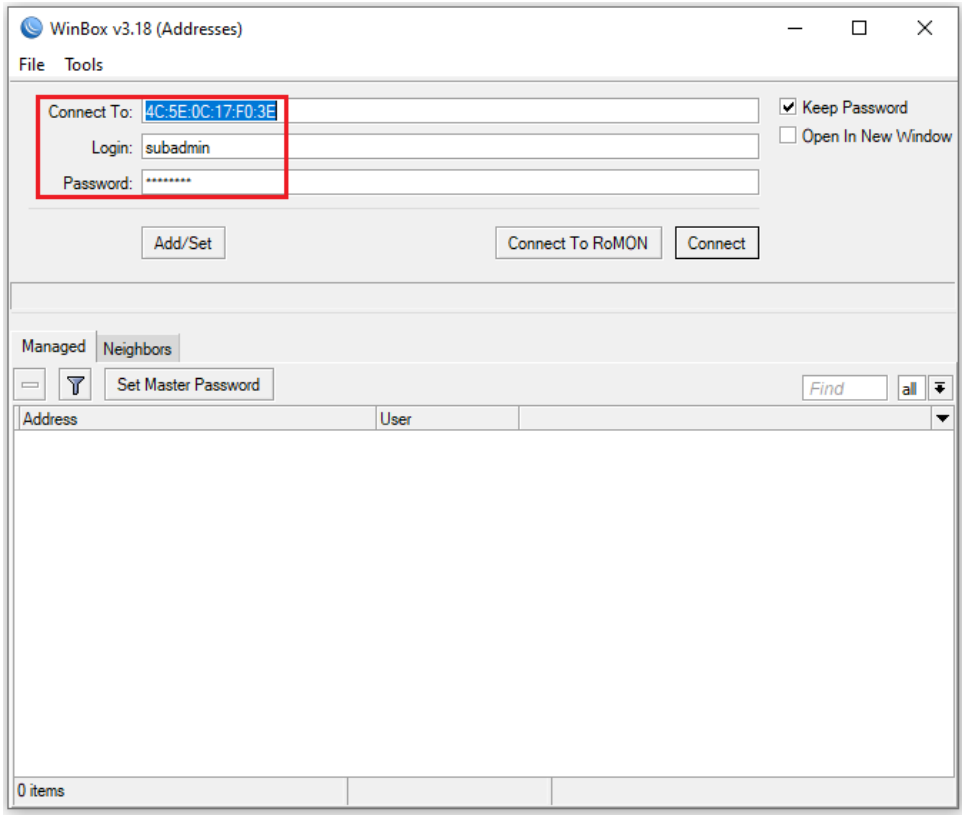

Safe Mode
Session: 4C:5E:0C:17:F0:3E
Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Mesh
IP
MPLS
IPv6
Routing
System
Queues
Files
Log
RADIUS
Tools
New Terminal
Dot1X
LCD
Partition
Make Supout.rif
Manual
New WinBox
RouterOS WinBox
User List
Users
Groups
SSH Keys
SSH Private Keys
Active Users
Find
Name
Group
::: system default user
admin
full
New User
Name:
subadmin
Group:
read
Allowed Address:
Last Logged In:
Password:
Confirm Password:
OK
Cancel
Apply
Disable
Comment
Copy
Remove
enabled
1 item


Safe Mode
Session: 4C:5E:0C:17:F0:3E
Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Mesh
IP
MPLS
IPv6
Routing
System
Queues
Files
Log
RADIUS
Tools
New Terminal
Dot1X
LCD
Partition
Make Supout.rif
Manual
New WinBox
RouterOS WinBox
User List
Users
Groups
SSH Keys
SSH Private Keys
Active Users
AAA
Find
Name
Group
Allowed Address
Last Logged In
system default user
admin
full
subadmin
read
2 items (1 selected)

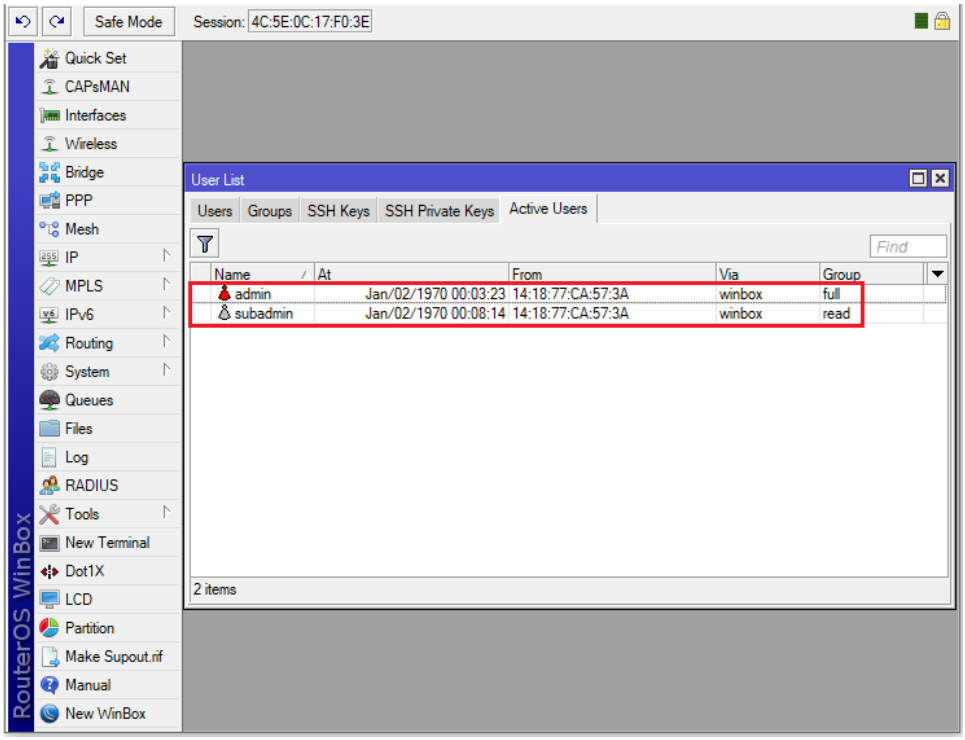

Safe Mode
Session: 4C:5E:0C:17:F0:3E
Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Mesh
IP
MPLS
IPv6
Routing
System
Queues
Files
Log
RADIUS
Tools
New Terminal
Dot1X
LCD
Partition
Make Supout.rif
Manual
New WinBox
RouterOS WinBox
User List
Users
Groups
SSH Keys
SSH Private Keys
Active Users
Find
Name
Policies
Skin
full
local telnet ssh ftp reboot read write policy test winbox passw...
default
read
local telnet ssh reboot read test winbox password web sniff s...
default
write
local telnet ssh reboot read write test winbox password web ...
default
3 items (1 selected)



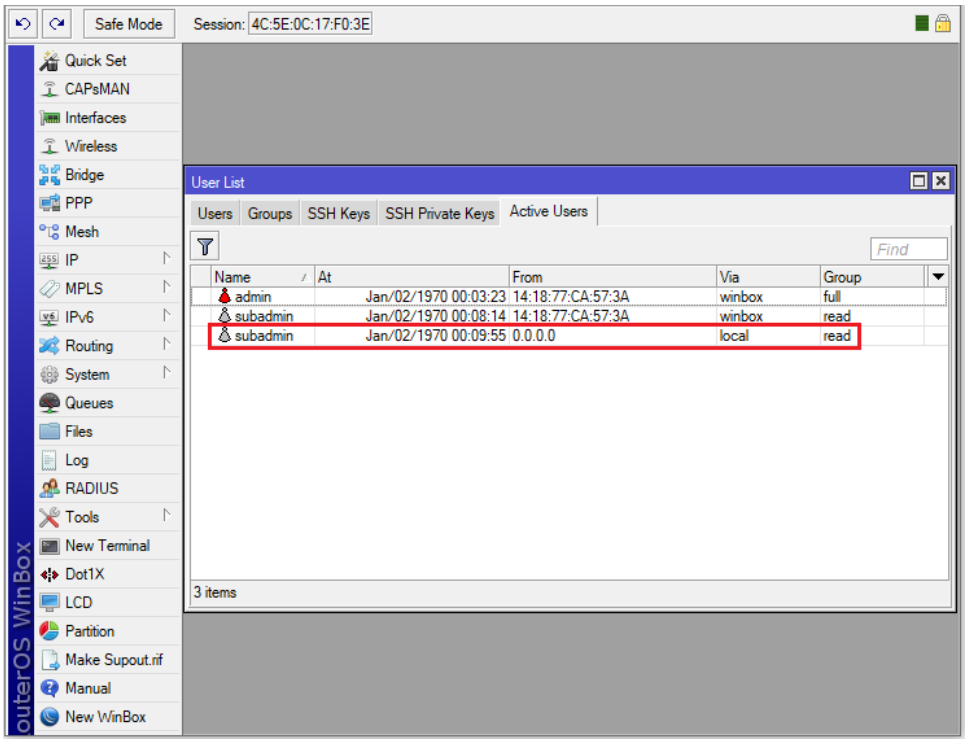
Bước 4. Khảo sát quá trình Login của tài khoản subadmin.



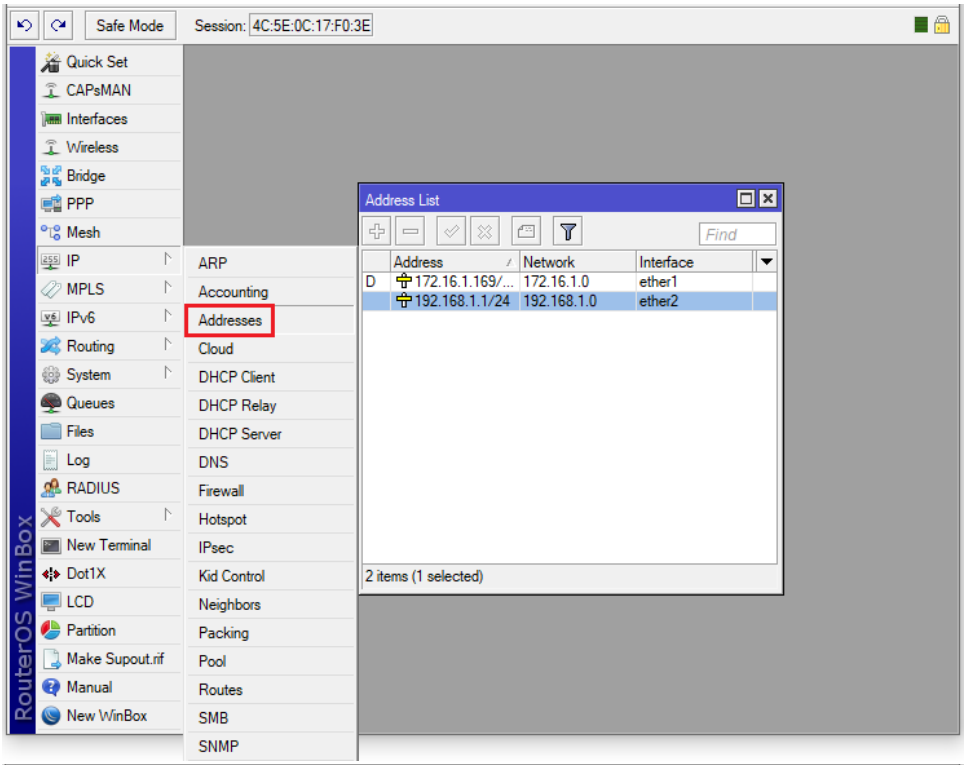
Cả admin và subadmin đều có thể quan sát danh sách các tài khoản user đang Login vào thiết bị Router MikroTik.

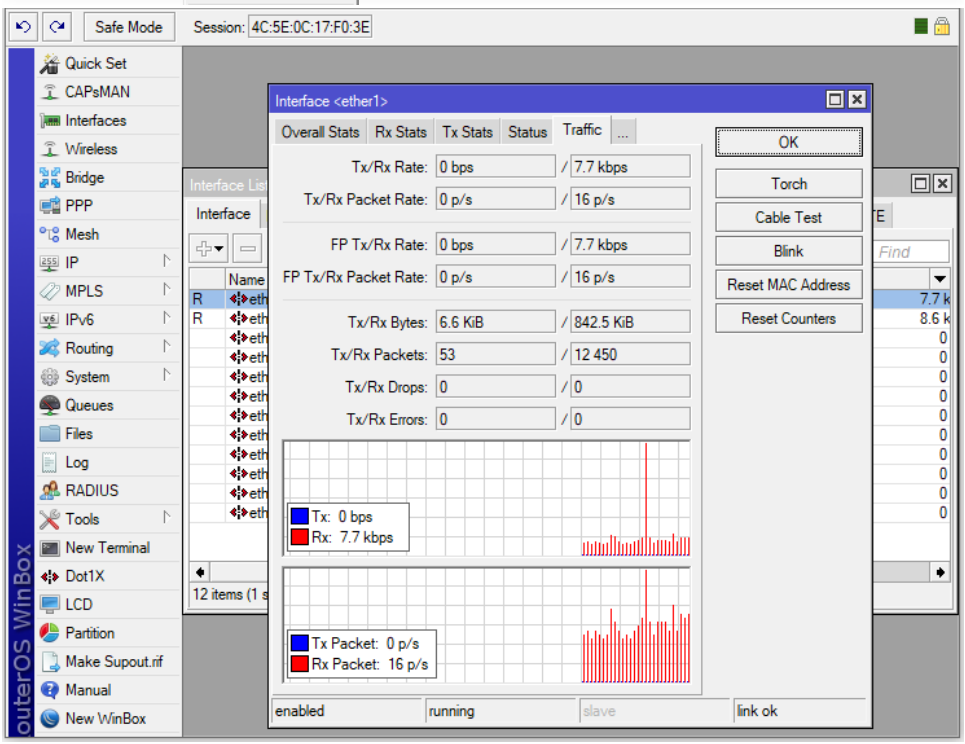


Khi subadmin đăng nhập vào giao diện Terminal thông qua Winbox.

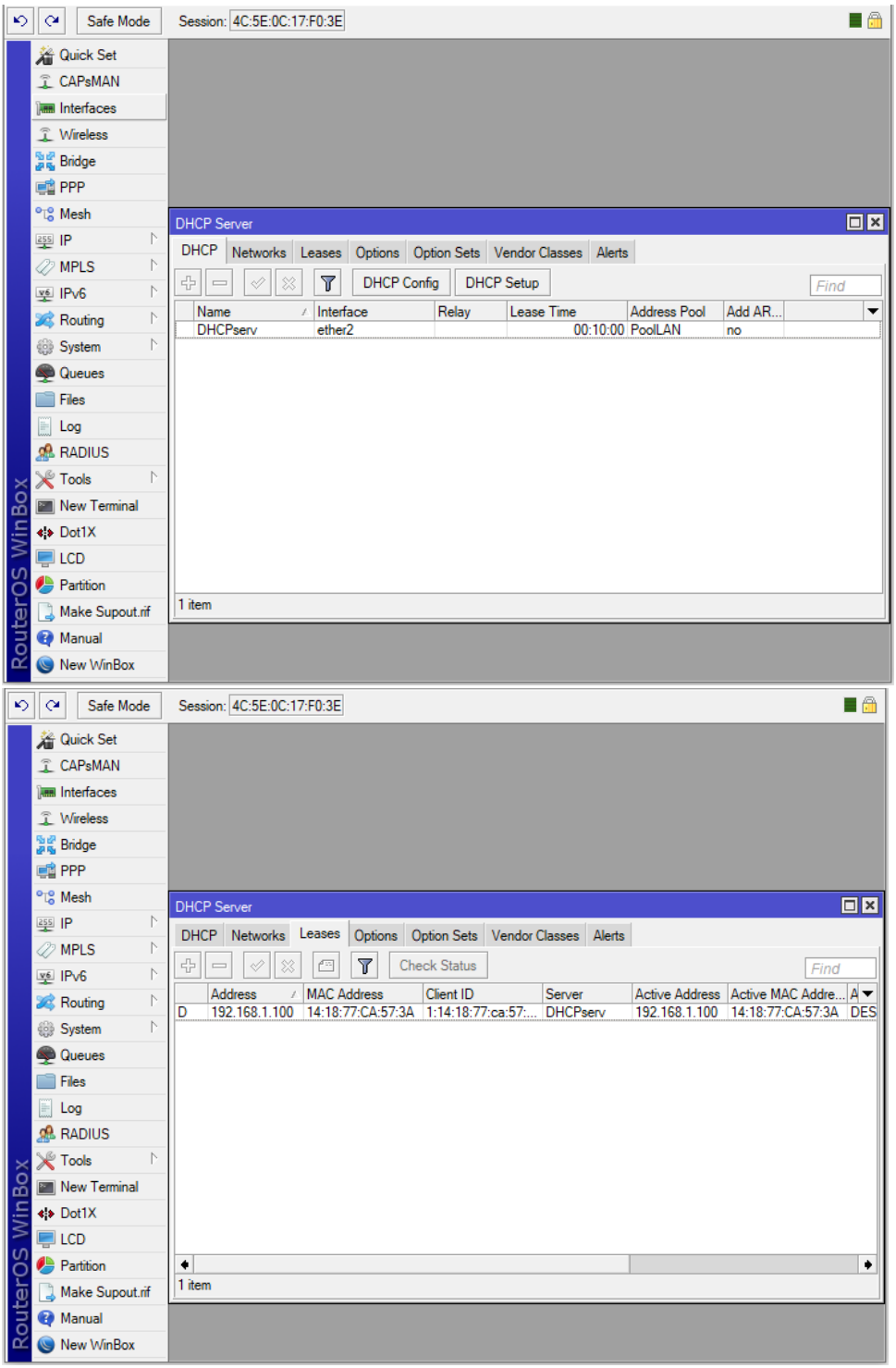


Subadmin có thể quan sát danh sách các IP hiện có trên thiết bị nhưng vẫn có thể giám sát được băng thông real-time trên các cổng vật lý.

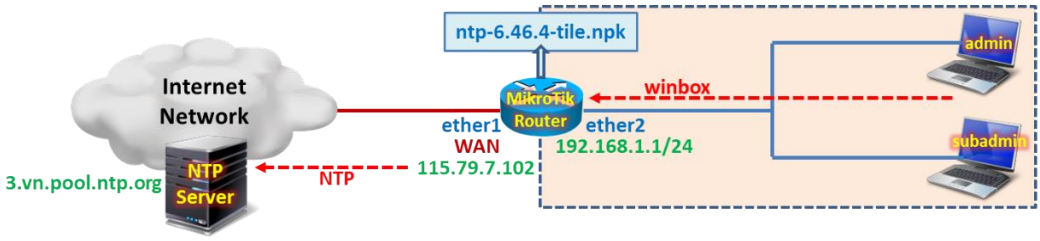




Subadmin có thể quan sát cổng giao tiếp được kích hoạt chức năng DHCP và danh sách địa chỉ IP đã cấp phát.



Phần 13.11. Thiết lập giao thức đồng bộ hóa thời gian NTP trên thiết bị Router MikroTik.



Tổng quan các bước thực hiện:

- Bước 1. Cấu hình cơ bản trên thiết bị Router MikroTik.
- Bước 2. Tải và cài đặt gói ntp-6.46.4-tile.npk trên Router MikroTik.
- Bước 3. Thiết lập chức năng NTP Client trên Router MikroTik.
- Bước 4. Thiết lập chức năng NTP Server trên Router MikroTik.

Các bước thực hiện chi tiết:

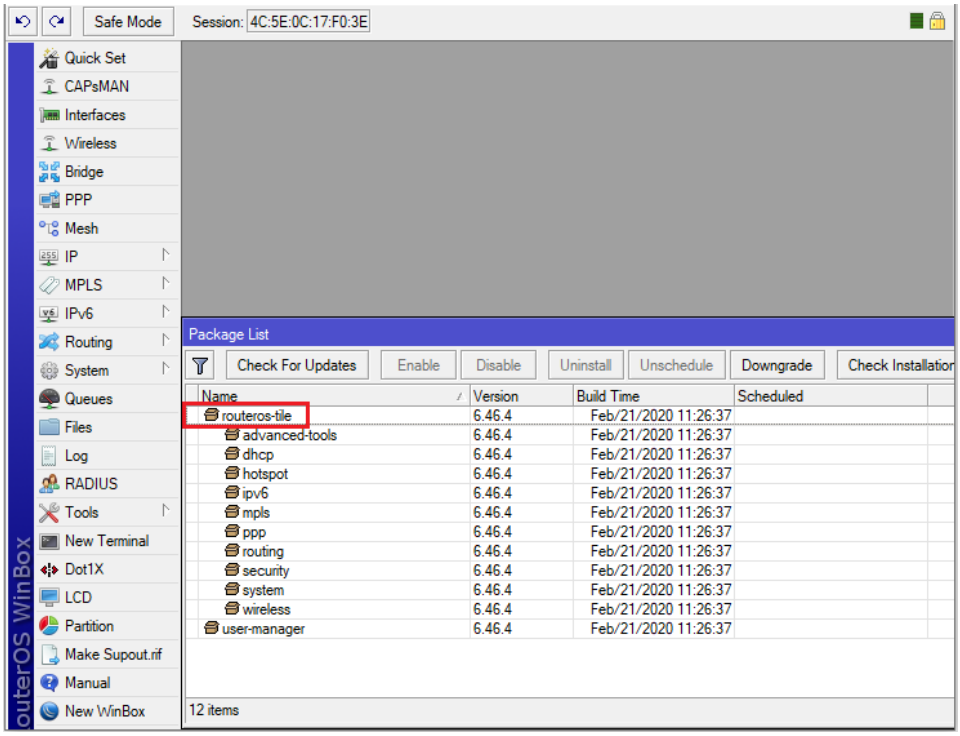
Bước 1. Cấu hình cơ bản trên thiết bị Router MikroTik.

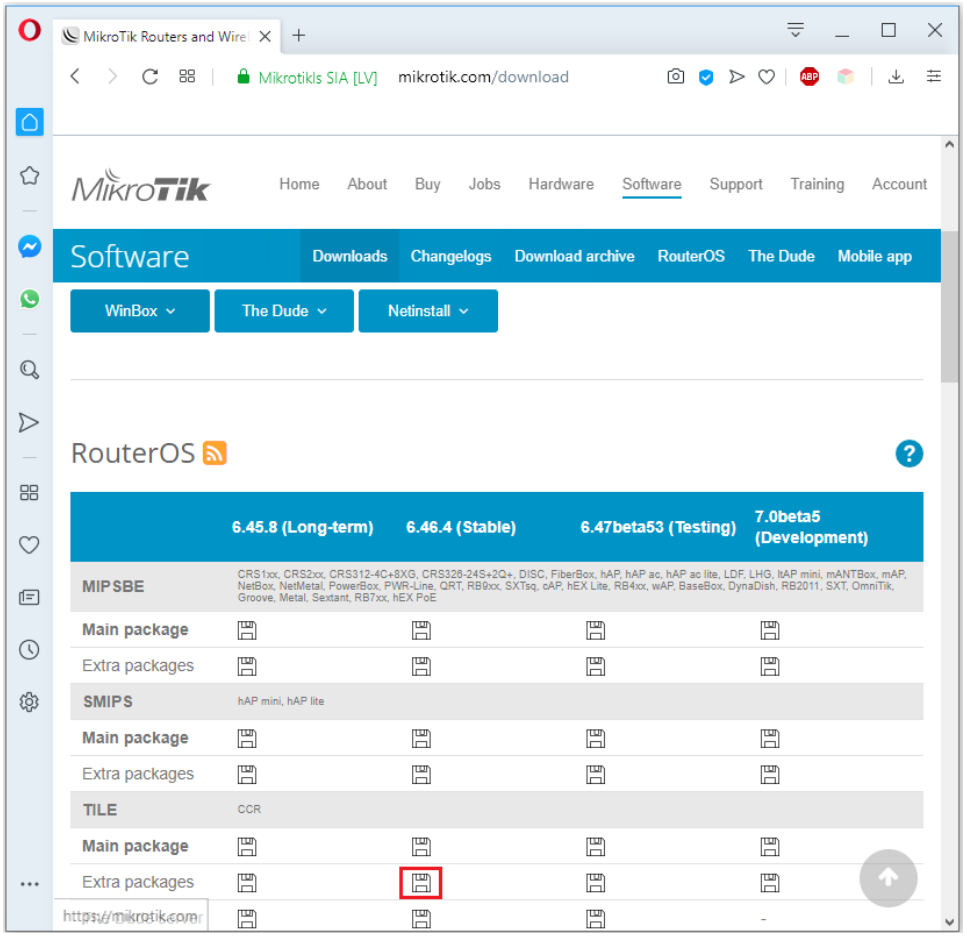
Cấu hình cơ bản trên thiết bị Router MikroTik.

```
[admin@MikroTik]>
/ip address add address=192.168.1.1/24 interface=ether2
/ip dhcp-client add interface=ether1 disabled=no add-default-route=yes

/ip firewall nat add chain=srcnat action=masquerade out-interface=ether1

/ip pool add name=PoolLAN ranges=192.168.1.10-192.168.1.100
/ip dhcp-server network add address=192.168.1.0/24 gateway=192.168.1.1 dns-server=8.8.4.4
/ip dhcp-server add name=DHCPserv interface=ether2 address-pool=PoolLAN disabled=no
```

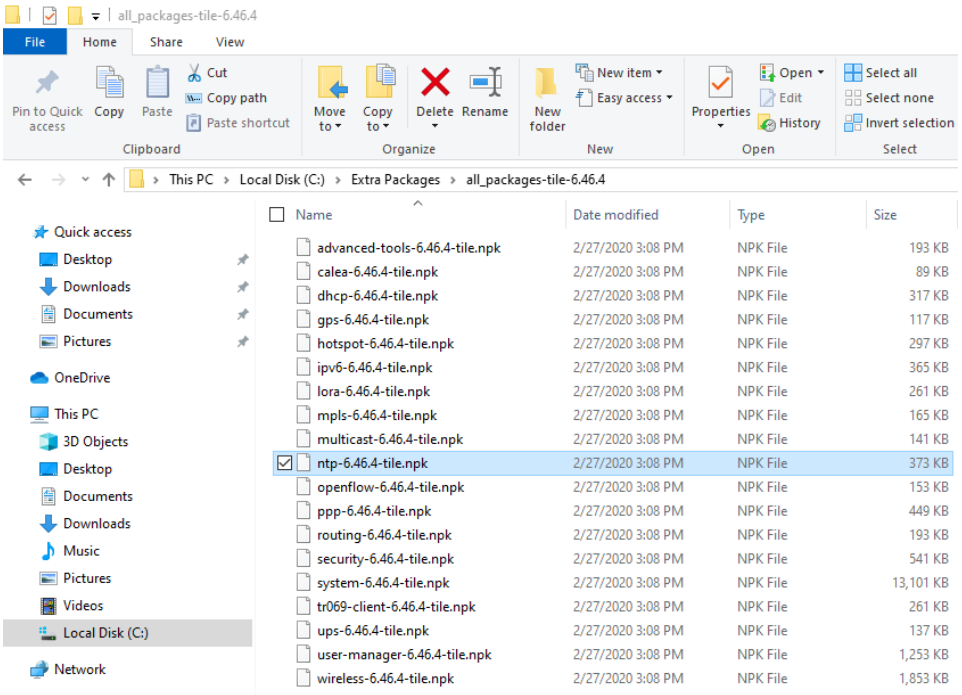
Bước 2. Tải và cài đặt gói ntp-6.46.4-tile.npk trên Router MikroTik.

Xác định kiến trúc phần cứng trên thiết bị Router MikroTik trước khi lựa chọn gói Extra Packages phù hợp để tải về.

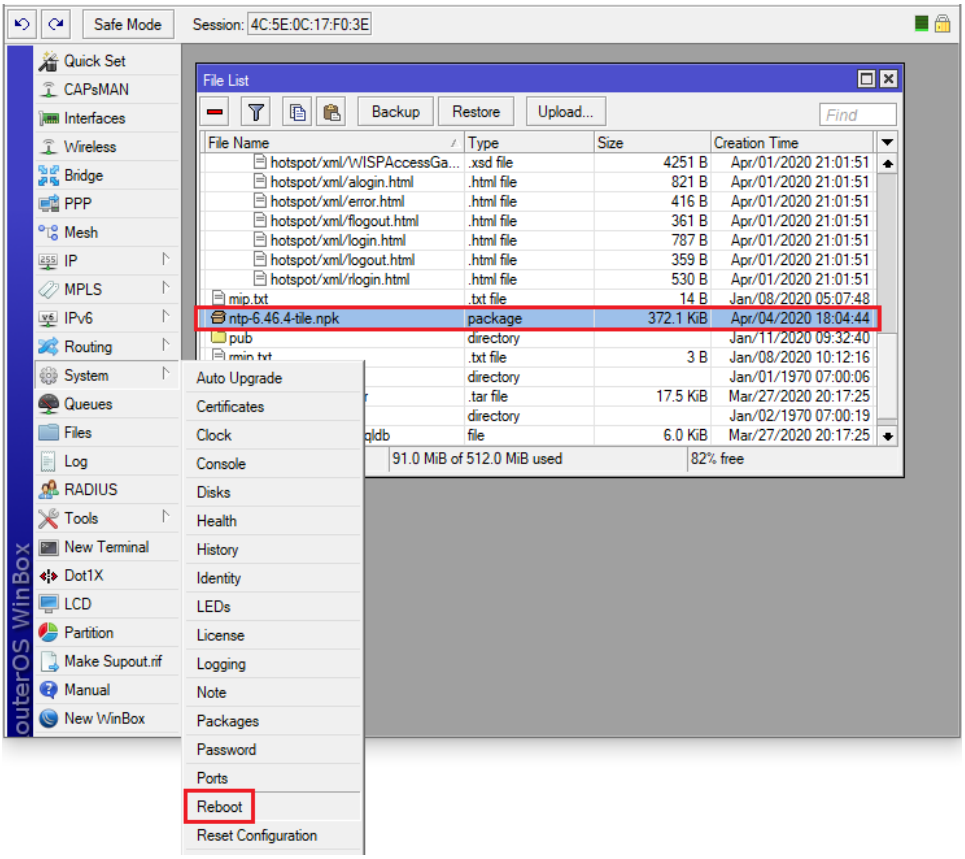

Safe Mode
Session: 4C:5E:0C:17:F0:3E
Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Mesh
IP
MPLS
IPv6
Routing
System
Queues
Files
Log
RADIUS
Tools
New Terminal
Dot1X
LCD
Partition
Make Supout.rif
Manual
New WinBox
RouterOS WinBox
Package List
Check For Updates
Enable
Disable
Uninstall
Unschedule
Downgrade
Check Installation
Name
Version
Build Time
Scheduled
routeros-tile 6.46.4 Feb/21/2020 11:26:37
advanced-tools 6.46.4 Feb/21/2020 11:26:37
dhcp 6.46.4 Feb/21/2020 11:26:37
hotspot 6.46.4 Feb/21/2020 11:26:37
ipv6 6.46.4 Feb/21/2020 11:26:37
mpls 6.46.4 Feb/21/2020 11:26:37
ppp 6.46.4 Feb/21/2020 11:26:37
routing 6.46.4 Feb/21/2020 11:26:37
security 6.46.4 Feb/21/2020 11:26:37
system 6.46.4 Feb/21/2020 11:26:37
wireless 6.46.4 Feb/21/2020 11:26:37
user-manager 6.46.4 Feb/21/2020 11:26:37
12 items


MikroTik Routers and Wire
Mikrotikls SIA [LV]
mikrotik.com/download
MikroTik
Home
About
Buy
Jobs
Hardware
Software
Support
Training
Account
Software
Downloads
Changelogs
Download archive
RouterOS
The Dude
Mobile app
WinBox
The Dude
Netinstall
RouterOS
6.45.8 (Long-term)
6.46.4 (Stable)
6.47beta53 (Testing)
7.0beta5 (Development)
MIPSBE
CRS1xx, CRS2xx, CRS312-4C+8XG, CRS328-24S+2Q+, DISC, FiberBox, hAP, hAP ac, hAP ac lite, LDF, LHG, ltAP mini, mANTBox, mAP, NetBox, NetMetal, PowerBox, PWR-Line, QRT, RB9xx, SXTsq, cAP, hEX Lite, RB4xx, wAP, BaseBox, DynaDish, RB2011, SXT, OmniTik, Groove, Metal, Sextant, RB7xx, hEX PoE
Main package
Extra packages
SMIPS
hAP mini, hAP lite
Main package
Extra packages
TILE
CCR
Main package
Extra packages
https://mikrotik.com

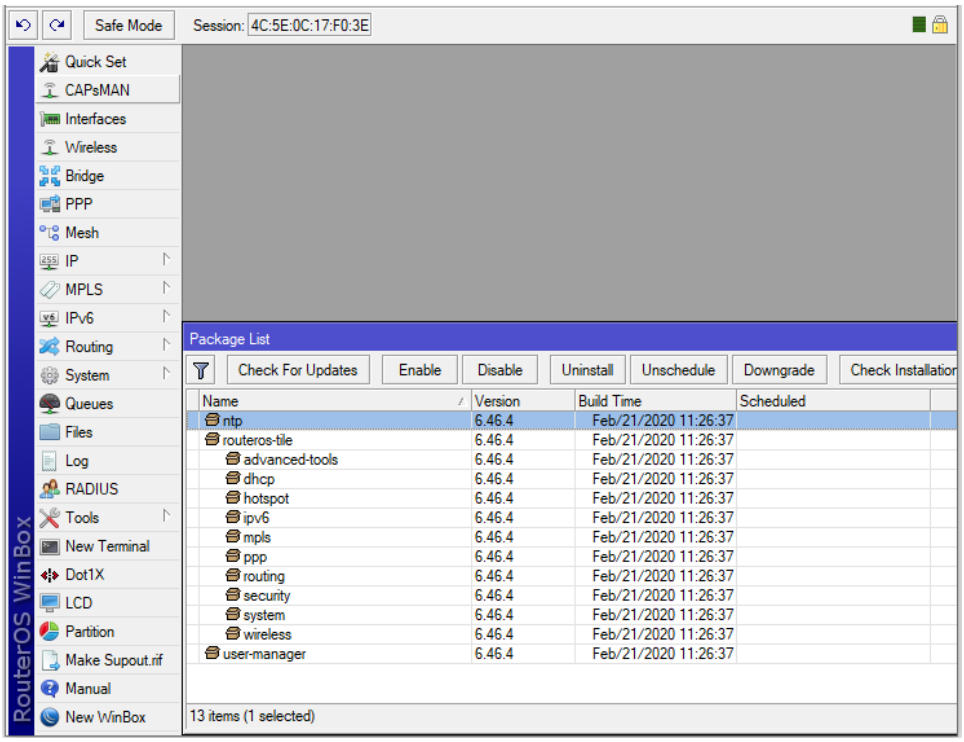
https://mikrotik.com/download



Tiến hành copy gói cài đặt ntp-6.46.4-tile.npk vào bộ nhớ Flash của thiết bị Router MikroTik sau đó tiến hành khởi động lại thiết bị.

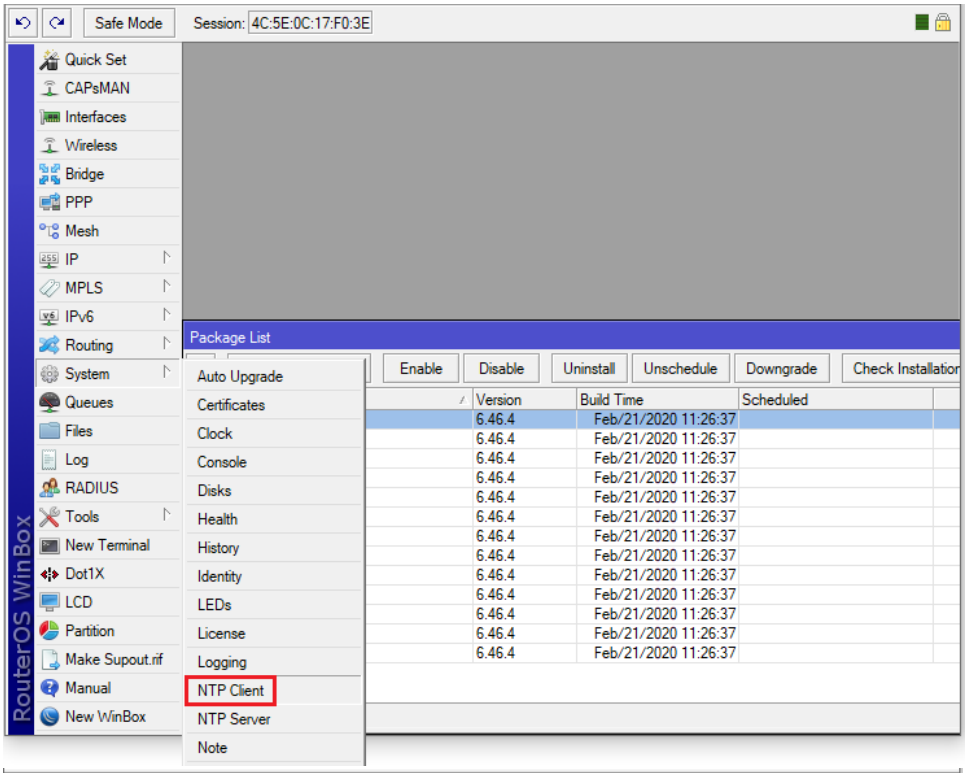


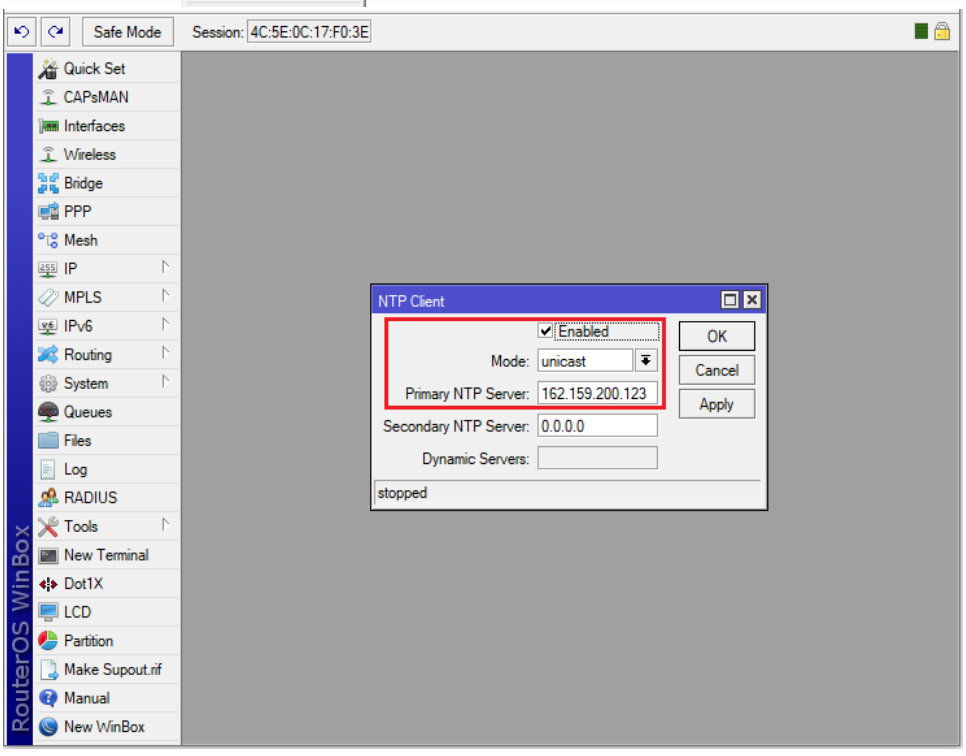
Sau khi thiết bị khởi động thành công thì chúng ta có thể quan sát thấy gói NTP xuất hiện tại giao diện Package List.



Bước 3. Thiết lập chức năng NTP Client trên Router MikroTik.

Khai báo thông tin địa chỉ IP hoặc Domain Name tương ứng với các NTP Server ở ngoài Internet.





Kiểm tra thời gian hiện tại của thiết bị đã được đồng bộ hóa hay chưa.

- Thiết lập thời gian thủ công trên Router MikroTik.

```
[admin@MikroTik] >
/system clock set date=apr/04/2020 time=18:37:00 time-zone-name=Asia/Ho_Chi_Minh
```

- Kiểm tra thời gian hiện tại trên thiết bị.

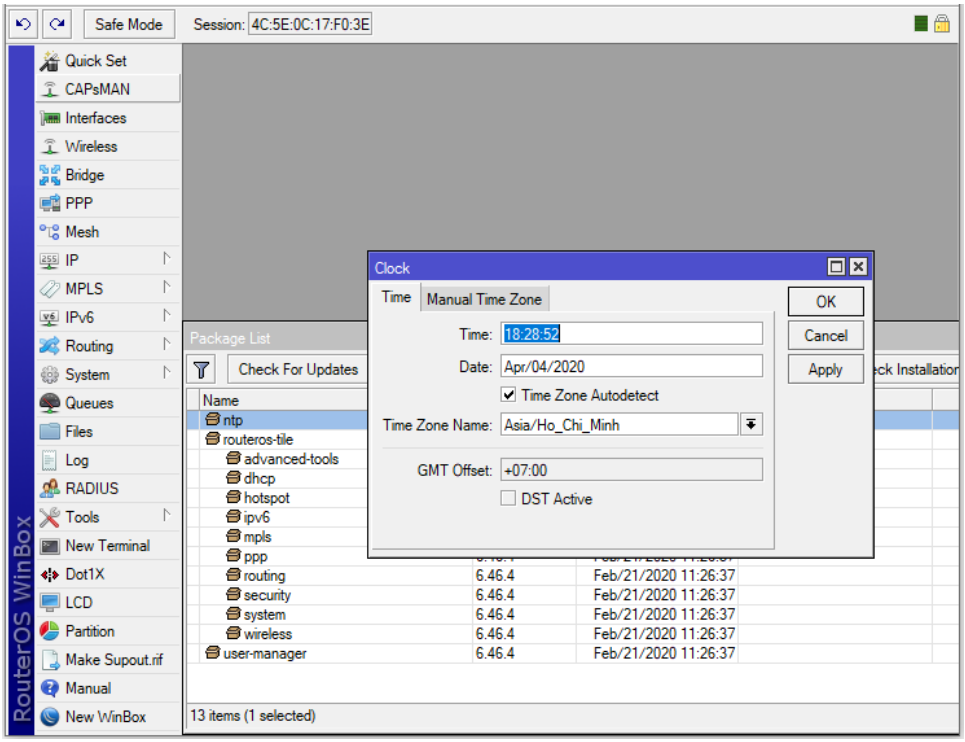
```
[admin@MikroTik] > /system clock print
                  time: 18:37:18
                  date: apr/04/2020
  time-zone-autodetect: yes
        time-zone-name: Asia/Ho_Chi_Minh
            gmt-offset: +07:00
            dst-active: no
[admin@MikroTik] >
```

- Thiết lập chức năng NTP Client trên thiết bị Router MikroTik.

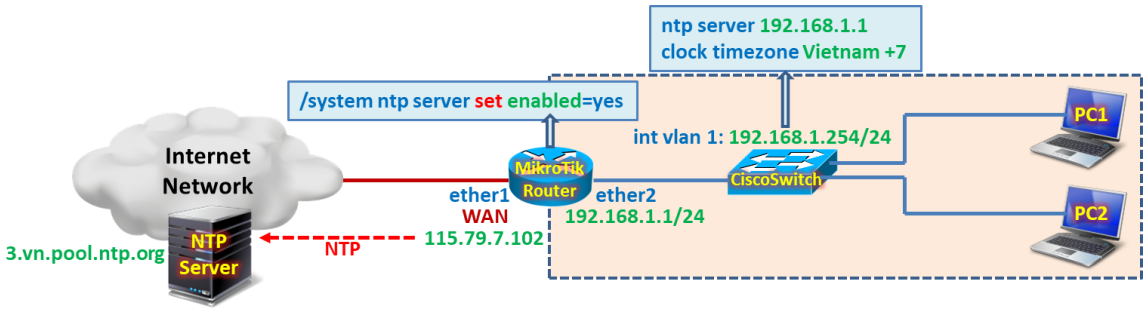
```
[admin@MikroTik] >
/system ntp client set enabled=yes mode=unicast primary-ntp=3.vn.pool.ntp.org
```

- Thiết bị tự động phân giải tên miền thành địa chỉ IP tương ứng.

```
[admin@MikroTik] > /system ntp client print
           enabled: yes
              mode: unicast
       primary-ntp: 162.159.200.123
     secondary-ntp: 0.0.0.0
  dynamic-servers:
            status: synchronized
[admin@MikroTik] >
```

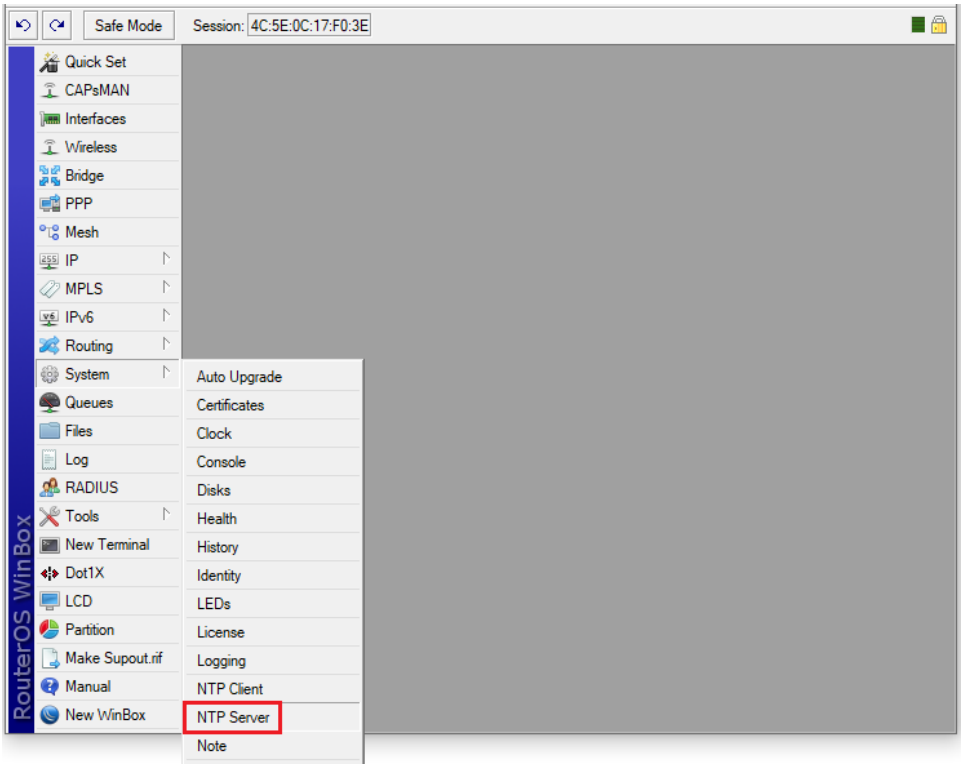


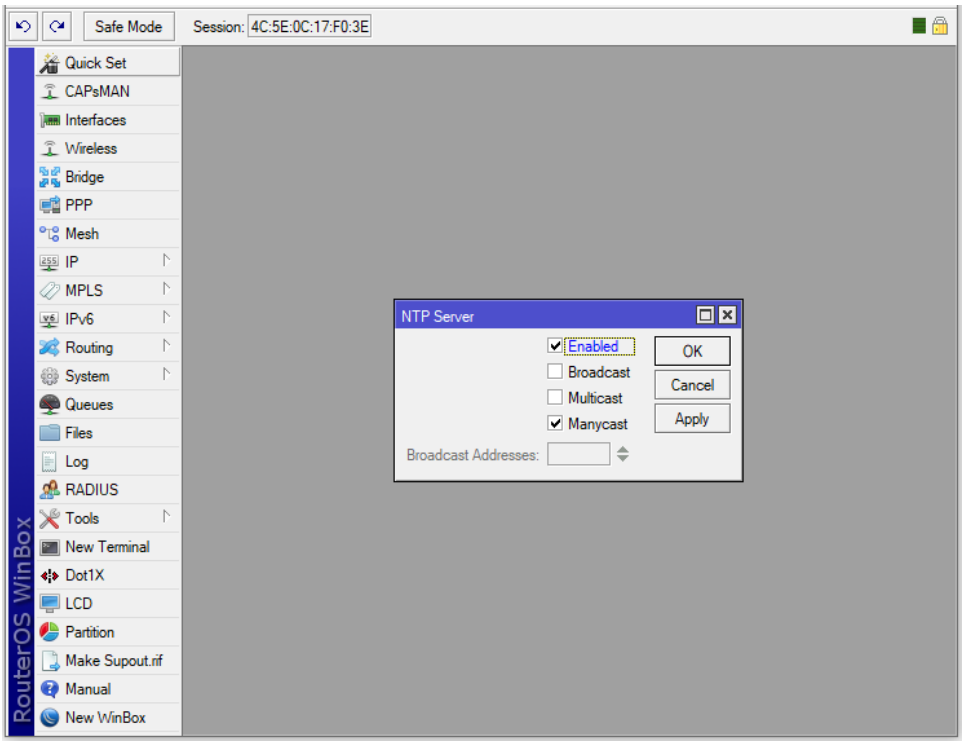
Bước 4. Thiết lập chức năng NTP Server trên Router MikroTik.




```
[admin@MikroTik] >
/system ntp server set enabled=yes
```

```
[admin@MikroTik] > /system ntp server print
              enabled: yes
            broadcast: no
            multicast: no
             manycast: yes
  broadcast-addresses:
[admin@MikroTik] >
```





Kích hoạt chức năng NTP Client trên Cisco Switch.

```
hostname CiscoSwitch

ntp server 192.168.1.1
clock timezone Vietnam +7
```

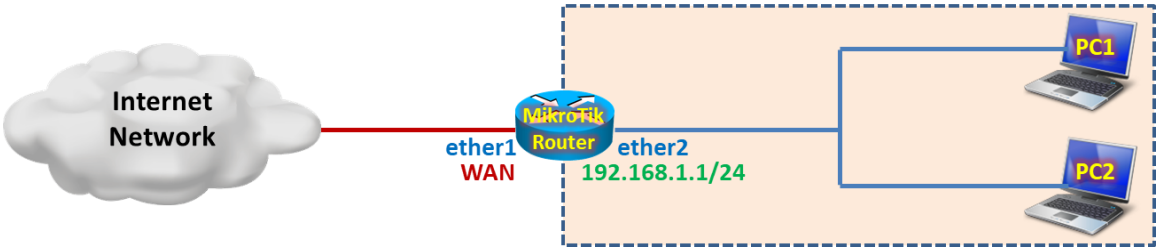
Kiểm tra thời gian và trạng thái đồng bộ hóa thời gian trên Cisco Switch.

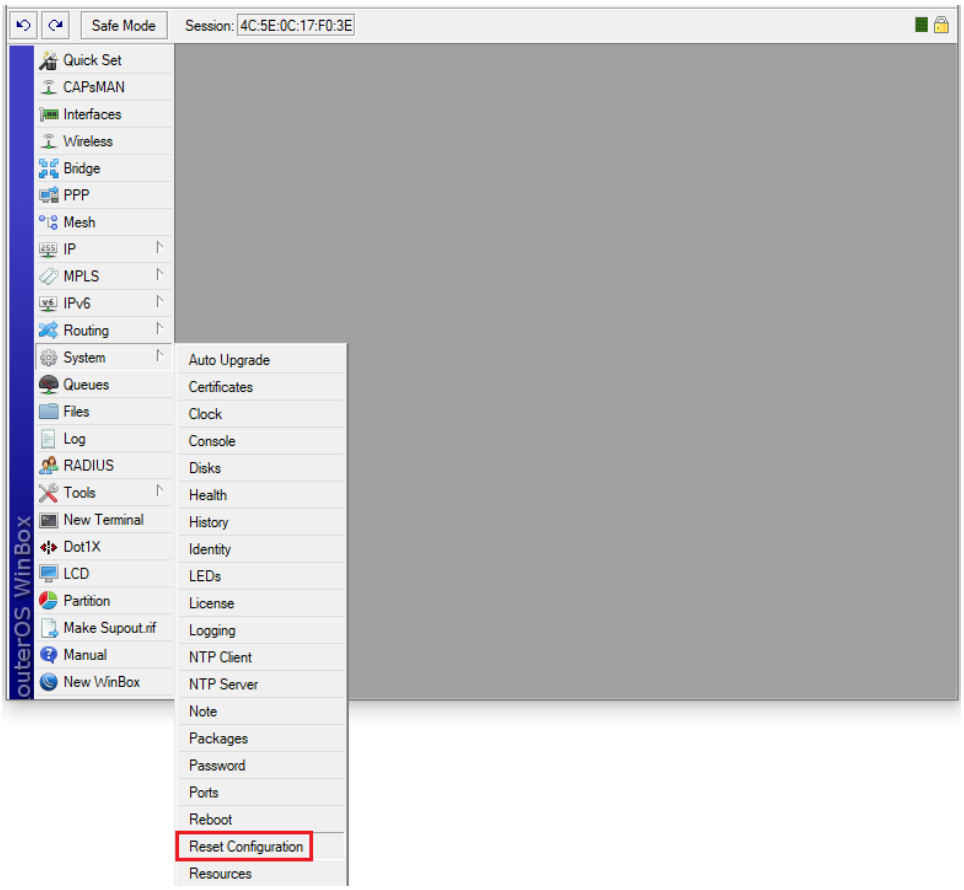
```
CiscoSwitch# show ntp status
Clock is synchronized, stratum 5, reference is 192.168.1.1
nominal freq is 119.2092 Hz, actual freq is 119.2092 Hz, precision is 2**18
reference time is E232F5D2.A73850BB (19:02:26.653 Vietnam Sat Apr 4 2020)
clock offset is 0.1454 msec, root delay is 115.66 msec
root dispersion is 5.74 msec, peer dispersion is 0.06 msec
CiscoSwitch#
```

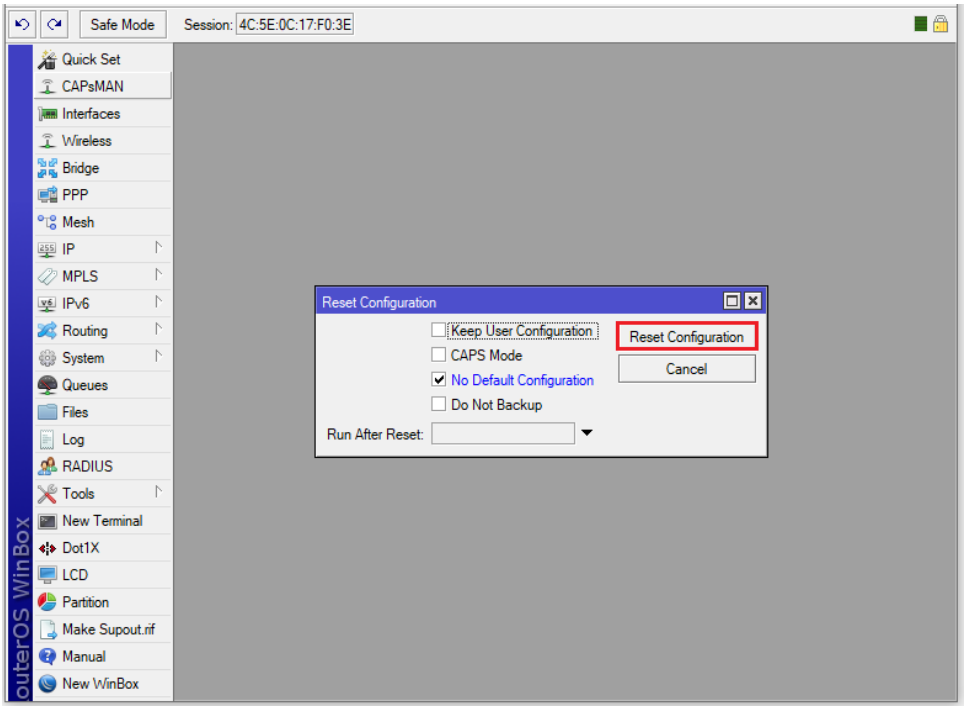
```
CiscoSwitch# show ntp associations

      address         ref clock      st   when   poll reach   delay   offset    disp
*~192.168.1.1      162.159.200.123   4     38     64  377     0.5     0.15      0.1
 * master (synced), # master (unsynced), + selected, - candidate, ~ configured
CiscoSwitch#
```

```
CiscoSwitch# show clock
19:12:23.310 Vietnam Sat Apr 4 2020
CiscoSwitch#
```

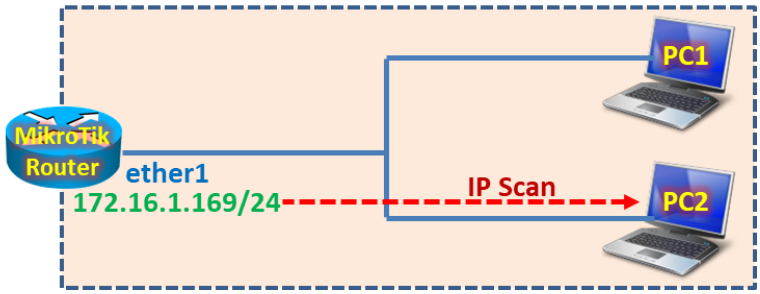
Phần 13.12. Xóa cấu hình và khởi động lại Router MikroTik với cấu hình trắng.

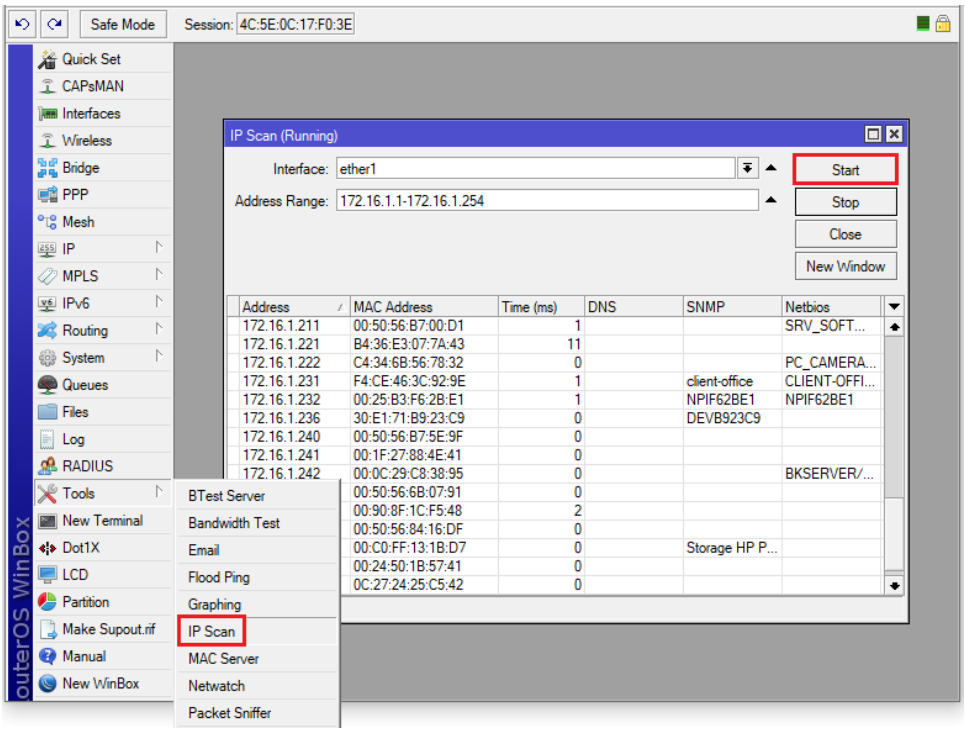

Internet
Network
ether1
WAN
MikroTik
Router
ether2
192.168.1.1/24
PC1
PC2


Safe Mode
Session: 4C:5E:0C:17:F0:3E
Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Mesh
IP
MPLS
IPv6
Routing
System
Queues
Files
Log
RADIUS
Tools
New Terminal
Dot1X
LCD
Partition
Make Supout.rif
Manual
New WinBox
outerOS WinBox
Auto Upgrade
Certificates
Clock
Console
Disks
Health
History
Identity
LEDs
License
Logging
NTP Client
NTP Server
Note
Packages
Password
Ports
Reboot
Reset Configuration
Resources

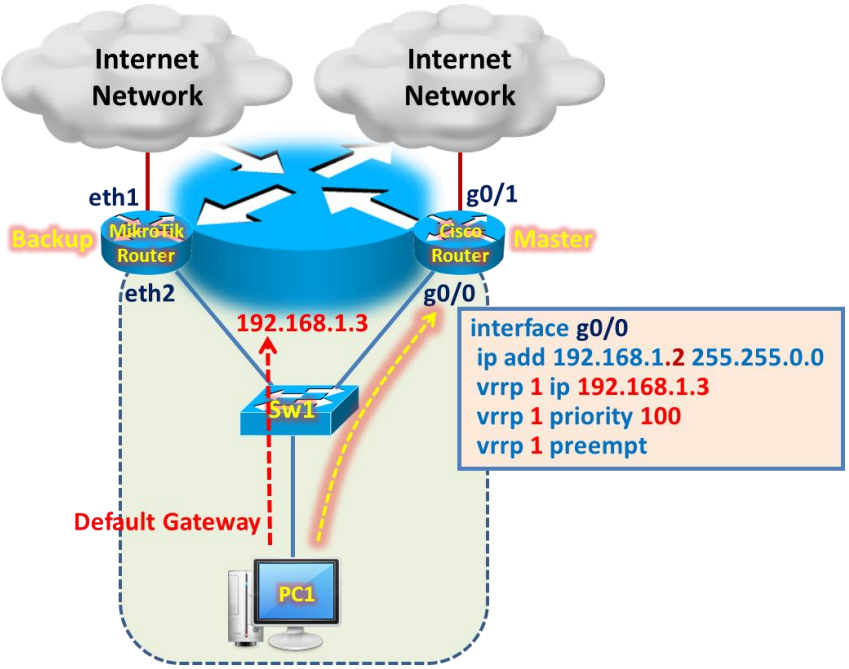


Phần 13.13. Tính năng IP Scan cho phép quét danh sách địa chỉ IP và MAC của các thiết bị trên hạ tầng mạng.





Phần 14. Công nghệ dự phòng Gateway VRRP trên Router MikroTik.



Tổng quan các bước thực hiện:

- **Bước 1.** Cấu hình cơ bản và VRRP trên Cisco Router.
- **Bước 2.** Cấu hình cơ bản trên Router MikroTik.

- **Bước 3.** Cấu hình VRRP trên Router MikroTik.

Các bước thực hiện chi tiết:

Bước 1. Cấu hình cơ bản và VRRP trên Cisco Router.

```
hostname CiscoRT

interface g0/0
 ip address 192.168.1.2 255.255.255.0
 vrrp 1 ip 192.168.1.3
 vrrp 1 priority 100
 vrrp 1 preempt
 vrrp 1 authentication 123456
 ip nat inside
 no shutdown
 exit

interface g0/1
 ip address dhcp
 ip nat outside
 no shutdown
 exit
ip route 0.0.0.0 0.0.0.0 dhcp

ip access-list extended NetTraffic
 10 permit ip 192.0.0.0 0.255.255.255 any
 exit
route-map Internet1
 match ip address NetTraffic
 match interface g0/1
 exit
ip nat inside source route-map Internet1 interface g0/1 overload

line vty 0 4
 privilege level 15
 no login
 transport input telnet
 exit
no ip domain-lookup

ip dhcp excluded-address 192.168.1.1 192.168.1.9
ip dhcp pool LAN
 network 192.168.1.0 255.255.255.0
 default-router 192.168.1.3
 dns-server 8.8.4.4
```

```
exit
```

Bước 2. Cấu hình cơ bản trên Router MikroTik.

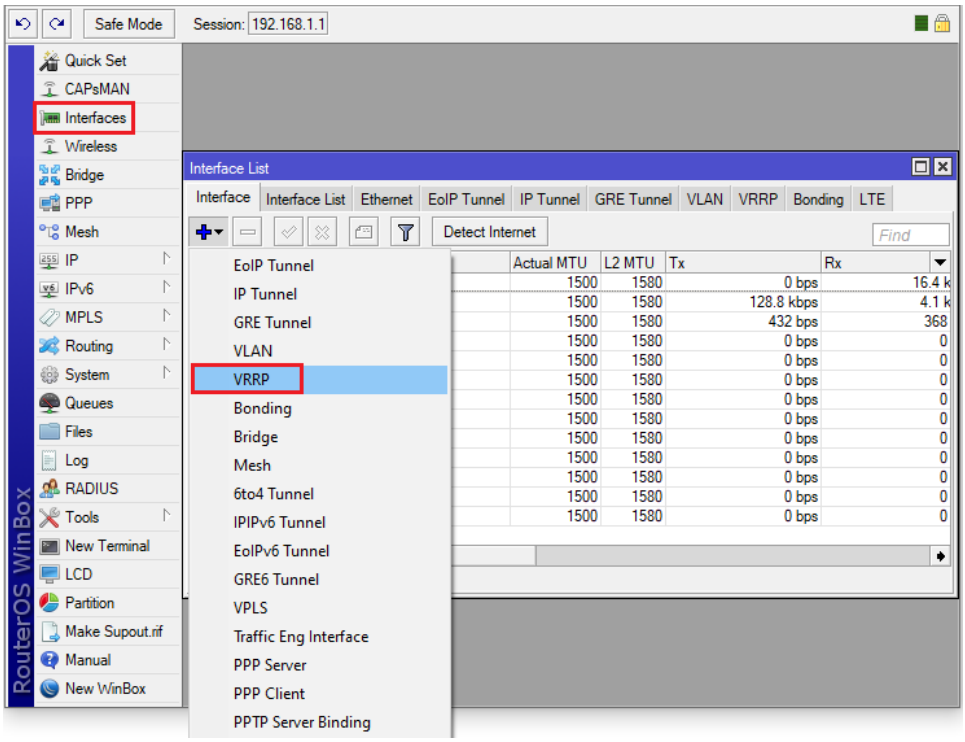
```
[admin@MikroTik]>
/ip address add address=192.168.1.1/24 interface=ether2
/ip dhcp-client add interface=ether1 disabled=no add-default-route=yes

/ip firewall nat add chain=srcnat action=masquerade out-interface=ether1
```

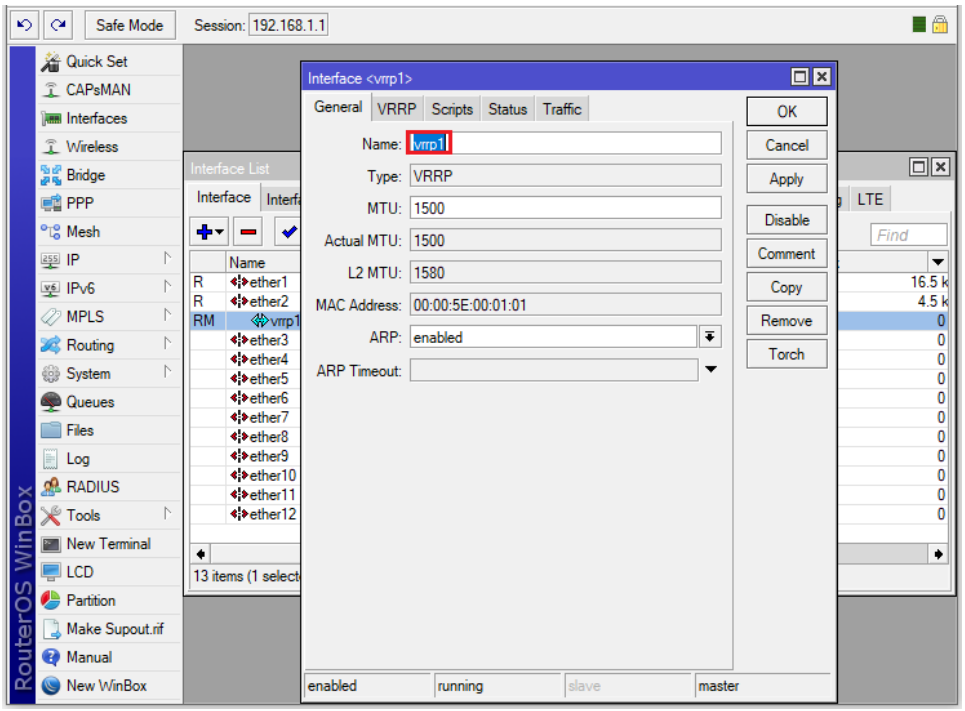
Bước 3. Cấu hình VRRP trên Router MikroTik.

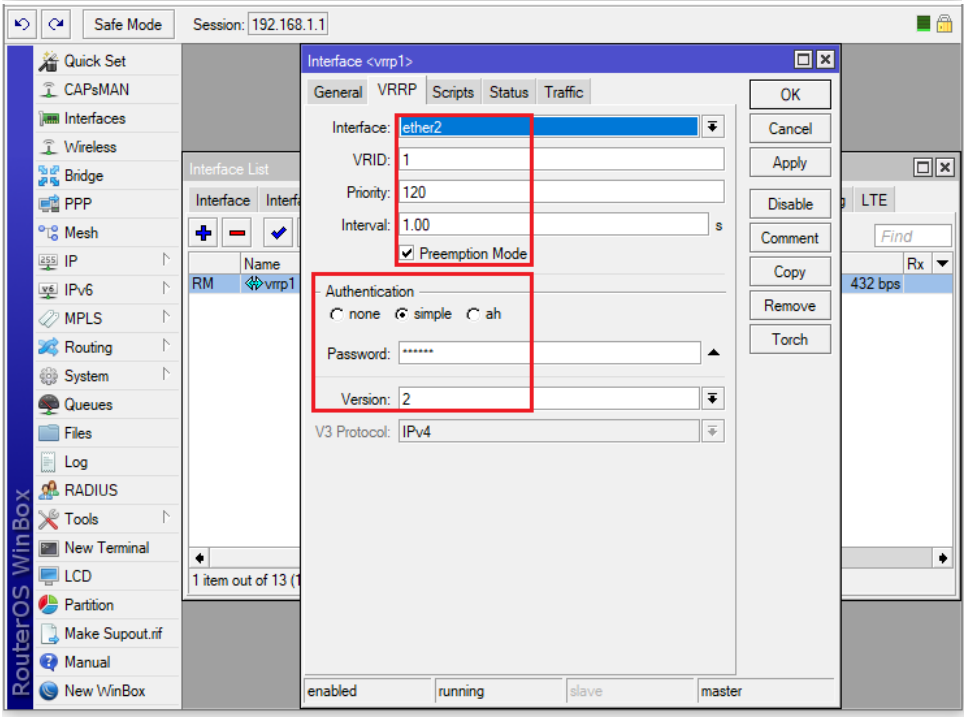
```
[admin@MikroTik]>
/interface vrrp add name=vrrp1 interface=ether2 vrid=1 priority=120 version=2 preemption-mode=yes
authentication=simple password="123456"
/ip address add address=192.168.1.3/32 interface=vrrp1
```

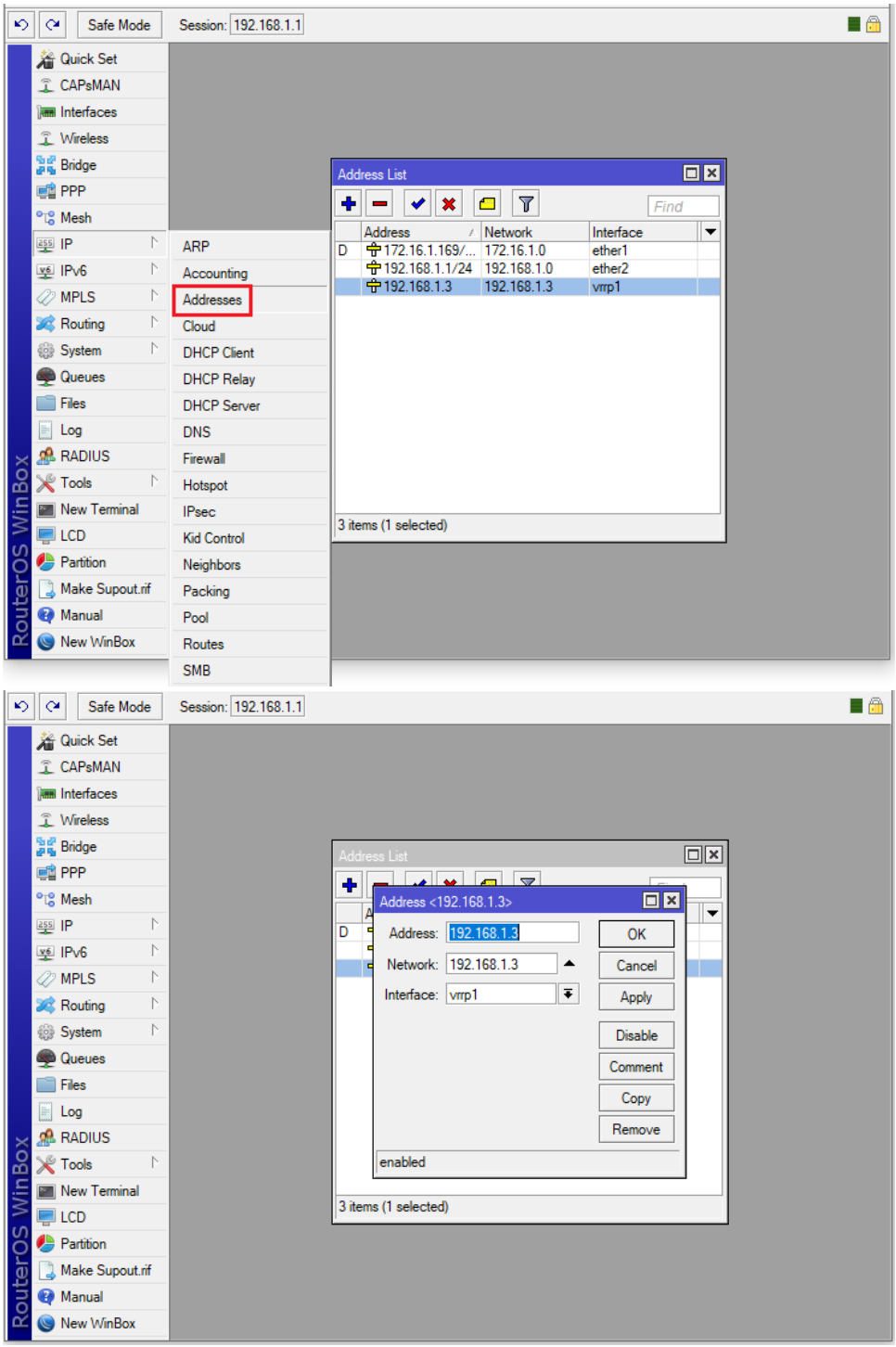
```
[admin@MikroTik] > /interface vrrp print
Flags: X - disabled, I - invalid, R - running, M - master, B - backup
 #      NAME        INTERFACE MAC-ADDRESS       VRI PRI INTERVAL              V V3..
 0  RM vrrp1       ether2    00:00:5E:00:01:01   1 120 1s                    2 ipv4
[admin@MikroTik] >
```

```
[admin@MikroTik] > /interface vrrp print detail
Flags: X - disabled, I - invalid, R - running, M - master, B - backup
 0  RM name="vrrp1" mtu=1500 mac-address=00:00:5E:00:01:01 arp=enabled
       arp-timeout=auto interface=ether2 vrid=1 priority=120 interval=1s
       preemption-mode=yes authentication=simple password="123456" on-backup=""
       on-master="" version=2 v3-protocol=ipv4
[admin@MikroTik] >
```

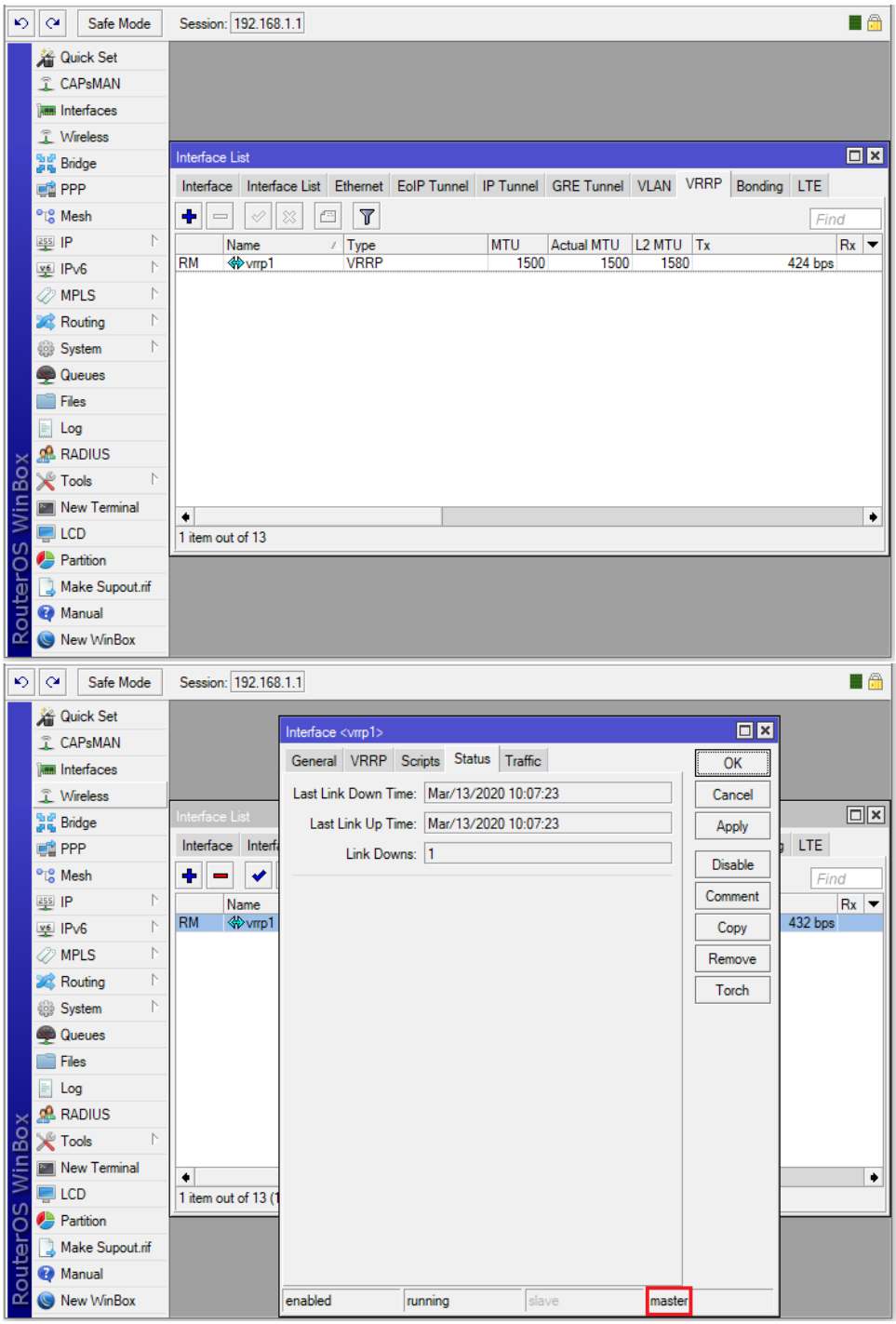


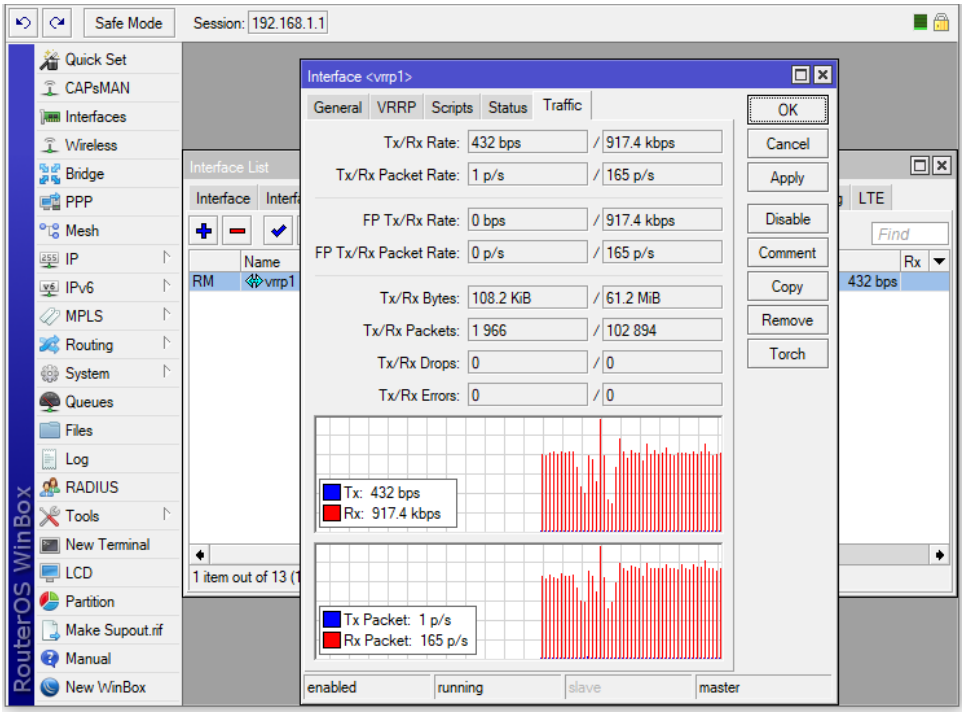

Safe Mode
Session: 192.168.1.1
Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Mesh
IP
IPv6
MPLS
Routing
System
Queues
Files
Log
RADIUS
Tools
New Terminal
LCD
Partition
Make Supout.rif
Manual
New WinBox
RouterOS WinBox
Interface List
Interface
Name
R ether1
R ether2
RM vrrp1
ether3
ether4
ether5
ether6
ether7
ether8
ether9
ether10
ether11
ether12
13 items (1 select
Interface <vrrp1>
General
VRRP
Scripts
Status
Traffic
Name: vrrp1
Type: VRRP
MTU: 1500
Actual MTU: 1500
L2 MTU: 1580
MAC Address: 00:00:5E:00:01:01
ARP: enabled
ARP Timeout:
OK
Cancel
Apply
Disable
Comment
Copy
Remove
Torch
enabled
running
slave
master
LTE
Find
16.5 k
4.5 k


Safe Mode
Session: 192.168.1.1
Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Mesh
IP
IPv6
MPLS
Routing
System
Queues
Files
Log
RADIUS
Tools
New Terminal
LCD
Partition
Make Supout.rif
Manual
New WinBox
RouterOS WinBox
Interface List
Interface
Name
RM vrrp1
1 item out of 13 (1
Interface <vrrp1>
General
VRRP
Scripts
Status
Traffic
Interface: ether2
VRID: 1
Priority: 120
Interval: 1.00 s
Preemption Mode
Authentication
none
simple
ah
Password: ******
Version: 2
V3 Protocol: IPv4
OK
Cancel
Apply
Disable
Comment
Copy
Remove
Torch
enabled
running
slave
master
LTE
Find
Rx
432 bps



Kiểm tra VRRP trên Router MikroTik.


Safe Mode
Session: 192.168.1.1
Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Mesh
IP
IPv6
MPLS
Routing
System
Queues
Files
Log
RADIUS
Tools
New Terminal
LCD
Partition
Make Supout.rif
Manual
New WinBox
RouterOS WinBox
Interface List
Interface
Interface List
Ethernet
EoIP Tunnel
IP Tunnel
GRE Tunnel
VLAN
VRRP
Bonding
LTE
Find
Name
Type
MTU
Actual MTU
L2 MTU
Tx
Rx
RM
vrrp1
VRRP
1500
1500
1580
424 bps
1 item out of 13
Interface <vrrp1>
General
VRRP
Scripts
Status
Traffic
OK
Cancel
Apply
Disable
Comment
Copy
Remove
Torch
Last Link Down Time:
Mar/13/2020 10:07:23
Last Link Up Time:
Mar/13/2020 10:07:23
Link Downs:
1
enabled
running
slave
master
432 bps



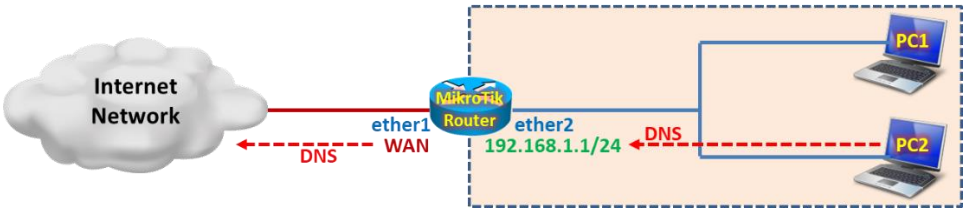
Kiểm tra VRRP trên Router Cisco.

```
CiscoRT# show vrrp brief
Interface          Grp Pri Time  Own Pre State   Master addr     Group addr
Gi0/0              1   100 3609        Y  Backup  192.168.1.1     192.168.1.3
CiscoRT#
```

```
CiscoRT# show vrrp
GigabitEthernet0/0 - Group 1
  State is Backup
  Virtual IP address is 192.168.1.3
  Virtual MAC address is 0000.5e00.0101
  Advertisement interval is 1.000 sec
  Preemption enabled
  Priority is 100
  Authentication text, string "123456"
  Master Router is 192.168.1.1, priority is 120
  Master Advertisement interval is 1.000 sec
  Master Down interval is 3.609 sec (expires in 3.561 sec)

CiscoRT#
```

Phần 15. Cấu hình các dịch vụ mở rộng trên Router MikroTik.

Phần 15.1. Cấu hình dịch vụ DNS Proxy và DNS Server trên Router MikroTik.



Tổng quan các bước thực hiện:

- **Bước 1.** Cấu hình cơ bản trên Router MikroTik.
- **Bước 2.** Thiết lập DNS Server & Proxy trên Router MikroTik.
- **Bước 3.** Thiết lập DHCP Server cấp IP LAN của Router MikroTik đóng vai trò là DNS Server.
- **Bước 4.** Thiết lập các dòng Static DNS Entries trên Router Router MikroTik.
- **Bước 5.** Thiết lập Firewall Rule chỉ cho phép lưu lượng DNS tới Router MikroTik.

Các bước thực hiện chi tiết:

Bước 1. Cấu hình cơ bản trên Router MikroTik.

Cấu hình cơ bản trên Router MikroTik.

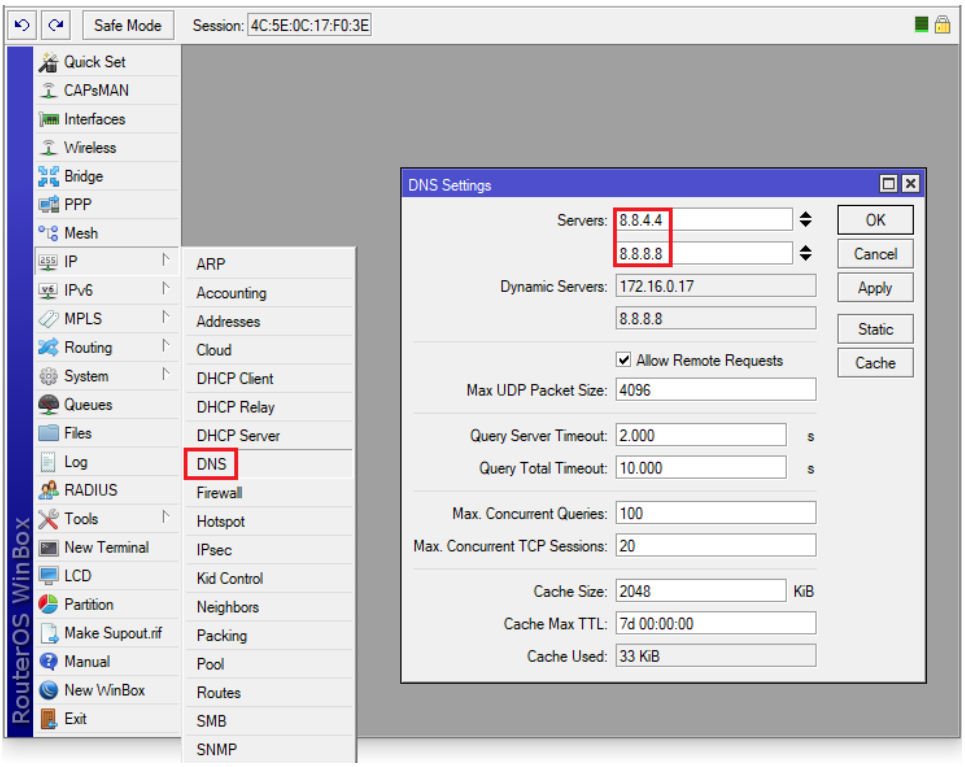
```
[admin@MikroTik]>
/ip address add address=192.168.1.1/24 interface=ether2
/ip dhcp-client add interface=ether1 disabled=no add-default-route=yes

/ip firewall nat add chain=srcnat action=masquerade out-interface=ether1
```

Bước 2. Thiết lập DNS Server & Proxy trên Router MikroTik.

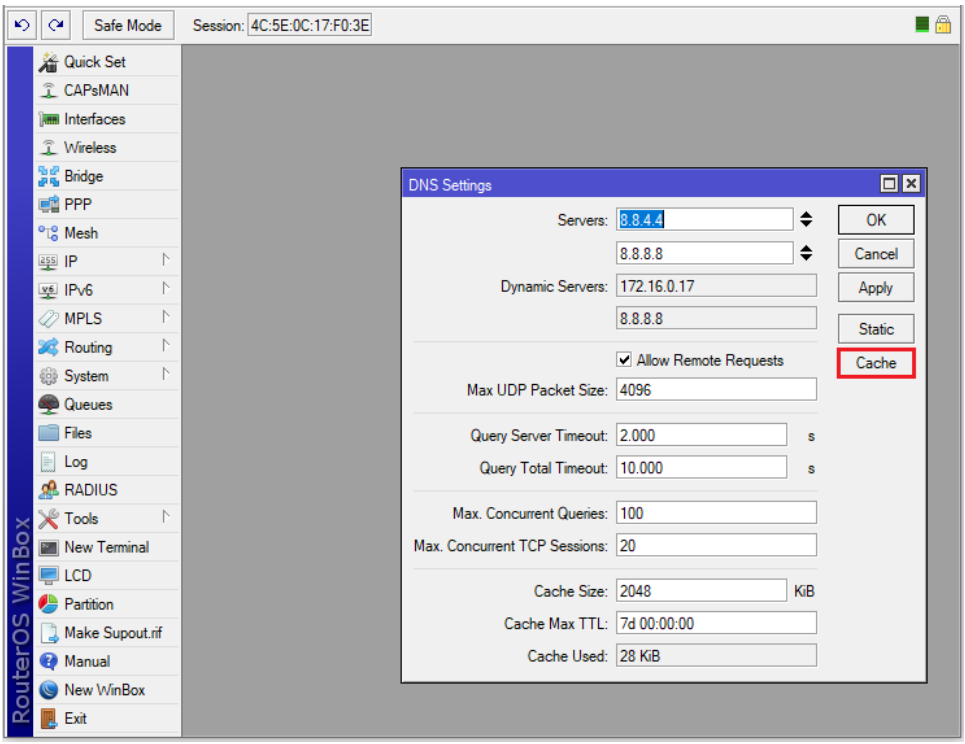
Router MikroTik có thể vừa đóng vai trò là DNS Server, vừa có thể đóng vai trò là DNS Client. Khi các máy tính khai báo DNS trỏ tới IP của Router MikroTik, Router MikroTik sẽ tiếp tục truy vấn DNS Server mà ta khai báo trên thiết bị rồi hồi đáp ngược trở về cho các máy tính người dùng.

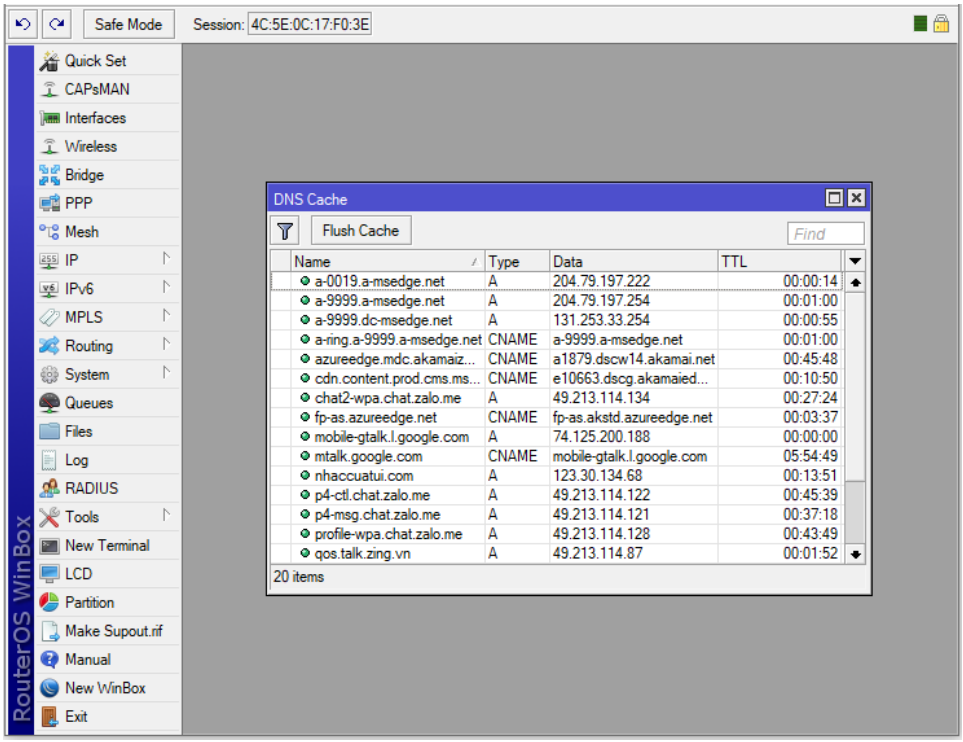
```
[admin@MikroTik]>
/ip dns set server=8.8.4.4,8.8.8.8 allow-remote-requests=yes
```

```
[admin@MikroTik] > /ip dns print
                    servers: 8.8.4.4,8.8.8.8
          dynamic-servers: 172.16.0.17,8.8.8.8
      allow-remote-requests: yes
        max-udp-packet-size: 4096
       query-server-timeout: 2s
        query-total-timeout: 10s
    max-concurrent-queries: 100
max-concurrent-tcp-sessions: 20
                 cache-size: 2048KiB
             cache-max-ttl: 1w
                cache-used: 23KiB
[admin@MikroTik] >
```



Kiểm tra DNS Cache trên Router MikroTik.





Bước 3. Thiết lập DHCP Server cấp IP LAN của Router MikroTik đóng vai trò là DNS Server.

```
[admin@MikroTik]>
/ip pool add name=PoolLAN ranges=192.168.1.10-192.168.1.100
/ip dhcp-server network add address=192.168.1.0/24 gateway=192.168.1.1 dns-server=192.168.1.1
/ip dhcp-server add name=DHCPserv interface=ether2 address-pool=PoolLAN disabled=no
```

Bước 4. Thiết lập các dòng Static DNS Entries trên Router Router MikroTik.

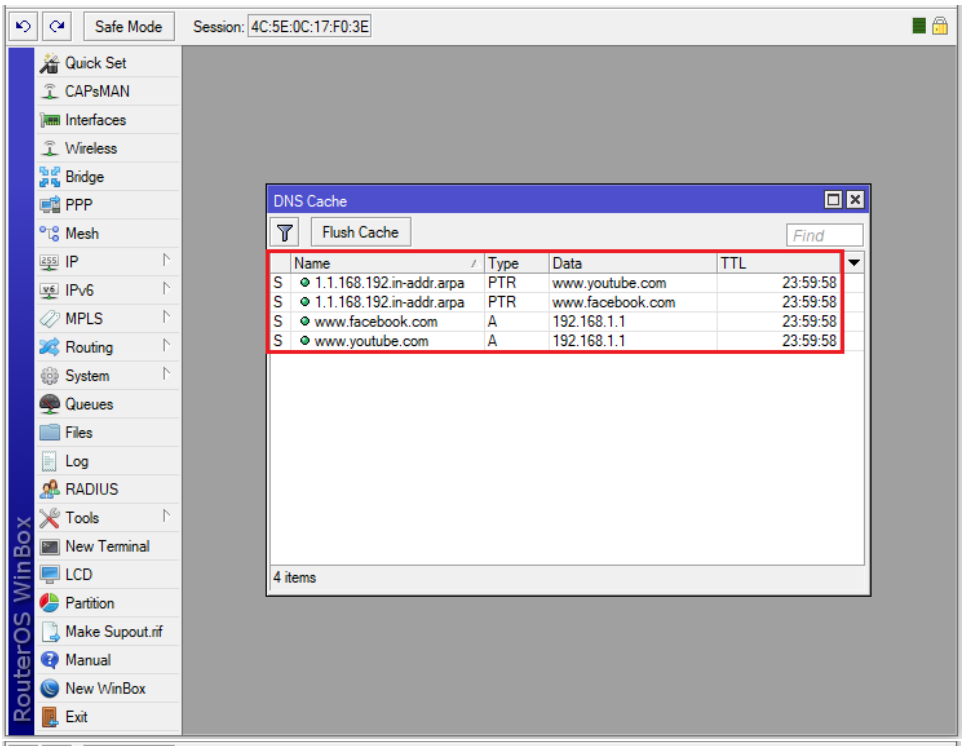
```
[admin@MikroTik]>
/ip dns static add name=www.youtube.com address=192.168.1.1
/ip dns static add name=www.facebook.com address=192.168.1.1
```

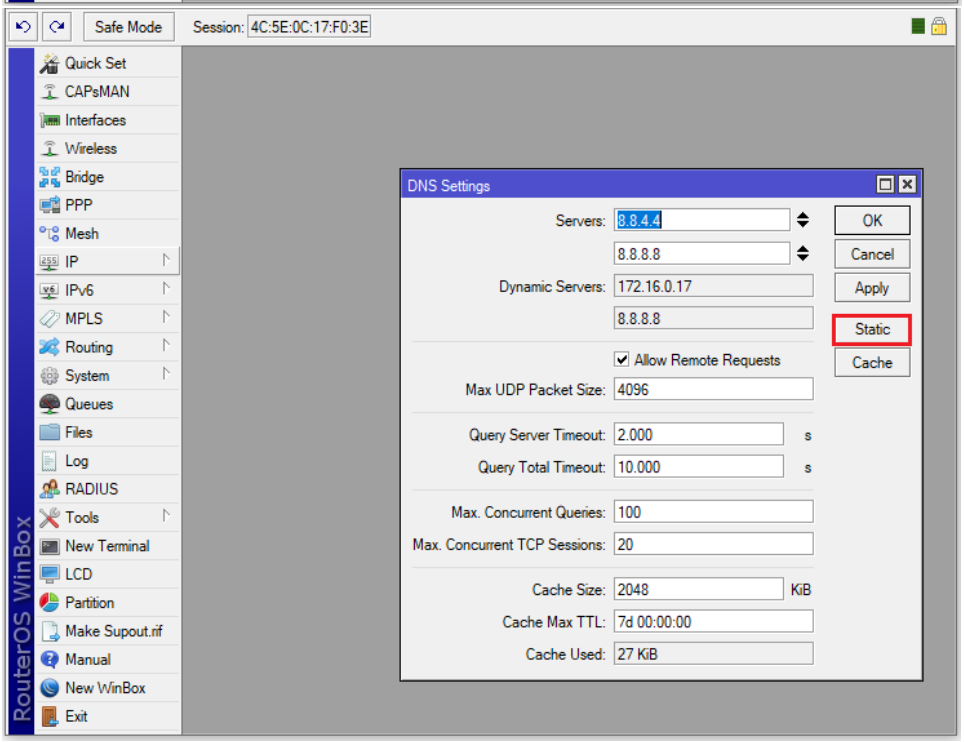
```
[admin@MikroTik] > /ip dns static print
Flags: D - dynamic, X - disabled
 #     NAME      REGEXP     ADDRESS                                  TTL
 0     www.y...             192.168.1.1                              1d
 1     www.f...             192.168.1.1                              1d
[admin@MikroTik] >
```

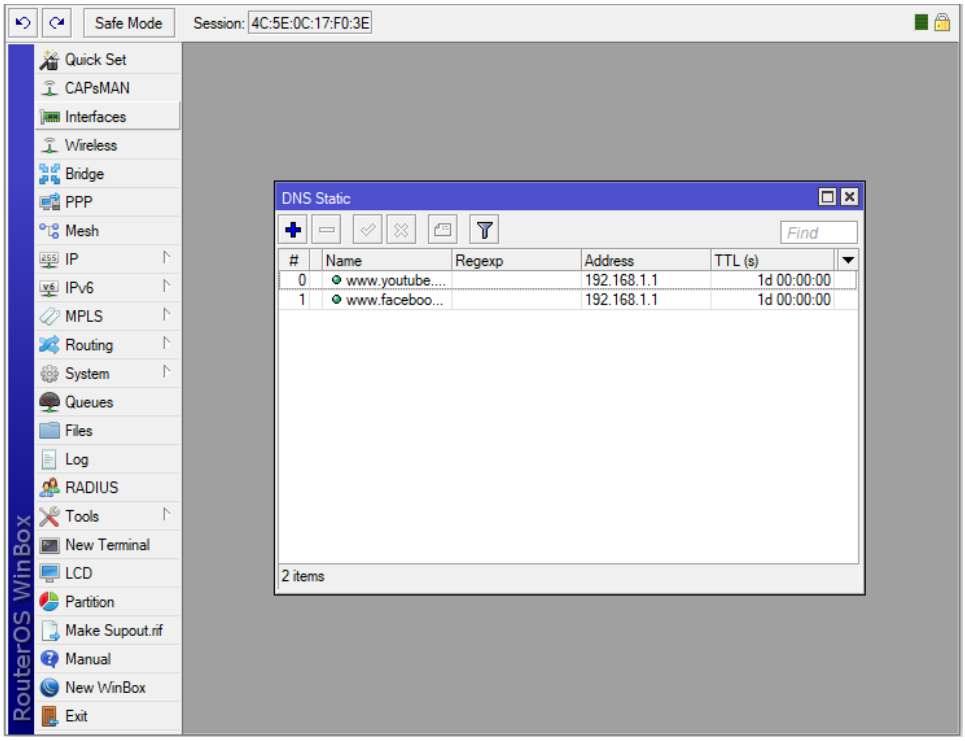
```
[admin@MikroTik] > /ip dns static print detail
Flags: D - dynamic, X - disabled
 0     name="www.youtube.com" regexp="" address=192.168.1.1 ttl=1d

 1     name="www.facebook.com" regexp="" address=192.168.1.1 ttl=1d
[admin@MikroTik] >
```

```
[admin@MikroTik] > /ip dns cache all print
Flags: S - static, N - negative
 #    NAME         TYPE  DATA                                     TTL
 0 S  www.yout...  A     192.168.1.1                              1d
 1 S  1.1.168....  PTR   www.youtube.com                          1d
 2 S  www.face...  A     192.168.1.1                              1d
```

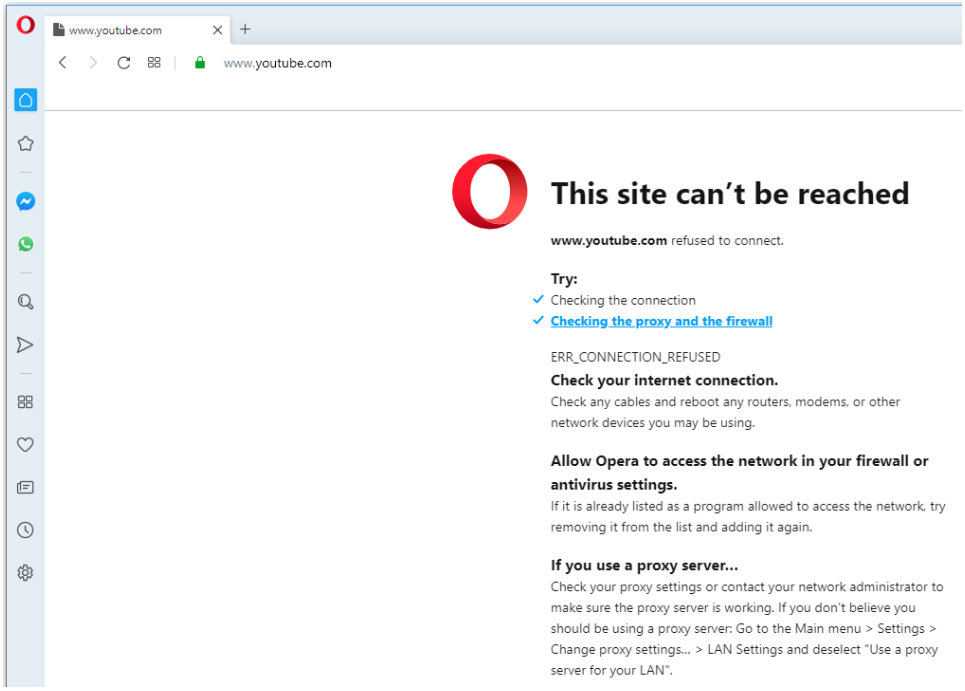
```
 3 S 1.1.168.... PTR   www.facebook.com                                 1d
 4   wdcp.mic... CNAME wd-prod-cp.trafficmanager.net                   10m49s
 5   wd-prod-... CNAME wd-prod-cp-as-southeast-2-fe.southeastasia....  2m39s
 6   wd-prod-... A     13.67.75.200                                    0s
[admin@MikroTik] >
```







Lúc này người dùng đầu cuối sẽ không thể truy cập tới Facebook hoặc Youtube.

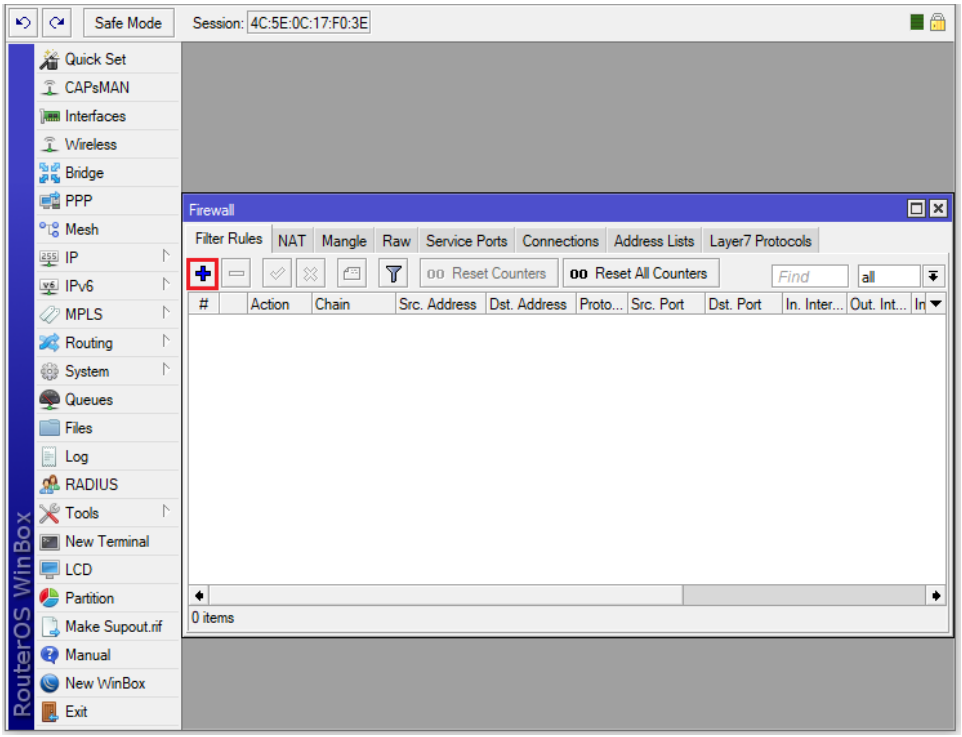


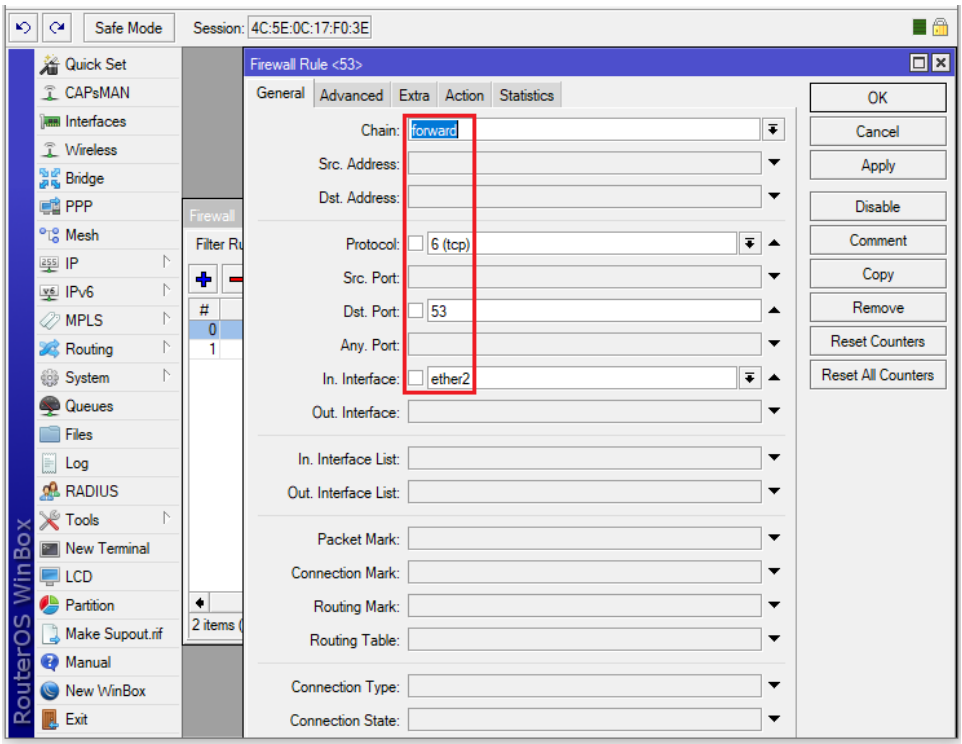
Bước 5. Thiết lập Firewall Rule chỉ cho phép lưu lượng DNS tới Router MikroTik.
Thiết lập Firewall Rule chặn tất cả các lưu lượng phân giải tên miền gửi tới bất kỳ DNS Server nào ngoài môi trường Internet, điều này yêu cầu các End User bắt buộc phải trỏ DNS Server tới IP của Router MikroTik thì mới phân giải được tên miền.

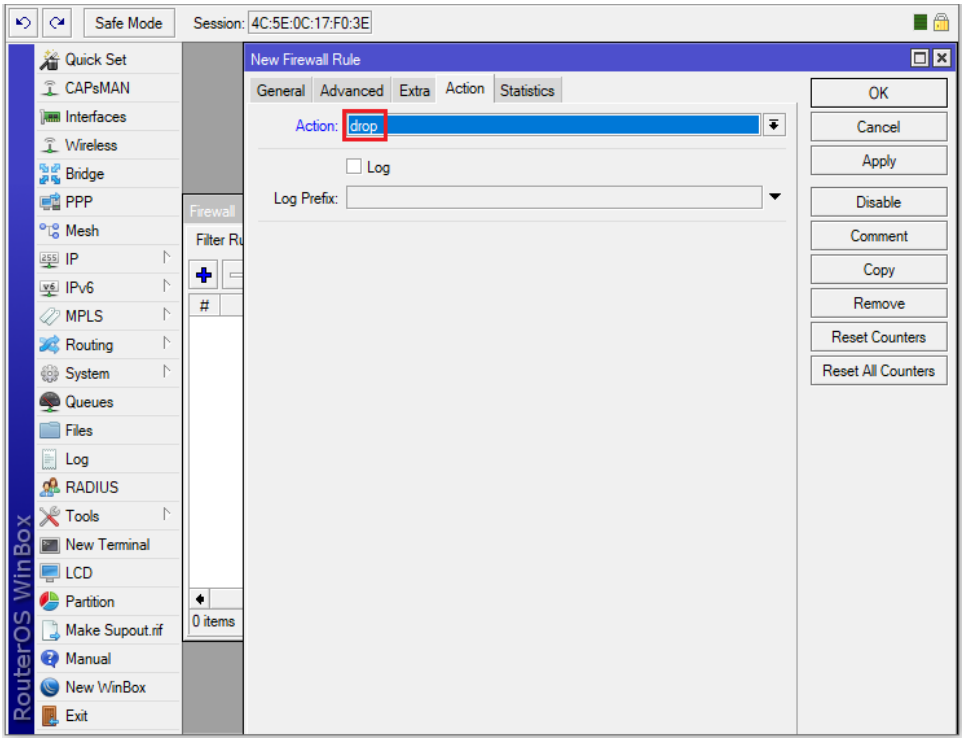
```
[admin@MikroTik] >
/ip firewall filter add chain=forward action=drop protocol=tcp in-interface=ether2 dst-port=53
/ip firewall filter add chain=forward action=drop protocol=udp in-interface=ether2 dst-port=53
```

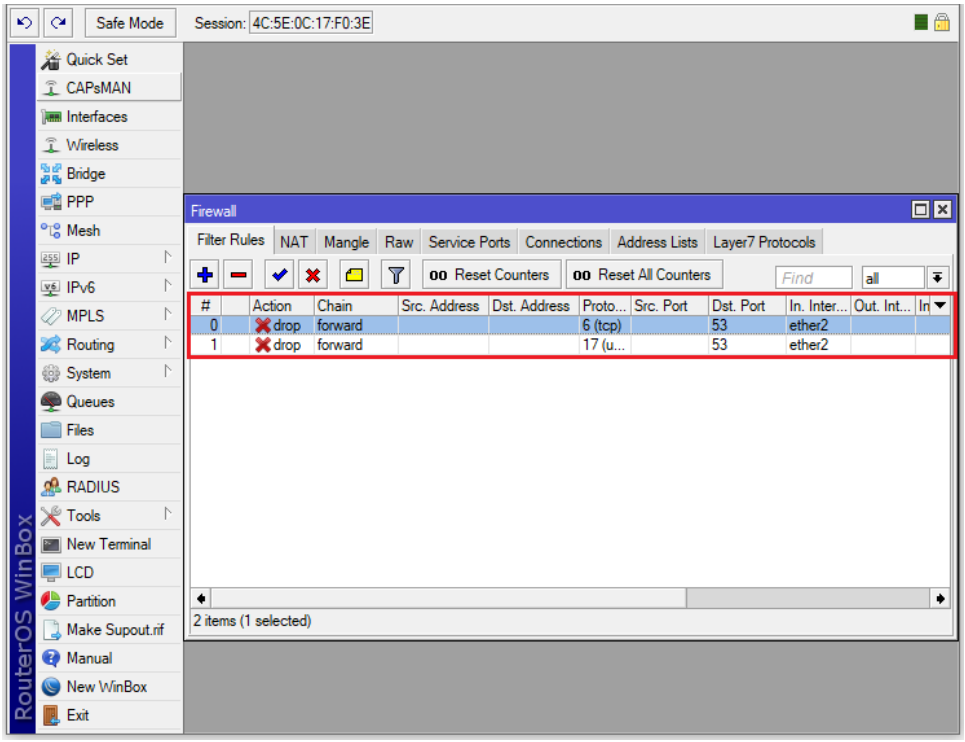
```
[admin@MikroTik] > /ip firewall filter print
Flags: X - disabled, I - invalid, D - dynamic
 0    chain=forward action=drop protocol=tcp in-interface=ether2 dst-port=53
      log=no log-prefix=""

 1    chain=forward action=drop protocol=udp in-interface=ether2 dst-port=53
      log=no log-prefix=""
[admin@MikroTik] >
```

```
[admin@MikroTik] > /ip firewall filter print detail
Flags: X - disabled, I - invalid, D - dynamic
 0    chain=forward action=drop protocol=tcp in-interface=ether2 dst-port=53
      log=no log-prefix=""

 1    chain=forward action=drop protocol=udp in-interface=ether2 dst-port=53
      log=no log-prefix=""
[admin@MikroTik] >
```

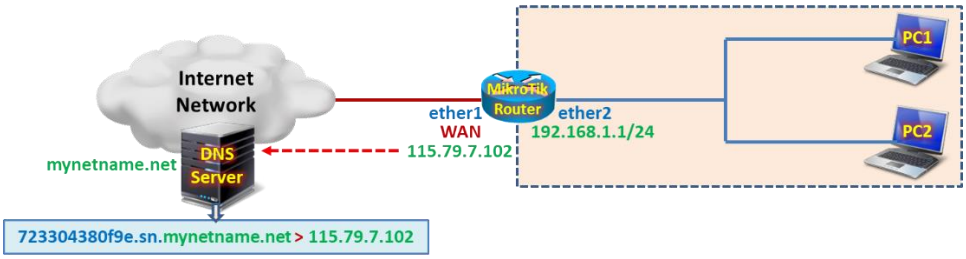



Safe Mode
Session: 4C:5E:0C:17:F0:3E
Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Mesh
IP
IPv6
MPLS
Routing
System
Queues
Files
Log
RADIUS
Tools
New Terminal
LCD
Partition
Make Supout.rif
Manual
New WinBox
Exit
RouterOS WinBox
Firewall Rule <53>
General
Advanced
Extra
Action
Statistics
Chain: forward
Src. Address:
Dst. Address:
Protocol: 6 (tcp)
Src. Port:
Dst. Port: 53
Any. Port:
In. Interface: ether2
Out. Interface:
In. Interface List:
Out. Interface List:
Packet Mark:
Connection Mark:
Routing Mark:
Routing Table:
Connection Type:
Connection State:
OK
Cancel
Apply
Disable
Comment
Copy
Remove
Reset Counters
Reset All Counters
2 items


Safe Mode
Session: 4C:5E:0C:17:F0:3E
Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Mesh
IP
IPv6
MPLS
Routing
System
Queues
Files
Log
RADIUS
Tools
New Terminal
LCD
Partition
Make Supout.rif
Manual
New WinBox
Exit
RouterOS WinBox
New Firewall Rule
General
Advanced
Extra
Action
Statistics
Action: drop
Log
Log Prefix:
OK
Cancel
Apply
Disable
Comment
Copy
Remove
Reset Counters
Reset All Counters
0 items

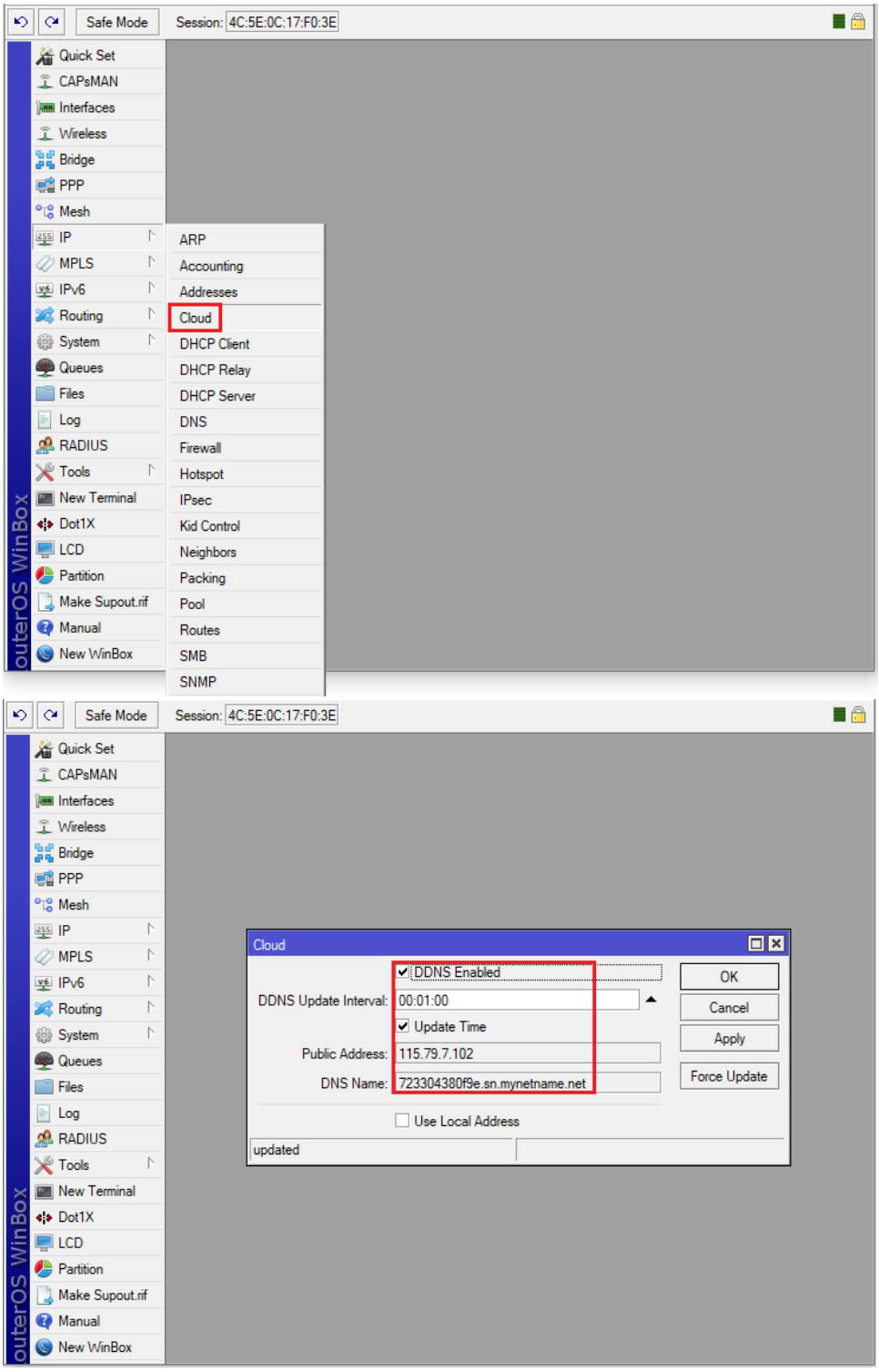


Phần 15.2. Cấu hình tính năng Dynamic DNS trên Router MikroTik.

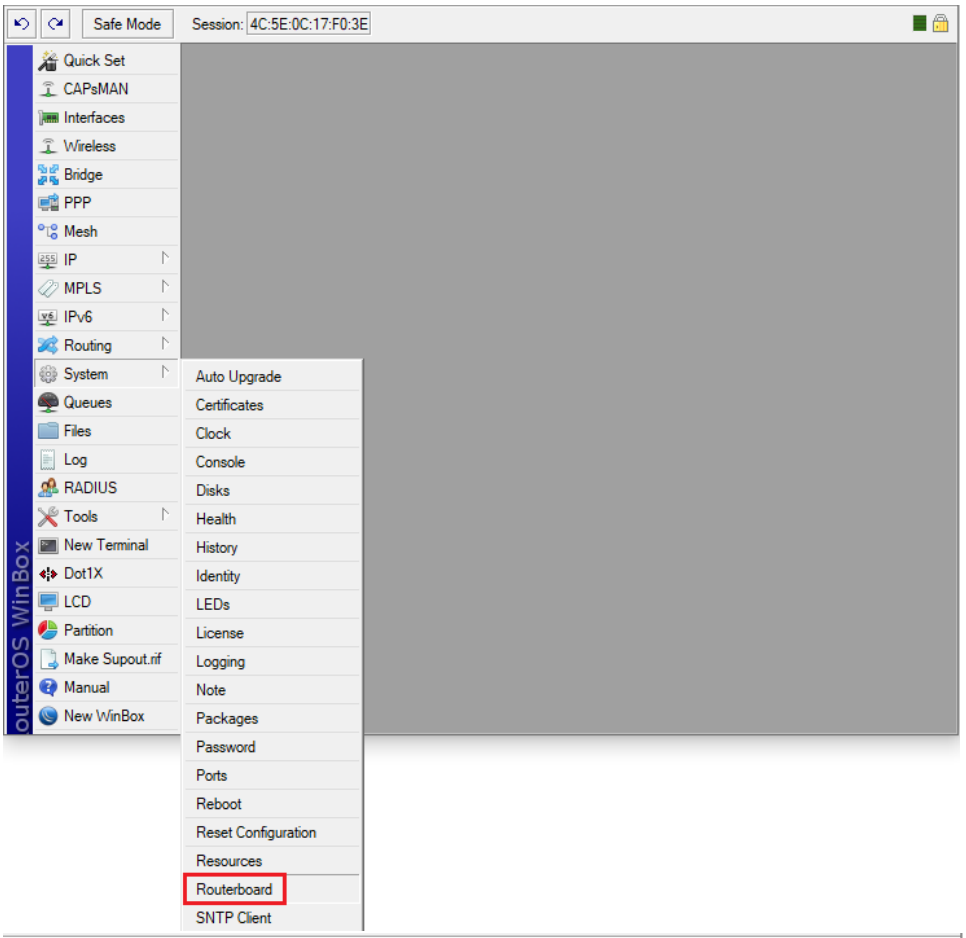


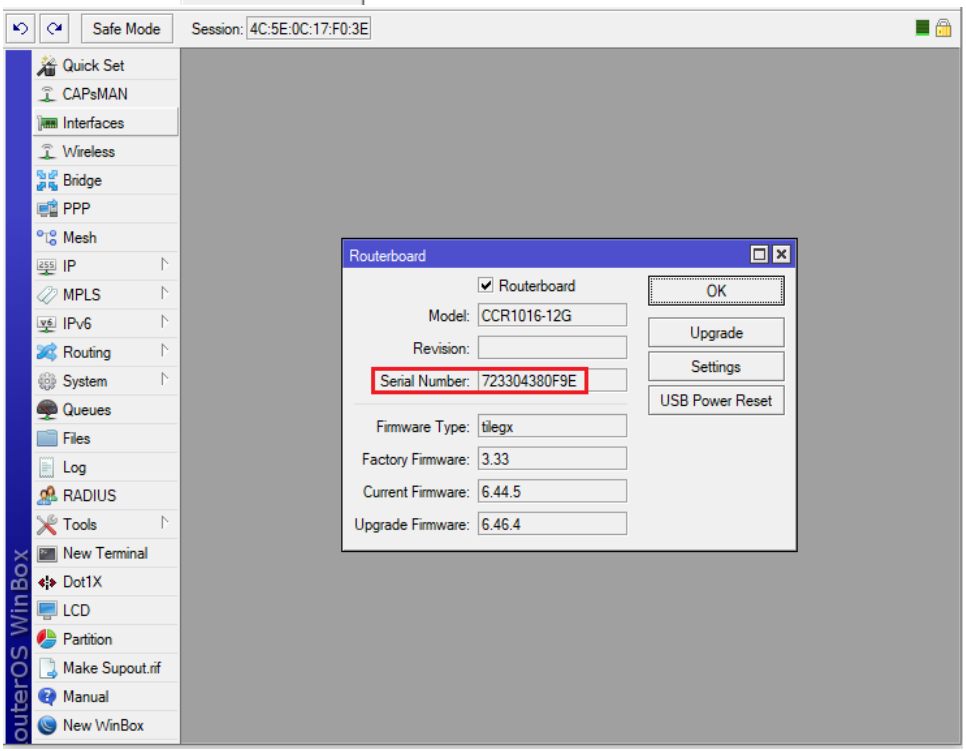

```
[admin@MikroTik] >
/ip cloud set ddns-enabled=yes ddns-update-interval=1m
```

```
 [admin@MikroTik] > /ip cloud print
          ddns-enabled: yes
  ddns-update-interval: 1m
           update-time: yes
        public-address: 115.79.7.102
              dns-name: 723304380f9e.sn.mynetname.net
                status: updated
[admin@MikroTik] >
```

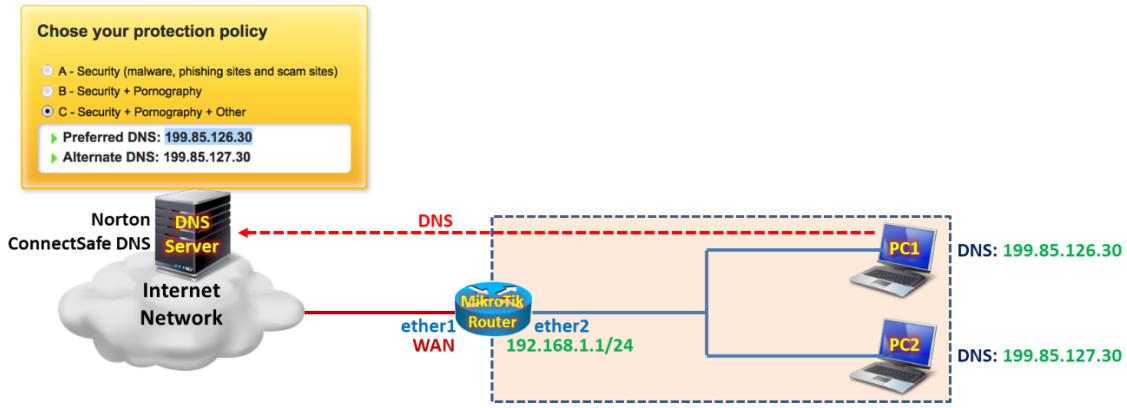


Kiểm tra mã Serial Number của thiết bị Router MikroTik.


Safe Mode
Session: 4C:5E:0C:17:F0:3E
Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Mesh
IP
MPLS
IPv6
Routing
System
Queues
Files
Log
RADIUS
Tools
New Terminal
Dot1X
LCD
Partition
Make Supout.rif
Manual
New WinBox
outerOS WinBox
Auto Upgrade
Certificates
Clock
Console
Disks
Health
History
Identity
LEDs
License
Logging
Note
Packages
Password
Ports
Reboot
Reset Configuration
Resources
Routerboard
SNTP Client


Safe Mode
Session: 4C:5E:0C:17:F0:3E
Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Mesh
IP
MPLS
IPv6
Routing
System
Queues
Files
Log
RADIUS
Tools
New Terminal
Dot1X
LCD
Partition
Make Supout.rif
Manual
New WinBox
outerOS WinBox
Routerboard
Routerboard
Model: CCR1016-12G
Revision:
Serial Number: 723304380F9E
Firmware Type: tilegx
Factory Firmware: 3.33
Current Firmware: 6.44.5
Upgrade Firmware: 6.46.4
OK
Upgrade
Settings
USB Power Reset

Phần 15.3. Chặn tất cả người dùng không được phép truy cập tới các Website có nội dung đồi trụy sử dụng Norton DNS Server.



Tổng quan các bước thực hiện:

- **Bước 1.** Cấu hình cơ bản trên Router MikroTik.
- **Bước 2.** Cấu hình DHCP Server trên Router MikroTik cấp thông tin Norton DNS cho các End User.
- **Bước 3.** Cấu hình Firewall Filter Rule trên Router MikroTik chặn tất cả lưu lượng truy cập DNS ngoài Internet ngoại trừ danh sách các IP của Norton DNS.
- **Bước 4.** Khảo sát kết quả chặn truy cập tới các WebSite có nội dung đồi trụy.

Các bước thực hiện chi tiết:

Bước 1. Cấu hình cơ bản trên Router MikroTik.

Cấu hình cơ bản trên Router MikroTik.

```
[admin@MikroTik]>
/ip address add address=192.168.1.1/24 interface=ether2
/ip dhcp-client add interface=ether1 disabled=no add-default-route=yes

/ip firewall nat add chain=srcnat action=masquerade out-interface=ether1
```

Bước 2. Cấu hình DHCP Server trên Router MikroTik cấp thông tin Norton DNS cho các End User.

```
[admin@MikroTik]>
/ip pool add name=PoolLAN ranges=192.168.1.10-192.168.1.100
/ip dhcp-server network add address=192.168.1.0/24 gateway=192.168.1.1 dns-
server=199.85.126.30,199.85.127.30
/ip dhcp-server add name=DHCPserv interface=ether2 address-pool=PoolLAN disabled=no
```

Bước 3. Cấu hình Firewall Filter Rule trên Router MikroTik chặn tất cả lưu lượng truy cập DNS ngoài Internet ngoại trừ danh sách các IP của Norton DNS.

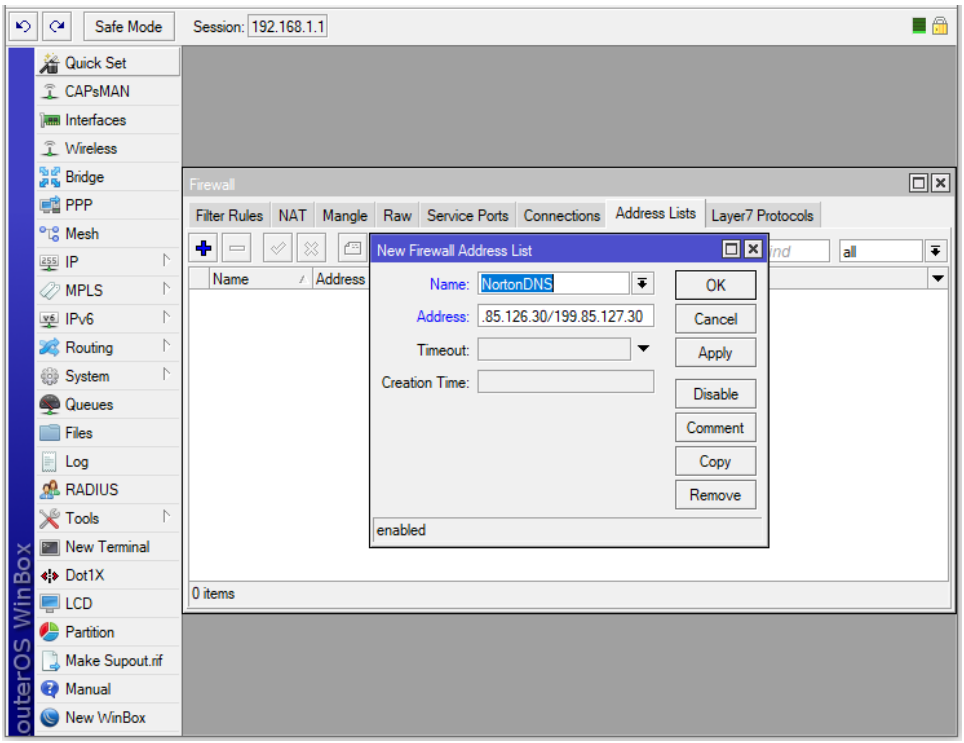
Thiết lập Address Lists chứa danh sách các Norton ConnectSafe DNS.

- Nên sử dụng NortonDNS sau: 199.85.126.20 & 199.85.127.20.

```
[admin@MikroTik]>
/ip firewall address-list add list=NortonDNS address=199.85.126.30/199.85.127.30
```

```
[admin@MikroTik] > /ip firewall address-list print
Flags: X - disabled, D - dynamic
 #    LIST              ADDRESS                                 CREATION-TIME
 0    NortonDNS         199.85.126.30-255.255.254.255           apr/09/2020 18:54:07
[admin@MikroTik] >
```

```
 [admin@MikroTik] > /ip firewall address-list print detail
Flags: X - disabled, D - dynamic
 0    list=NortonDNS address=199.85.126.30-255.255.254.255
      creation-time=apr/09/2020 18:54:07
[admin@MikroTik] >
```



Thiết lập Firewall Filter Rule trên Router MikroTik chặn tất cả lưu lượng truy cập DNS ngoài Internet ngoại trừ danh sách các IP của Norton DNS.

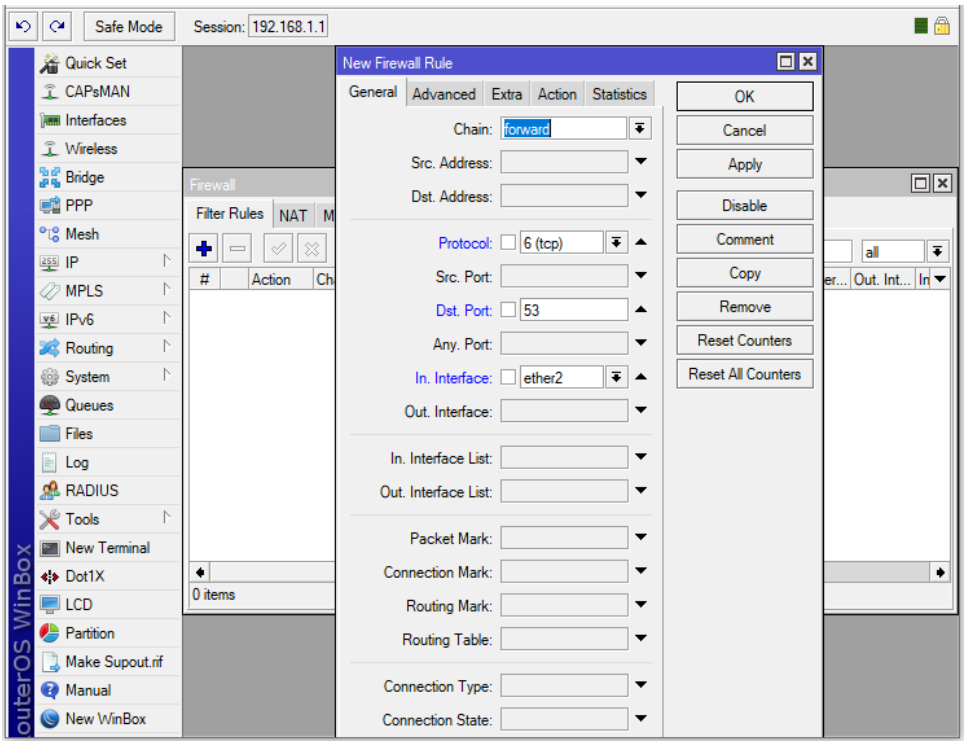
```
[admin@MikroTik]>
/ip firewall filter add chain=forward protocol=tcp in-interface=ether2 dst-port=53 dst-address-
list=!NortonDNS action=drop
/ip firewall filter add chain=forward protocol=udp in-interface=ether2 dst-port=53 dst-address-
list=!NortonDNS action=drop
```

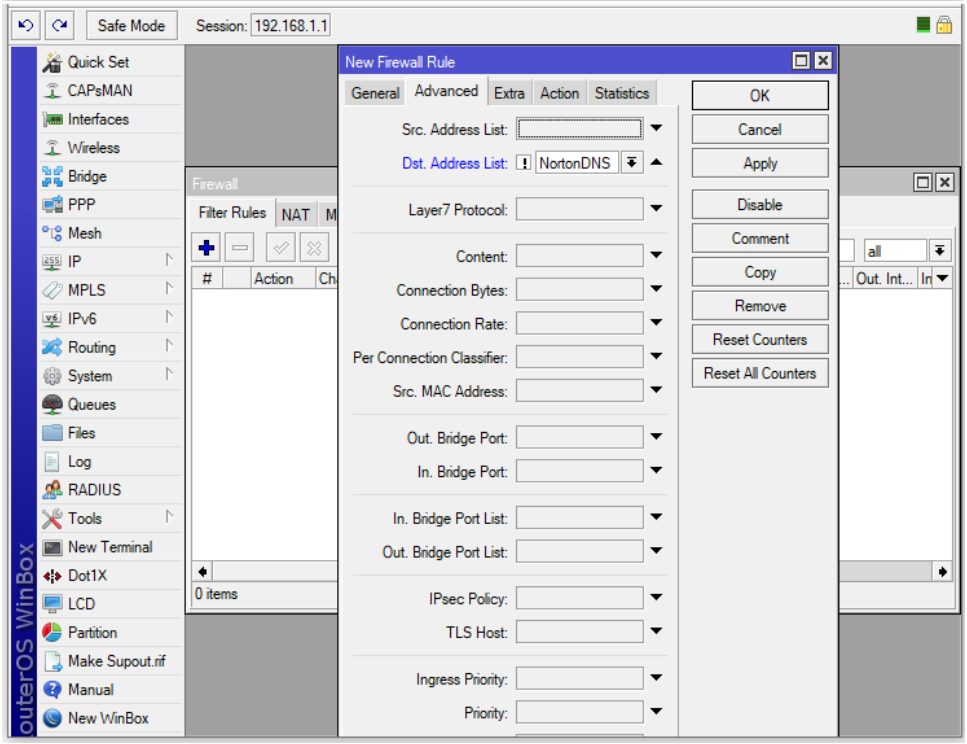
```
[admin@MikroTik] > /ip firewall filter print
Flags: X - disabled, I - invalid, D - dynamic
 0    chain=forward action=drop protocol=tcp dst-address-list=!NortonDNS
      in-interface=ether2 dst-port=53 log=no log-prefix=""

 1    chain=forward action=drop protocol=udp dst-address-list=!NortonDNS
      in-interface=ether2 dst-port=53 log=no log-prefix=""
[admin@MikroTik] >
```

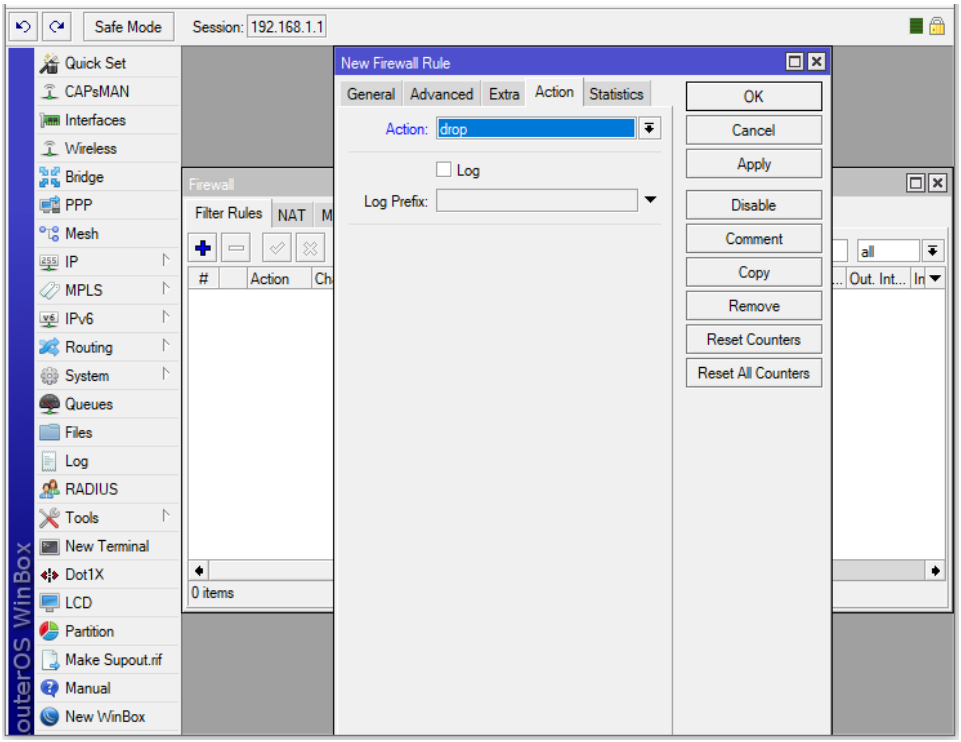
Lúc này, máy tính sử dụng DNS không phải của Norton sẽ không thể phân giải được tên miền.

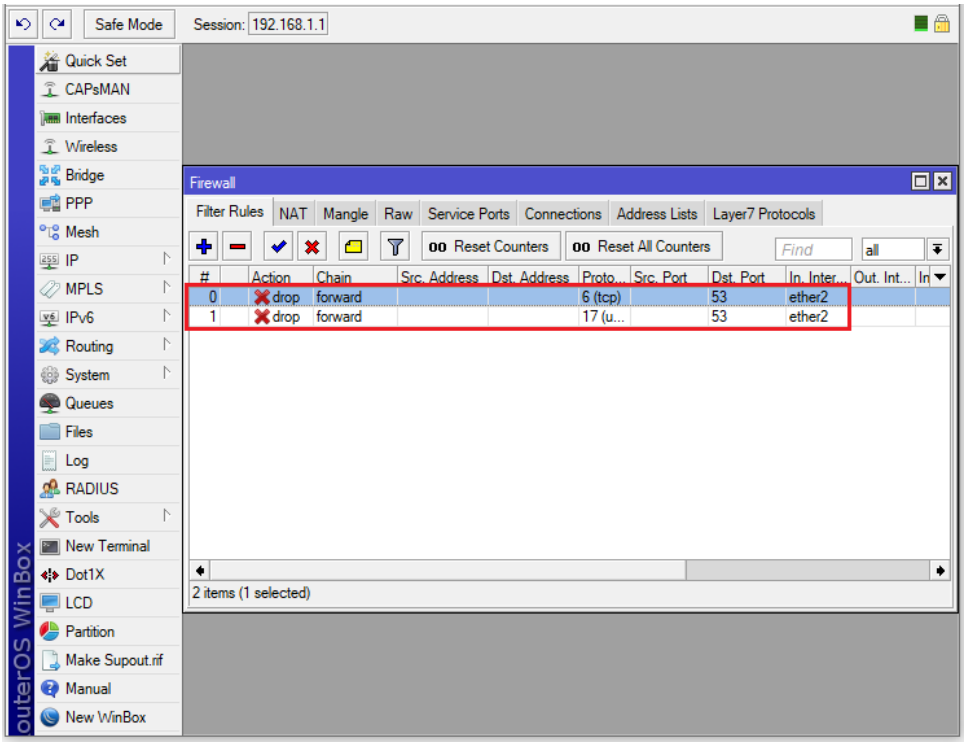
```
C:\Users\buipham>nslookup
DNS request timed out.
    timeout was 2 seconds.
Default Server:  UnKnown
Address:  8.8.4.4

> google.com
Server:  UnKnown
Address:  8.8.4.4

DNS request timed out.
    timeout was 2 seconds.
DNS request timed out.
    timeout was 2 seconds.
DNS request timed out.
    timeout was 2 seconds.
DNS request timed out.
    timeout was 2 seconds.
*** Request to UnKnown timed-out
>
```

```
C:\Users\buipham>nslookup
Default Server:  UnKnown
Address:  199.85.126.30

> google.com
Server:  UnKnown
Address:  199.85.126.30

Non-authoritative answer:
Name:    google.com
Addresses:  2607:f8b0:4007:801::200e
          216.58.217.206

>
```


Safe Mode
Session: 192.168.1.1
Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Mesh
IP
MPLS
IPv6
Routing
System
Queues
Files
Log
RADIUS
Tools
New Terminal
Dot1X
LCD
Partition
Make Supout.rif
Manual
New WinBox
outerOS WinBox
Firewall
Filter Rules
NAT
Action
0 items
New Firewall Rule
General
Advanced
Extra
Action
Statistics
Chain: forward
Src. Address:
Dst. Address:
Protocol: 6 (tcp)
Src. Port:
Dst. Port: 53
Any. Port:
In. Interface: ether2
Out. Interface:
In. Interface List:
Out. Interface List:
Packet Mark:
Connection Mark:
Routing Mark:
Routing Table:
Connection Type:
Connection State:
OK
Cancel
Apply
Disable
Comment
Copy
Remove
Reset Counters
Reset All Counters


Safe Mode
Session: 192.168.1.1
Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Mesh
IP
MPLS
IPv6
Routing
System
Queues
Files
Log
RADIUS
Tools
New Terminal
Dot1X
LCD
Partition
Make Supout.rif
Manual
New WinBox
outerOS WinBox
Firewall
Filter Rules
NAT
Action
0 items
New Firewall Rule
General
Advanced
Extra
Action
Statistics
Src. Address List:
Dst. Address List: NortonDNS
Layer7 Protocol:
Content:
Connection Bytes:
Connection Rate:
Per Connection Classifier:
Src. MAC Address:
Out. Bridge Port:
In. Bridge Port:
In. Bridge Port List:
Out. Bridge Port List:
IPsec Policy:
TLS Host:
Ingress Priority:
Priority:
OK
Cancel
Apply
Disable
Comment
Copy
Remove
Reset Counters
Reset All Counters



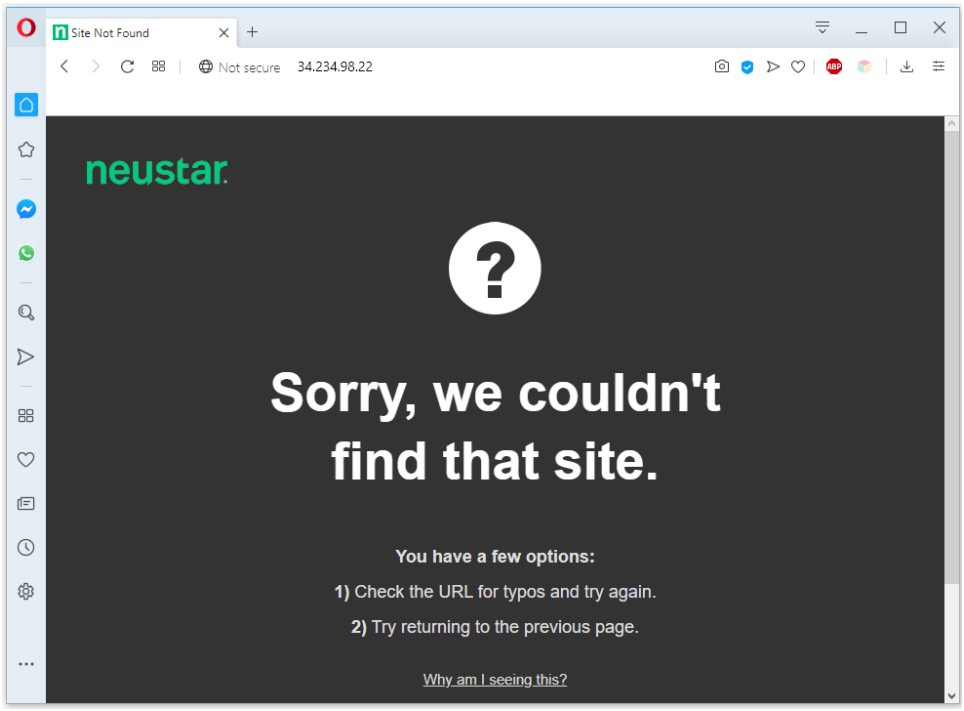


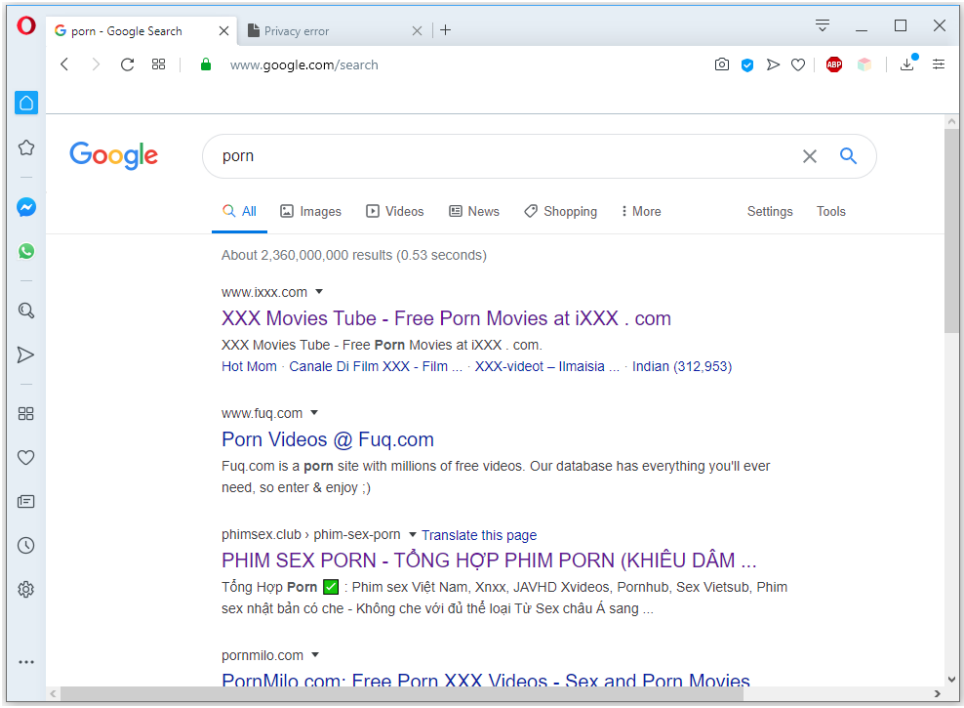
Bước 4. Khảo sát kết quả chặn truy cập tới các WebSite có nội dung đồi trụy.

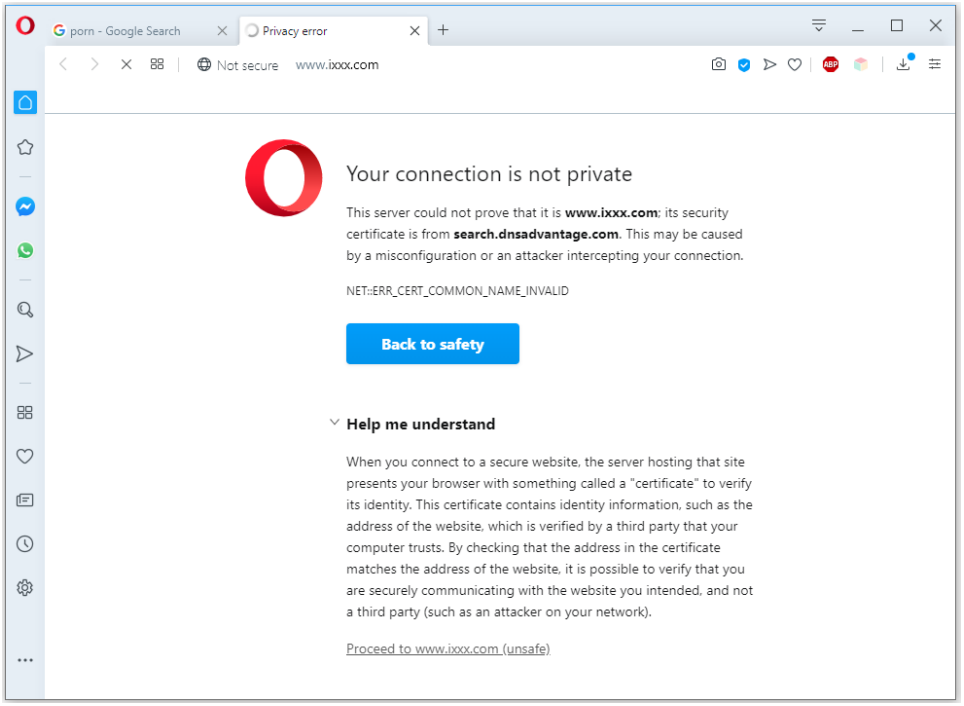
```
C:\Users\buipham>nslookup
Default Server:  UnKnown
Address:  199.85.126.30
```

```
> www.ixxx.com
Server:  UnKnown
Address:  199.85.126.30

Non-authoritative answer:
Name:    www.ixxx.com
Addresses:  156.154.176.30
          156.154.175.30

>
```

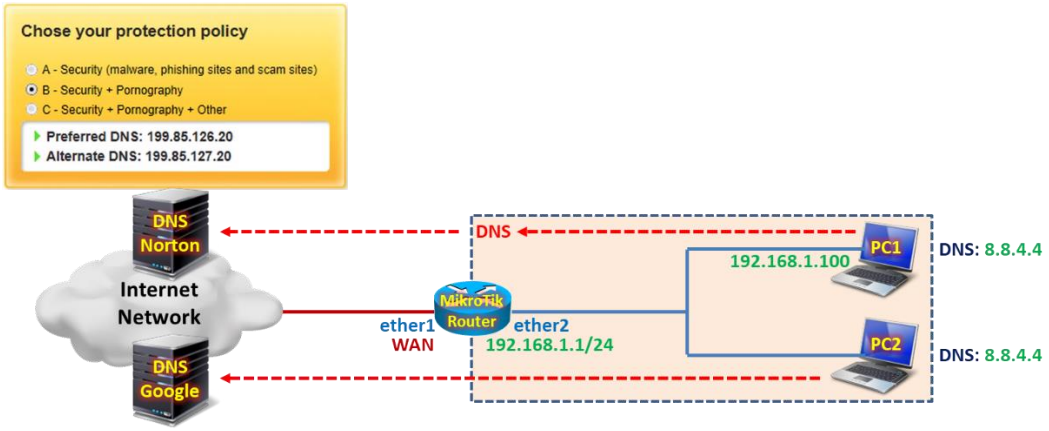
```
C:\Users\buipham>nslookup
Default Server:  UnKnown
Address:  199.85.126.30

> www.fuq.com
Server:  UnKnown
Address:  199.85.126.30

Non-authoritative answer:
Name:    www.fuq.com
Addresses:  156.154.176.30
          156.154.175.30

>
```







Phần 15.4. Chặn User cụ thể không được phép truy cập tới các Website có nội dung đồi trụy sử dụng Norton DNS Server.



Tổng quan các bước thực hiện:

- **Bước 1.** Cấu hình cơ bản trên Router MikroTik.
- **Bước 2.** Thiết lập DHCP Static cấp IP tĩnh cho PC.
- **Bước 3.** Thiết lập Address List chứa danh sách Source IP muốn chuyển hướng lưu lượng DNS tới Norton DNS Server.
- **Bước 4.** Cấu hình tính năng Destination-NAT chuyển hướng lưu lượng DNS tới Norton DNS Server.
- **Bước 5.** Kiểm tra kết quả chuyển hướng lưu lượng DNS tới Norton DNS Server.

Các bước thực hiện chi tiết:

Bước 1. Cấu hình cơ bản trên Router MikroTik.

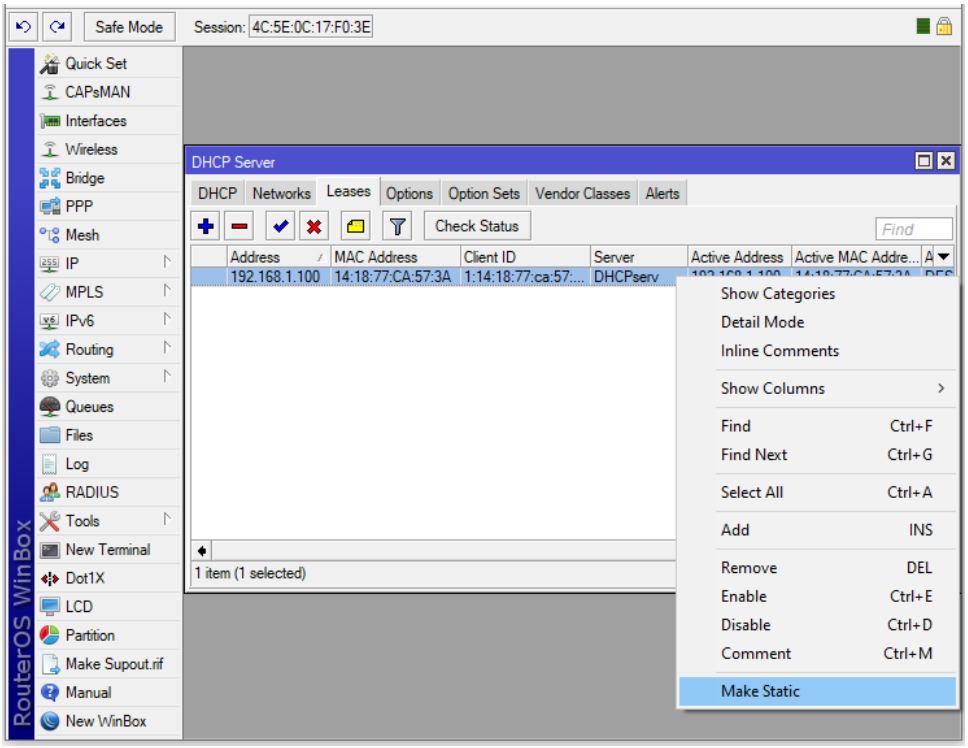
```
[admin@MikroTik]>
/ip address add address=192.168.1.1/24 interface=ether2
/ip dhcp-client add interface=ether1 disabled=no add-default-route=yes

/ip firewall nat add chain=srcnat action=masquerade out-interface=ether1
```

Bước 2. Thiết lập DHCP Static cấp IP tĩnh cho PC.

```
[admin@MikroTik] > /ip dhcp-server lease print
Flags: X - disabled, R - radius, D - dynamic, B - blocked
 #    ADDRESS            MAC-ADDRESS       H SE.. R STATUS   LAST-SEEN
 0    192.168.1.100      14:18:77:CA:57:3A D DH..   bound    2m44s
[admin@MikroTik] >
```

```
[admin@MikroTik]>
/ip dhcp-server lease make-static 0
```

```
[admin@MikroTik] > /ip dhcp-server lease print detail
Flags: X - disabled, R - radius, D - dynamic, B - blocked
 0   address=192.168.1.100 mac-address=14:18:77:CA:57:3A
     client-id="1:14:18:77:ca:57:3a" address-lists="" server=DHCPserv
     dhcp-option="" status=bound expires-after=6m45s last-seen=3m15s
     active-address=192.168.1.100 active-mac-address=14:18:77:CA:57:3A
     active-client-id="1:14:18:77:ca:57:3a" active-server=DHCPserv
     host-name="DESKTOP-HACFP9Q"
[admin@MikroTik] >
```

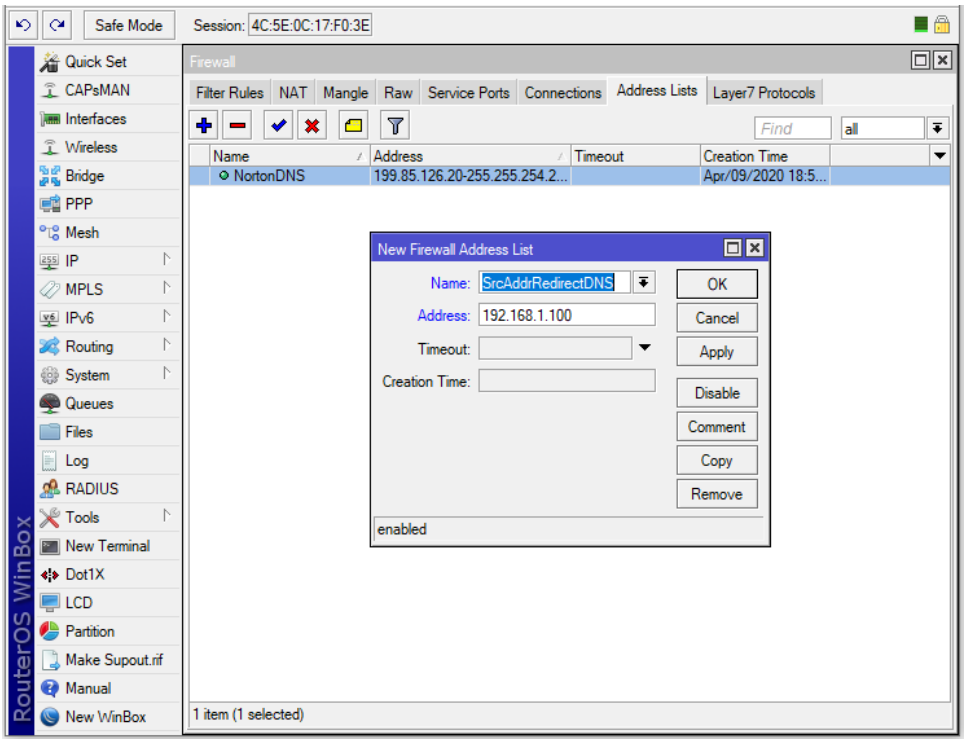


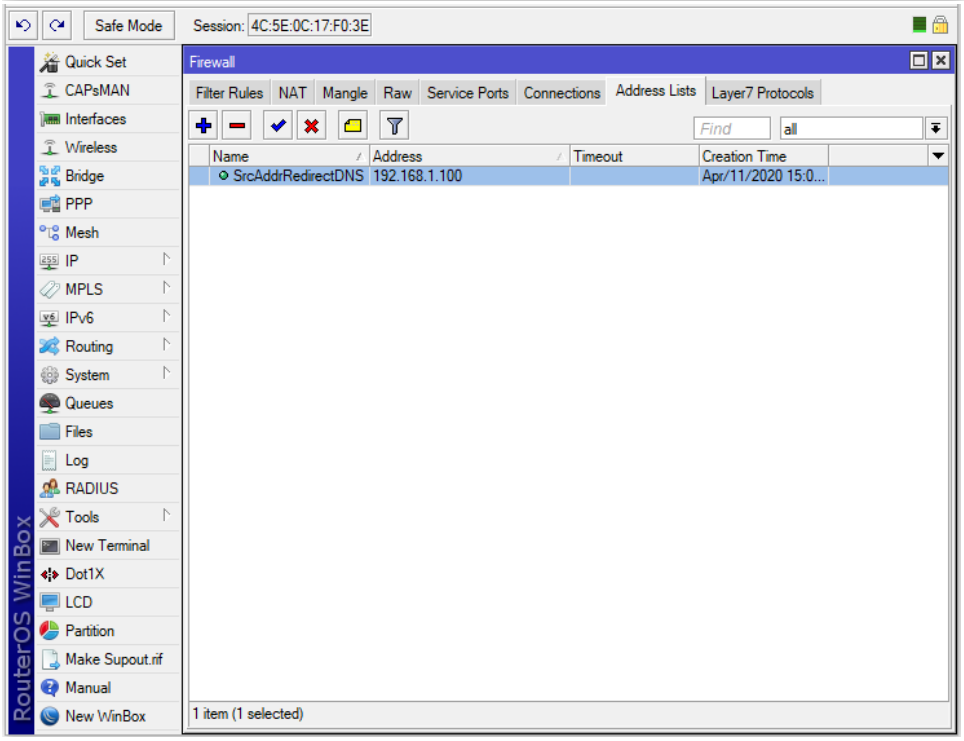
Bước 3. Thiết lập Address List chứa danh sách Source IP muốn chuyển hướng lưu lượng DNS tới Norton DNS Server.

```
[admin@MikroTik]>
/ip firewall address-list add list=SrcAddrRedirectDNS address=192.168.1.100
```

```
[admin@MikroTik] > /ip firewall address-list print
Flags: X - disabled, D - dynamic
 #    LIST              ADDRESS                                 CREATION-TIME
 0    NortonDNS         199.85.126.20-255.255.254.255           apr/09/2020 18:54:07
 1    SrcAddrRedirec... 192.168.1.100                           apr/11/2020 15:05:56
[admin@MikroTik] >
```

```
[admin@MikroTik] > /ip firewall address-list print detail
Flags: X - disabled, D - dynamic
 0   list=NortonDNS address=199.85.126.20-255.255.254.255
     creation-time=apr/09/2020 18:54:07

 1   list=SrcAddrRedirectDNS address=192.168.1.100
     creation-time=apr/11/2020 15:05:56
[admin@MikroTik] >
```



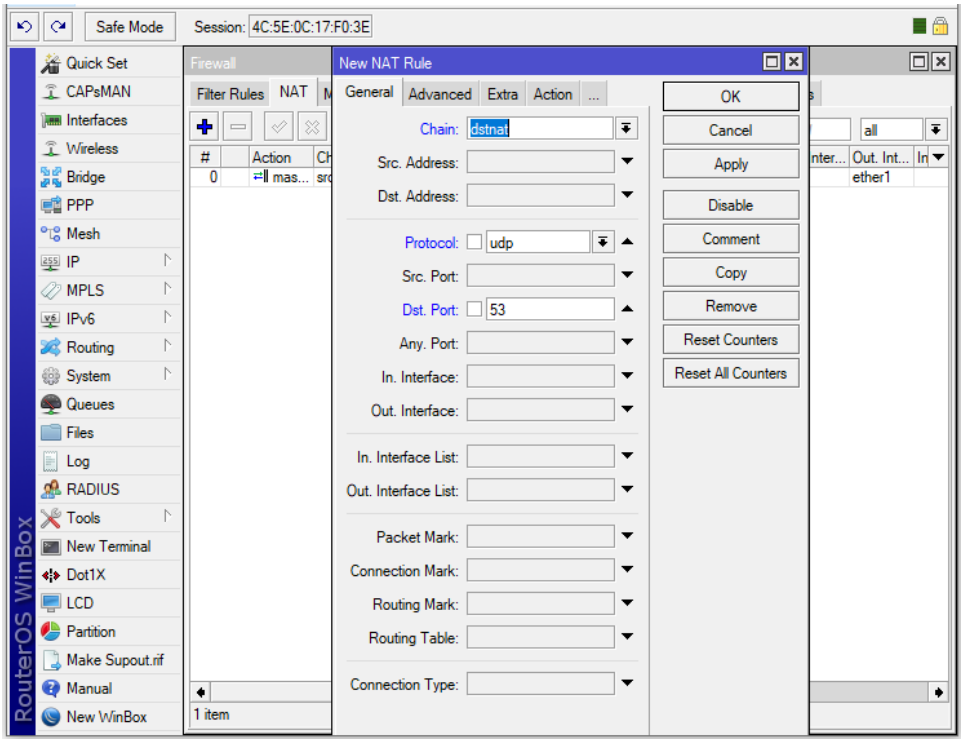


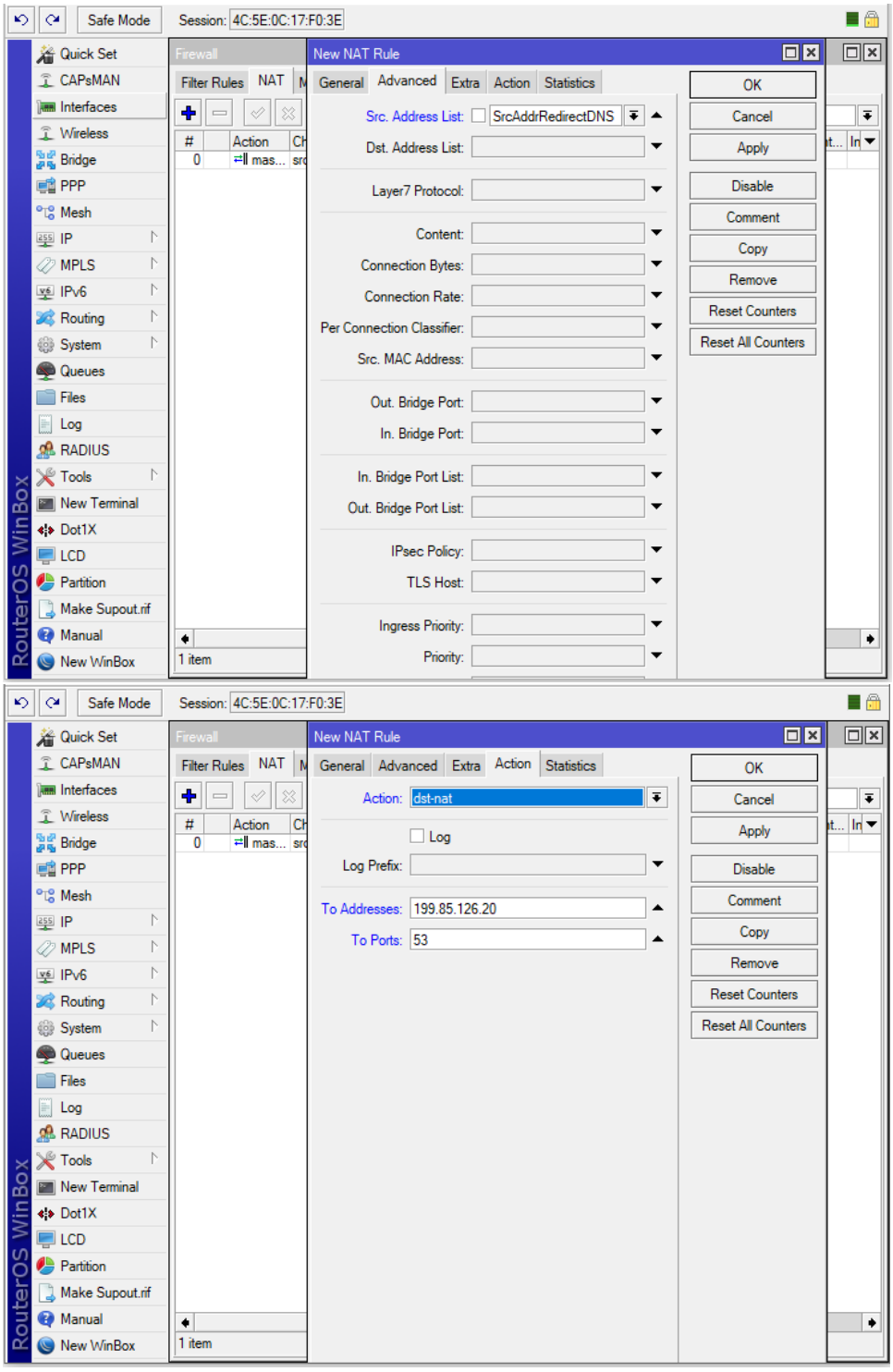
Bước 4. Cấu hình tính năng Destination-NAT chuyển hướng lưu lượng DNS tới Norton DNS Server.

```
[admin@MikroTik]>
/ip firewall nat add chain=dstnat protocol=udp dst-port=53 src-address-list=SrcAddrRedirectDNS
action=dst-nat to-addresses=199.85.126.20 to-ports=53
```

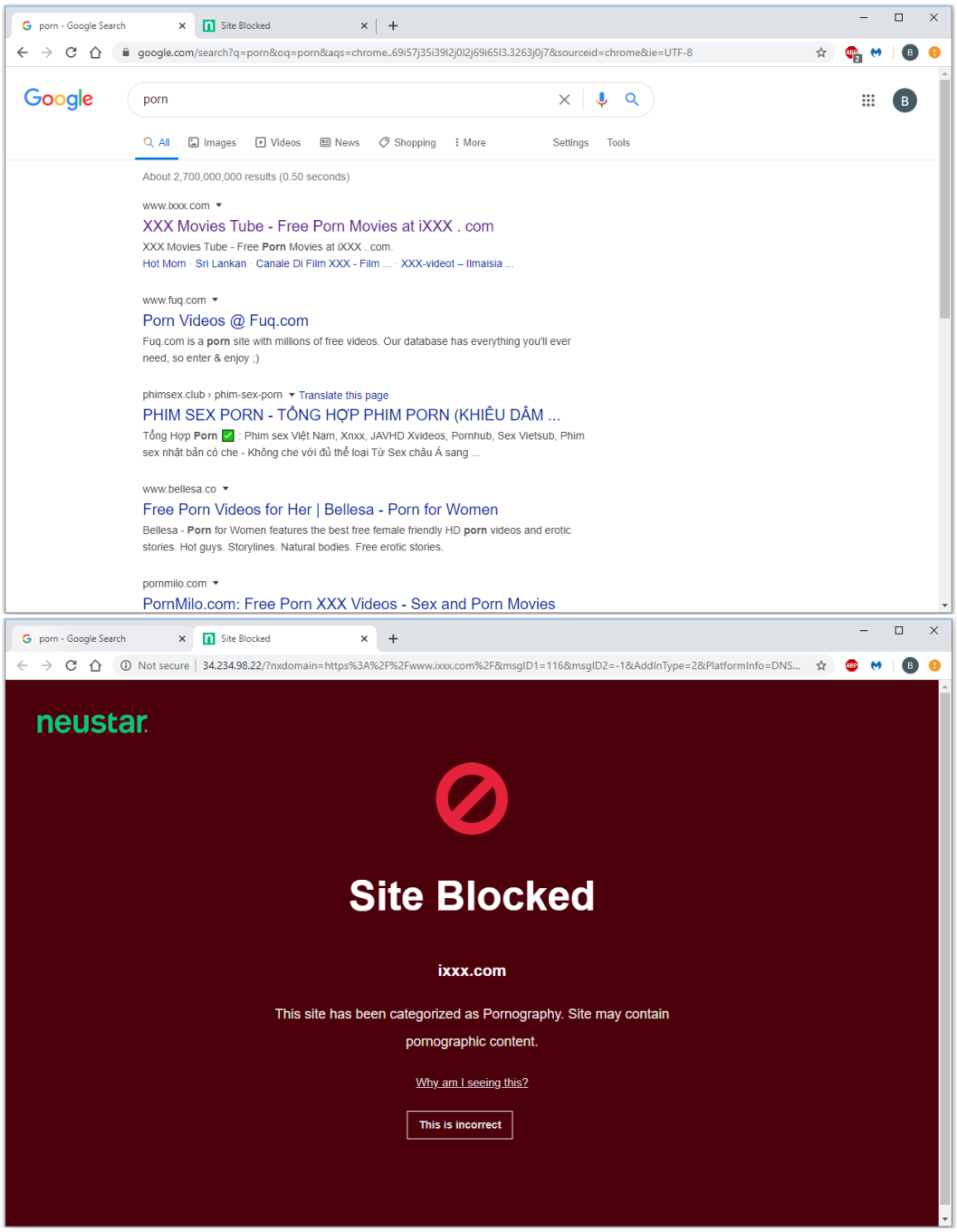
```
[admin@MikroTik] > /ip firewall nat print
Flags: X - disabled, I - invalid, D - dynamic
 0    chain=srcnat action=masquerade out-interface=ether1

 1    chain=dstnat action=dst-nat to-addresses=199.85.126.20 to-ports=53
      protocol=udp src-address-list=SrcAddrRedirectDNS dst-port=53 log=no
      log-prefix=""
[admin@MikroTik] >
```

```
[admin@MikroTik] > /ip firewall nat print detail
Flags: X - disabled, I - invalid, D - dynamic
 0    chain=srcnat action=masquerade out-interface=ether1

 1    chain=dstnat action=dst-nat to-addresses=199.85.126.20 to-ports=53
      protocol=udp src-address-list=SrcAddrRedirectDNS dst-port=53 log=no
      log-prefix=""
[admin@MikroTik] >
```

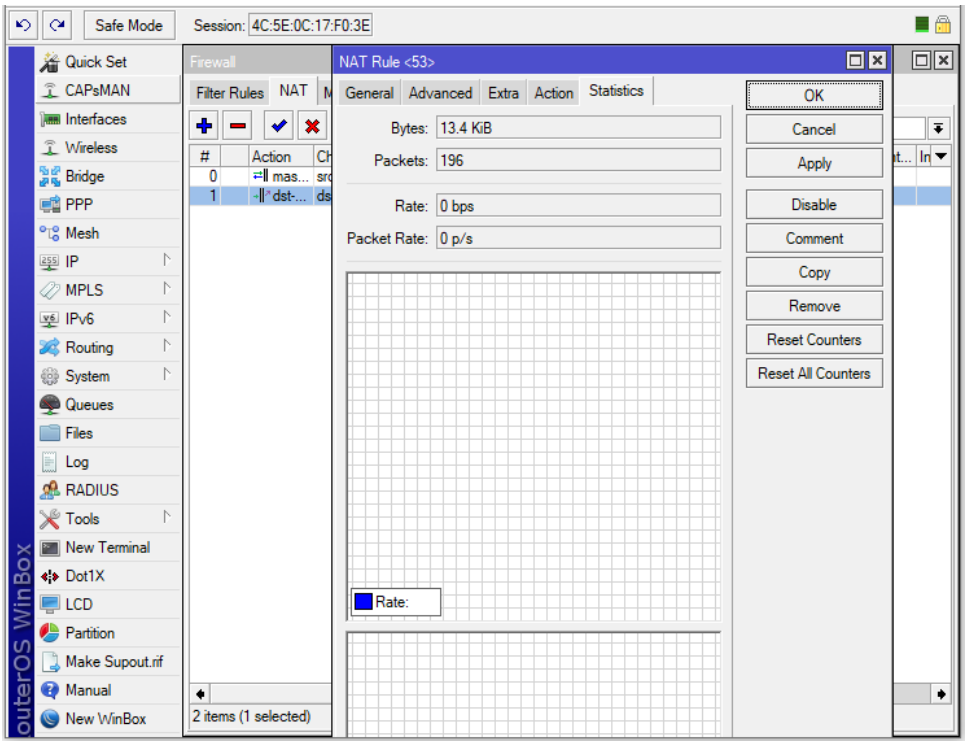




Bước 5. Kiểm tra kết quả chuyển hướng lưu lượng DNS tới Norton DNS Server.
Khi End User truy cập tới Website có nội dung đồi trụy thì ngay lập tức sẽ bị chuyển hướng tới giao diện cảnh báo Website bị block.

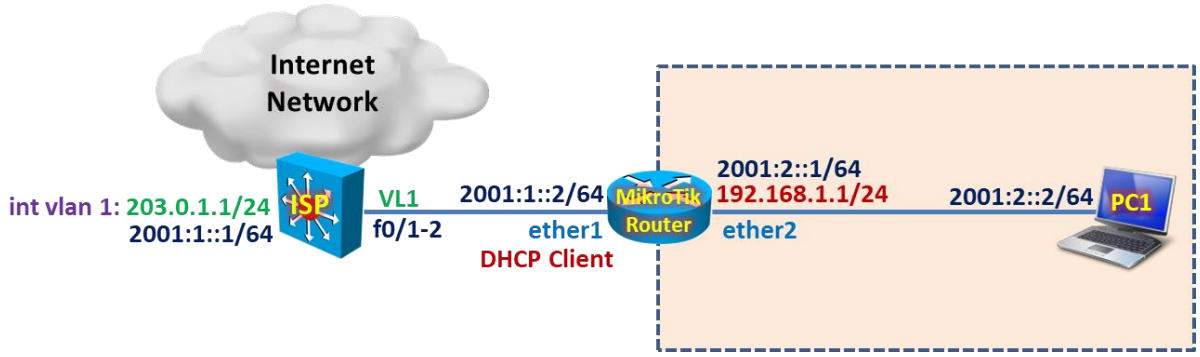


Thống kê lưu lượng DNS đã bị chuyển hướng trên Router MikroTik.



Phần 16. Cấu hình IPv6 trên Router MikroTik.

Phần 16.1. Gán địa chỉ IPv6 trên cổng giao tiếp Interface của Router MikroTik.



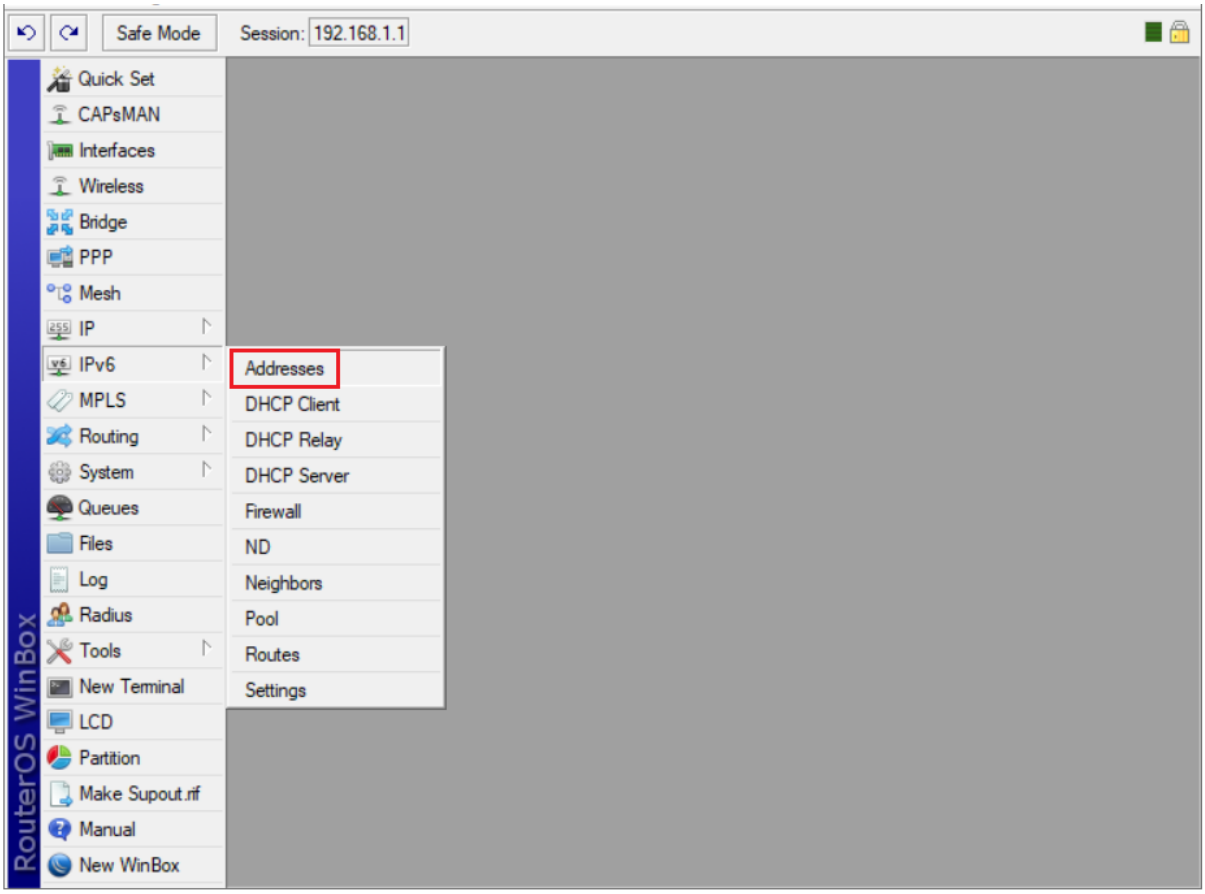
Cấu hình địa chỉ IPv6 trên ISP.

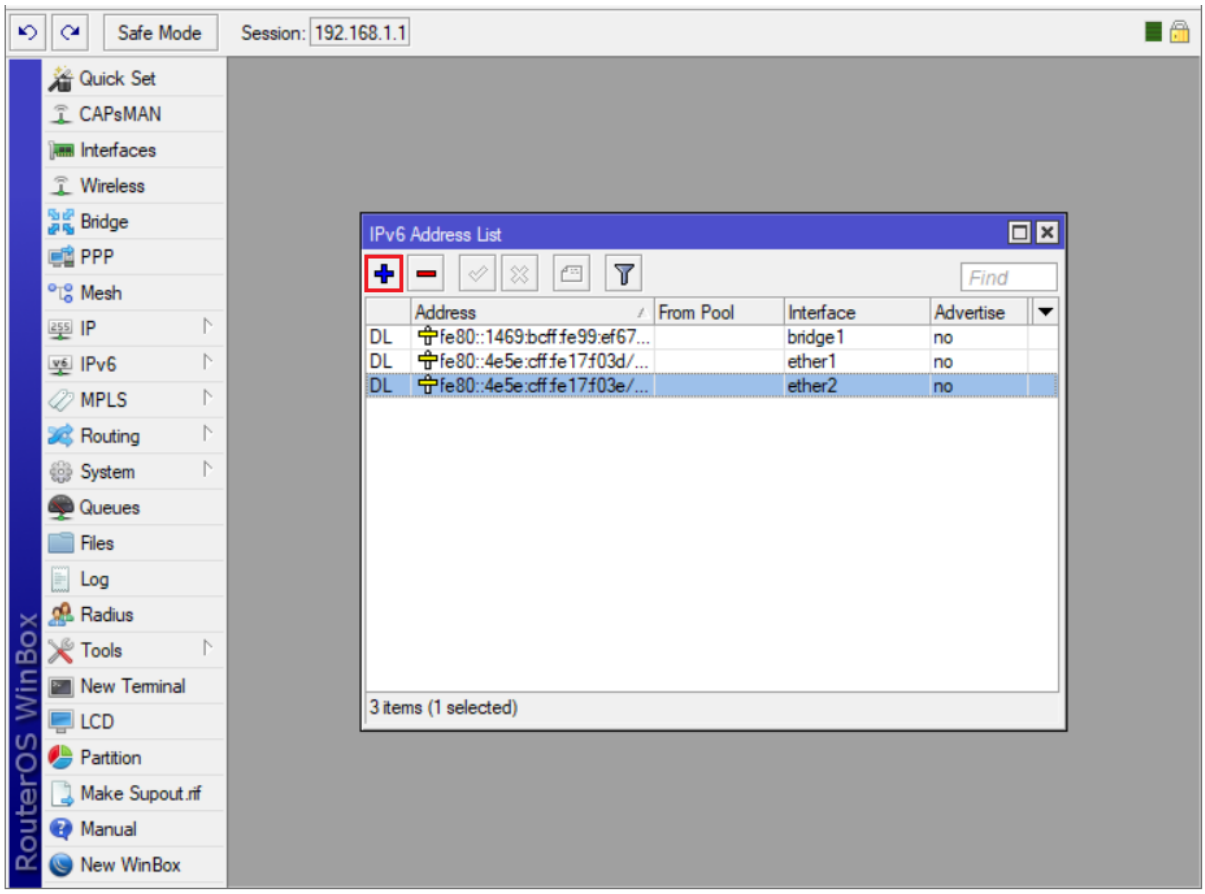
```
hostname ISP

sdm prefer dual-ipv4-and-ipv6 routing
exit
reload
show sdm prefer
```

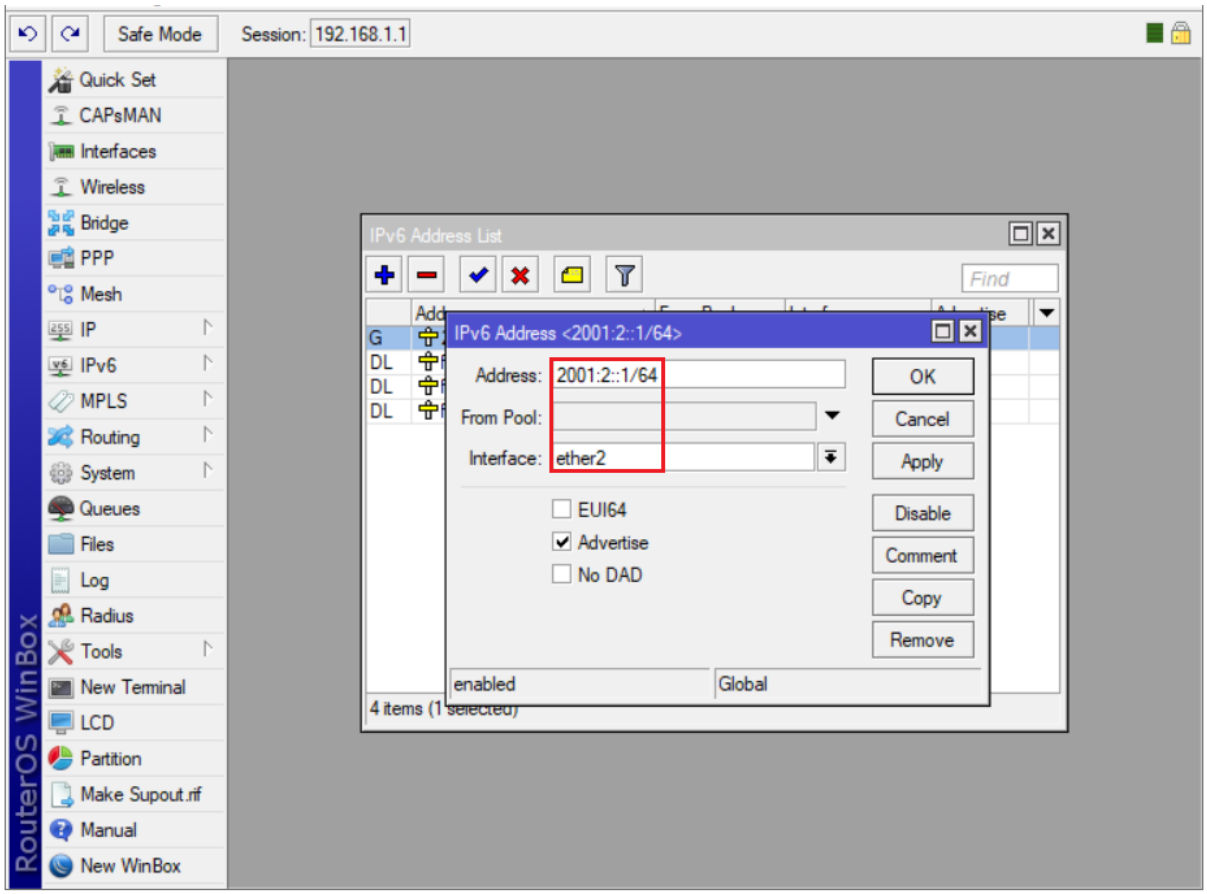
```
ipv6 unicast-routing
interface vlan 1
  ip address 203.0.1.1 255.255.255.0
```

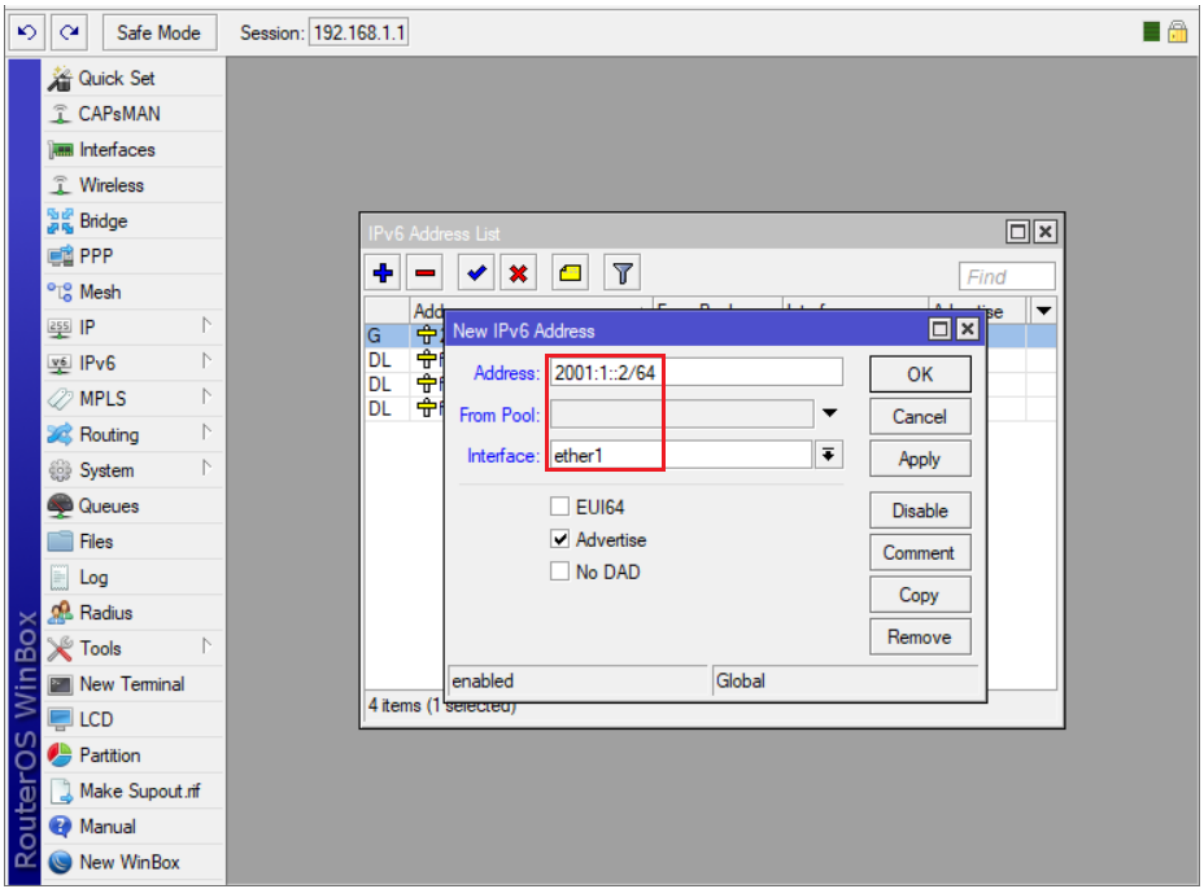
```
ipv6 enable
ipv6 address 2001:1::1/64
no shutdown
exit

ipv6 route 2001:2::/64 2001:1::2
```

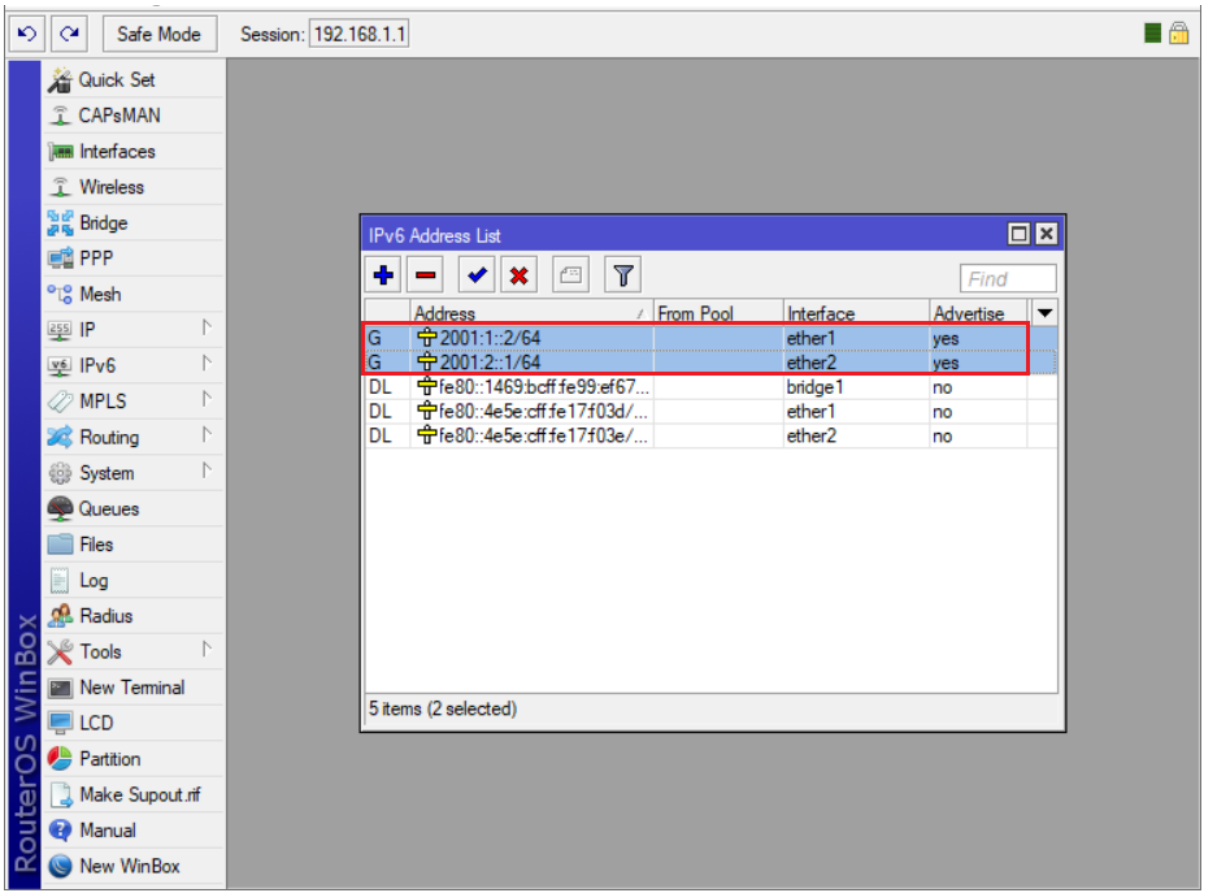
Gán địa chỉ IPv6 trên cổng giao tiếp ether2 của Router MikroTik.




Safe Mode
Session: 192.168.1.1
Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Mesh
IP
IPv6
MPLS
Routing
System
Queues
Files
Log
Radius
Tools
New Terminal
LCD
Partition
Make Supout.rif
Manual
New WinBox
RouterOS WinBox
IPv6 Address List
Find
Address
From Pool
Interface
Advertise
DL fe80::1469:bcff:fe99:ef67...
bridge1
no
DL fe80::4e5e:cff:fe17:f03d/...
ether1
no
DL fe80::4e5e:cff:fe17:f03e/...
ether2
no
3 items (1 selected)

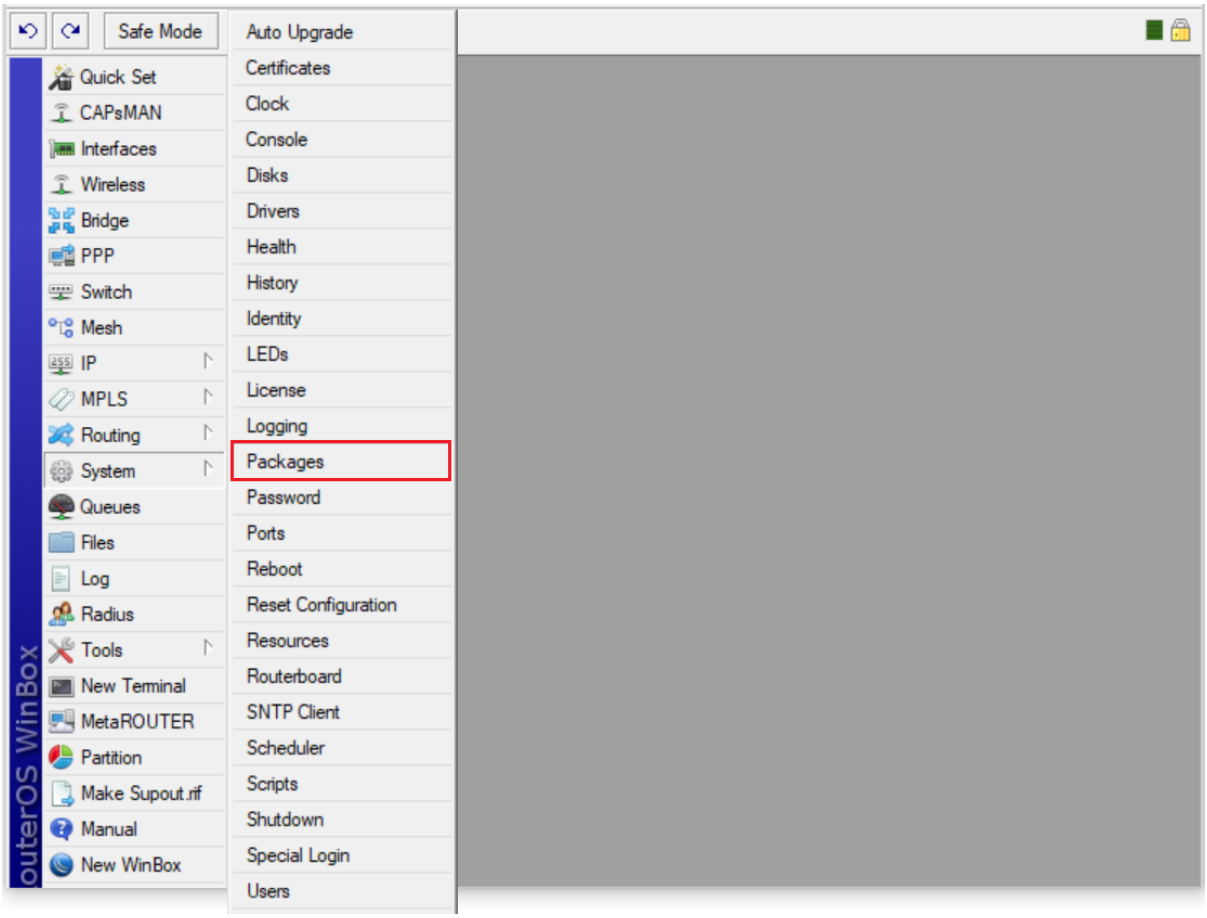

Safe Mode
Session: 192.168.1.1
Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Mesh
IP
IPv6
MPLS
Routing
System
Queues
Files
Log
Radius
Tools
New Terminal
LCD
Partition
Make Supout.rif
Manual
New WinBox
RouterOS WinBox
IPv6 Address List
Find
IPv6 Address <2001:2::1/64>
Address: 2001:2::1/64
From Pool:
Interface: ether2
EUI64
Advertise
No DAD
OK
Cancel
Apply
Disable
Comment
Copy
Remove
enabled
Global
4 items (1 selected)

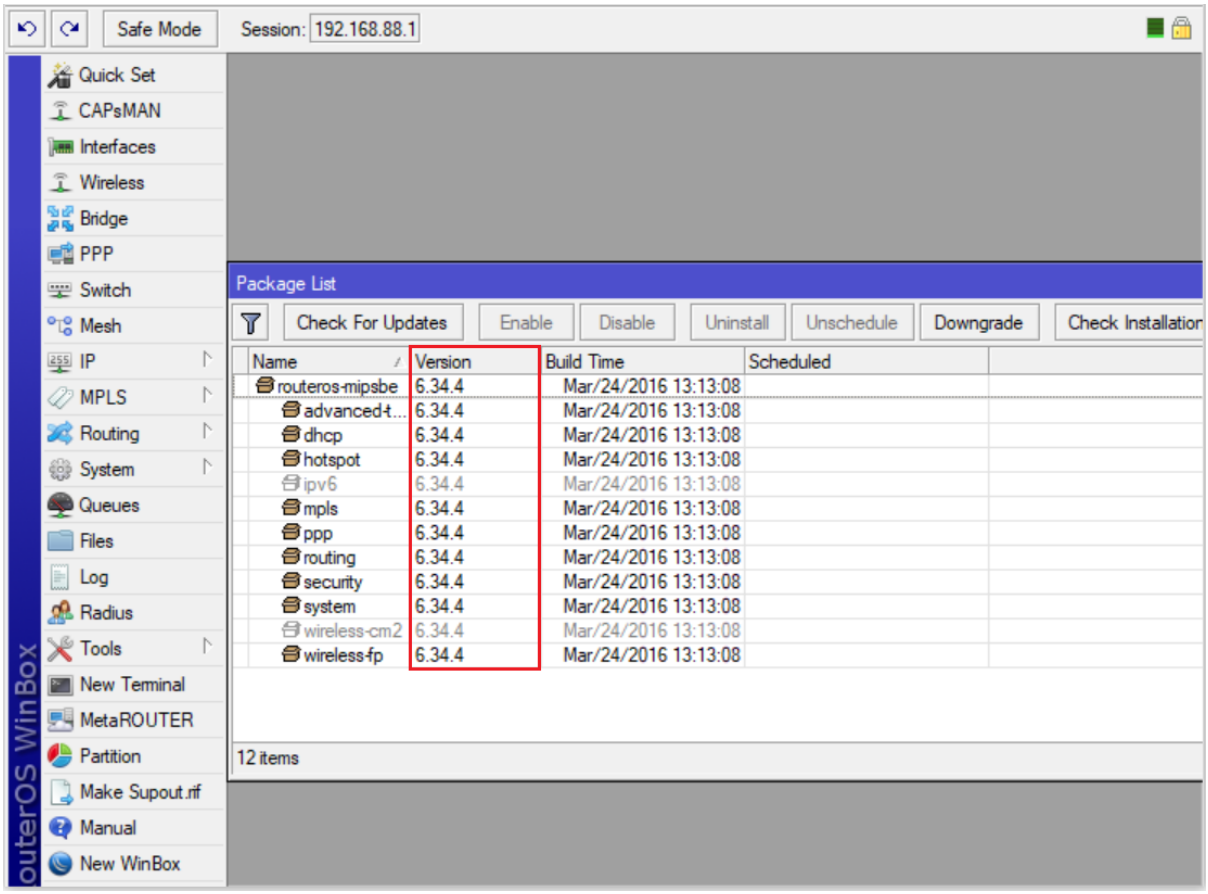

Safe Mode
Session: 192.168.1.1
Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Mesh
IP
IPv6
MPLS
Routing
System
Queues
Files
Log
Radius
Tools
New Terminal
LCD
Partition
Make Supout.rif
Manual
New WinBox
RouterOS WinBox
IPv6 Address List
Find
New IPv6 Address
Address: 2001:1::2/64
From Pool:
Interface: ether1
EUI64
Advertise
No DAD
OK
Cancel
Apply
Disable
Comment
Copy
Remove
enabled
Global
4 items (1 selected)



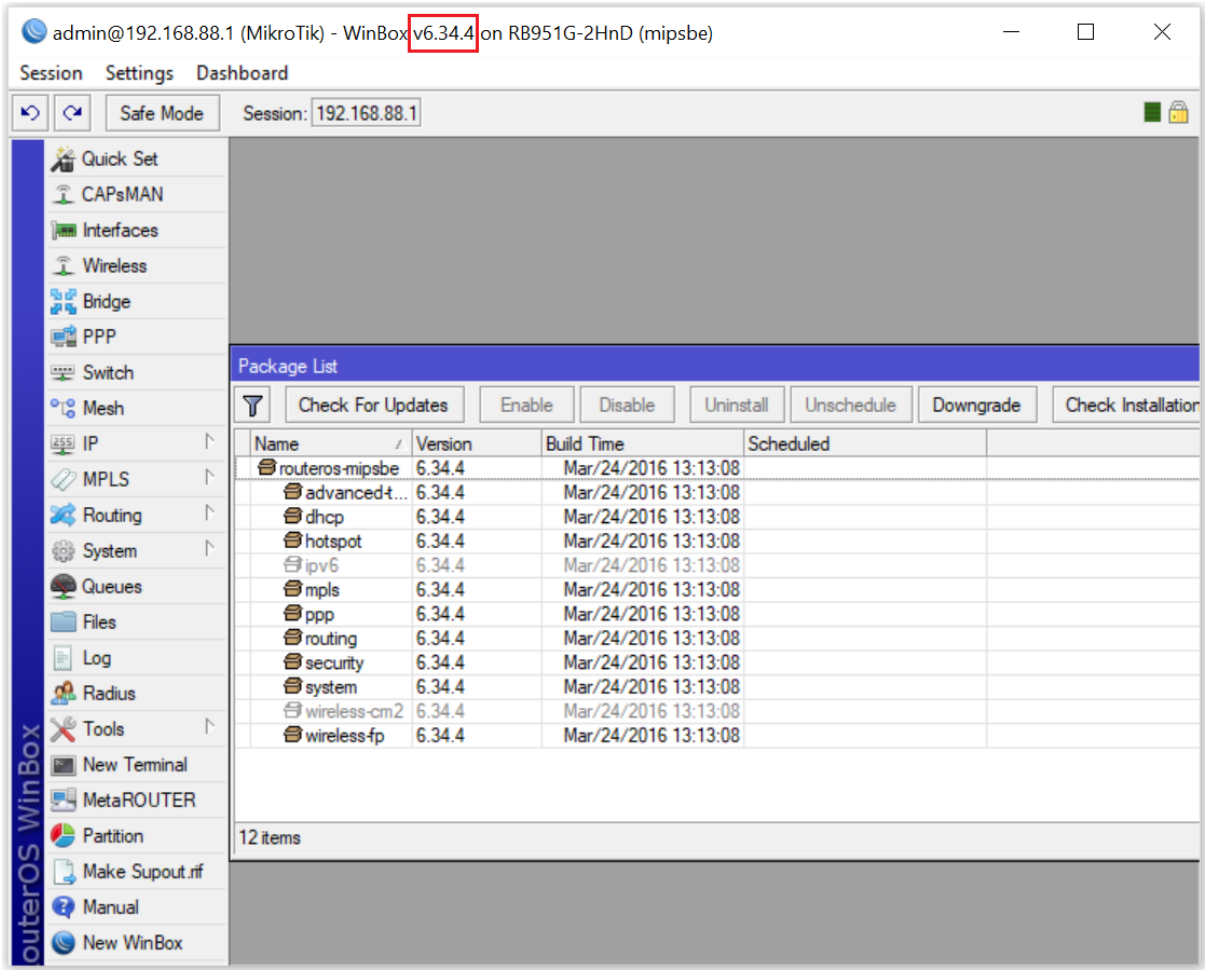
Lúc này, PC1 vừa có thể ping tới Router MikroTik và ISP bằng IPv4 lẫn IPv6.

Phần 17. Nâng cấp RouterOS trên Router MikroTik.
Phần 17.1. Tìm hiểu tổng quan về các gói cài đặt trên Router MikroTik.
Phần 17.2. Kiểm tra thông tin RouterOS Version hiện tại trên Router MikroTik.


Safe Mode
Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Switch
Mesh
IP
MPLS
Routing
System
Queues
Files
Log
Radius
Tools
New Terminal
MetaROUTER
Partition
Make Supout.rif
Manual
New WinBox
outerOS WinBox
Auto Upgrade
Certificates
Clock
Console
Disks
Drivers
Health
History
Identity
LEDs
License
Logging
Packages
Password
Ports
Reboot
Reset Configuration
Resources
Routerboard
SNTP Client
Scheduler
Scripts
Shutdown
Special Login
Users



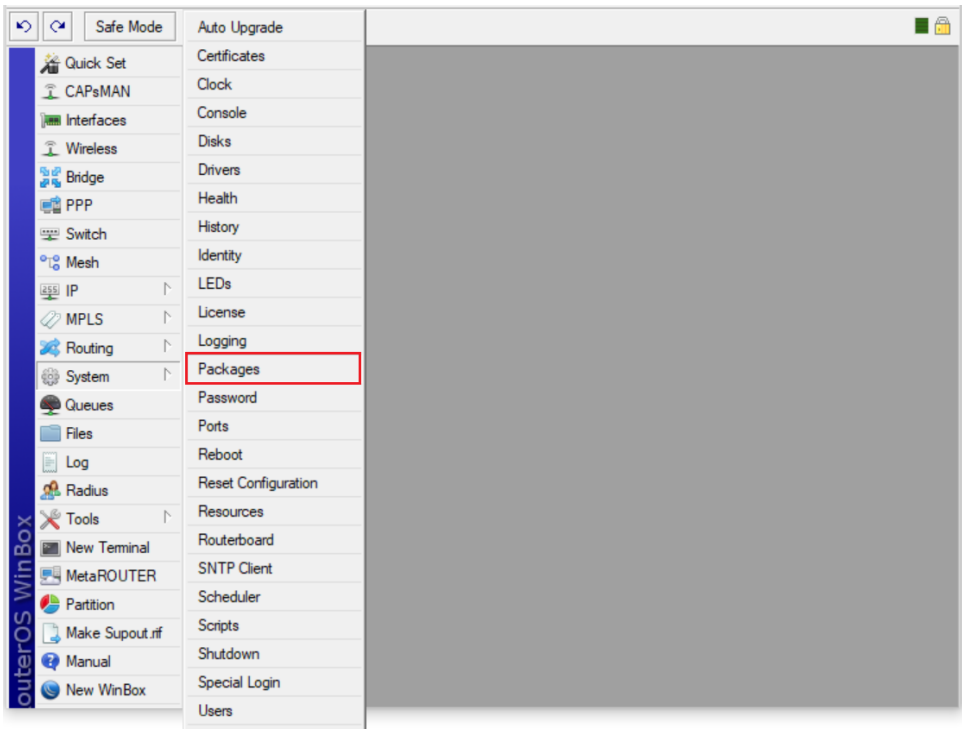
Hoặc thông qua phần mềm Winbox kết nối tới Router MikroTik ta cũng có thể kiểm tra được RouterOS Version của thiết bị.

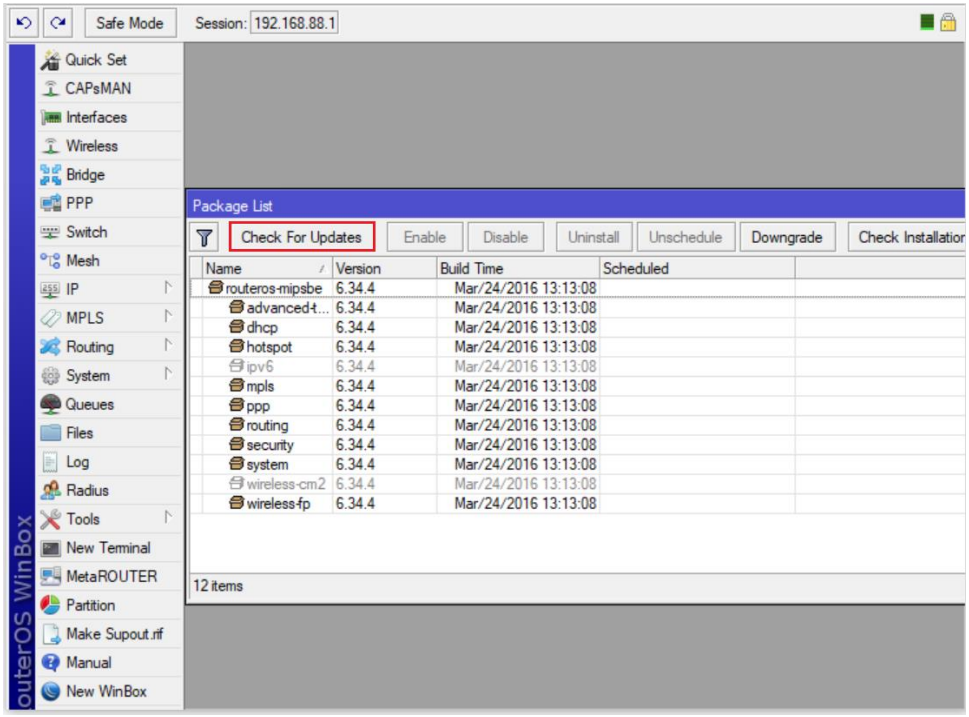


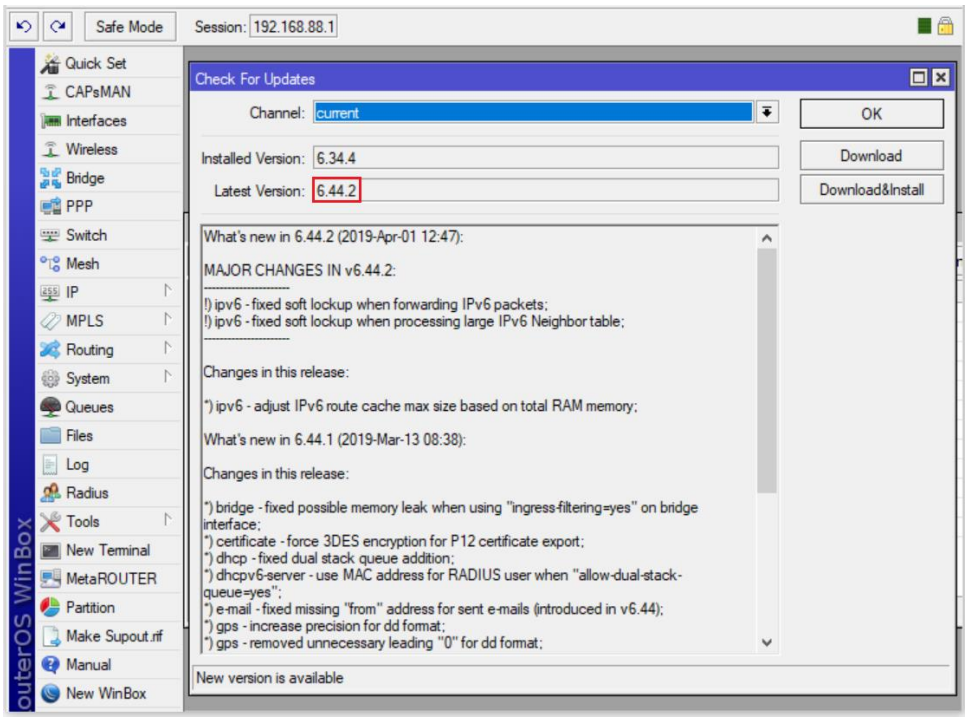
Phần 17.3. Kiểm tra và tải RouterOS phiên bản mới nhất cho Router MikroTik.

Kiểm tra và tải RouterOS phiên bản mới nhất cho Router MikroTik thông qua phần mềm Winbox.

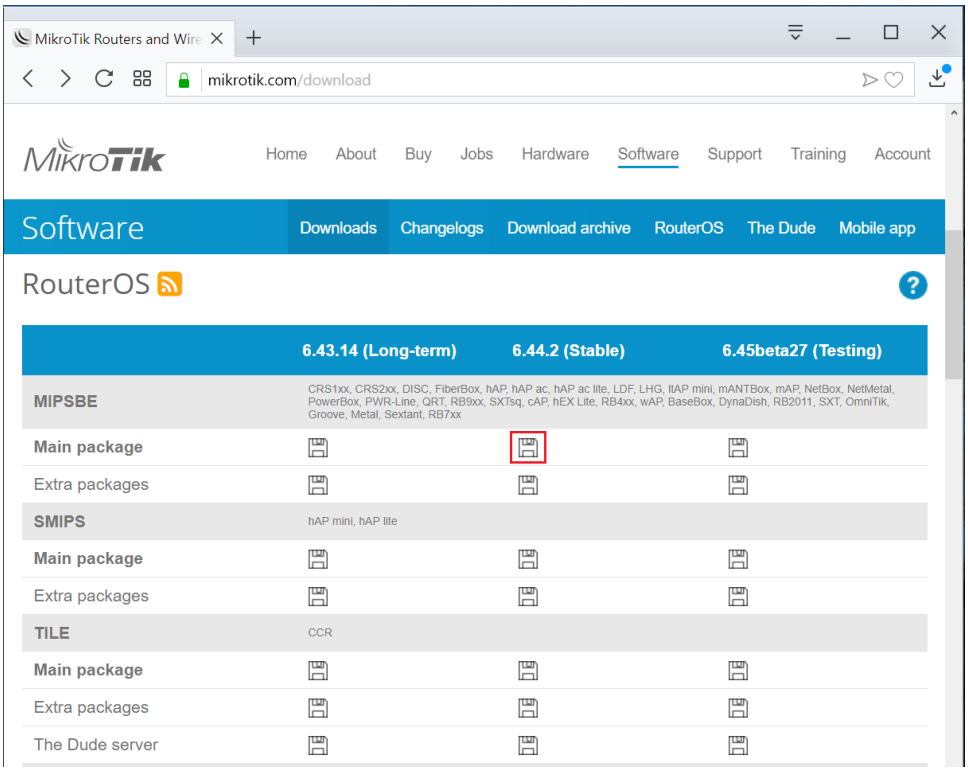
- Đảm bảo Router MikroTik có kết nối truy cập Internet.


Safe Mode
Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Switch
Mesh
IP
MPLS
Routing
System
Queues
Files
Log
Radius
Tools
New Terminal
MetaROUTER
Partition
Make Supout.rif
Manual
New WinBox
outerOS WinBox
Auto Upgrade
Certificates
Clock
Console
Disks
Drivers
Health
History
Identity
LEDs
License
Logging
Packages
Password
Ports
Reboot
Reset Configuration
Resources
Routerboard
SNTP Client
Scheduler
Scripts
Shutdown
Special Login
Users


Safe Mode
Session: 192.168.88.1
Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Switch
Mesh
IP
MPLS
Routing
System
Queues
Files
Log
Radius
Tools
New Terminal
MetaROUTER
Partition
Make Supout.rif
Manual
New WinBox
outerOS WinBox
Package List
Check For Updates
Enable
Disable
Uninstall
Unschedule
Downgrade
Check Installatior
Name
Version
Build Time
Scheduled
routeros-mipsbe 6.34.4 Mar/24/2016 13:13:08
advanced-t... 6.34.4 Mar/24/2016 13:13:08
dhcp 6.34.4 Mar/24/2016 13:13:08
hotspot 6.34.4 Mar/24/2016 13:13:08
ipv6 6.34.4 Mar/24/2016 13:13:08
mpls 6.34.4 Mar/24/2016 13:13:08
ppp 6.34.4 Mar/24/2016 13:13:08
routing 6.34.4 Mar/24/2016 13:13:08
security 6.34.4 Mar/24/2016 13:13:08
system 6.34.4 Mar/24/2016 13:13:08
wireless-cm2 6.34.4 Mar/24/2016 13:13:08
wireless-fp 6.34.4 Mar/24/2016 13:13:08
12 items

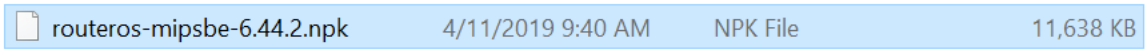


Kiểm tra và tải RouterOS phiên bản mới nhất cho Router MikroTik trực tiếp tại trang chủ.



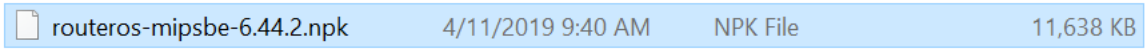
https://mikrotik.com/download

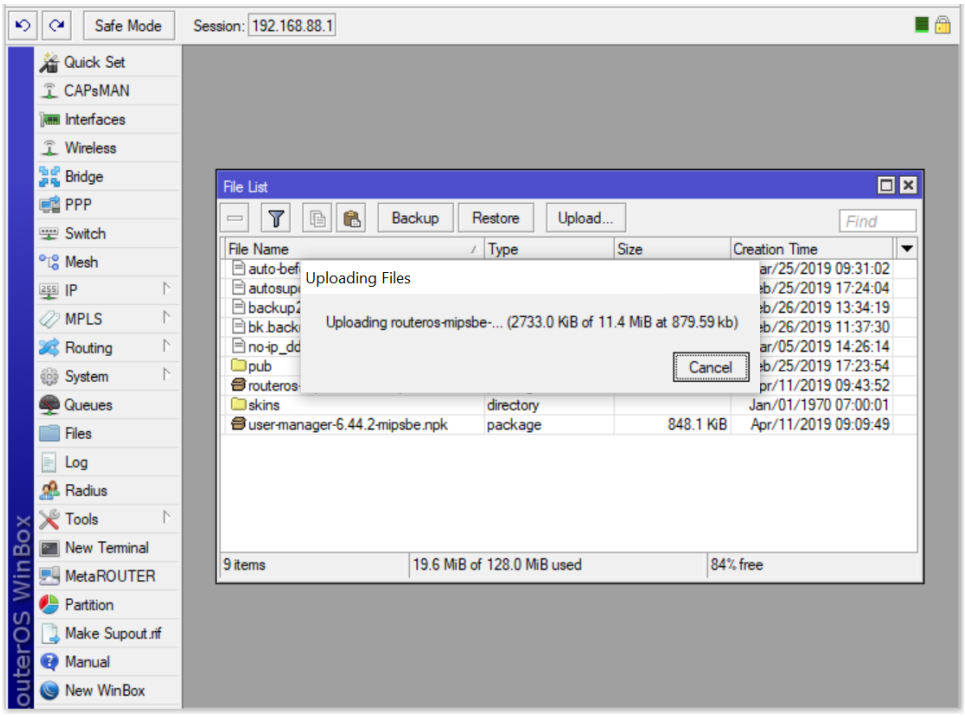
Firmware của RouterOS tải về thành công.



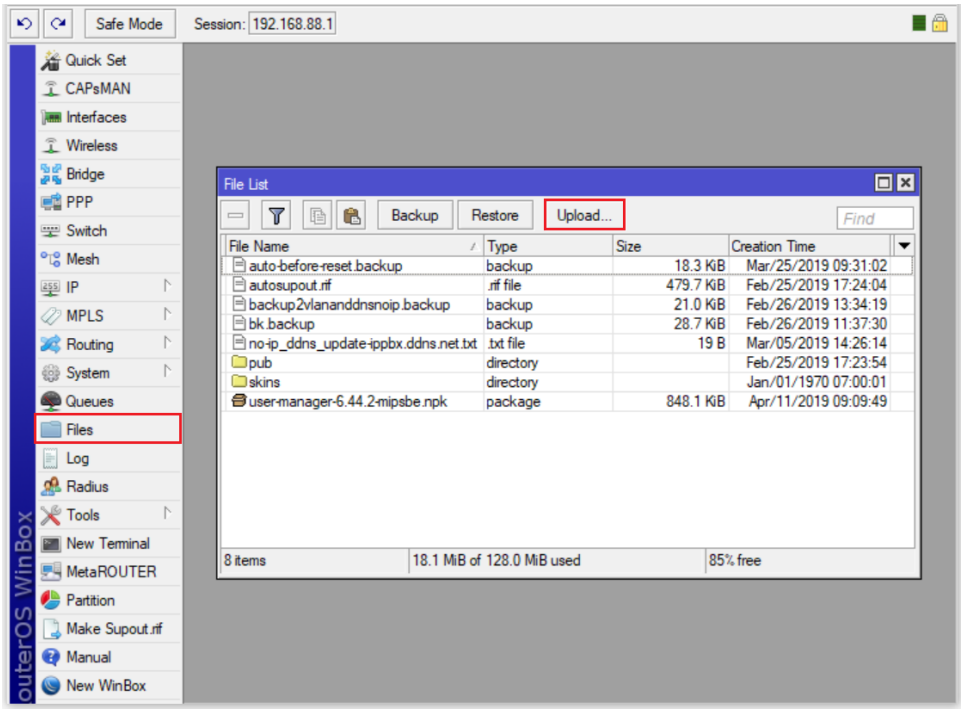
Phần 17.4. Tiến hành nâng cấp RouterOS cho Router MikroTik.

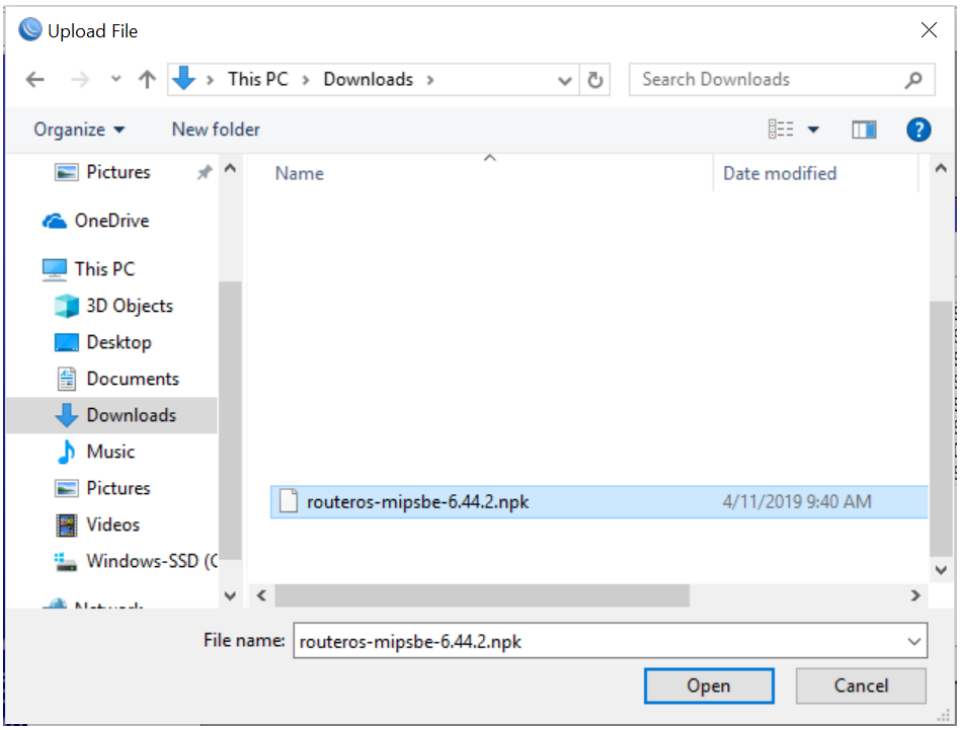
Tiến hành kéo thả **routeros-mipsbe-6.44.2.npk** (RouterOS) vào Work Space của WinBox để nâng cấp Firmware.

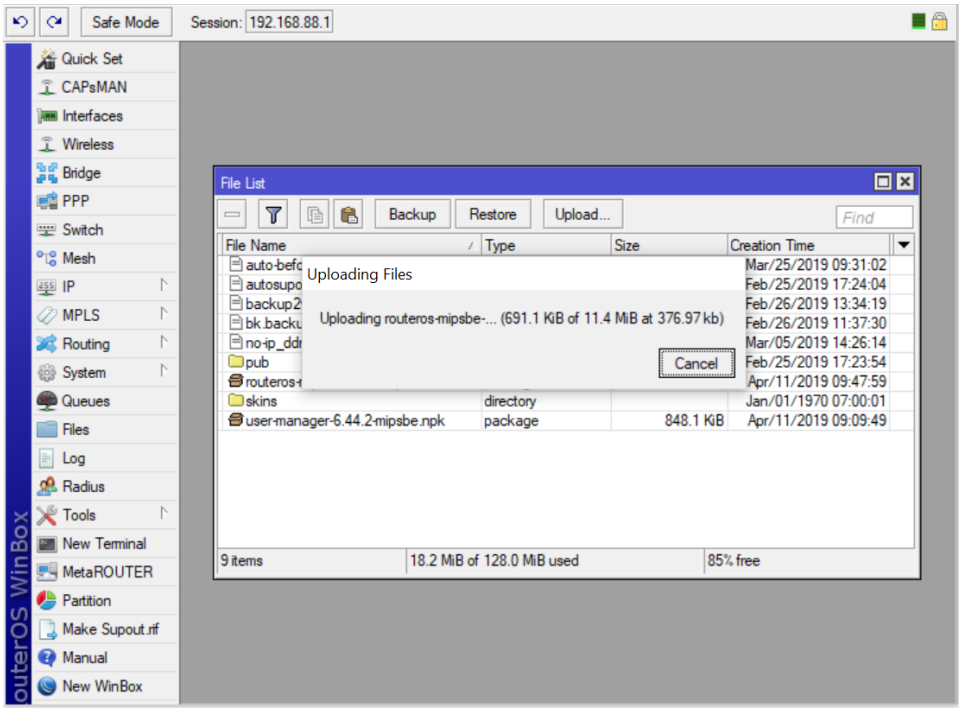


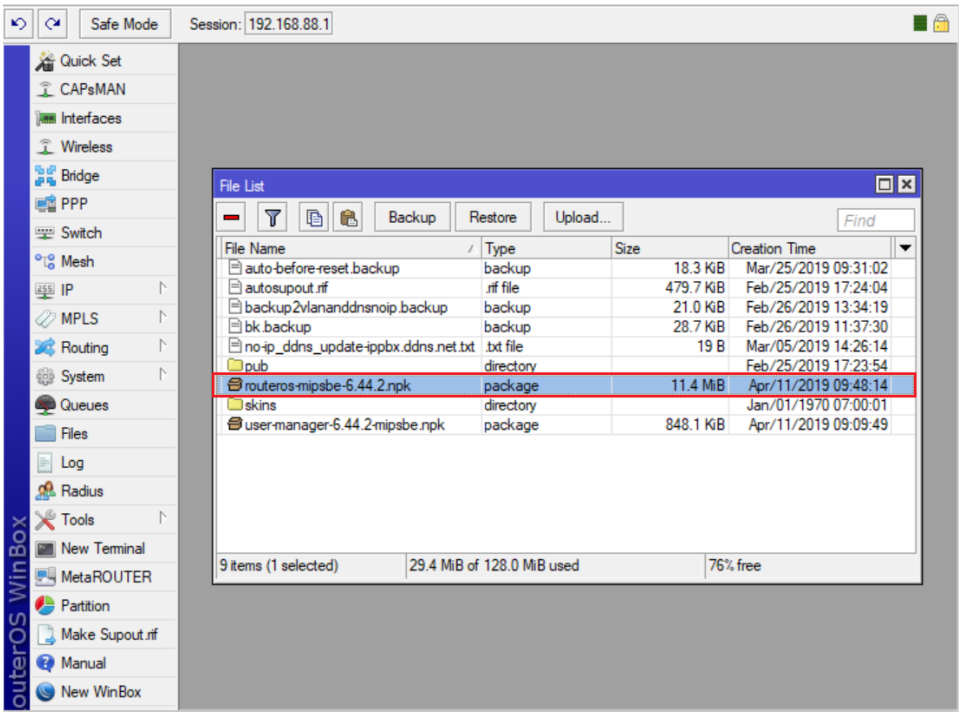


Hoặc cũng có thể nâng cấp RouterOS cho thiết bị bằng cách truy cập vào giao diện File List.



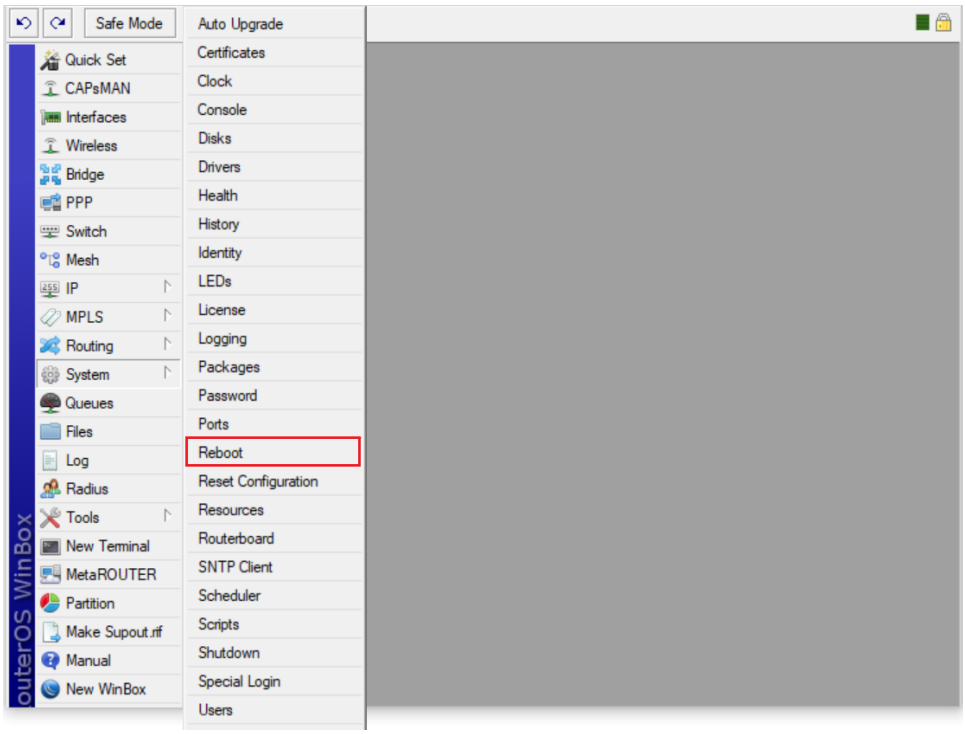

Upload File
This PC › Downloads ›
Search Downloads
Organize
New folder
Pictures
OneDrive
This PC
3D Objects
Desktop
Documents
Downloads
Music
Pictures
Videos
Windows-SSD (C
Name
Date modified
routeros-mipsbe-6.44.2.npk
4/11/2019 9:40 AM
File name:
routeros-mipsbe-6.44.2.npk
Open
Cancel

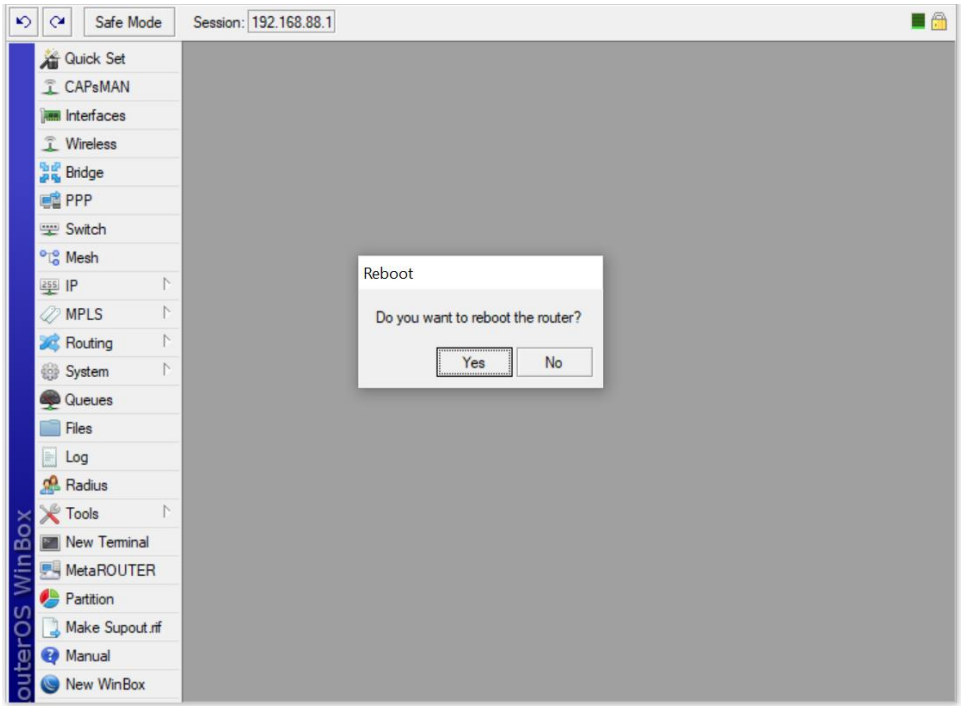

Safe Mode
Session: 192.168.88.1
Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Switch
Mesh
IP
MPLS
Routing
System
Queues
Files
Log
Radius
Tools
New Terminal
MetaROUTER
Partition
Make Supout.rif
Manual
New WinBox
RouterOS WinBox
File List
Backup
Restore
Upload...
Find
File Name
Type
Size
Creation Time
Uploading Files
Uploading routeros-mipsbe-... (691.1 KiB of 11.4 MiB at 376.97 kb)
Cancel
skins
directory
Jan/01/1970 07:00:01
user-manager-6.44.2-mipsbe.npk
package
848.1 KiB
Apr/11/2019 09:09:49
9 items
18.2 MiB of 128.0 MiB used
85% free



Phần 17.5. Tiến hành khởi động lại Router MikroTik.

Tiến khành khởi động lại thiết bị Router MikroTik.





Phần 17.6. Cài đặt các gói Extra packages cho Router MikroTik.

Phần 17.6.1. Tìm hiểu tổng quan về các gói Extra packages trên Router MikroTik.

Kiểm tra các gói Packages và chức năng của từng gói.

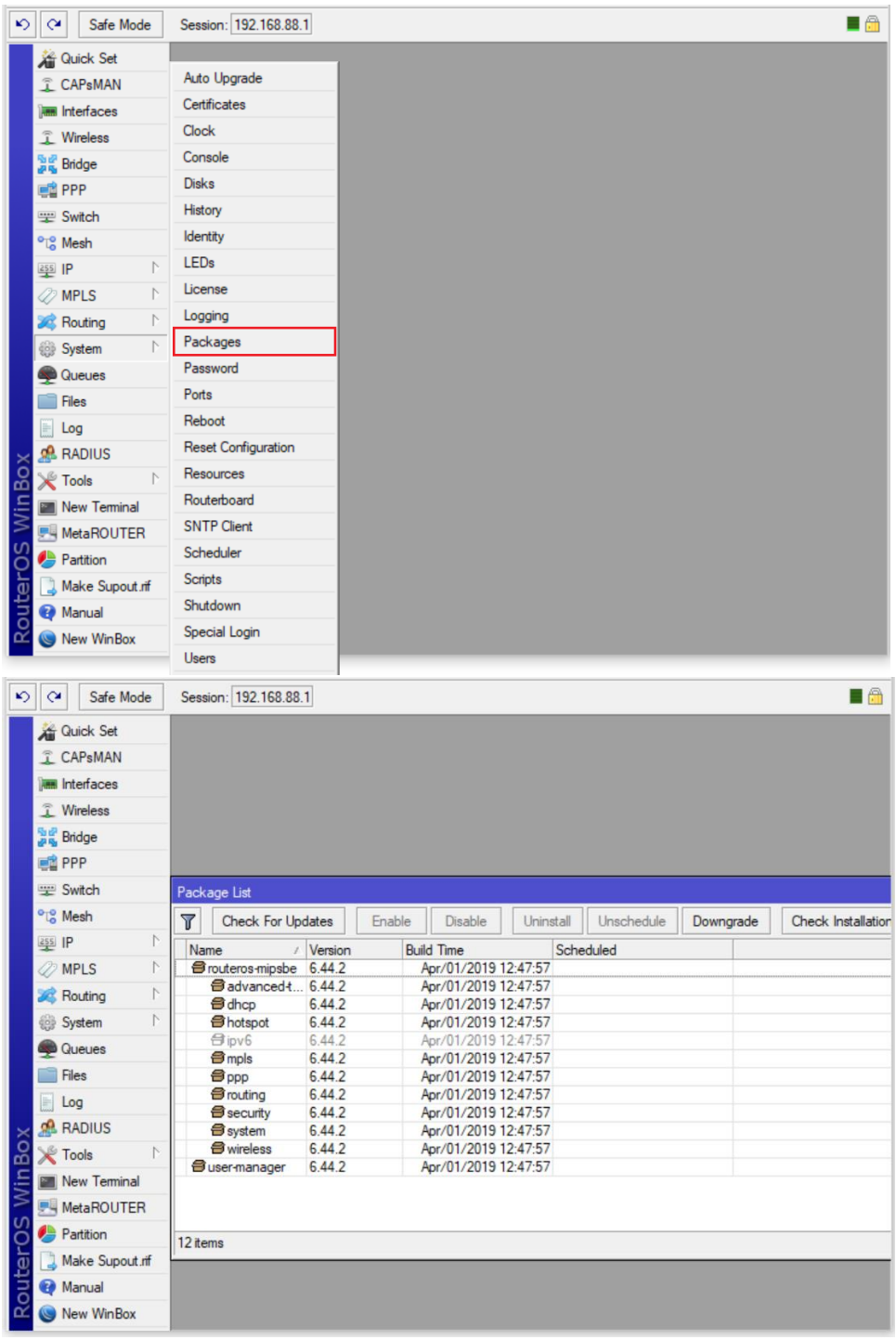
- **Static Route no extra package is needed**: system package là đủ.

https://wiki.mikrotik.com/wiki/Manual:System/Packages

Package	Features
advanced-tools (*mipsle, mipsbe, ppc, x86, mmips, arm, smips*)	Advanced ping tools (flood-ping, ping-speed), Netwatch, ip-scan, SMS tool, Wake-on-LAN
calea (*mipsle, mipsbe, ppc, x86, mmips, arm*)	Data gathering tool for specific use due to "Communications Assistance for Law Enforcement Act" in USA
dhcp (*mipsle, mipsbe, ppc, x86, mmips, arm, smips*)	Dynamic Host Control Protocol client and server
gps (*mipsle, mipsbe, ppc, x86, mmips, arm*)	Global Positioning System devices support
hotspot (*mipsle, mipsbe, ppc, x86, mmips, arm, smips*)	HotSpot captive portal server for user management
ipv6 (*mipsle, mipsbe, ppc, x86, mmips, arm, smips*)	IPv6 addressing support
lte (*mipsbe*)	Required package only for SXT LTE (RBSXTLTE3-7), which contains drivers for the built-in LTE interface.
mpls (*mipsle, mipsbe, ppc, x86, mmips, arm, smips*)	Multi Protocol Labels Switching support
multicast (*mipsle, mipsbe, ppc, x86, mmips, arm, smips*)	Protocol Independent Multicast - Sparse Mode; Internet Group Managing Protocol - Proxy
ntp (*mipsle, mipsbe, ppc, x86, mmips, arm*)	Network protocol server, also includes simplistic client. NTP client is also built into the system package and functions well without this package installed.

https://wiki.mikrotik.com/wiki/Manual:System/Packages

Kiểm tra các gói Package cho Router MikroTik.

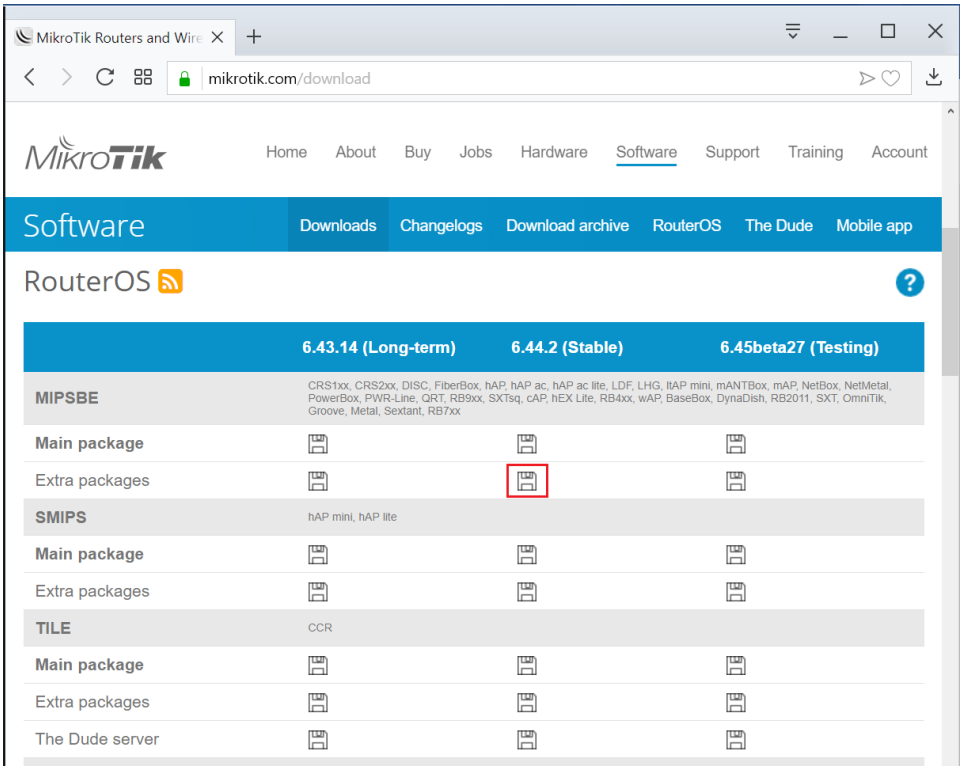


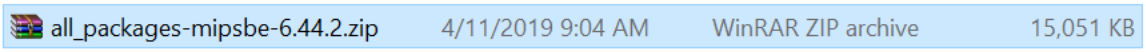
Phần 17.6.2. Cài đặt gói user-manager trên Router MikroTik.

Sử dụng gói user-manager của MikroTik để quản lý tập trung người dùng truy cập hệ thống Hotspot, gói user-manager cũng kiêm tính năng của một RADIUS Server.

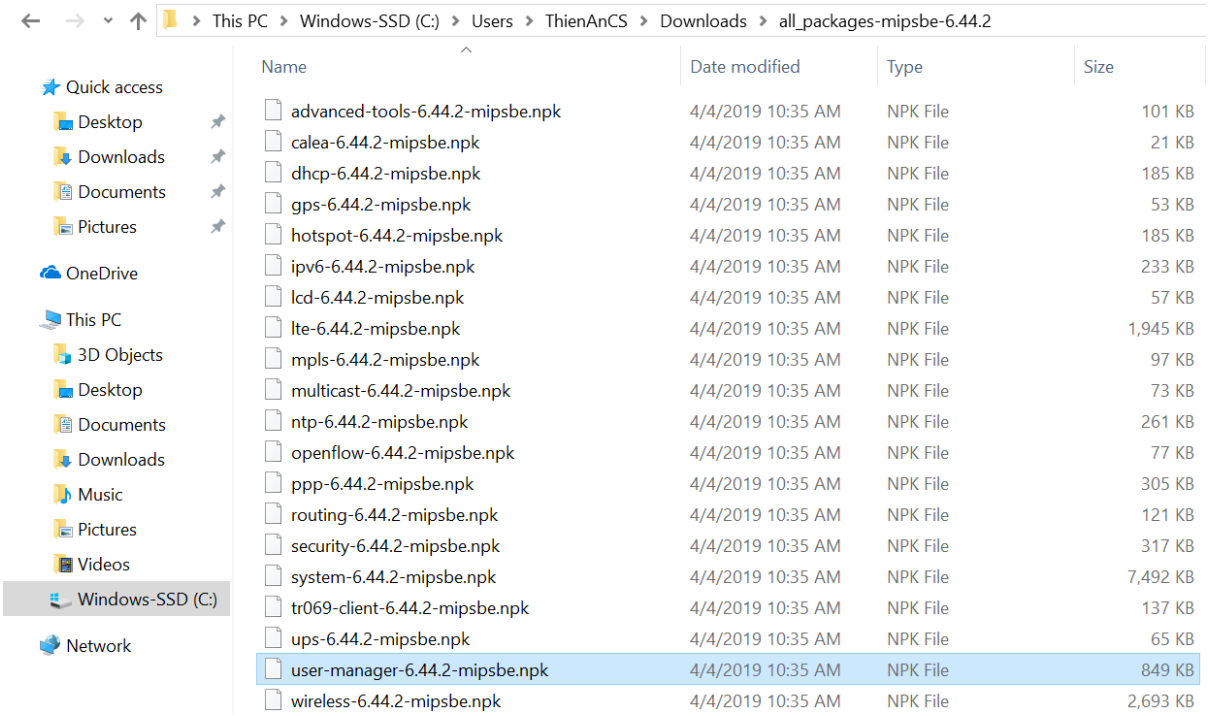
Truy cập trang http://www.mikrotik.com/download rồi chọn phiên bản phù hợp với thiết bị và version đang dùng và download gói **Extra packages** về.

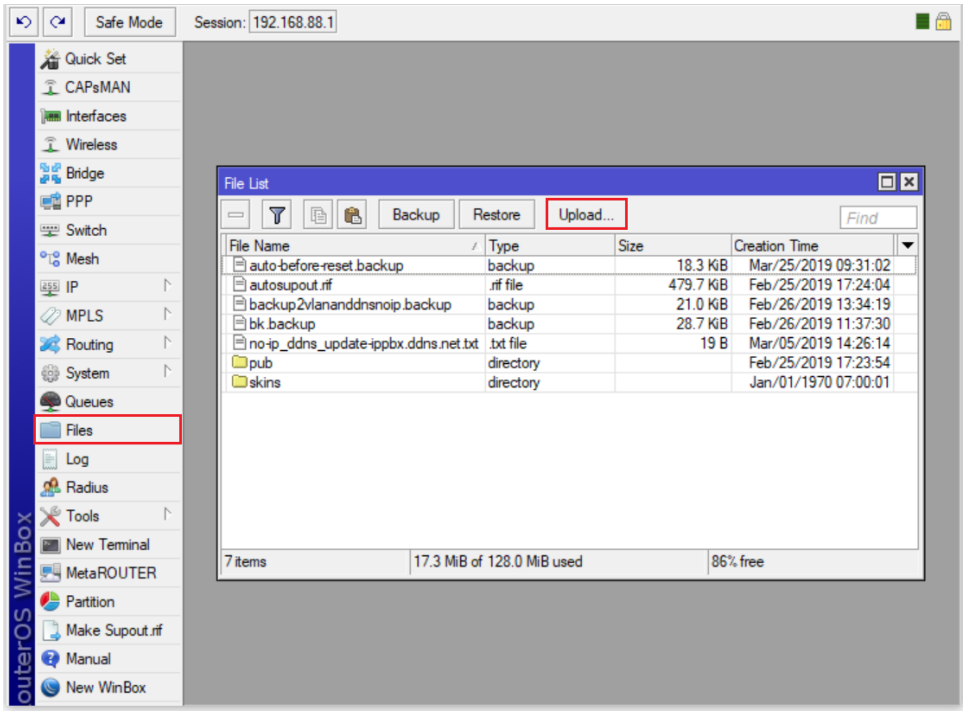
- Tải gói **Extra packages** tương ứng với thiết bị **RB951G-2HnD**.

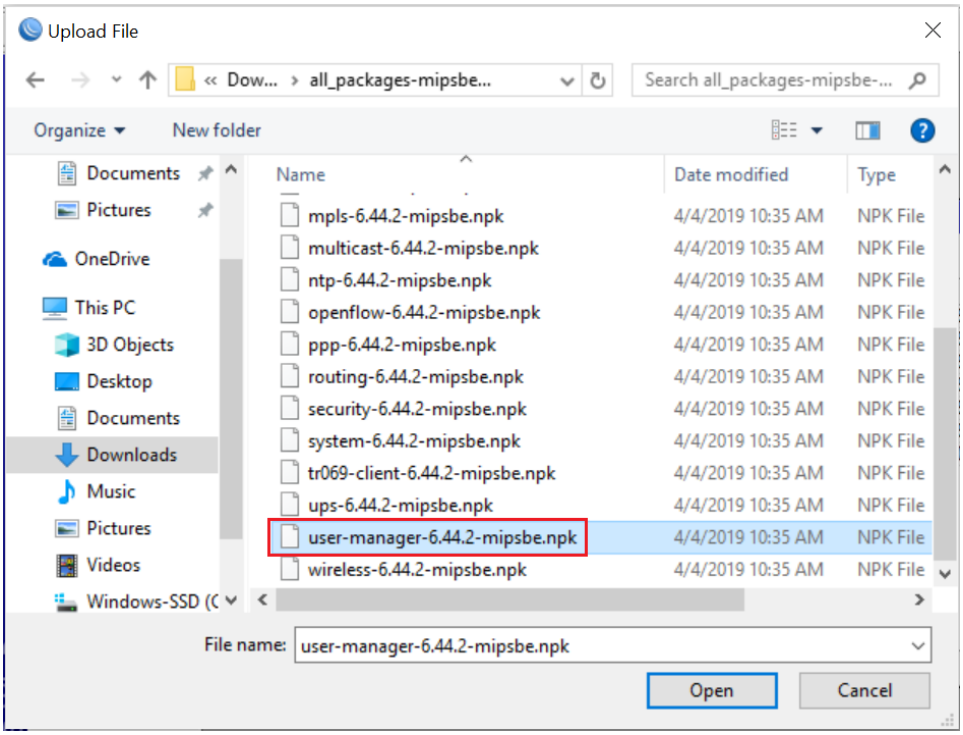


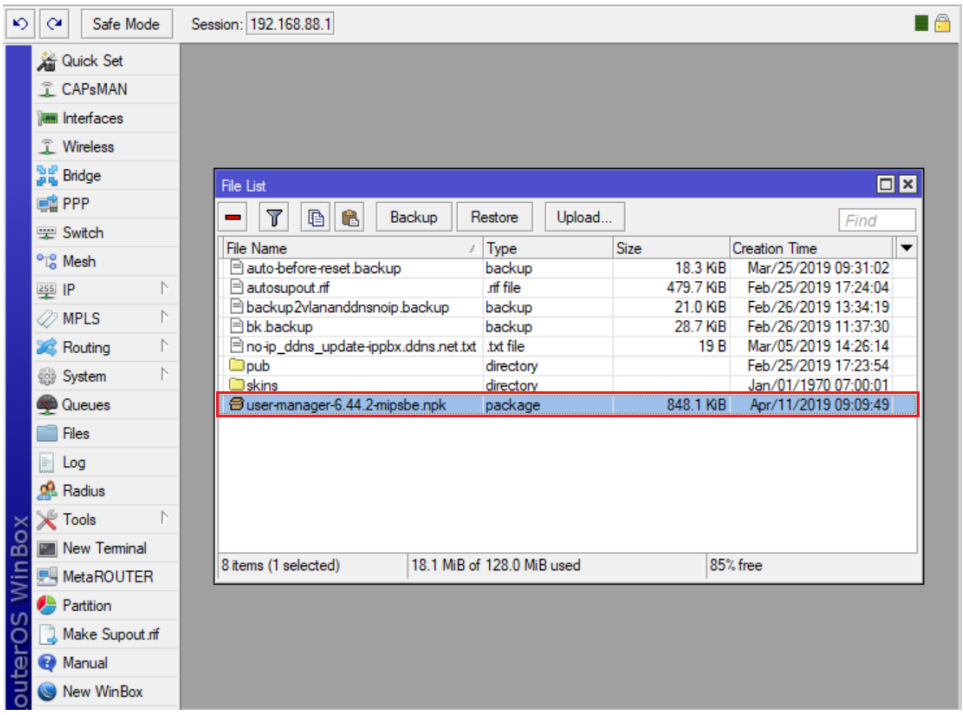


Sau khi download về chúng ta giải nén và upload file **user-manager-6.44.2-mipsbe.npk** lên **File List** và reboot lại router để cài đặt.

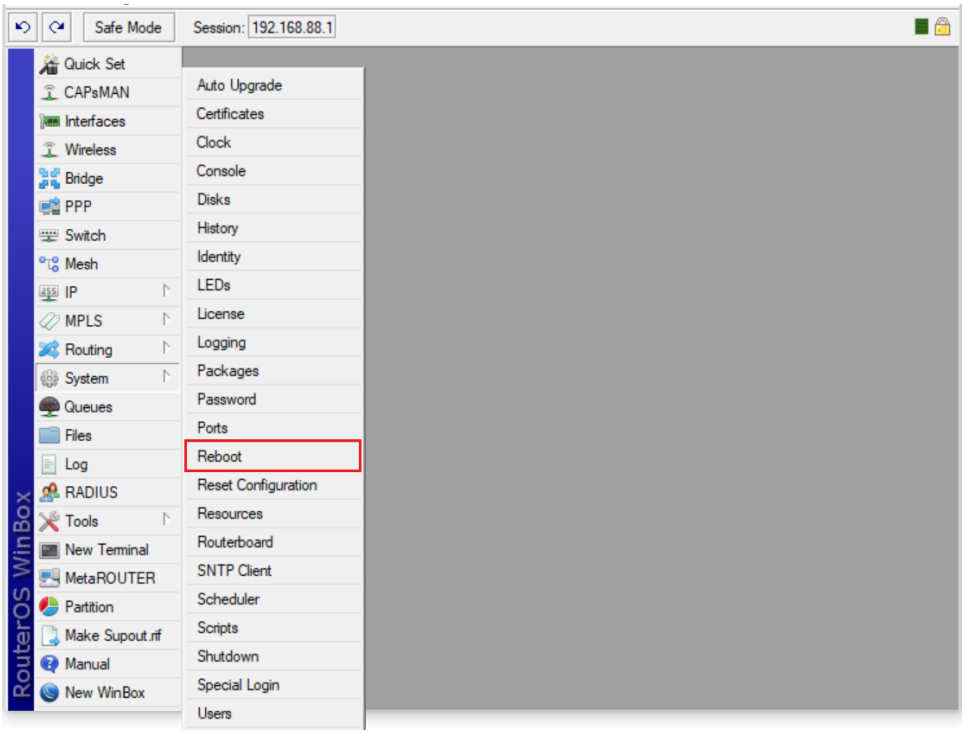

This PC › Windows-SSD (C:) › Users › ThienAnCS › Downloads › all_packages-mipsbe-6.44.2
Quick access
Desktop
Downloads
Documents
Pictures
OneDrive
This PC
3D Objects
Desktop
Documents
Downloads
Music
Pictures
Videos
Windows-SSD (C:)
Network
Name
Date modified
Type
Size
advanced-tools-6.44.2-mipsbe.npk 4/4/2019 10:35 AM NPK File 101 KB
calea-6.44.2-mipsbe.npk 4/4/2019 10:35 AM NPK File 21 KB
dhcp-6.44.2-mipsbe.npk 4/4/2019 10:35 AM NPK File 185 KB
gps-6.44.2-mipsbe.npk 4/4/2019 10:35 AM NPK File 53 KB
hotspot-6.44.2-mipsbe.npk 4/4/2019 10:35 AM NPK File 185 KB
ipv6-6.44.2-mipsbe.npk 4/4/2019 10:35 AM NPK File 233 KB
lcd-6.44.2-mipsbe.npk 4/4/2019 10:35 AM NPK File 57 KB
lte-6.44.2-mipsbe.npk 4/4/2019 10:35 AM NPK File 1,945 KB
mpls-6.44.2-mipsbe.npk 4/4/2019 10:35 AM NPK File 97 KB
multicast-6.44.2-mipsbe.npk 4/4/2019 10:35 AM NPK File 73 KB
ntp-6.44.2-mipsbe.npk 4/4/2019 10:35 AM NPK File 261 KB
openflow-6.44.2-mipsbe.npk 4/4/2019 10:35 AM NPK File 77 KB
ppp-6.44.2-mipsbe.npk 4/4/2019 10:35 AM NPK File 305 KB
routing-6.44.2-mipsbe.npk 4/4/2019 10:35 AM NPK File 121 KB
security-6.44.2-mipsbe.npk 4/4/2019 10:35 AM NPK File 317 KB
system-6.44.2-mipsbe.npk 4/4/2019 10:35 AM NPK File 7,492 KB
tr069-client-6.44.2-mipsbe.npk 4/4/2019 10:35 AM NPK File 137 KB
ups-6.44.2-mipsbe.npk 4/4/2019 10:35 AM NPK File 65 KB
user-manager-6.44.2-mipsbe.npk 4/4/2019 10:35 AM NPK File 849 KB
wireless-6.44.2-mipsbe.npk 4/4/2019 10:35 AM NPK File 2,693 KB


Safe Mode
Session: 192.168.88.1
Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Switch
Mesh
IP
MPLS
Routing
System
Queues
Files
Log
Radius
Tools
New Terminal
MetaROUTER
Partition
Make Supout.rif
Manual
New WinBox
outerOS WinBox
File List
Backup
Restore
Upload...
Find
File Name
Type
Size
Creation Time
auto-before-reset.backup backup 18.3 KiB Mar/25/2019 09:31:02
autosupout.rif .rif file 479.7 KiB Feb/25/2019 17:24:04
backup2vlananddnsnoip.backup backup 21.0 KiB Feb/26/2019 13:34:19
bk.backup backup 28.7 KiB Feb/26/2019 11:37:30
no-ip_ddns_update-ippbx.ddns.net.txt .txt file 19 B Mar/05/2019 14:26:14
pub directory Feb/25/2019 17:23:54
skins directory Jan/01/1970 07:00:01
7 items
17.3 MiB of 128.0 MiB used
86% free

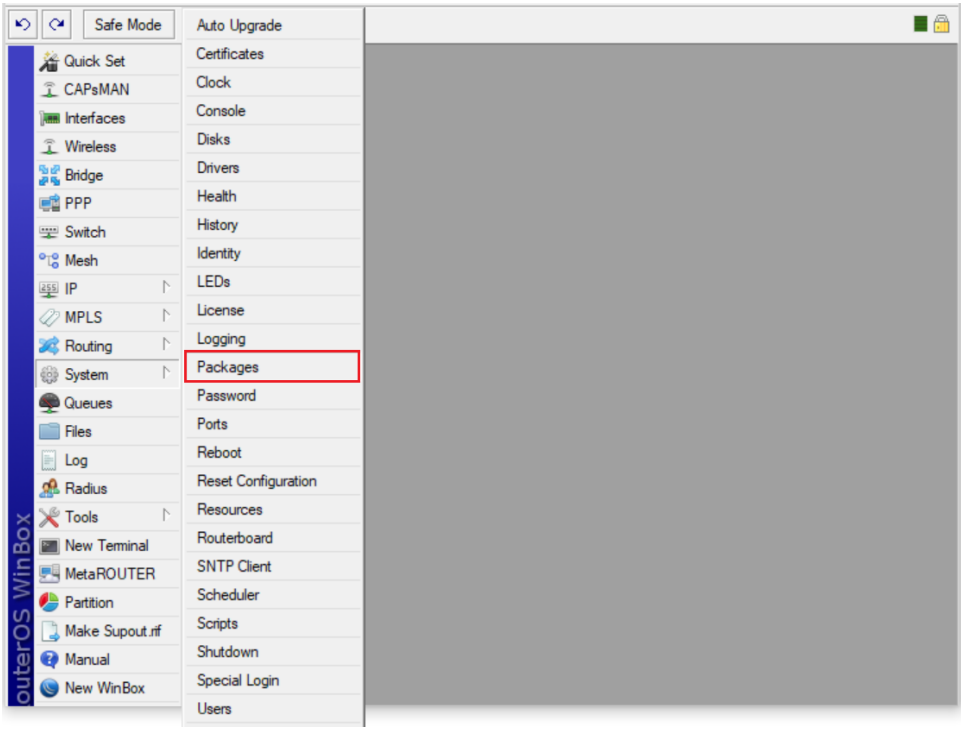


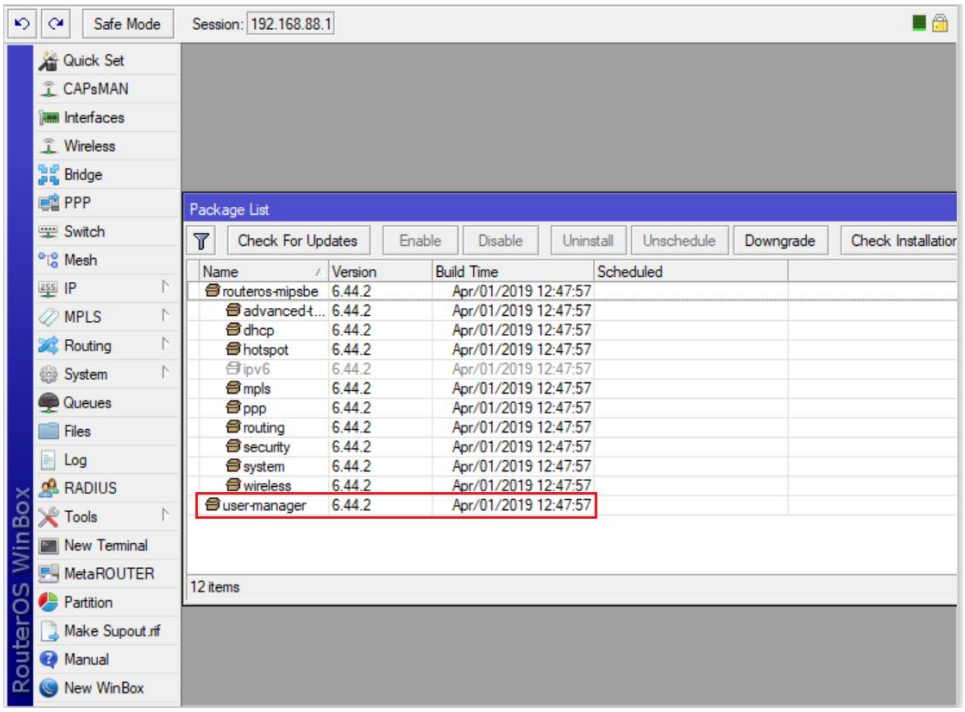


Khởi động lại thiết bị sau khi import các Package thành công vào Router MikroTik.



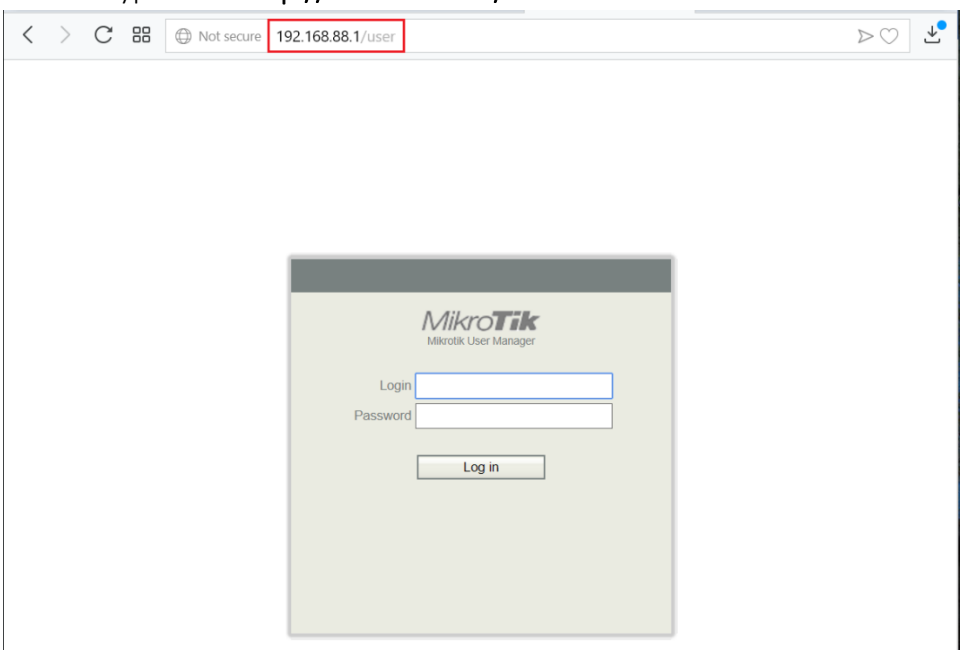
Kiểm tra trong System - Package đã có gói user-manager vừa cài đặt chưa.





Truy cập vào WebPage bằng gói user-mananger.

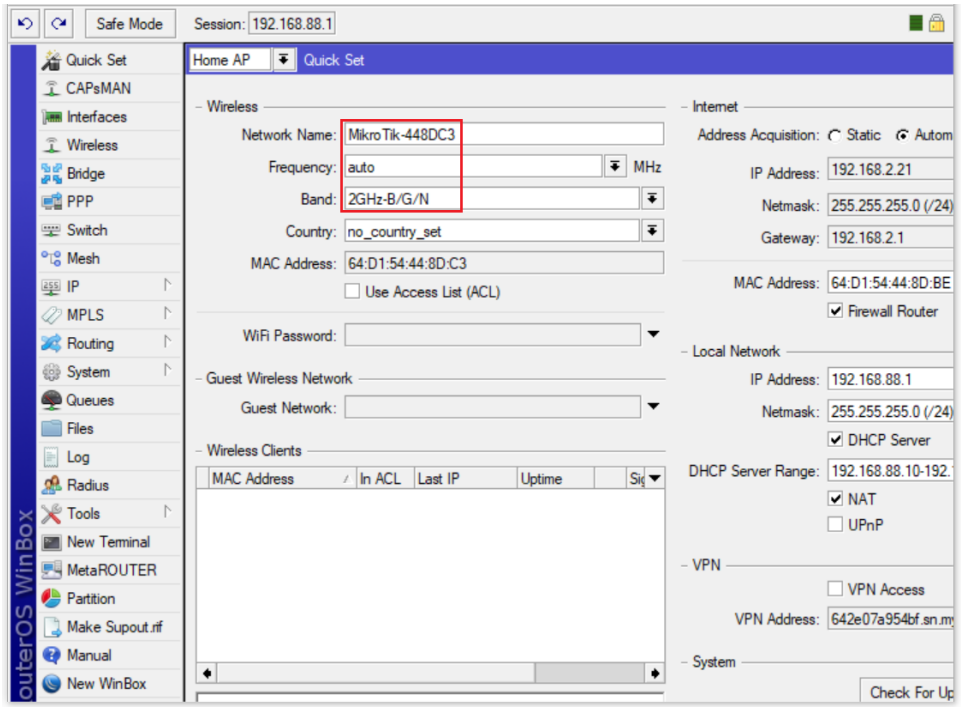
- HyperLink: **http://192.168.88.1/user**

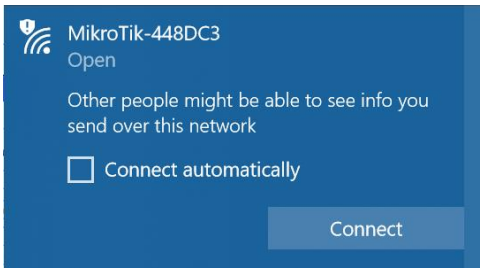


Phần 18. Cấu hình tính năng WiFi trên Router MikroTik.

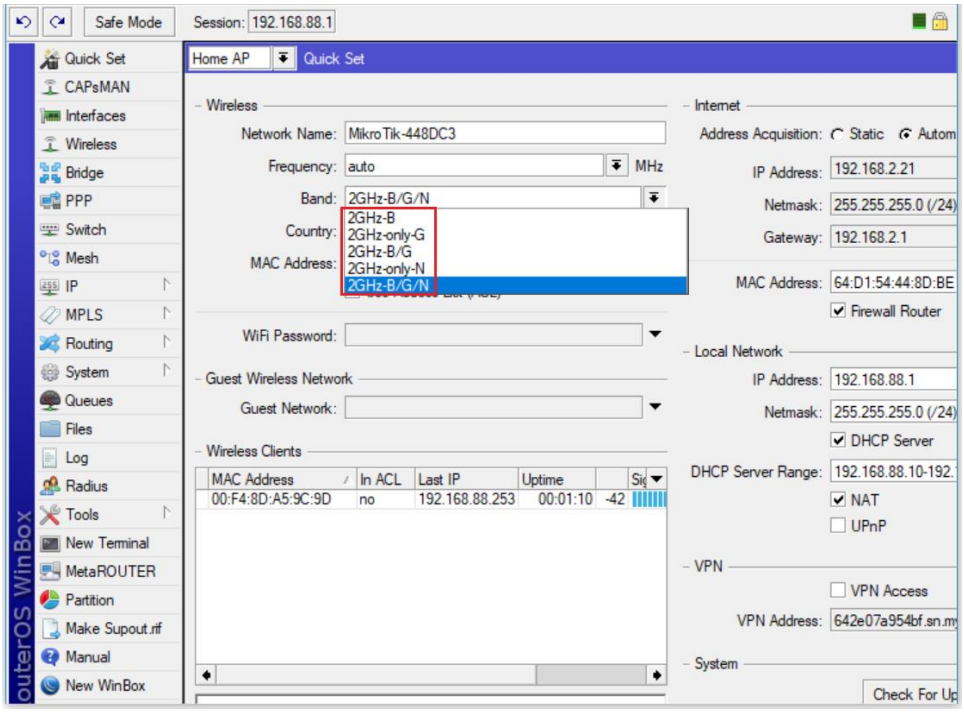
Phần 18.1. Cấu hình Router MikroTik phát SSID đầu tiên.

Router MikroTik phát SSID với tên mặc định là “MikroTik-448DC3” tương ứng với với MAC-Identifier của thiết bị với WiFi Password là rỗng.

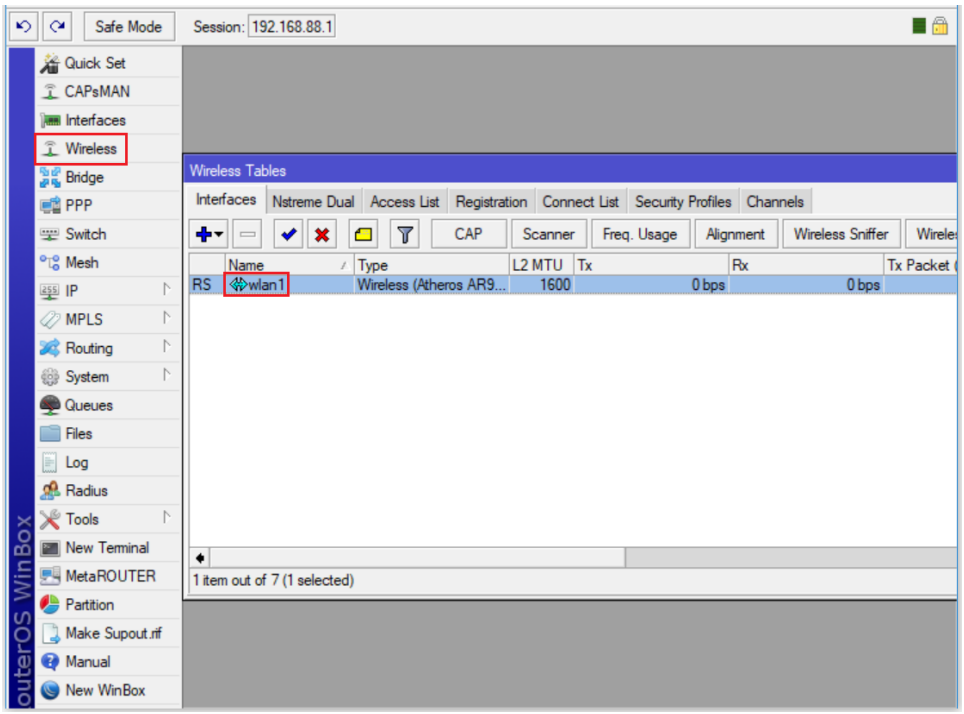


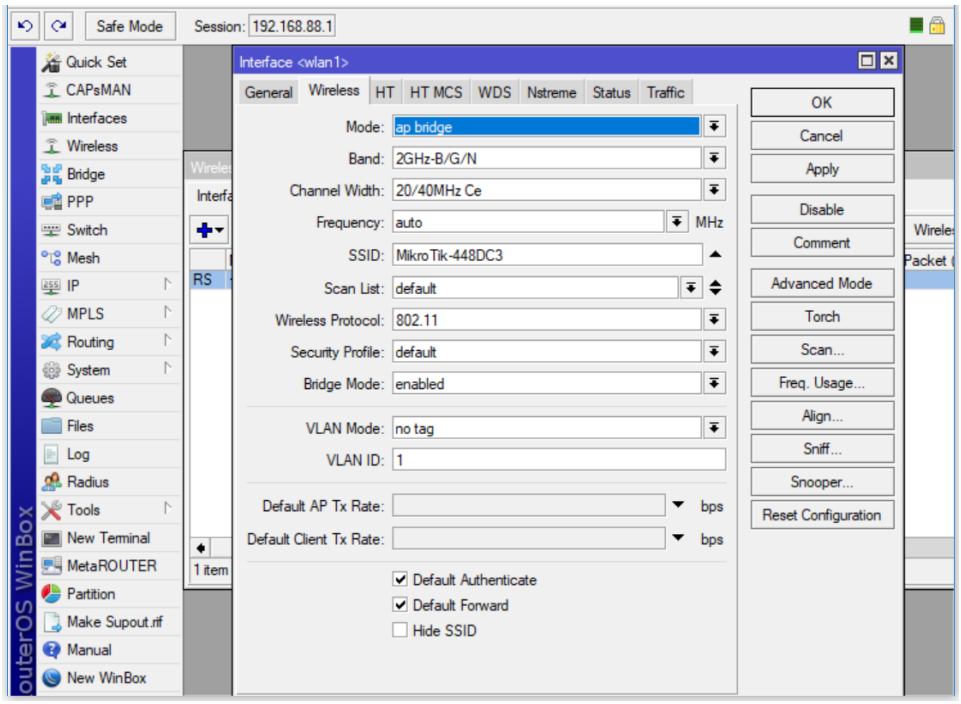


Hiệu chỉnh chuẩn không dây Band trên Router MikroTik.

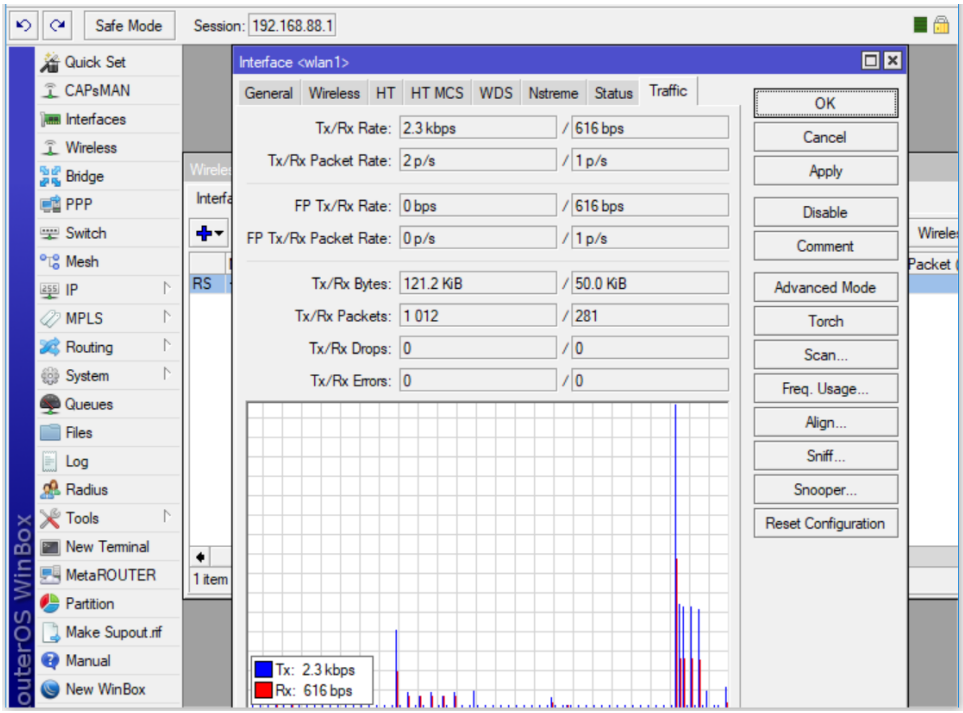


Giám sát và hiệu chỉnh các tham số settings tương ứng với mạng không dây phát ra của Router MikroTik.

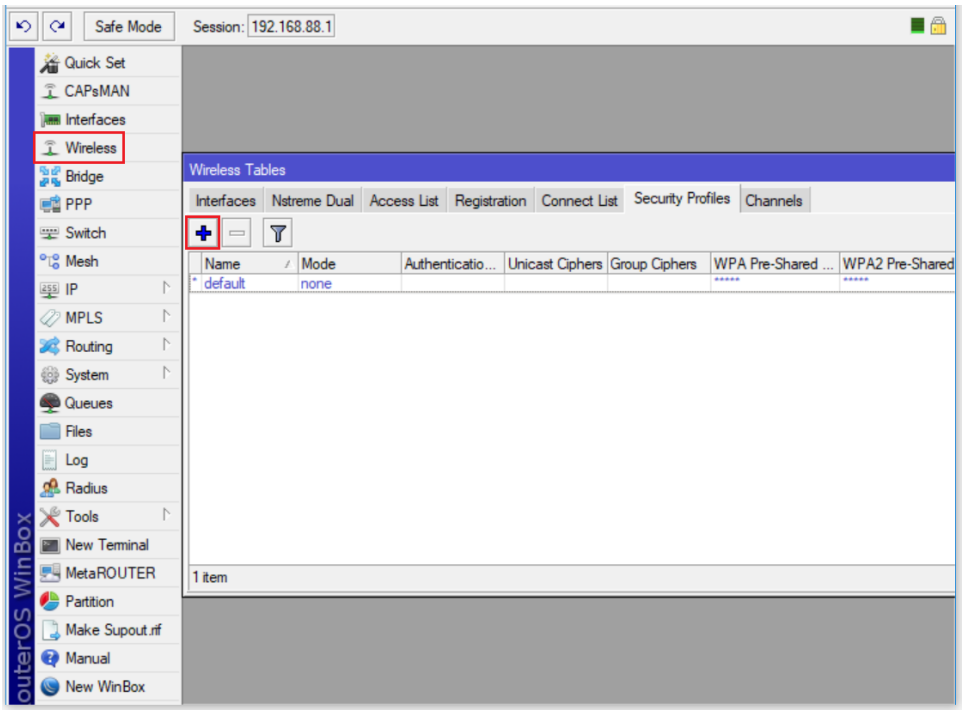


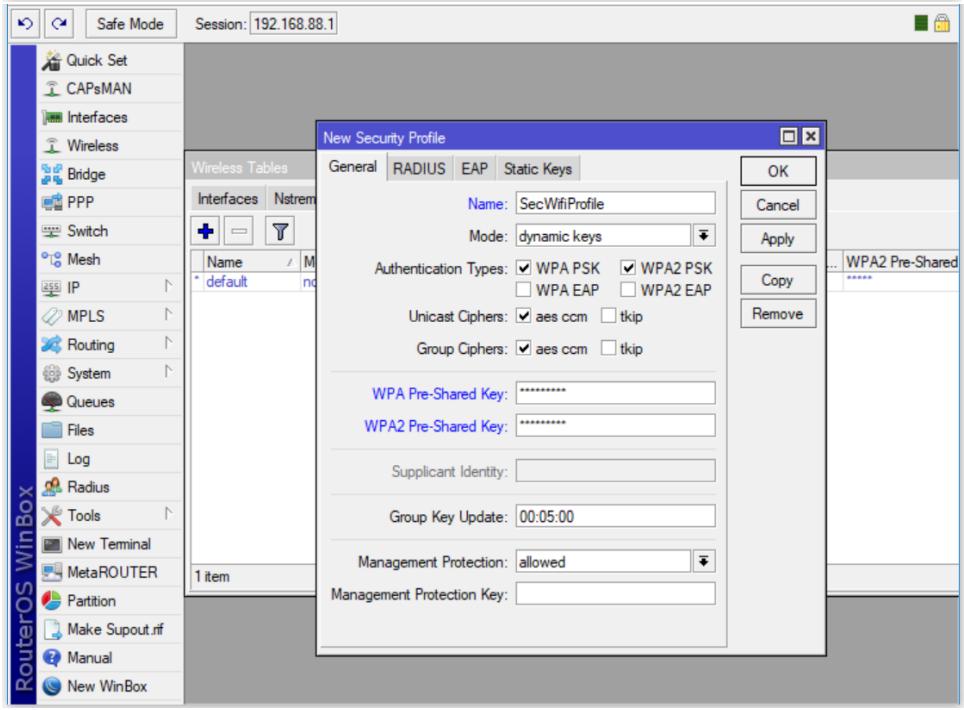


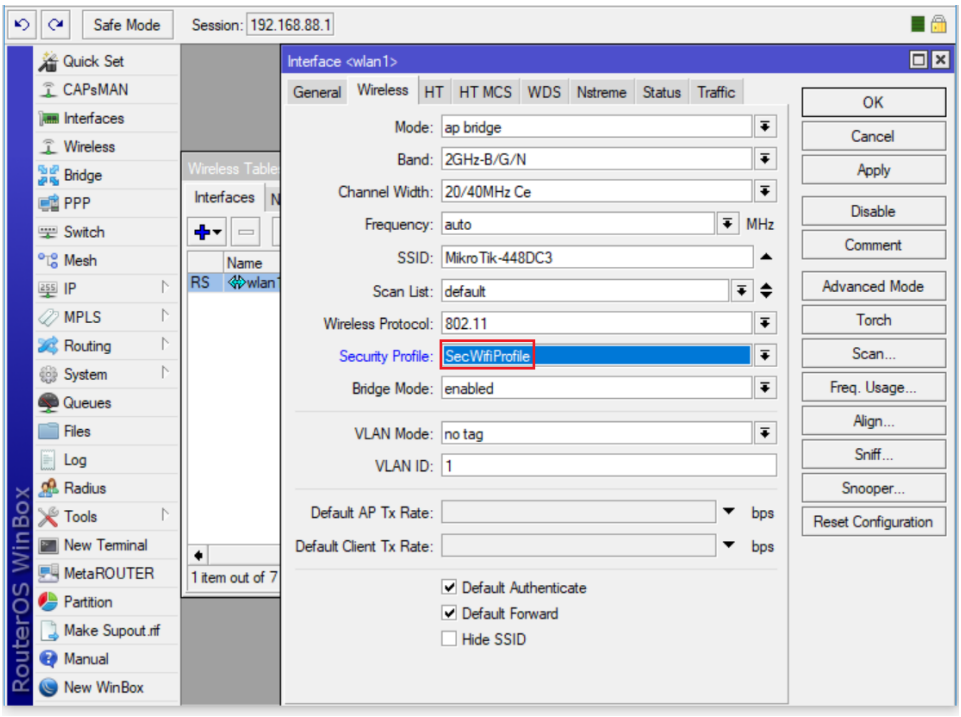
- Giám sát lưu lượng trao đổi thông qua môi trường mạng không dây.



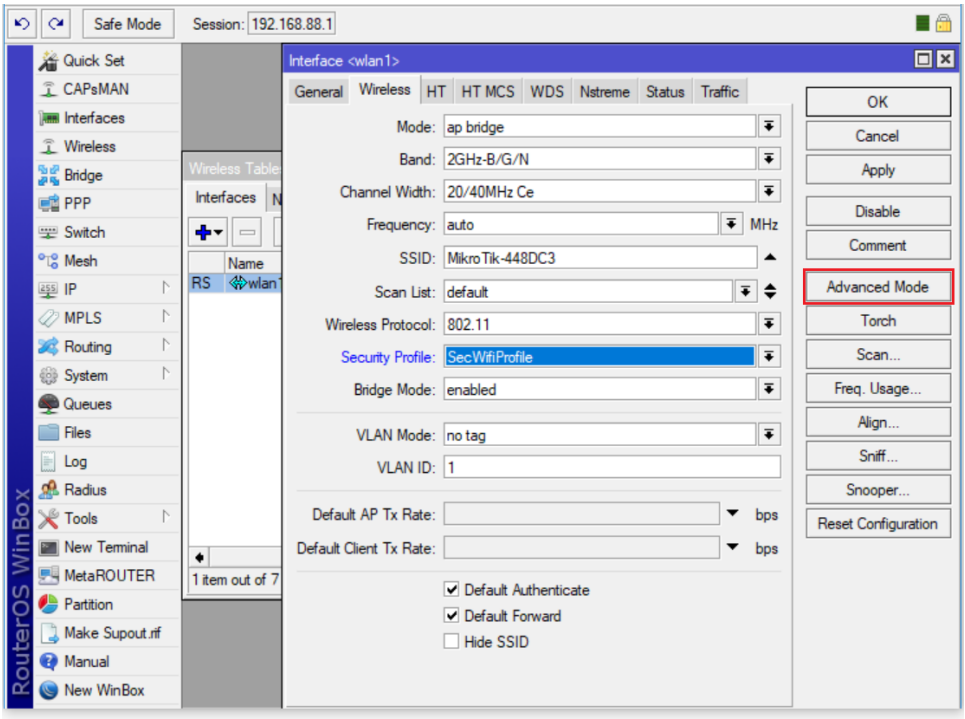
Phần 18.2. Hiệu chỉnh chuẩn bảo mật mạng không dây trên Router MikroTik.

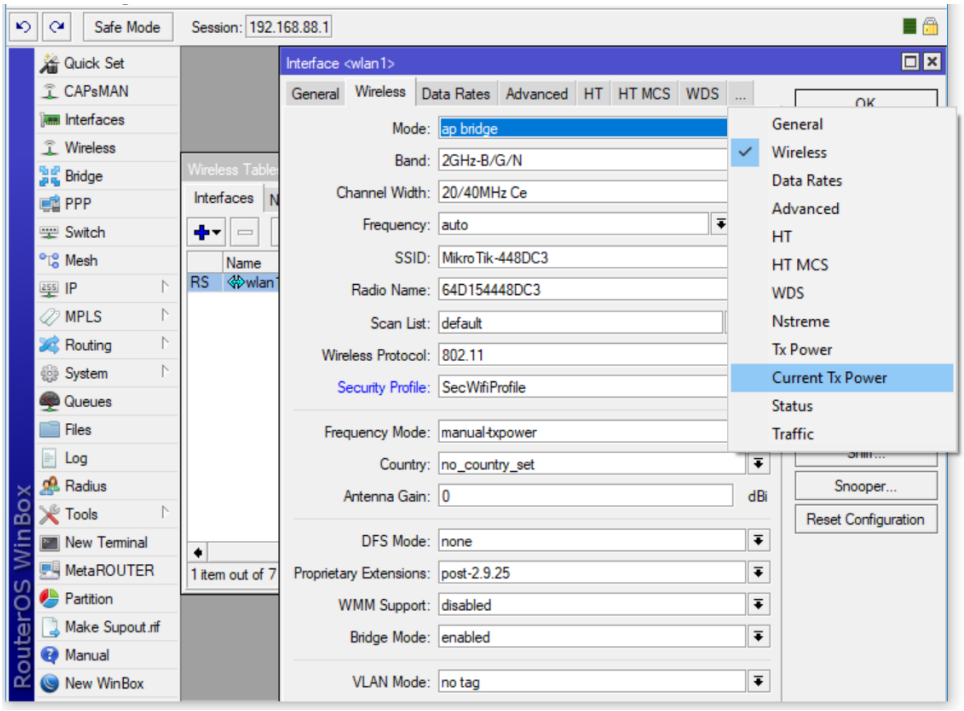

Safe Mode
Session: 192.168.88.1
Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Switch
Mesh
IP
MPLS
Routing
System
Queues
Files
Log
Radius
Tools
New Terminal
MetaROUTER
Partition
Make Supout.rif
Manual
New WinBox
RouterOS WinBox
Wireless Tables
Interfaces
Nstreme Dual
Access List
Registration
Connect List
Security Profiles
Channels
Name
Mode
Authenticatio...
Unicast Ciphers
Group Ciphers
WPA Pre-Shared ...
WPA2 Pre-Shared
default
none
1 item

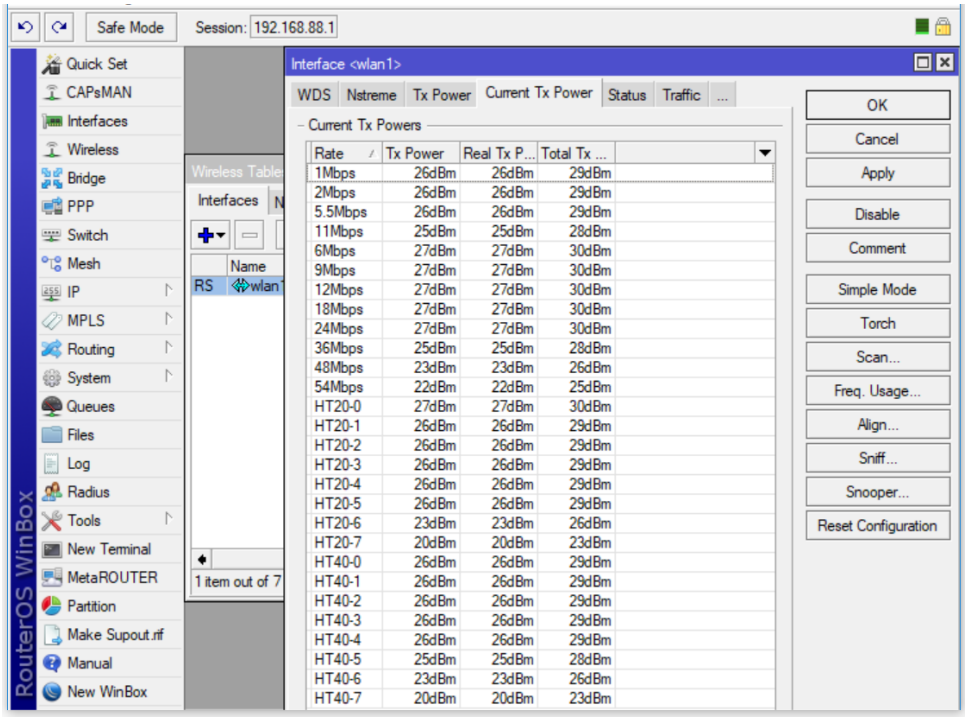

Safe Mode
Session: 192.168.88.1
Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Switch
Mesh
IP
MPLS
Routing
System
Queues
Files
Log
Radius
Tools
New Terminal
MetaROUTER
Partition
Make Supout.rif
Manual
New WinBox
RouterOS WinBox
Wireless Tables
Interfaces
Name
default
1 item
New Security Profile
General
RADIUS
EAP
Static Keys
Name: SecWifiProfile
Mode: dynamic keys
Authentication Types: WPA PSK WPA2 PSK WPA EAP WPA2 EAP
Unicast Ciphers: aes ccm tkip
Group Ciphers: aes ccm tkip
WPA Pre-Shared Key: *********
WPA2 Pre-Shared Key: *********
Supplicant Identity:
Group Key Update: 00:05:00
Management Protection: allowed
Management Protection Key:
OK
Cancel
Apply
Copy
Remove
WPA2 Pre-Shared



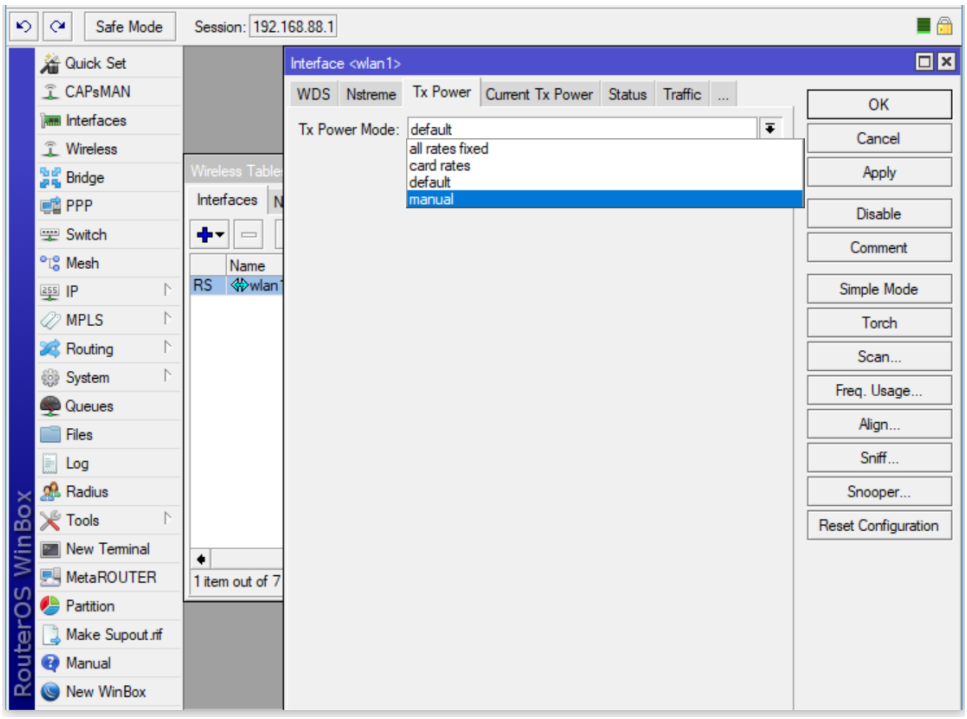
Phần 18.3. Hiệu chỉnh công xuất phát dBm trên Router MikroTik.

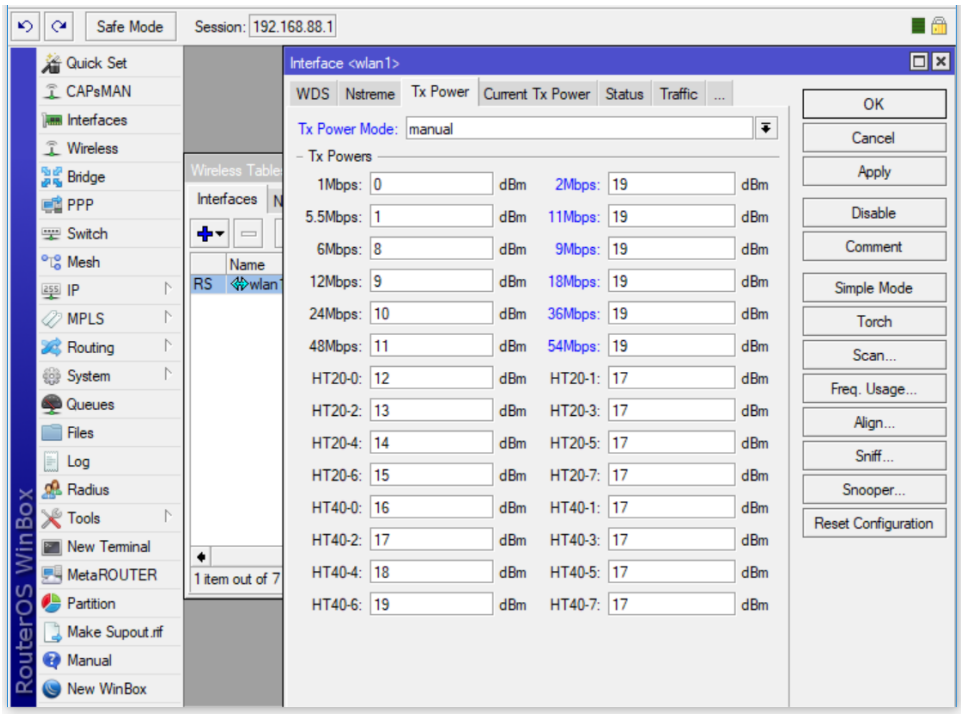


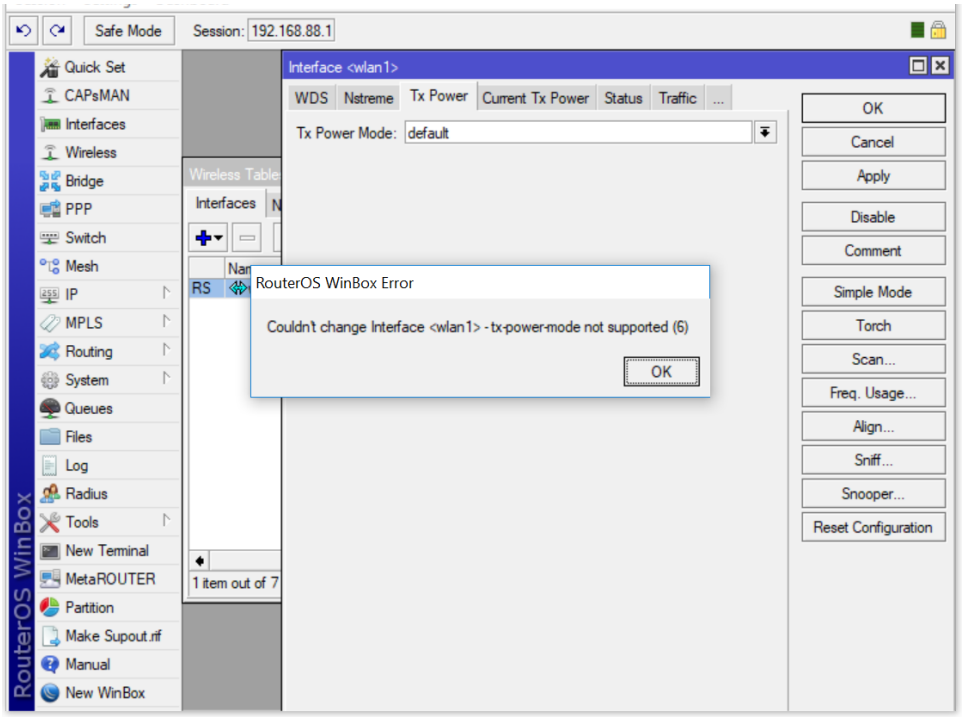




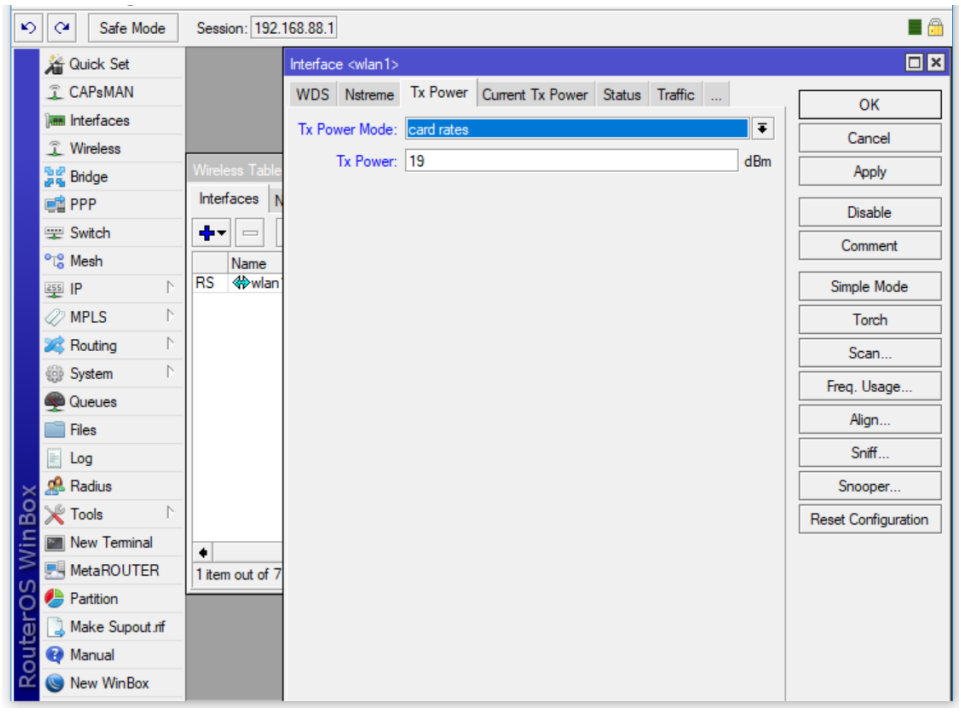
- Hiệu chỉnh Tx Power thủ công.

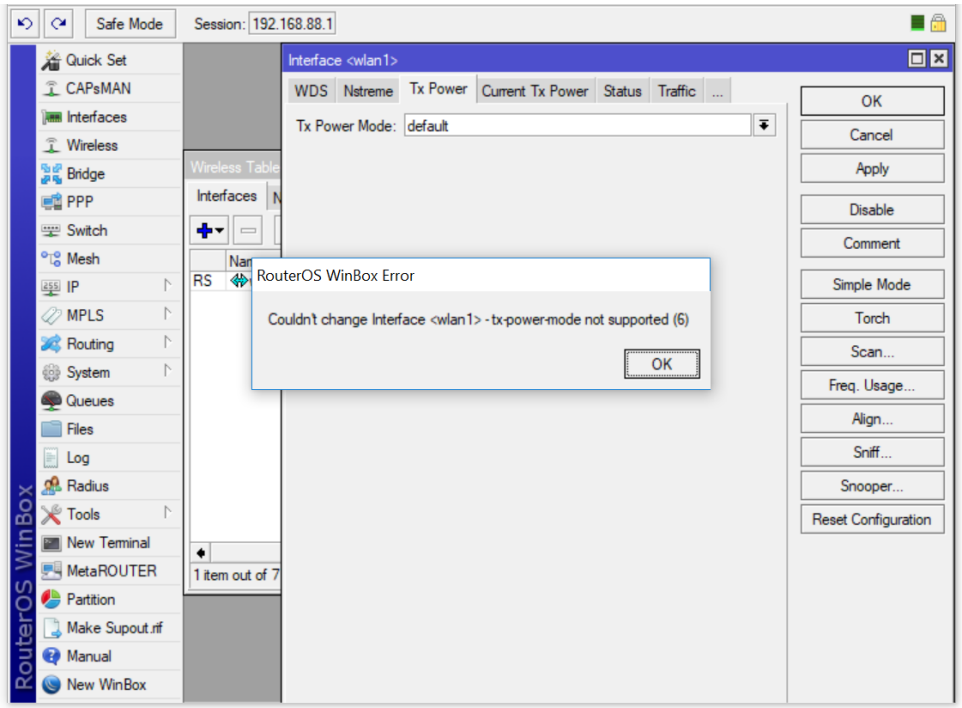

Safe Mode
Session: 192.168.88.1
Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Switch
Mesh
IP
MPLS
Routing
System
Queues
Files
Log
Radius
Tools
New Terminal
MetaROUTER
Partition
Make Supout.rif
Manual
New WinBox
RouterOS WinBox
Interface <wlan1>
WDS
Nstreme
Tx Power
Current Tx Power
Status
Traffic
...
Tx Power Mode: default
all rates fixed
card rates
default
manual
OK
Cancel
Apply
Disable
Comment
Simple Mode
Torch
Scan...
Freq. Usage...
Align...
Sniff...
Snooper...
Reset Configuration
Wireless Table
Interfaces
Name
RS
wlan1
1 item out of 7


Safe Mode
Session: 192.168.88.1
Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Switch
Mesh
IP
MPLS
Routing
System
Queues
Files
Log
Radius
Tools
New Terminal
MetaROUTER
Partition
Make Supout.rif
Manual
New WinBox
RouterOS WinBox
Interface <wlan1>
WDS
Nstreme
Tx Power
Current Tx Power
Status
Traffic
...
Tx Power Mode: manual
Tx Powers
1Mbps: 0 dBm
2Mbps: 19 dBm
5.5Mbps: 1 dBm
11Mbps: 19 dBm
6Mbps: 8 dBm
9Mbps: 19 dBm
12Mbps: 9 dBm
18Mbps: 19 dBm
24Mbps: 10 dBm
36Mbps: 19 dBm
48Mbps: 11 dBm
54Mbps: 19 dBm
HT20-0: 12 dBm
HT20-1: 17 dBm
HT20-2: 13 dBm
HT20-3: 17 dBm
HT20-4: 14 dBm
HT20-5: 17 dBm
HT20-6: 15 dBm
HT20-7: 17 dBm
HT40-0: 16 dBm
HT40-1: 17 dBm
HT40-2: 17 dBm
HT40-3: 17 dBm
HT40-4: 18 dBm
HT40-5: 17 dBm
HT40-6: 19 dBm
HT40-7: 17 dBm
OK
Cancel
Apply
Disable
Comment
Simple Mode
Torch
Scan...
Freq. Usage...
Align...
Sniff...
Snooper...
Reset Configuration
Wireless Table
Interfaces
Name
RS
wlan1
1 item out of 7

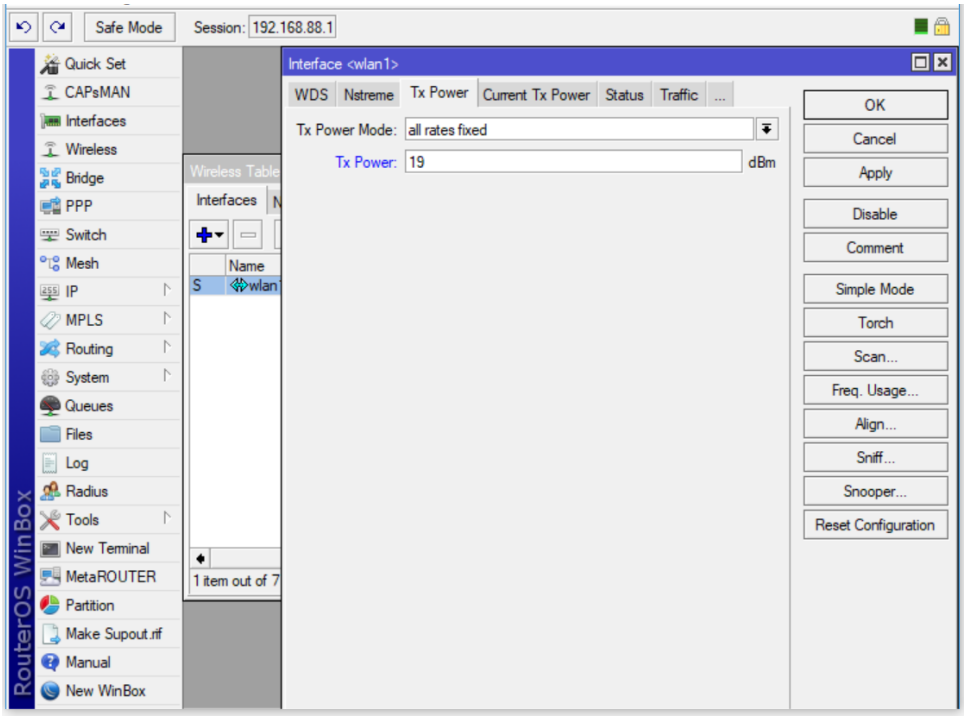


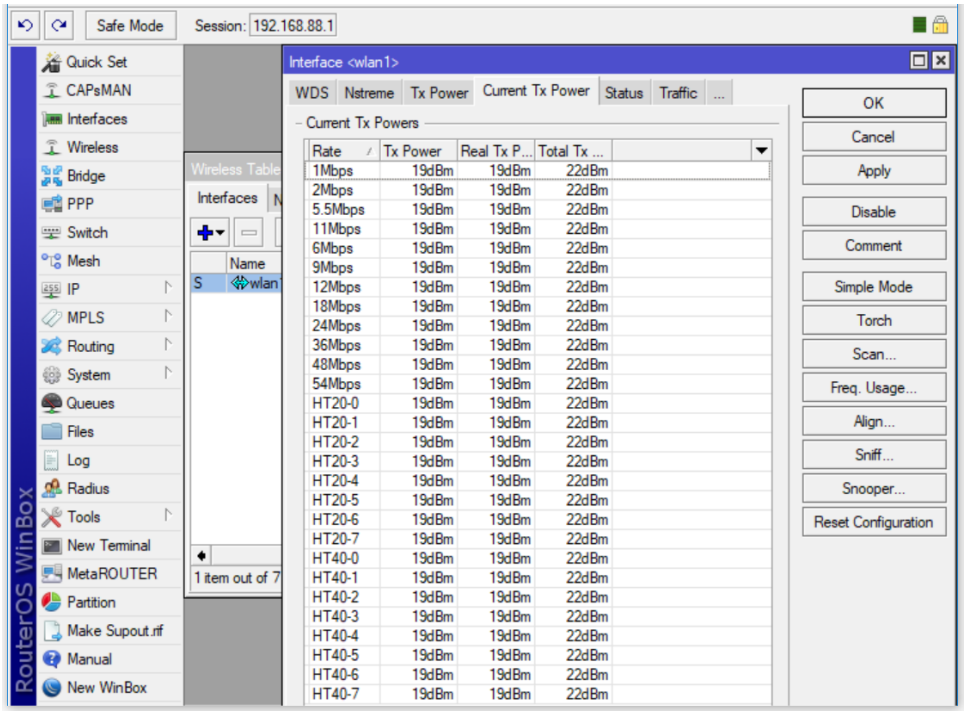
- Hiệu chỉnh công xuất phát Tx Power:
    - Giá trị Tx Power mặc định là: 17

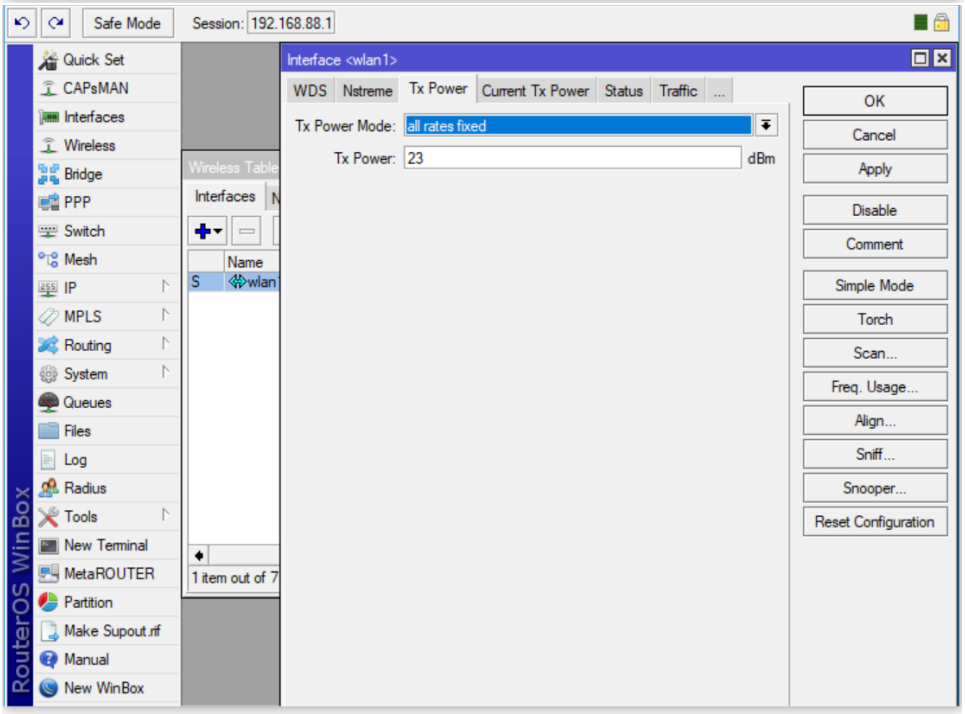


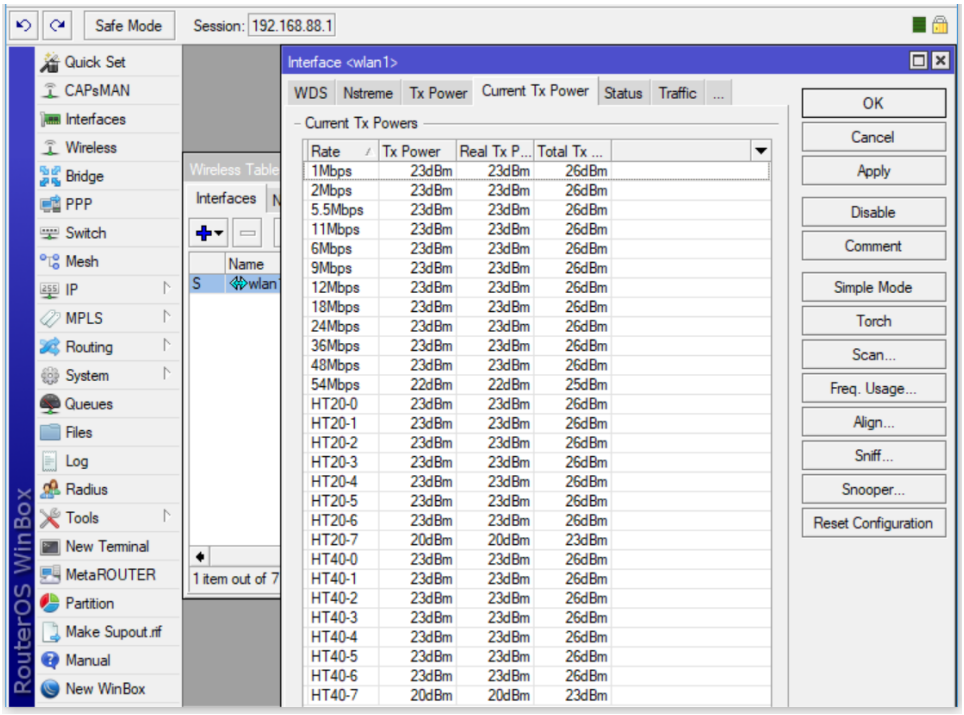


- Giá trị Tx Power mặc định là 17:



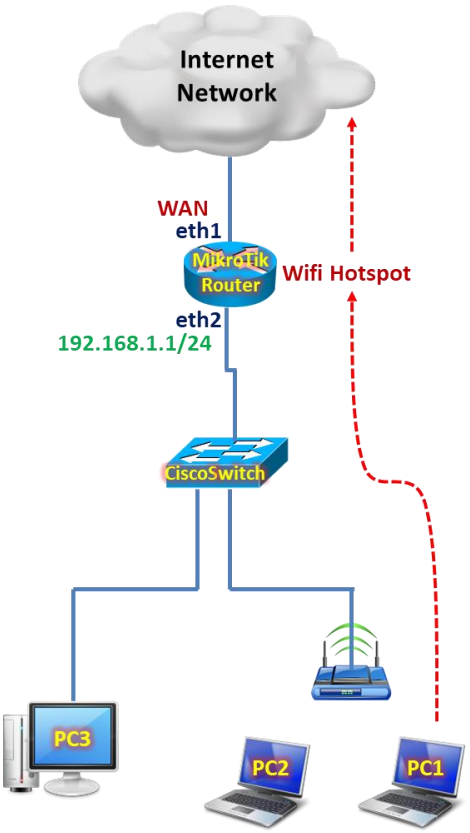

Safe Mode
Session: 192.168.88.1
Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Switch
Mesh
IP
MPLS
Routing
System
Queues
Files
Log
Radius
Tools
New Terminal
MetaROUTER
Partition
Make Supout.rif
Manual
New WinBox
RouterOS WinBox
Interface <wlan1>
WDS
Nstreme
Tx Power
Current Tx Power
Status
Traffic
...
Current Tx Powers
Rate
Tx Power
Real Tx P...
Total Tx ...
1Mbps 19dBm 19dBm 22dBm
2Mbps 19dBm 19dBm 22dBm
5.5Mbps 19dBm 19dBm 22dBm
11Mbps 19dBm 19dBm 22dBm
6Mbps 19dBm 19dBm 22dBm
9Mbps 19dBm 19dBm 22dBm
12Mbps 19dBm 19dBm 22dBm
18Mbps 19dBm 19dBm 22dBm
24Mbps 19dBm 19dBm 22dBm
36Mbps 19dBm 19dBm 22dBm
48Mbps 19dBm 19dBm 22dBm
54Mbps 19dBm 19dBm 22dBm
HT20-0 19dBm 19dBm 22dBm
HT20-1 19dBm 19dBm 22dBm
HT20-2 19dBm 19dBm 22dBm
HT20-3 19dBm 19dBm 22dBm
HT20-4 19dBm 19dBm 22dBm
HT20-5 19dBm 19dBm 22dBm
HT20-6 19dBm 19dBm 22dBm
HT20-7 19dBm 19dBm 22dBm
HT40-0 19dBm 19dBm 22dBm
HT40-1 19dBm 19dBm 22dBm
HT40-2 19dBm 19dBm 22dBm
HT40-3 19dBm 19dBm 22dBm
HT40-4 19dBm 19dBm 22dBm
HT40-5 19dBm 19dBm 22dBm
HT40-6 19dBm 19dBm 22dBm
HT40-7 19dBm 19dBm 22dBm
OK
Cancel
Apply
Disable
Comment
Simple Mode
Torch
Scan...
Freq. Usage...
Align...
Sniff...
Snooper...
Reset Configuration
Wireless Table
Interfaces
Name
S wlan
1 item out of 7


Safe Mode
Session: 192.168.88.1
Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Switch
Mesh
IP
MPLS
Routing
System
Queues
Files
Log
Radius
Tools
New Terminal
MetaROUTER
Partition
Make Supout.rif
Manual
New WinBox
RouterOS WinBox
Interface <wlan1>
WDS
Nstreme
Tx Power
Current Tx Power
Status
Traffic
...
Tx Power Mode: all rates fixed
Tx Power: 23 dBm
OK
Cancel
Apply
Disable
Comment
Simple Mode
Torch
Scan...
Freq. Usage...
Align...
Sniff...
Snooper...
Reset Configuration
Wireless Table
Interfaces
Name
S wlan
1 item out of 7



Phần 18.4. Cấu hình tính năng Wifi Hotspot trên Router MikroTik.

Tính năng Wifi Hotspot yêu cầu người dùng truy cập vào mạng không dây lẫn có dây bắt buộc phải đăng nhập bằng tài khoản xác thực trước khi có thể truy cập ra ngoài Internet.



Tổng quan các bước thực hiện:

- Bước 1. Cấu hình cơ bản trên Router MikroTik.
- Bước 2. Đảm bảo gói UserManager đã được cài đặt để Router MikroTik có thể đóng vai trò RADIUS Server.
- Bước 3. Thiết lập dải IP Pool chứa dải địa chỉ IP sẽ cấp phát cho các phiên kết nối WiFi Hotspot.
- Bước 4. Thiết lập Hotspot Server Profile trên Router MikroTik.
- Bước 5. Thiết lập Hostpot Server trên Router MikroTik.
- Bước 6. Thiết lập Hotspot User Profile trên Router MikroTik.
- Bước 7. Thiết lập Hotspot User trên Router MikroTik.
- Bước 8. Khảo sát quá trình truy cập WiFi Hotspot trên máy tính có dây.
- Bước 9. Giám sát danh sách End User đang truy cập dịch vụ WiFi Hotspot trên Router MikroTik.
- Bước 10. Thiết lập tính năng WiFi Hotspot Bypassed trên Router MikroTik.
- Bước 11. Thống kê lưu lượng WiFi Hotpot User.

Các bước thực hiện chi tiết:

Bước 1. Cấu hình cơ bản trên Router MikroTik.

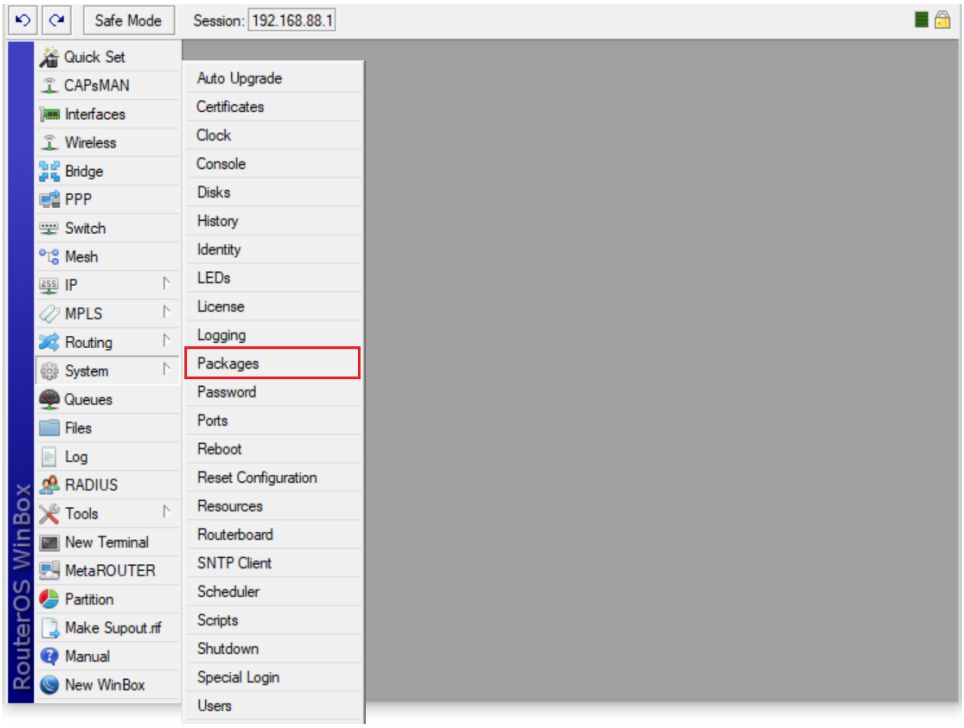
Cấu hình cơ bản trên Router MikroTik.

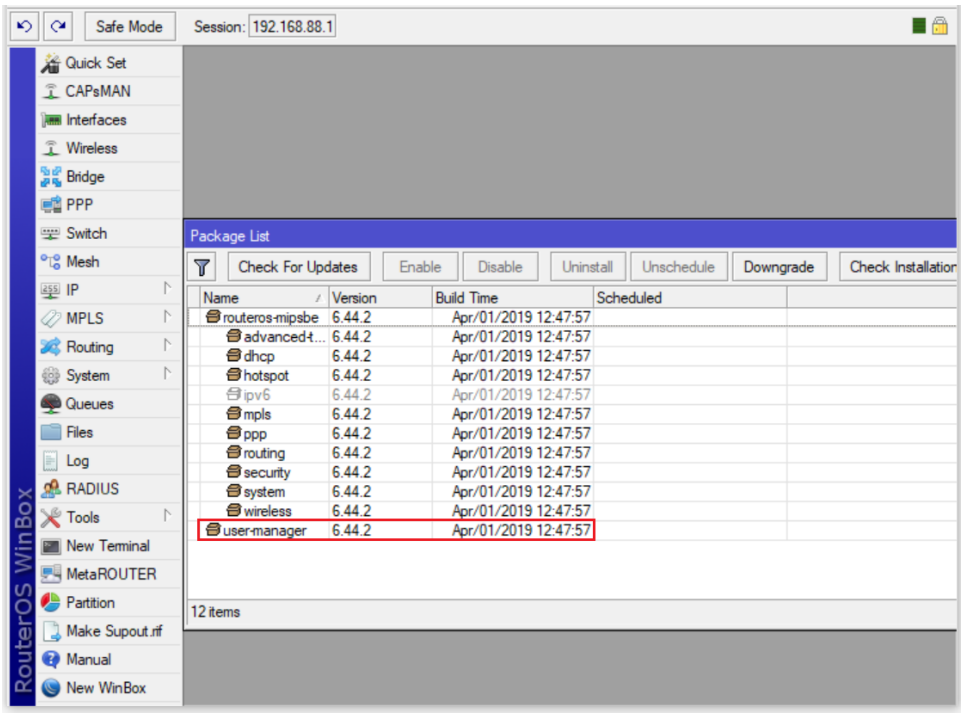
```
[admin@MikroTik]>
```

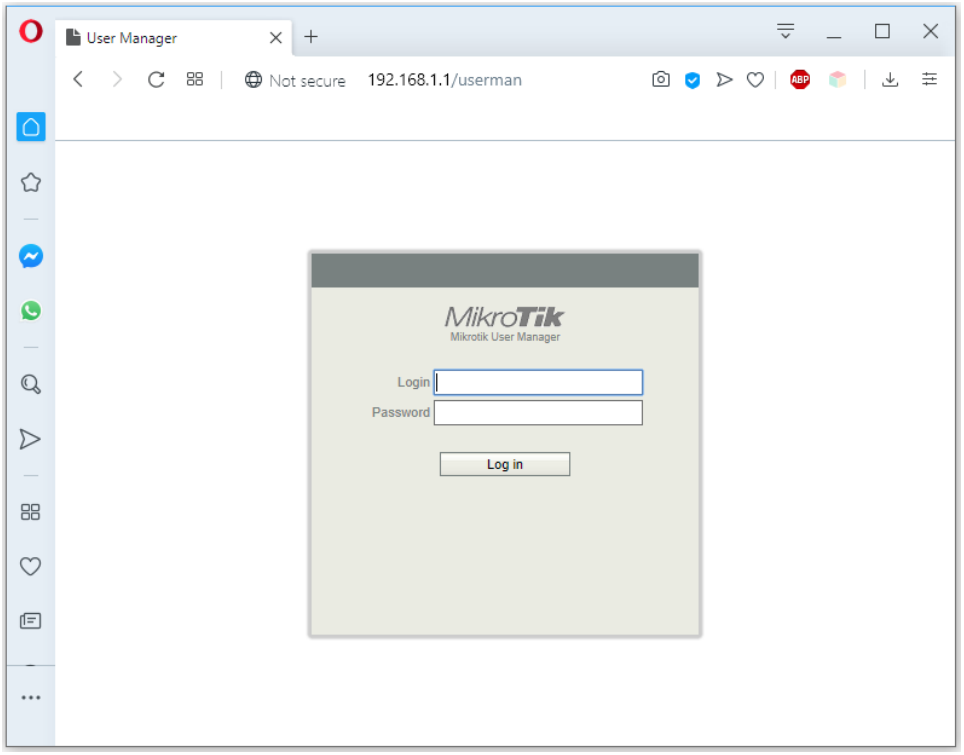
```
/ip address add address=192.168.1.1/24 interface=ether2
/ip dhcp-client add interface=ether1 disabled=no add-default-route=yes

/ip firewall nat add chain=srcnat action=masquerade out-interface=ether1
```

Bước 2. Đảm bảo gói UserManager đã được cài đặt để Router MikroTik có thể đóng vai trò RADIUS Server.

Có thể không cần cài đặt gói này nếu không sử dụng Database RADIUS Server trong suốt quá trình thiết lập WiFi Hotspot trên Router MikroTik.







Bước 3. Thiết lập dải IP Pool chứa dải địa chỉ IP sẽ cấp phát cho các phiên kết nối WiFi Hotspot. Định nghĩa dải IP Pool sẽ cấp xuống cho các thiết bị đầu cuối DHCP Client.

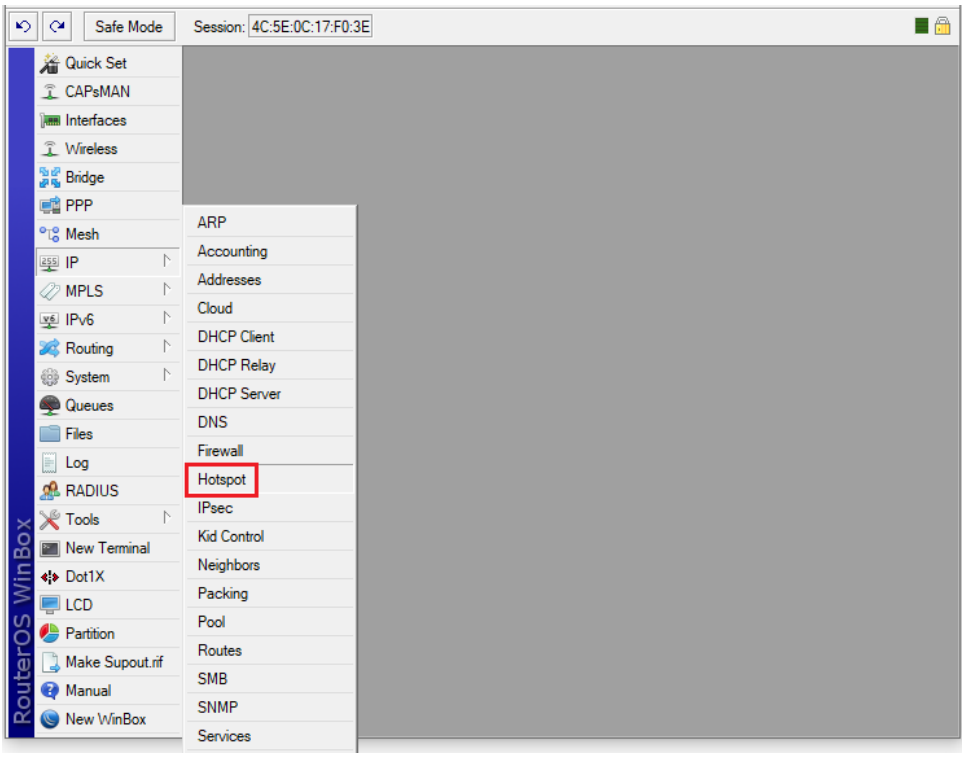
```
[admin@MikroTik]>
/ip pool add name=HotspotLAN ranges=192.168.1.10-192.168.1.100
/ip dhcp-server network add address=192.168.1.0/24 gateway=192.168.1.1 dns-
server=8.8.4.4
```

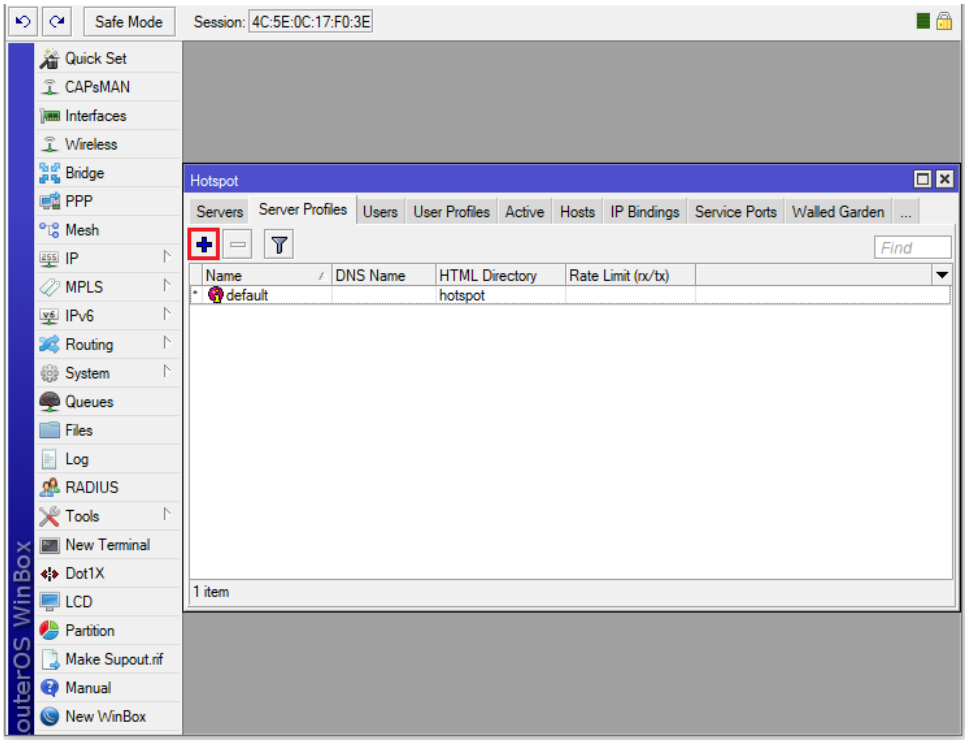
```
/ip dhcp-server add name=DHCP.LAN interface=ether2 address-pool=HotspotLAN disabled=no
```

Bước 4. Thiết lập Hotspot Server Profile trên Router MikroTik.

```
[admin@MikroTik] >
/ip hotspot profile add name="HotspotServerProfile" hotspot-address=192.168.1.1 dns-
name="hotspot.mobile24h.class" html-directory=hotspot rate-limit="512k/30M"
```

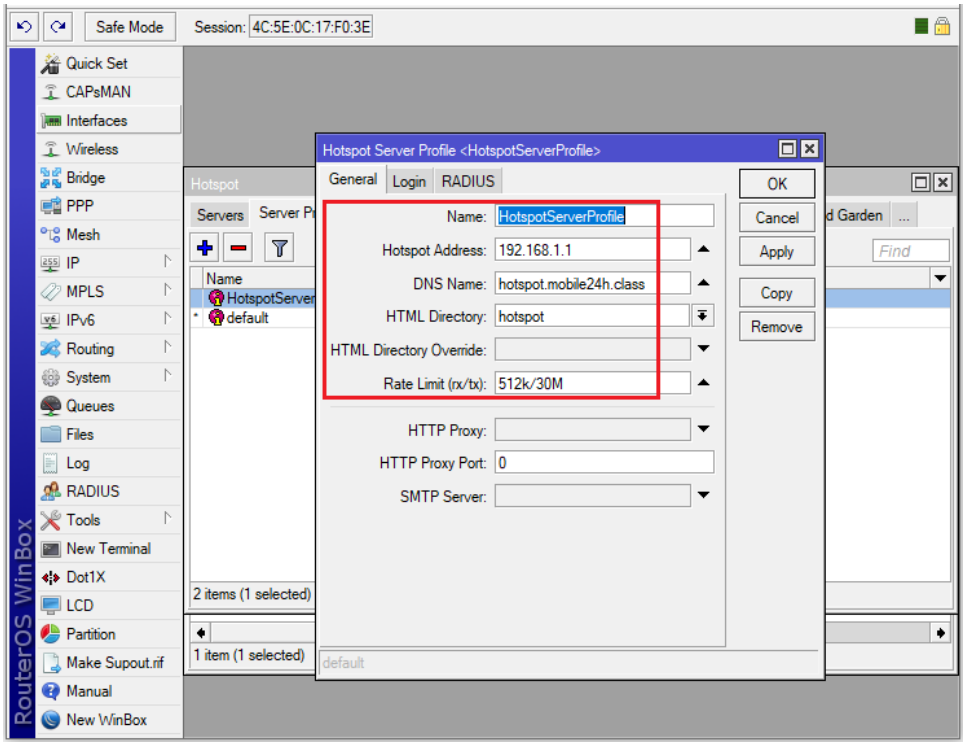
```
[admin@MikroTik] > /ip hotspot profile print
Flags: * - default
 0 * name="default" hotspot-address=0.0.0.0 dns-name="" html-directory=hotspot
     html-directory-override="" rate-limit="" http-proxy=0.0.0.0:0
     smtp-server=0.0.0.0 login-by=cookie,http-chap http-cookie-lifetime=3d
     split-user-domain=no use-radius=no

 1   name="HotspotServerProfile" hotspot-address=192.168.1.1
     dns-name="hotspot.mobile24h.class" html-directory=hotspot
     html-directory-override="" rate-limit="512k/30M" http-proxy=0.0.0.0:0
     smtp-server=0.0.0.0 login-by=http-chap split-user-domain=no use-radius=no
[admin@MikroTik] >
```

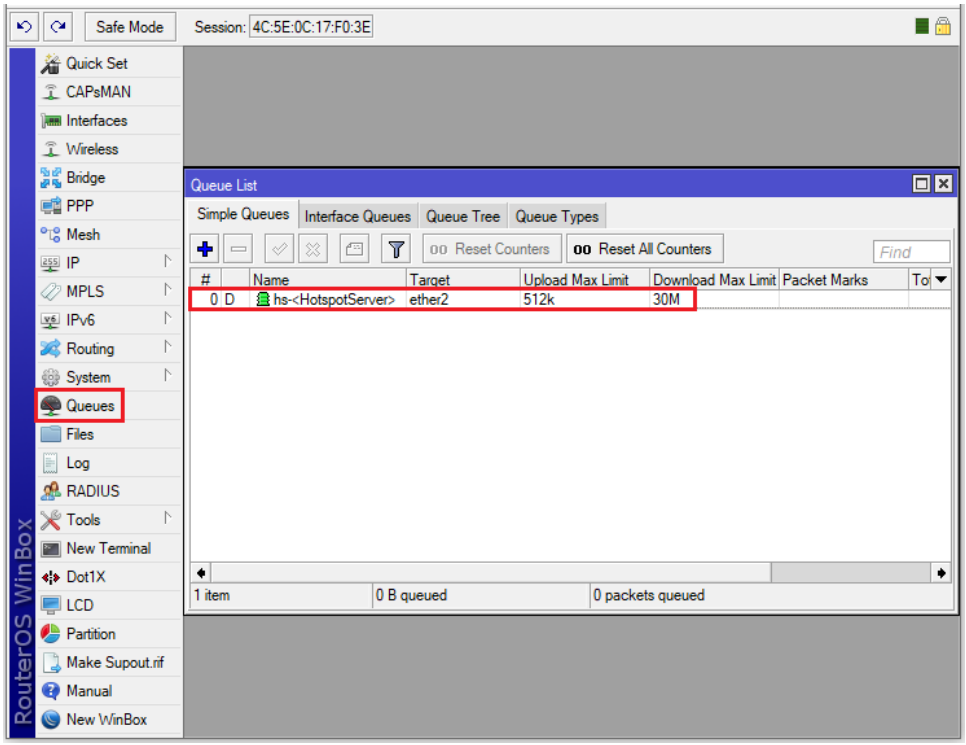


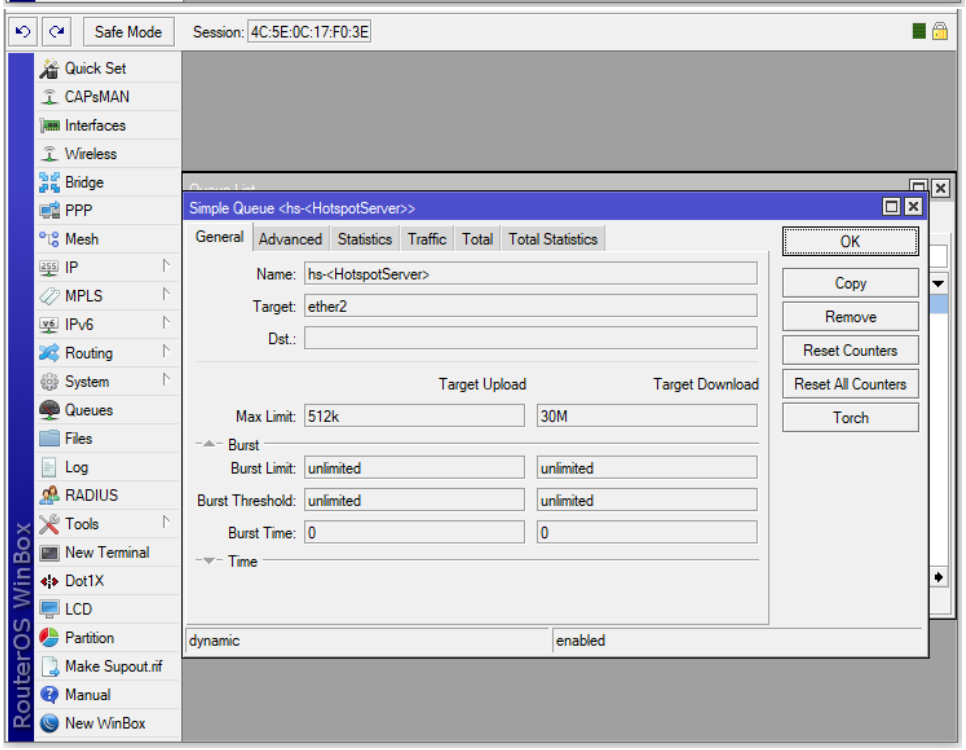


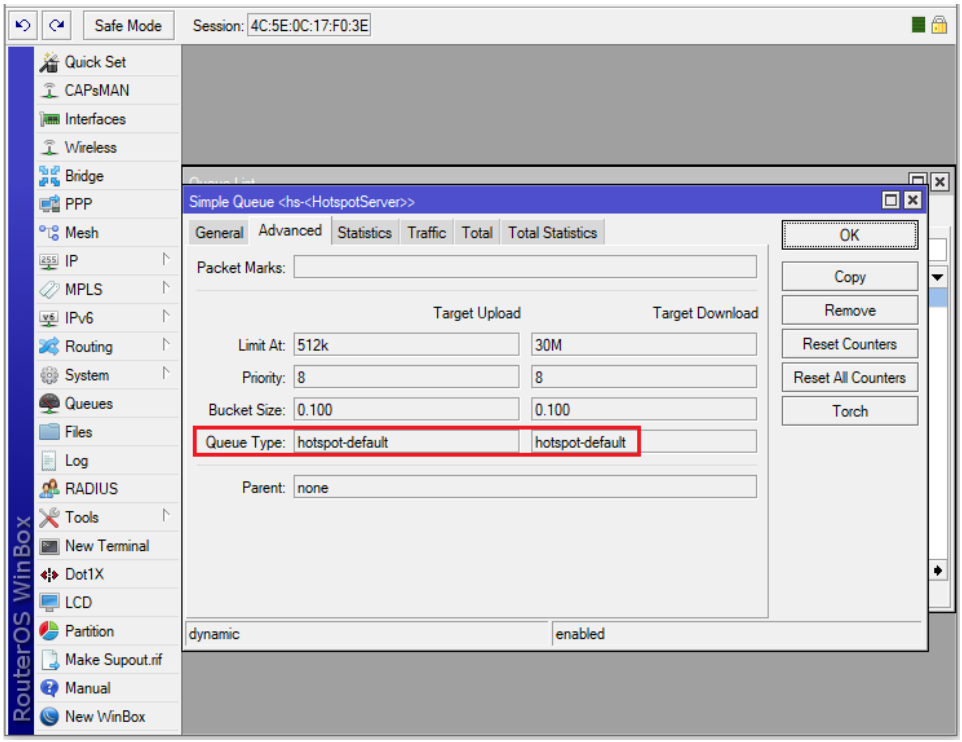
Rate Limit on a Hotspot Server Profile:

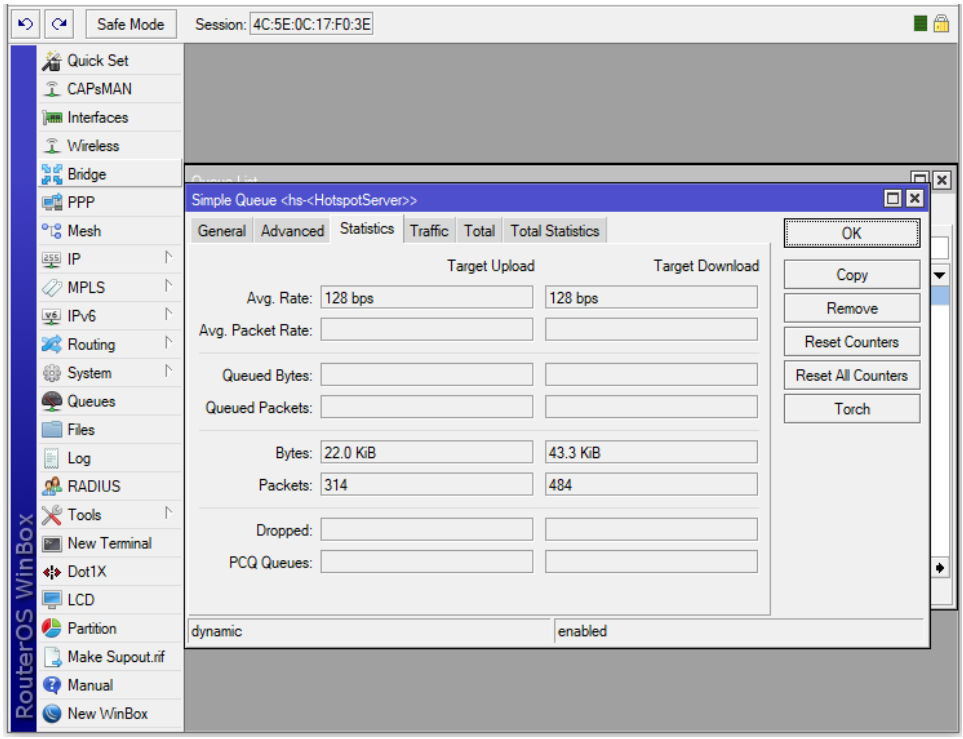
- Usage Rate Limit at this hotspot server profile, it will automatically limit the total traffic on the network Hotspot Mikrotik.

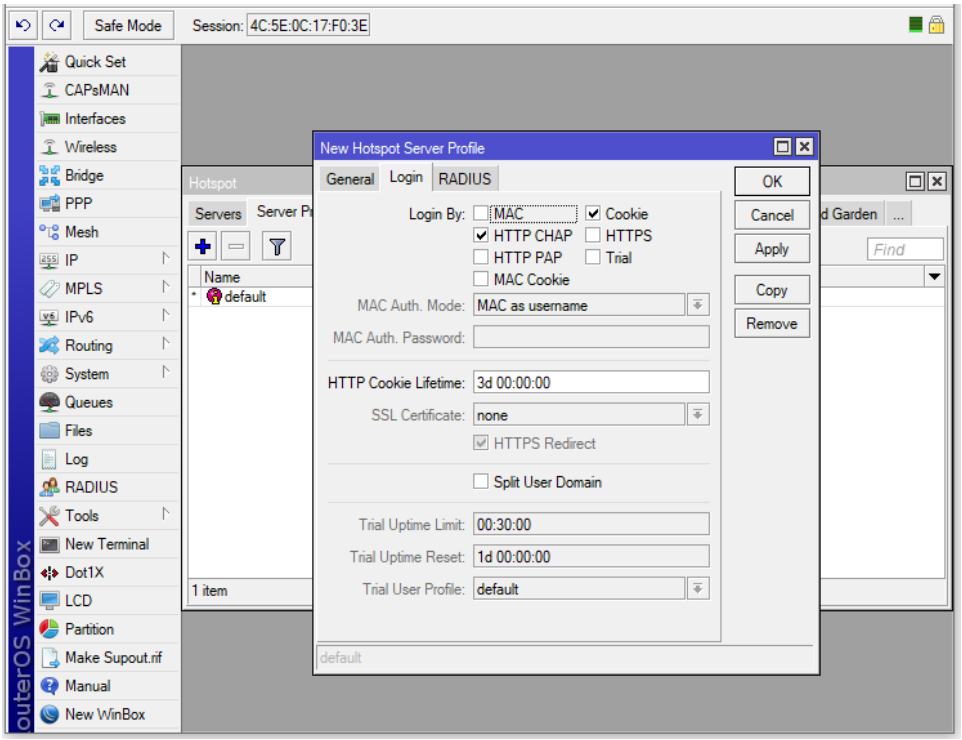


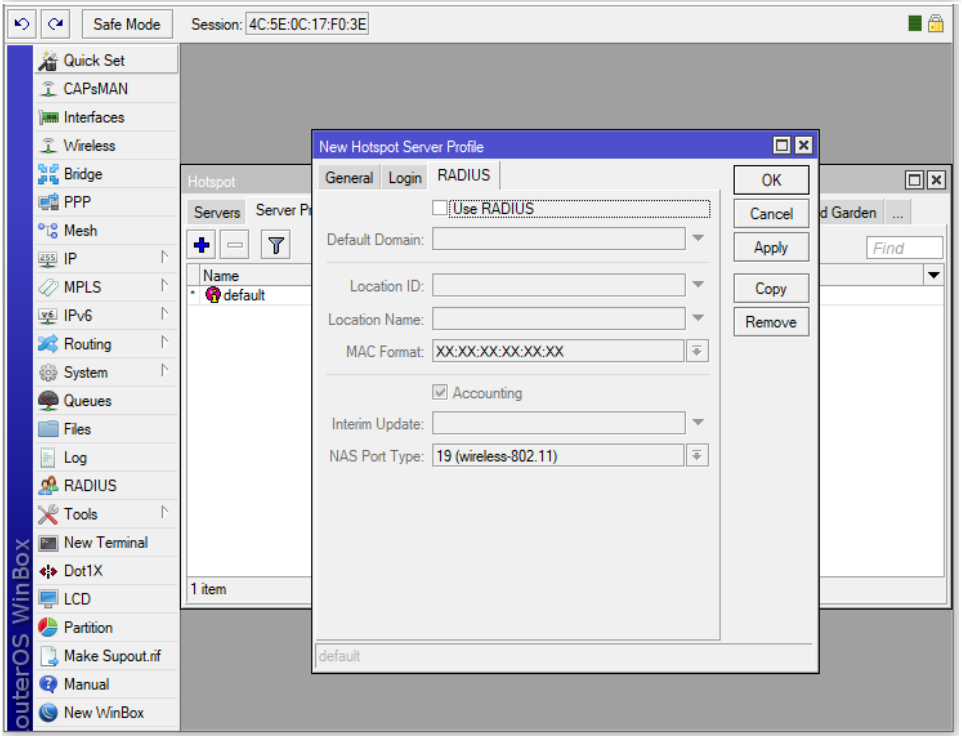

Safe Mode
Session: 4C:5E:0C:17:F0:3E
Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Mesh
IP
MPLS
IPv6
Routing
System
Queues
Files
Log
RADIUS
Tools
New Terminal
Dot1X
LCD
Partition
Make Supout.rif
Manual
New WinBox
RouterOS WinBox
Queue List
Simple Queues
Interface Queues
Queue Tree
Queue Types
Reset Counters
Reset All Counters
Find
Name Target Upload Max Limit Download Max Limit Packet Marks
0 D hs-<HotspotServer> ether2 512k 30M
1 item
0 B queued
0 packets queued

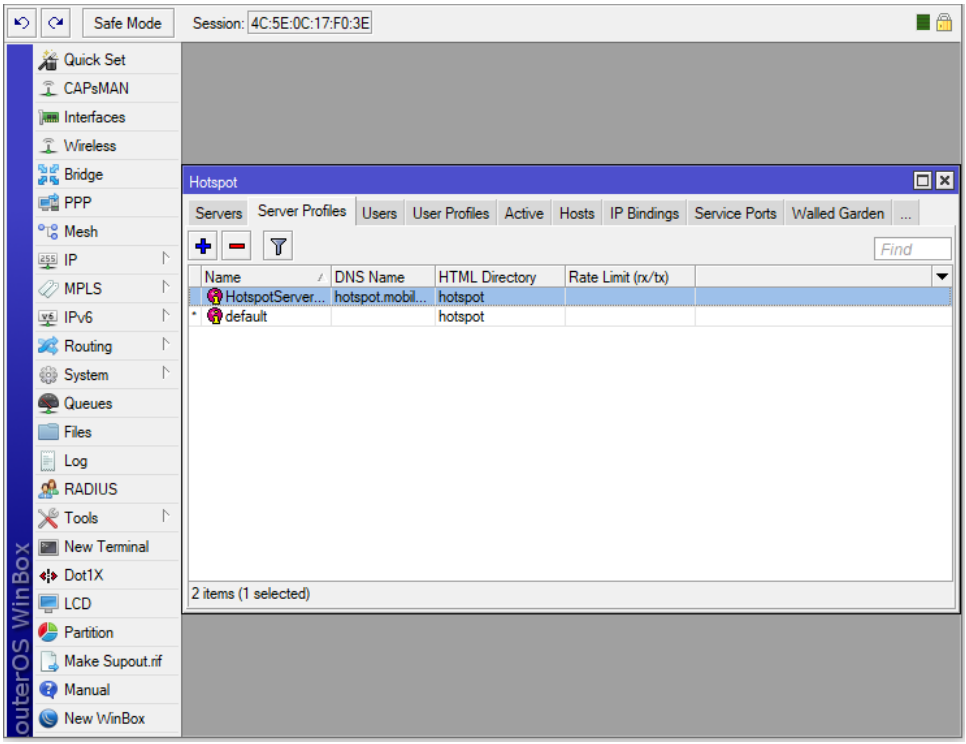

Safe Mode
Session: 4C:5E:0C:17:F0:3E
Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Mesh
IP
MPLS
IPv6
Routing
System
Queues
Files
Log
RADIUS
Tools
New Terminal
Dot1X
LCD
Partition
Make Supout.rif
Manual
New WinBox
RouterOS WinBox
Simple Queue <hs-<HotspotServer>>
General
Advanced
Statistics
Traffic
Total
Total Statistics
OK
Copy
Remove
Reset Counters
Reset All Counters
Torch
Name: hs-<HotspotServer>
Target: ether2
Dst.:
Target Upload
Target Download
Max Limit: 512k
30M
Burst
Burst Limit: unlimited
unlimited
Burst Threshold: unlimited
unlimited
Burst Time: 0
0
Time
dynamic
enabled


Safe Mode
Session: 4C:5E:0C:17:F0:3E
Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Mesh
IP
MPLS
IPv6
Routing
System
Queues
Files
Log
RADIUS
Tools
New Terminal
Dot1X
LCD
Partition
Make Supout.rif
Manual
New WinBox
RouterOS WinBox
Simple Queue <hs-<HotspotServer>>
General
Advanced
Statistics
Traffic
Total
Total Statistics
OK
Copy
Remove
Reset Counters
Reset All Counters
Torch
Packet Marks:
Target Upload
Target Download
Limit At:
512k
30M
Priority:
8
8
Bucket Size:
0.100
0.100
Queue Type:
hotspot-default
hotspot-default
Parent:
none
dynamic
enabled

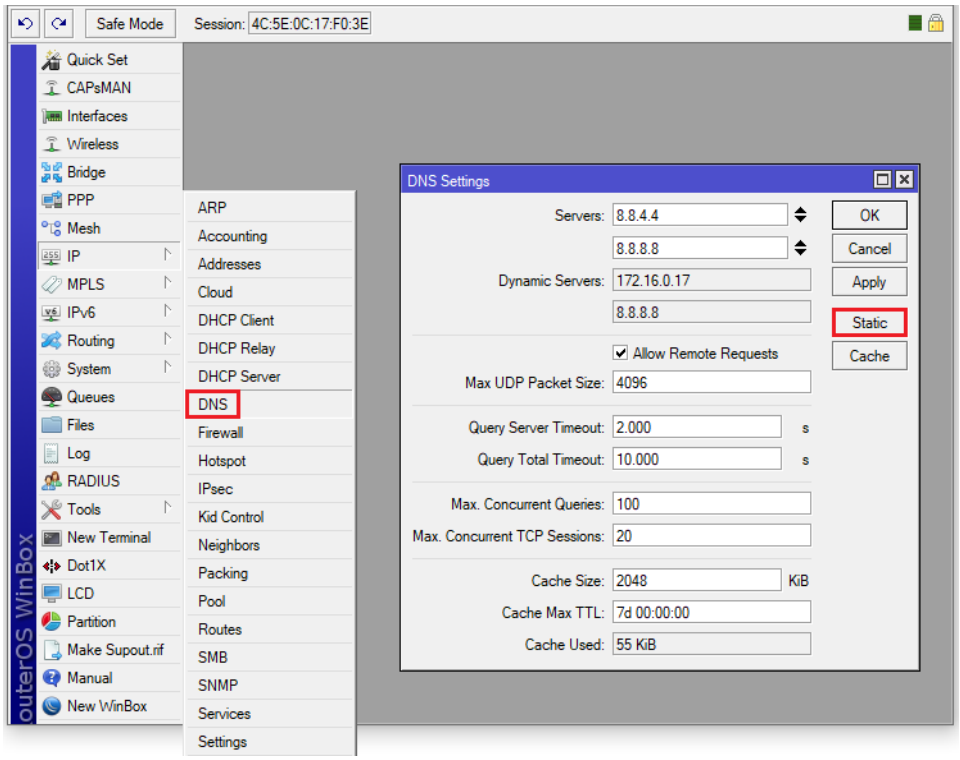

Safe Mode
Session: 4C:5E:0C:17:F0:3E
Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Mesh
IP
MPLS
IPv6
Routing
System
Queues
Files
Log
RADIUS
Tools
New Terminal
Dot1X
LCD
Partition
Make Supout.rif
Manual
New WinBox
RouterOS WinBox
Simple Queue <hs-<HotspotServer>>
General
Advanced
Statistics
Traffic
Total
Total Statistics
OK
Copy
Remove
Reset Counters
Reset All Counters
Torch
Target Upload
Target Download
Avg. Rate:
128 bps
128 bps
Avg. Packet Rate:
Queued Bytes:
Queued Packets:
Bytes:
22.0 KiB
43.3 KiB
Packets:
314
484
Dropped:
PCQ Queues:
dynamic
enabled

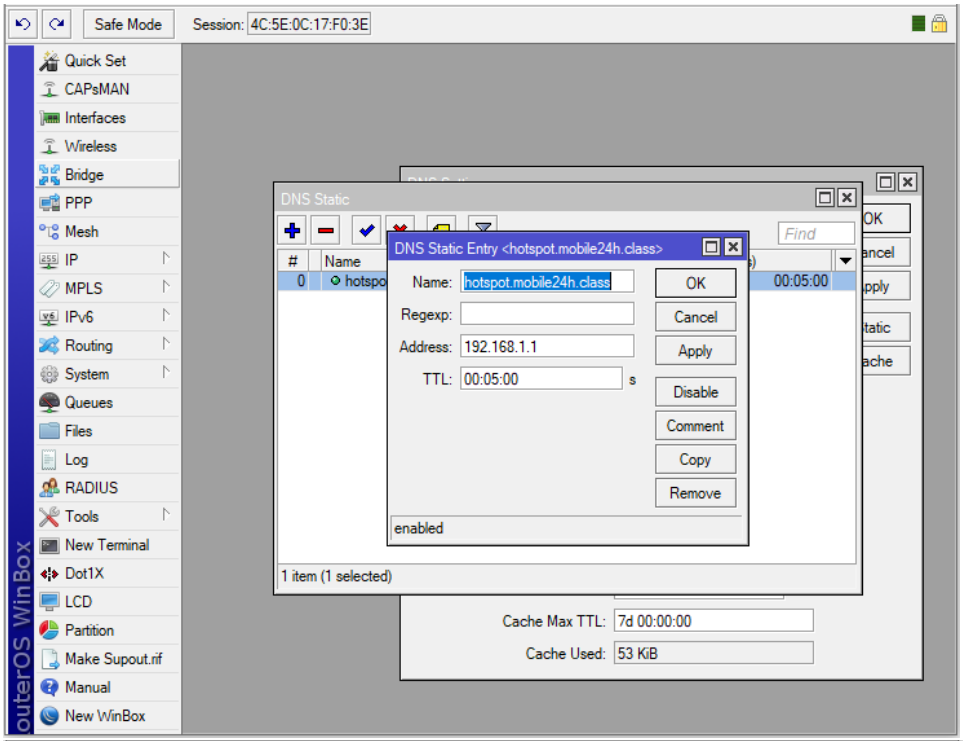

Safe Mode
Session: 4C:5E:0C:17:F0:3E
Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Mesh
IP
MPLS
IPv6
Routing
System
Queues
Files
Log
RADIUS
Tools
New Terminal
Dot1X
LCD
Partition
Make Supout.rif
Manual
New WinBox
outerOS WinBox
Hotspot
Servers
Server Pr
Name
default
1 item
New Hotspot Server Profile
General
Login
RADIUS
Login By:
MAC
Cookie
HTTP CHAP
HTTPS
HTTP PAP
Trial
MAC Cookie
MAC Auth. Mode:
MAC as username
MAC Auth. Password:
HTTP Cookie Lifetime:
3d 00:00:00
SSL Certificate:
none
HTTPS Redirect
Split User Domain
Trial Uptime Limit:
00:30:00
Trial Uptime Reset:
1d 00:00:00
Trial User Profile:
default
OK
Cancel
Apply
Copy
Remove
d Garden
Find

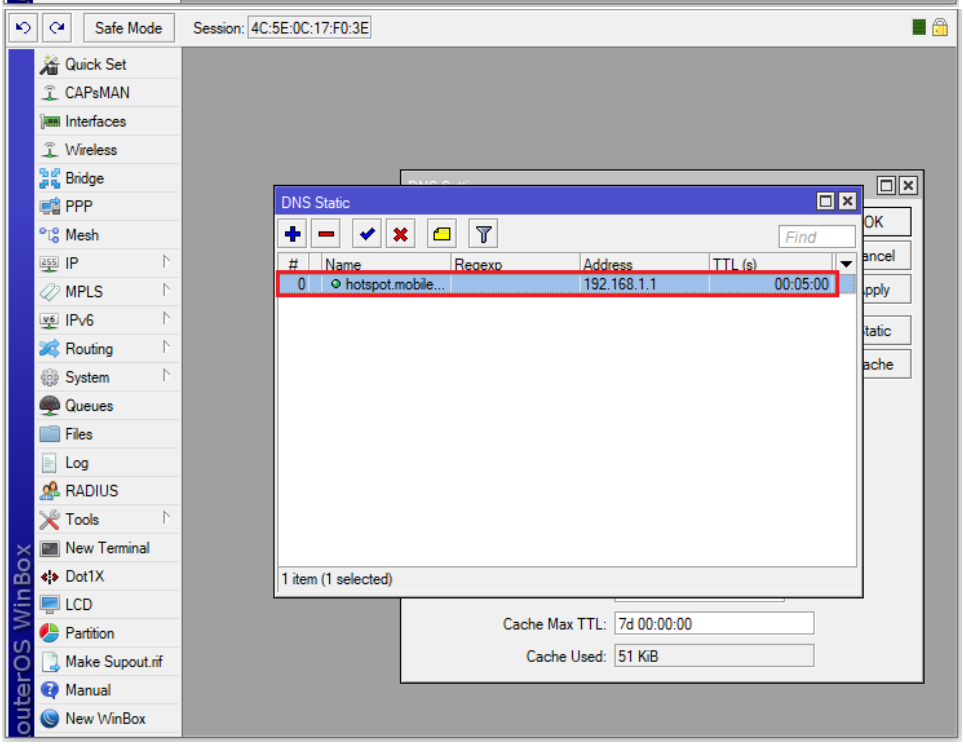

Safe Mode
Session: 4C:5E:0C:17:F0:3E
Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Mesh
IP
MPLS
IPv6
Routing
System
Queues
Files
Log
RADIUS
Tools
New Terminal
Dot1X
LCD
Partition
Make Supout.rif
Manual
New WinBox
outerOS WinBox
Hotspot
Servers
Server Pr
Name
default
1 item
New Hotspot Server Profile
General
Login
RADIUS
Use RADIUS
Default Domain:
Location ID:
Location Name:
MAC Format:
XX:XX:XX:XX:XX:XX
Accounting
Interim Update:
NAS Port Type:
19 (wireless-802.11)
OK
Cancel
Apply
Copy
Remove
d Garden
Find



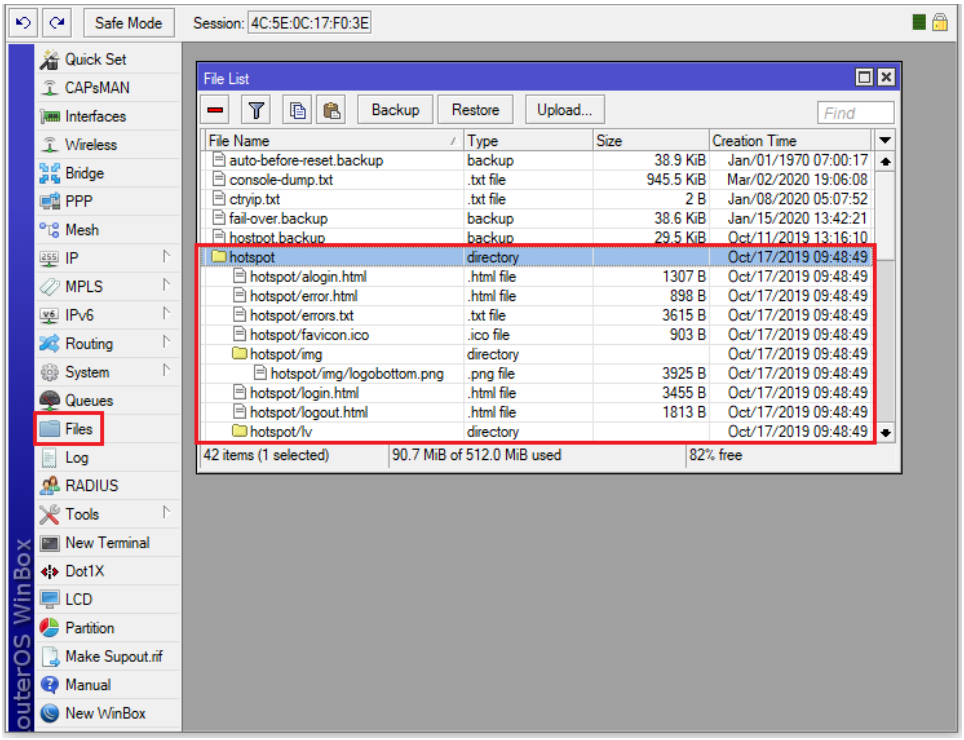
Router MikroTik tự động khởi tạo dòng Static DNS entry.







Thư mục lưu trữ liên quan đến tính năng WiFi Hotspot.

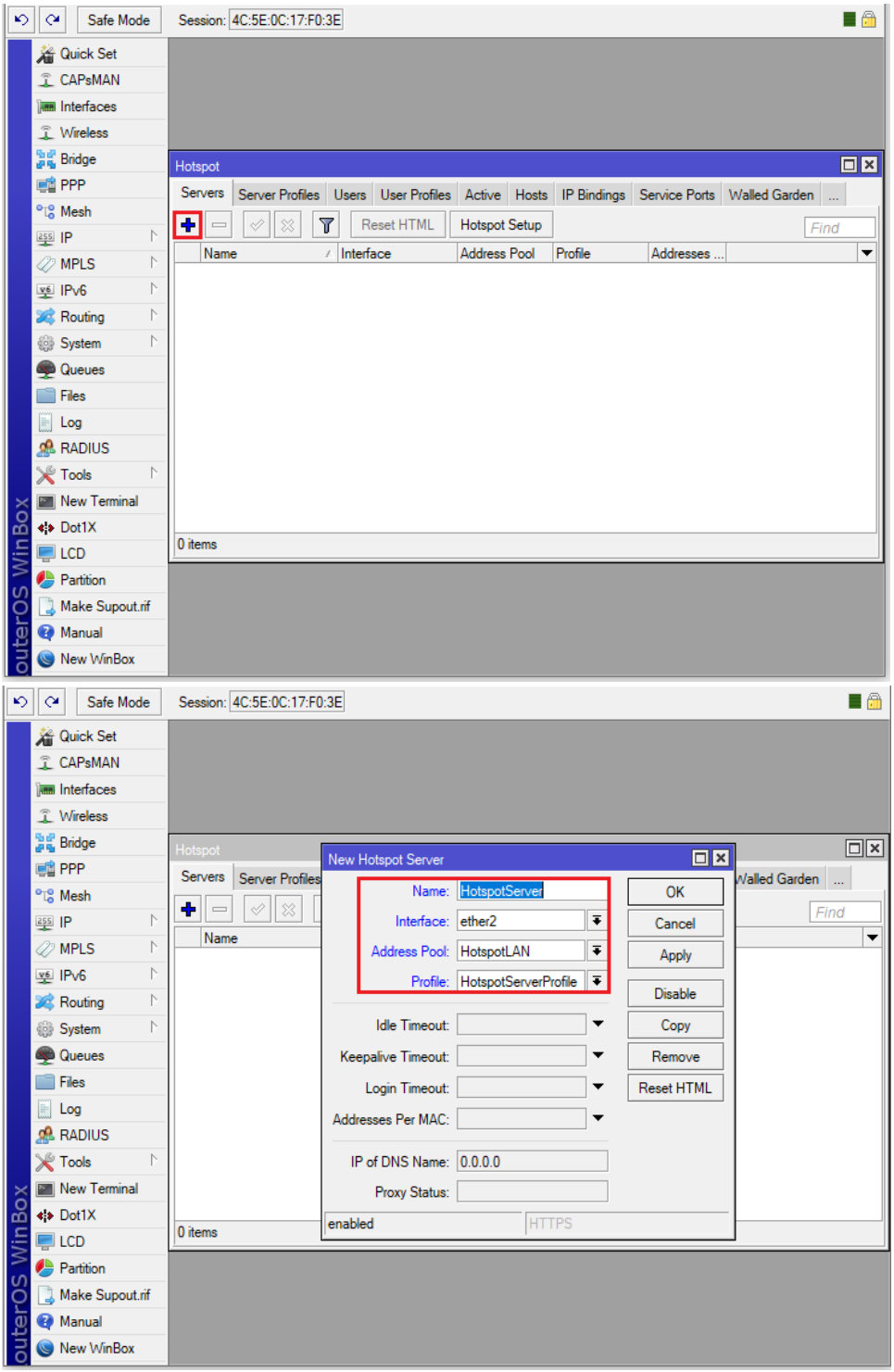


Bước 5. Thiết lập Hostpot Server trên Router MikroTik.

```
[admin@MikroTik] >
/ip hotspot add name="HotspotServer" interface=ether2 address-pool=HotspotLAN
profile=HotspotServerProfile disable=no
```

```
[admin@MikroTik] > /ip hotspot print
Flags: X - disabled, I - invalid, S - HTTPS
 #    NAME          INTERFACE         ADDRESS-POOL         PROFILE         IDLE-TIMEOUT
 0    HotspotSe...  ether2            HotspotLAN           HotspotServ...  none
[admin@MikroTik] >
```

```
[admin@MikroTik] > /ip hotspot print detail
Flags: X - disabled, I - invalid, S - HTTPS
 0   name="HotspotServer" interface=ether2 address-pool=HotspotLAN
     profile=HotspotServerProfile idle-timeout=none keepalive-timeout=none
     login-timeout=none ip-of-dns-name=192.168.1.1 proxy-status="running"
[admin@MikroTik] >
```



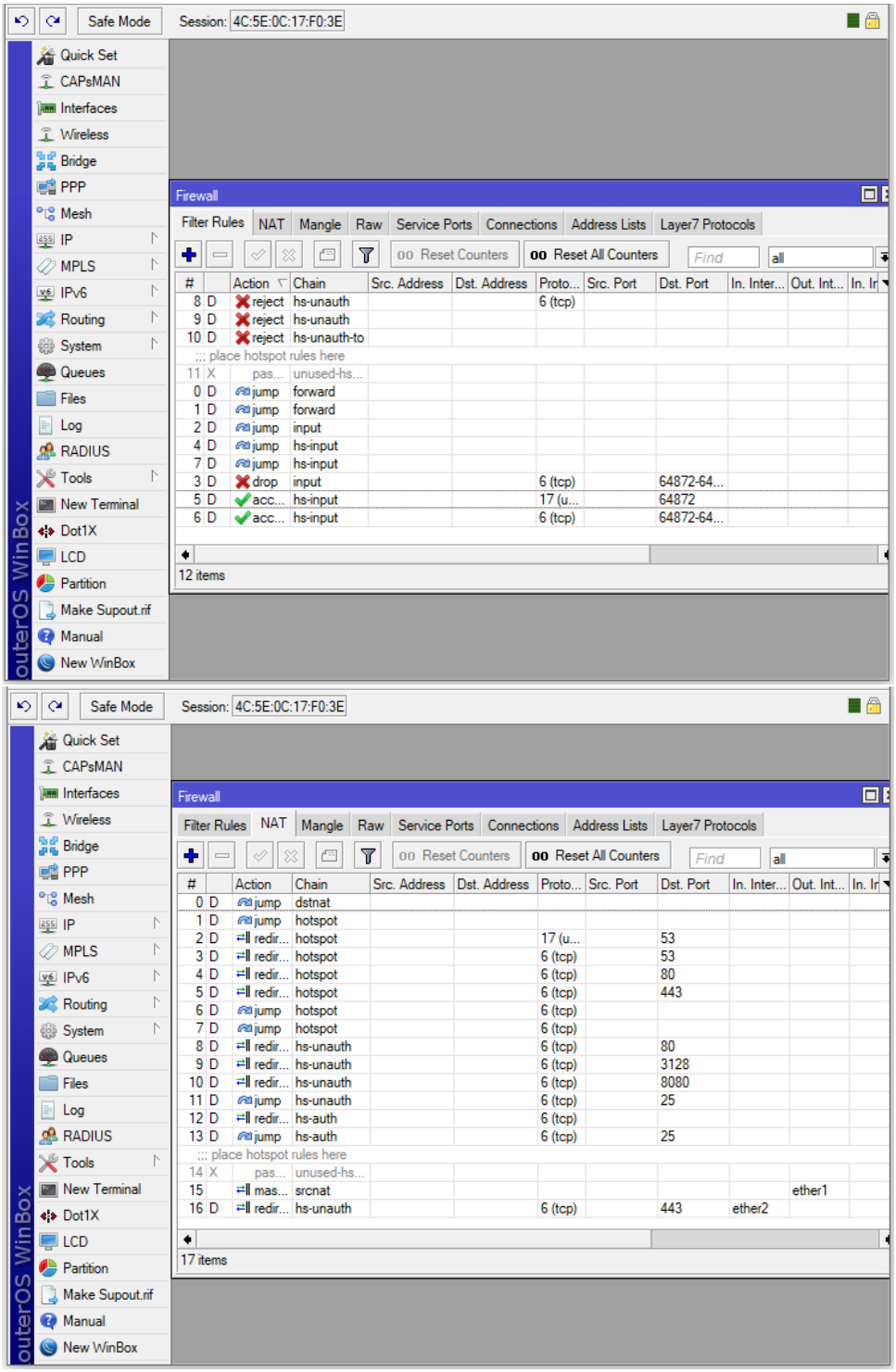
Lúc này thiết bị Router MikroTik tự động tạo ra các Firewall Rule và NAT Rule phục vụ cho tính năng WiFi Hotspot.

```
 [admin@MikroTik] > /ip firewall filter print detail
Flags: X - disabled, I - invalid, D - dynamic
 0  D chain=forward action=jump jump-target=hs-unauth hotspot=from-client,!auth
```

```
 1  D chain=forward action=jump jump-target=hs-unauth-to hotspot=to-client,!auth

 2  D chain=input action=jump jump-target=hs-input hotspot=from-client

 3  D chain=input action=drop protocol=tcp hotspot=!from-client
     dst-port=64872-64875

 4  D chain=hs-input action=jump jump-target=pre-hs-input

 5  D chain=hs-input action=accept protocol=udp dst-port=64872

 6  D chain=hs-input action=accept protocol=tcp dst-port=64872-64875

 7  D chain=hs-input action=jump jump-target=hs-unauth hotspot=!auth

 8  D chain=hs-unauth action=reject reject-with=tcp-reset protocol=tcp

 9  D chain=hs-unauth action=reject reject-with=icmp-net-prohibited

10  D chain=hs-unauth-to action=reject reject-with=icmp-host-prohibited

11 X  ;;; place hotspot rules here
     chain=unused-hs-chain action=passthrough
[admin@MikroTik] >
```

```
[admin@MikroTik] > /ip firewall nat print detail
Flags: X - disabled, I - invalid, D - dynamic
 0  D chain=dstnat action=jump jump-target=hotspot hotspot=from-client

 1  D chain=hotspot action=jump jump-target=pre-hotspot

 2  D chain=hotspot action=redirect to-ports=64872 protocol=udp dst-port=53

 3  D chain=hotspot action=redirect to-ports=64872 protocol=tcp dst-port=53

 4  D chain=hotspot action=redirect to-ports=64873 protocol=tcp hotspot=local-dst
     dst-port=80

 5  D chain=hotspot action=redirect to-ports=64875 protocol=tcp hotspot=local-dst
     dst-port=443

 6  D chain=hotspot action=jump jump-target=hs-unauth protocol=tcp hotspot=!auth

 7  D chain=hotspot action=jump jump-target=hs-auth protocol=tcp hotspot=auth

 8  D chain=hs-unauth action=redirect to-ports=64874 protocol=tcp dst-port=80

 9  D chain=hs-unauth action=redirect to-ports=64874 protocol=tcp dst-port=3128

10  D chain=hs-unauth action=redirect to-ports=64874 protocol=tcp dst-port=8080

11  D chain=hs-unauth action=jump jump-target=hs-smtp protocol=tcp dst-port=25

12  D chain=hs-auth action=redirect to-ports=64874 protocol=tcp hotspot=http

13  D chain=hs-auth action=jump jump-target=hs-smtp protocol=tcp dst-port=25

14 X  ;;; place hotspot rules here
     chain=unused-hs-chain action=passthrough

15    chain=srcnat action=masquerade out-interface=ether1

16  D chain=hs-unauth action=redirect to-ports=64875 protocol=tcp
     in-interface=ether2 dst-port=443
```

```
[admin@MikroTik] >
```



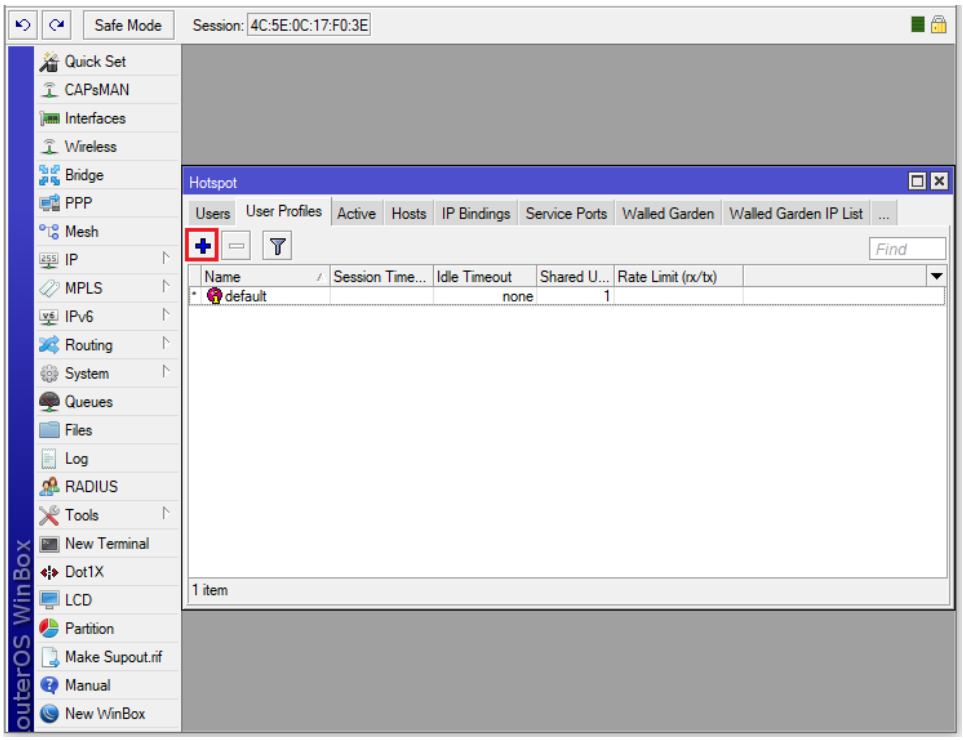
Bước 6. Thiết lập Hotspot User Profile trên Router MikroTik.

Session Timeout: Sau 2 phút thì người dùng đăng nhập thành công sẽ bị ngắt Internet, sau khi kết nối hết hạn End User có thể đăng nhập lại bằng đường dẫn HyperLink http://hotspot.mobile24h.class/login để có thể tiếp tục truy cập Internet

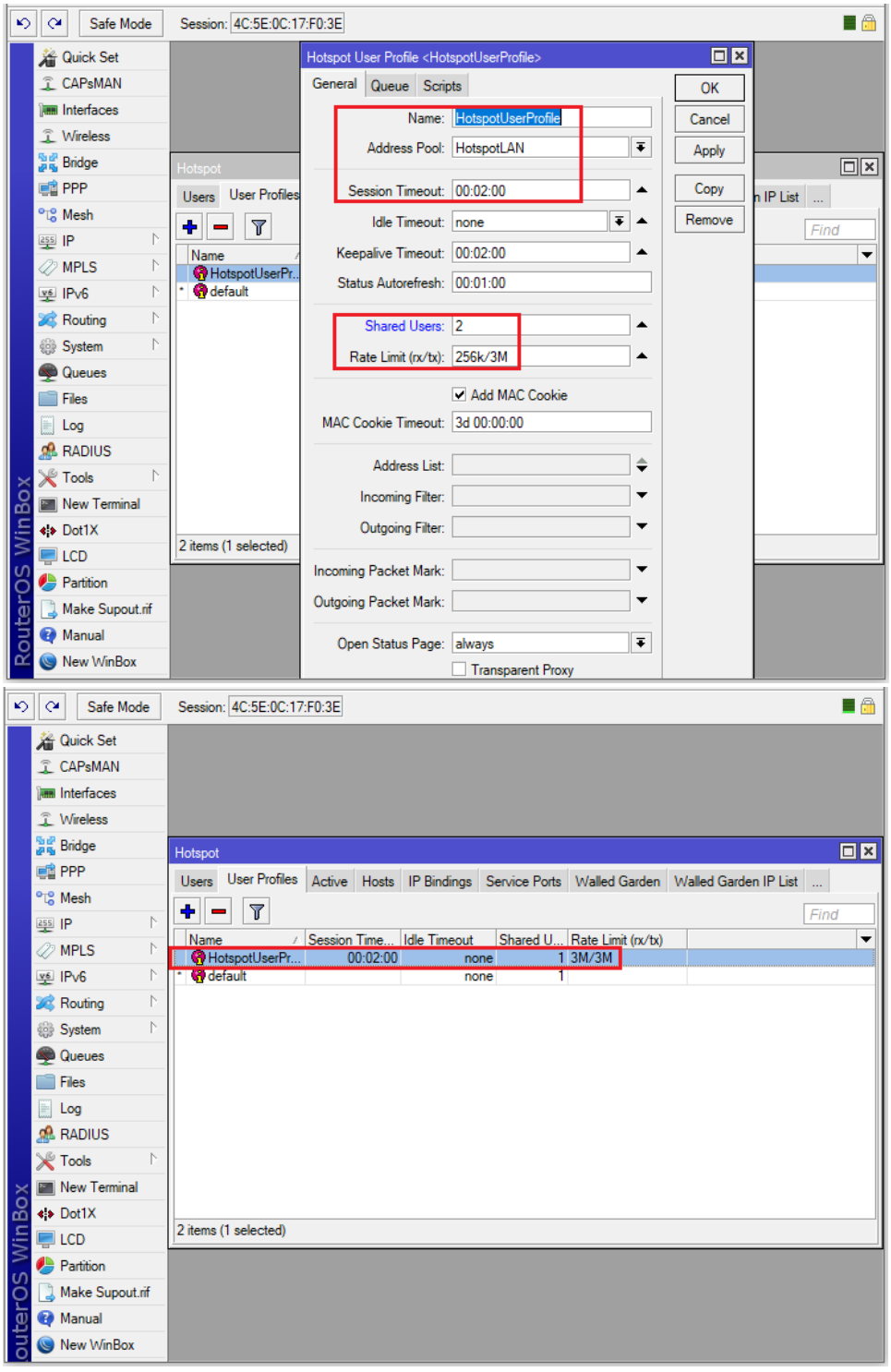
- shared-users=2: cho phép End User đăng nhập tài khoản xác thực trên 2 thiết bị đầu cuối khác nhau dựa vào thông tin địa chỉ MAC.

```
[admin@MikroTik] >
/ip hotspot user profile add name="HotspotUserProfile" address-pool=HotspotLAN shared-users=2
session-timeout=2m rate-limit="256k/3M"
```

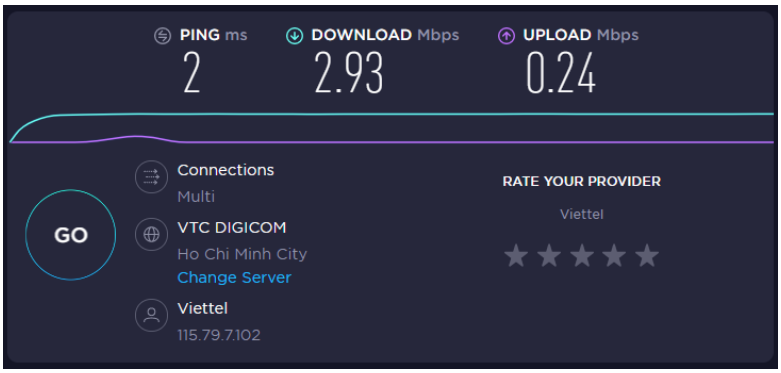
```
[admin@MikroTik] > /ip hotspot user profile print
Flags: * - default
 0 * name="default" idle-timeout=none keepalive-timeout=2m status-autorefresh=1m
     shared-users=1 add-mac-cookie=yes mac-cookie-timeout=3d address-list=""
     transparent-proxy=no

 1   name="HotspotUserProfile" address-pool=HotspotLAN session-timeout=2m
     idle-timeout=none keepalive-timeout=2m status-autorefresh=1m shared-users=2
     add-mac-cookie=yes mac-cookie-timeout=3d rate-limit="256k/3M"
     address-list="" transparent-proxy=no
[admin@MikroTik] >
```



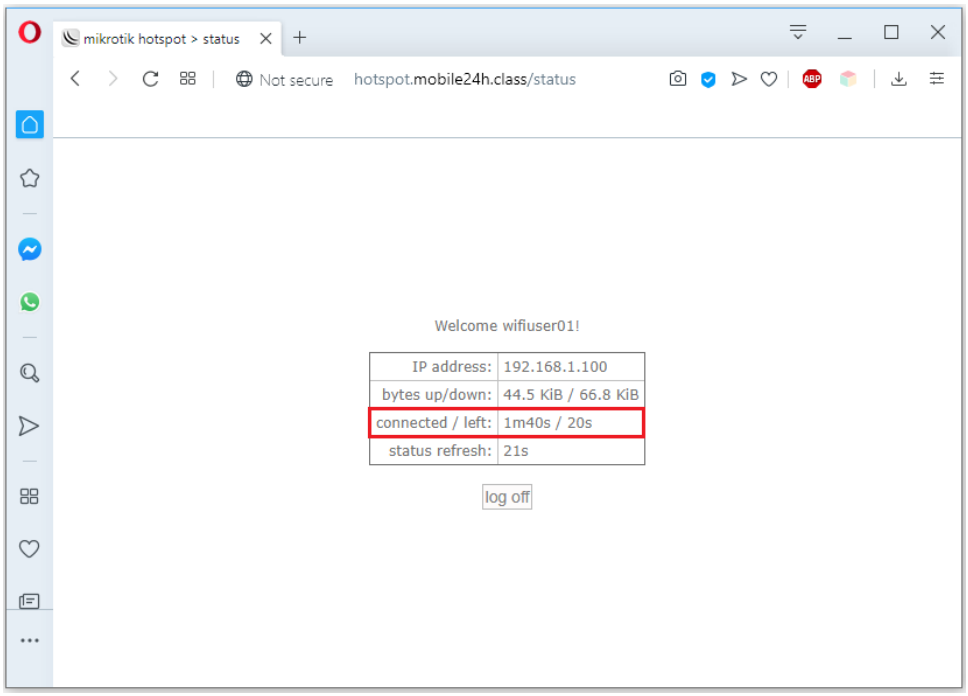
The built-in limiter is Hotspot Mikrotik Bandwidth Limit method which uses rate-limit parameters in server-profile for limit total traffic on the network hotspot whereas if you want to limit per user can use the rate-limit on user-profile.



End User được áp chính sách HotspotUserProfile sẽ bị giới hạn định mức bandwidth là 3M/3M.



End User có thể kiểm tra Session Timeout của mình.



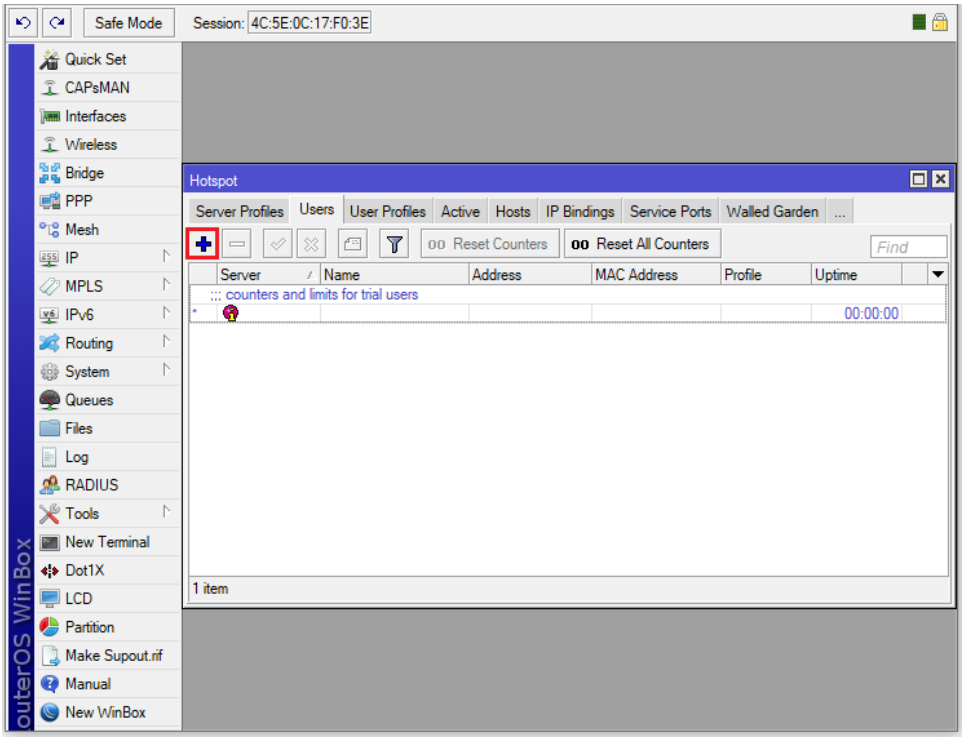
Bước 7. Thiết lập Hotspot User trên Router MikroTik.

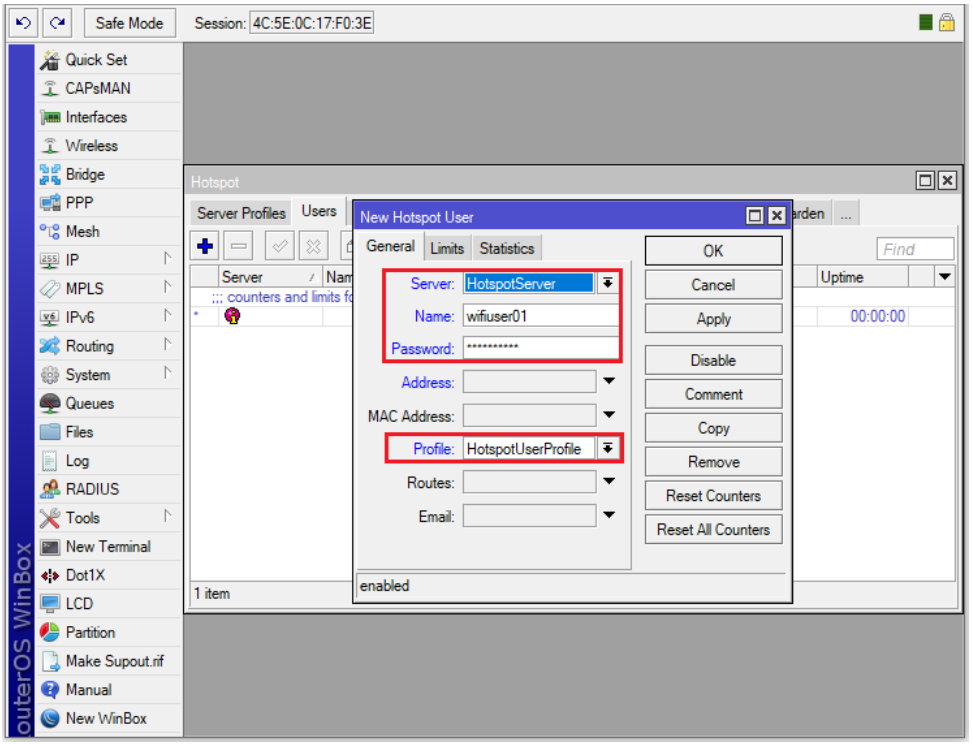
```
[admin@MikroTik] >
/ip hotspot user add server=HotspotServer name="wifiuser01" password="wifiuser01"
profile=HotspotUserProfile limit-uptime=30m limit-bytes-total=100000000
/ip hotspot user add server=HotspotServer name="wifiuser02" password="wifiuser02"
profile=HotspotUserProfile
```

```
[admin@MikroTik] > /ip hotspot user print
Flags: * - default, X - disabled, D - dynamic
 #    SERVER          NAME          ADDRESS         PROFILE          UPTIME
 0 * ;;; counters and limits for trial users
                      default-trial                                  0s
 1   HotspotServer    wifiuser01                    HotspotUserPr... 0s
[admin@MikroTik] >
```

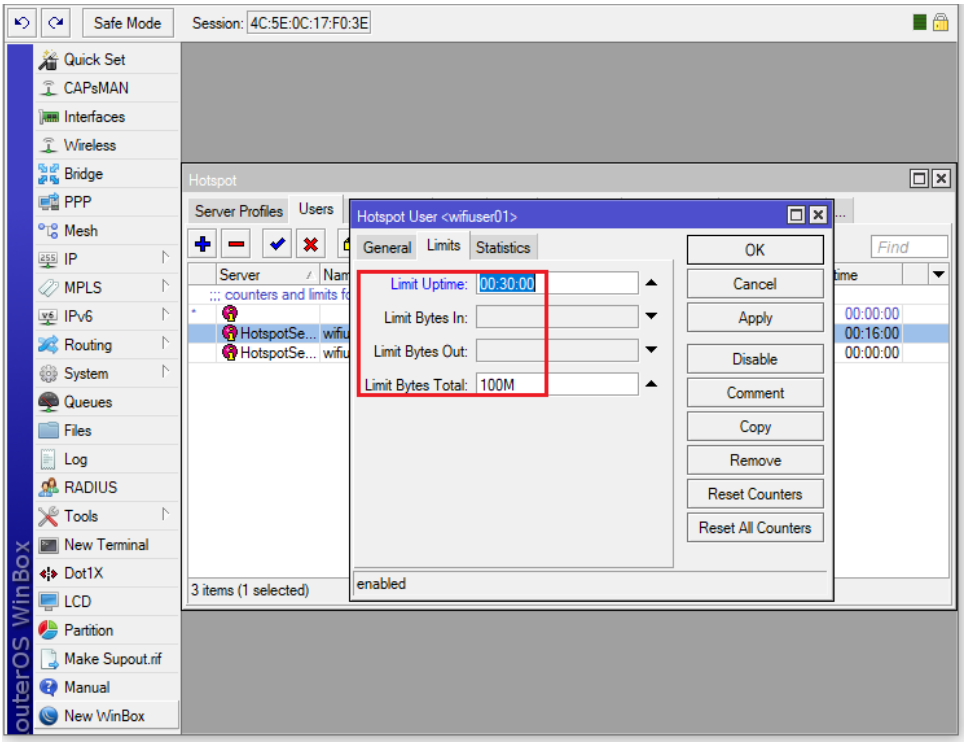
```
[admin@MikroTik] > /ip hotspot user print detail
Flags: * - default, X - disabled, D - dynamic
 0 * ;;; counters and limits for trial users
```

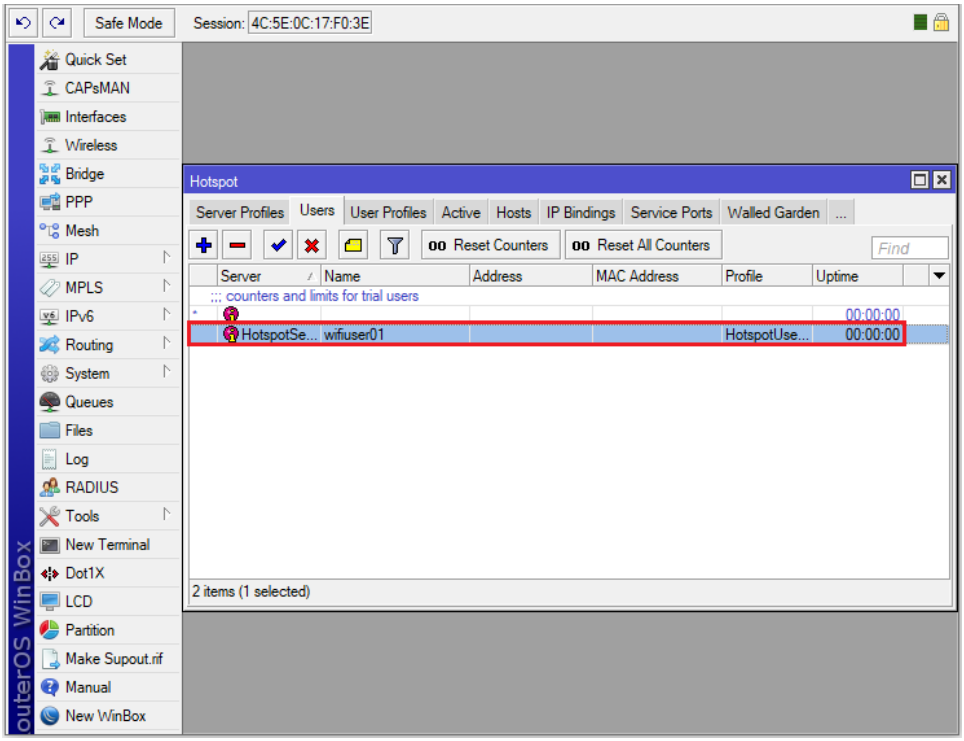
```
     name="default-trial" uptime=0s bytes-in=0 bytes-out=0 packets-in=0
     packets-out=0

 1   server=HotspotServer name="wifiuser01" password="wifiuser01"
     profile=HotspotUserProfile limit-uptime=30m limit-bytes-total=100000000
     uptime=16m bytes-in=1258266 bytes-out=23734601 packets-in=12577
     packets-out=18364

 2   server=HotspotServer name="wifiuser02" password="wifiuser02"
     profile=HotspotUserProfile uptime=0s bytes-in=0 bytes-out=0 packets-in=0
     packets-out=0
[admin@MikroTik] >
```



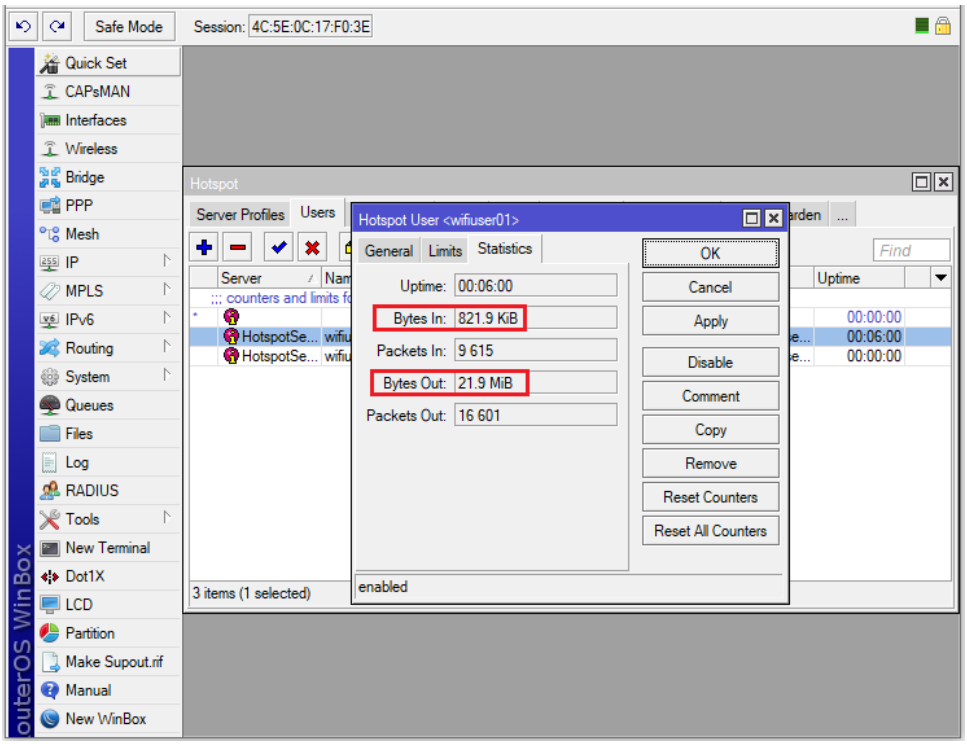


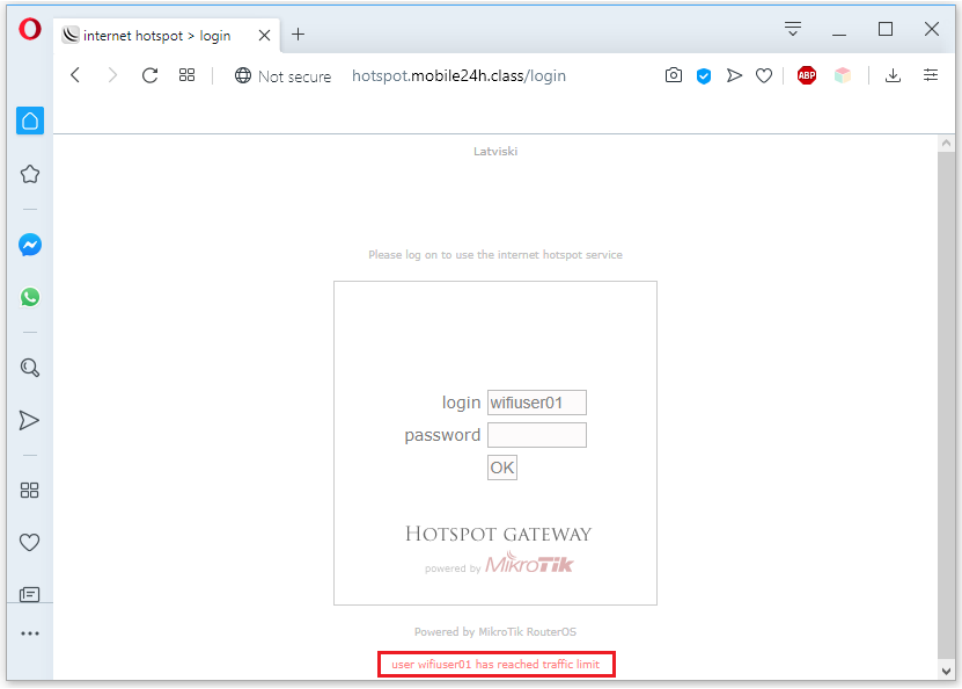
- Giới hạn thời gian truy cập Internet của End User là 30 phút, tổng dung lượng truy cập Internet (download & upload) là 100Mbps.



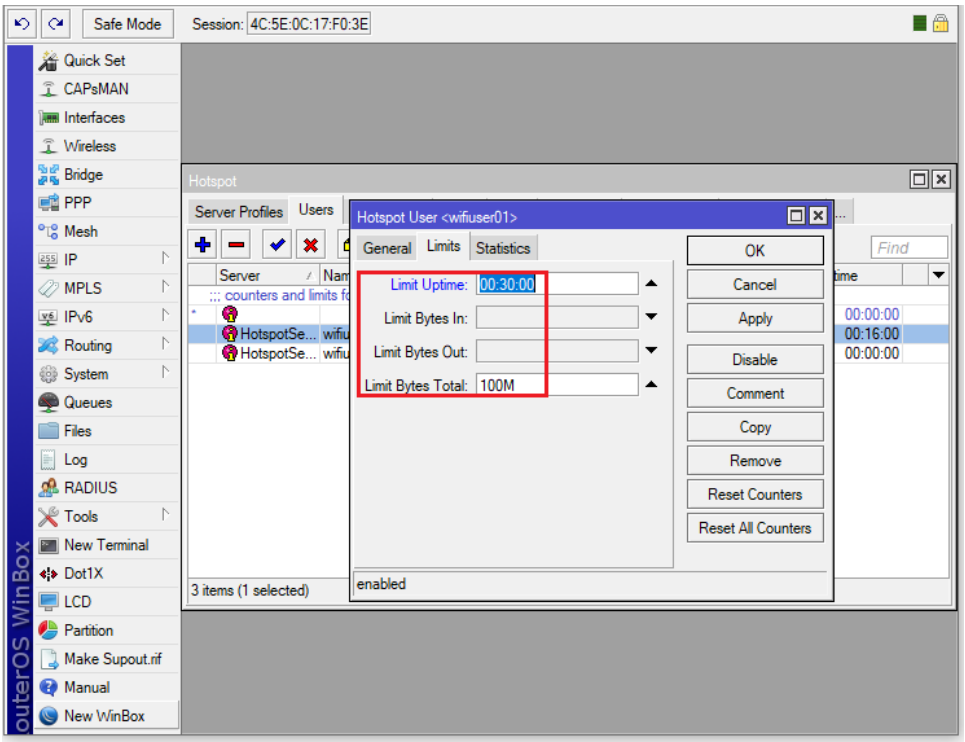


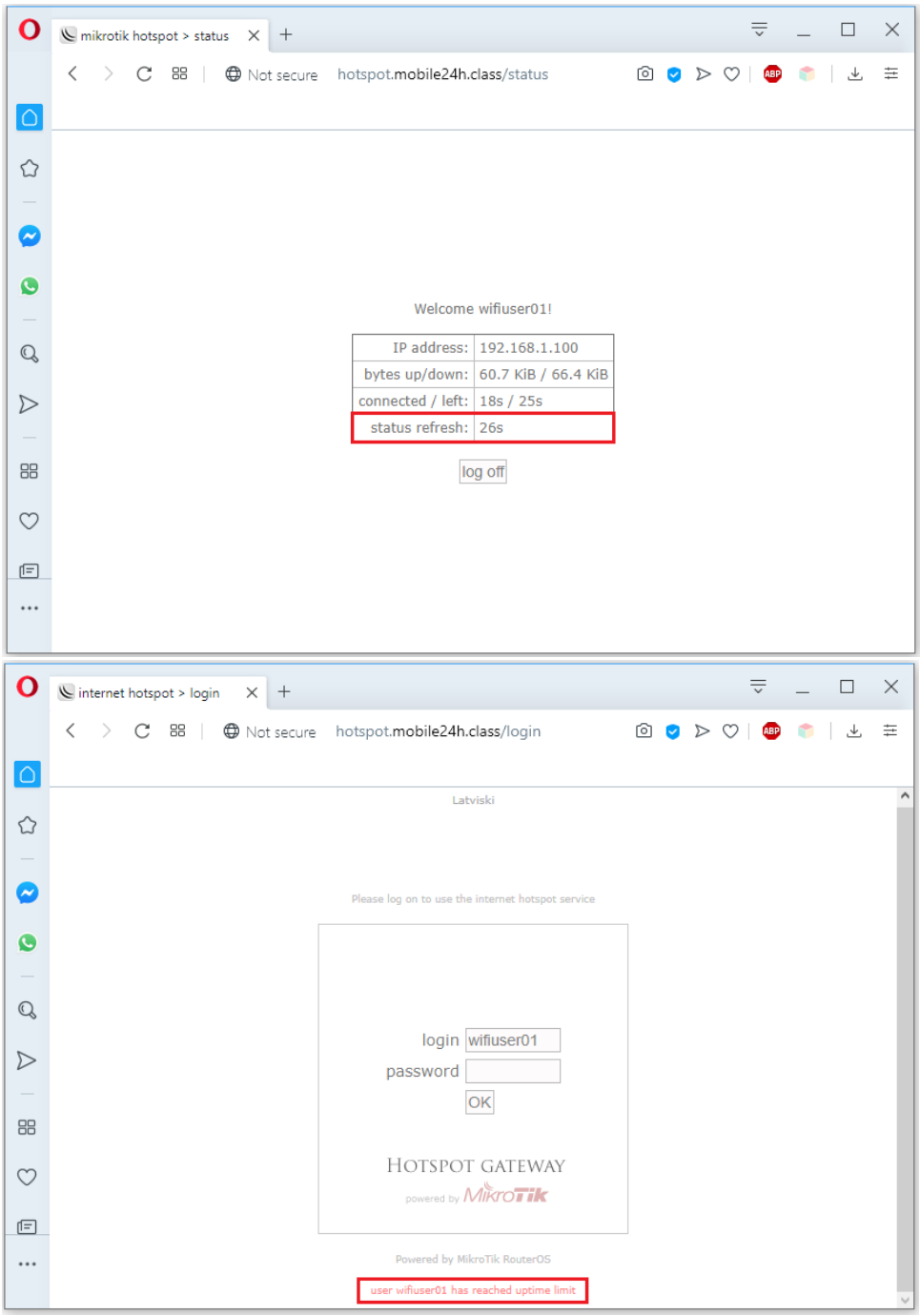
Khi End User sử dụng hết 100Mbps tài nguyên thì sẽ không thể truy cập Internet được nữa.



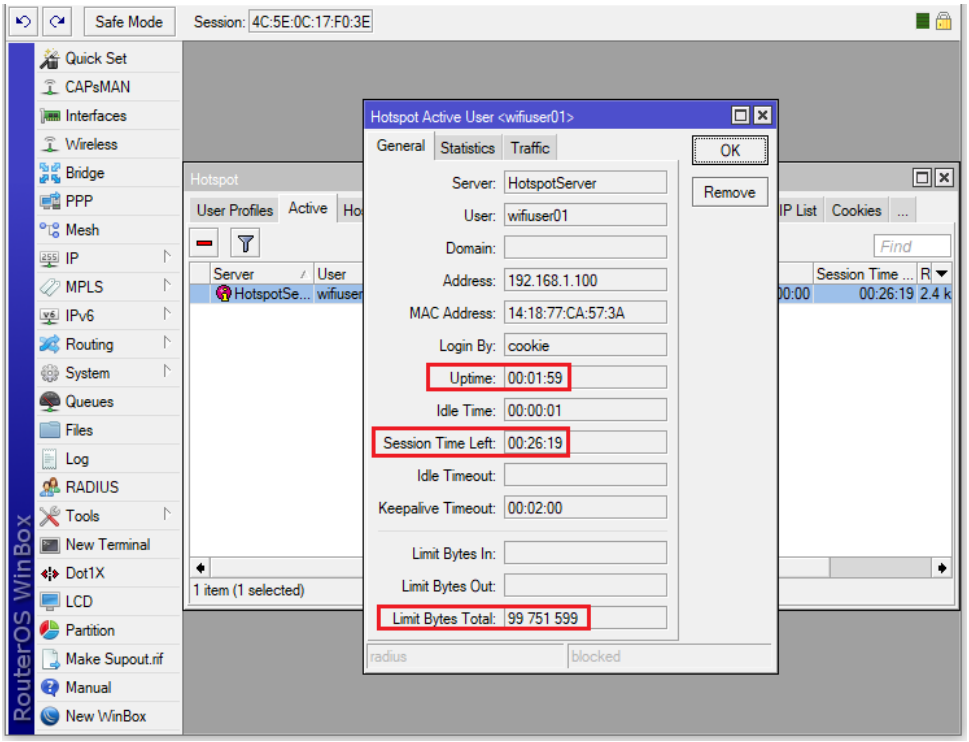


Giới hạn thời gian truy cập Internet theo thời gian.

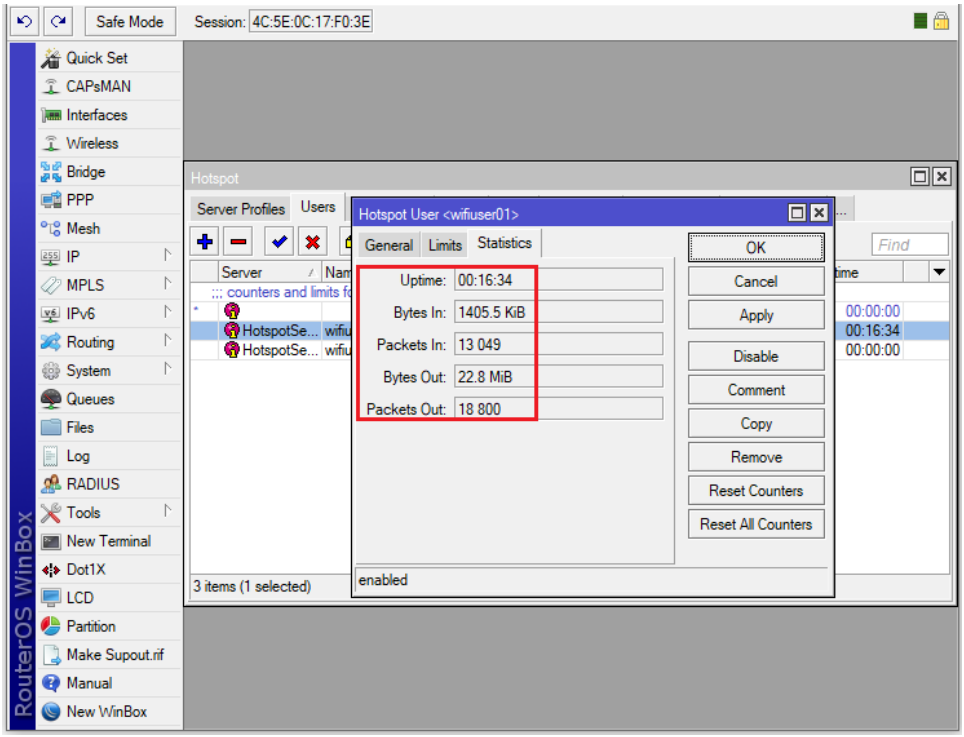


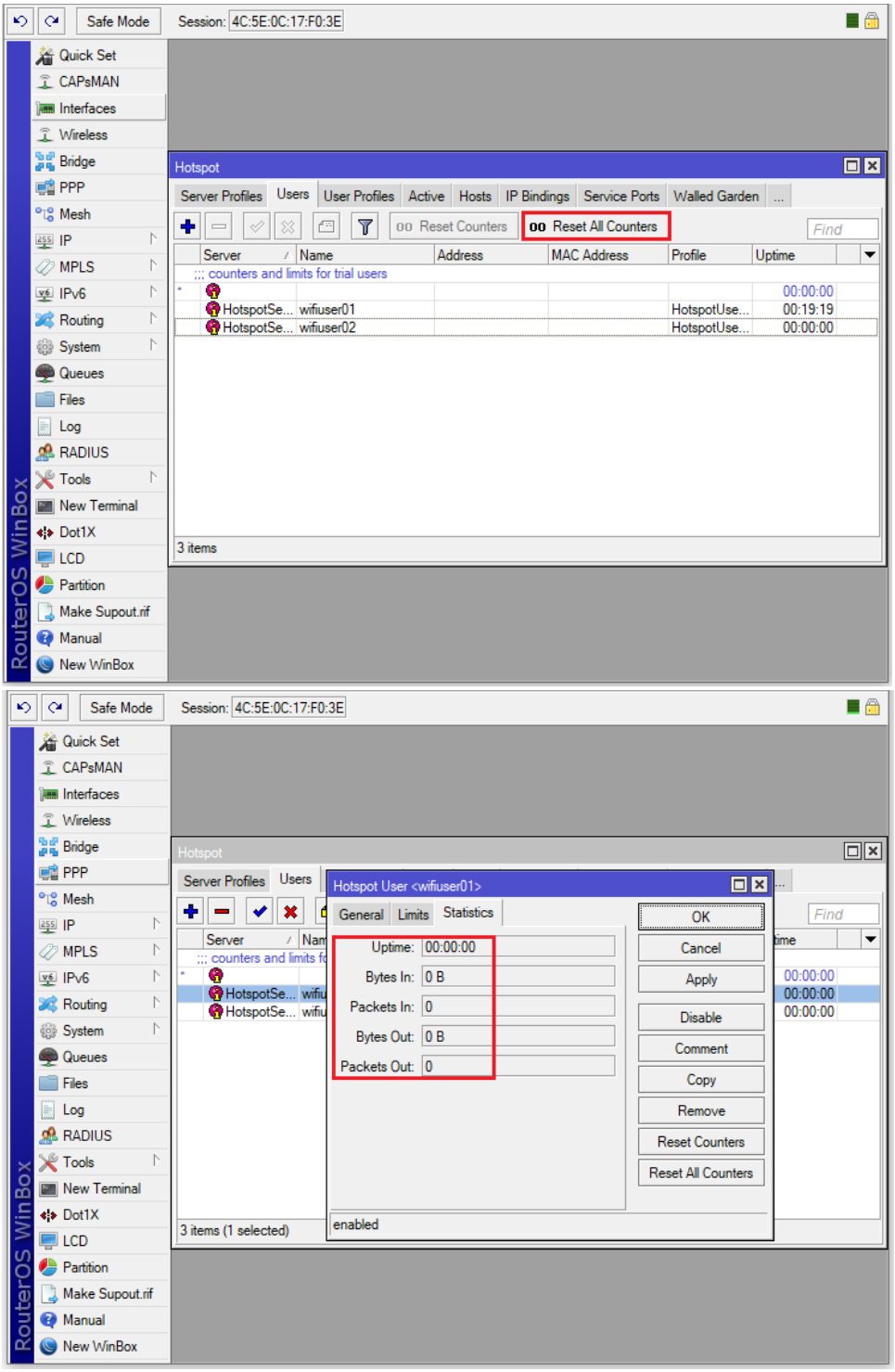


Kiểm tra các giới hạn Limit tương ứng với End User trên Router MikroTik.



Reset lại giới hạn truy cập Internet cho tất cả các End User.





Bước 8. Khảo sát quá trình truy cập WiFi Hotspot trên máy tính có dây.

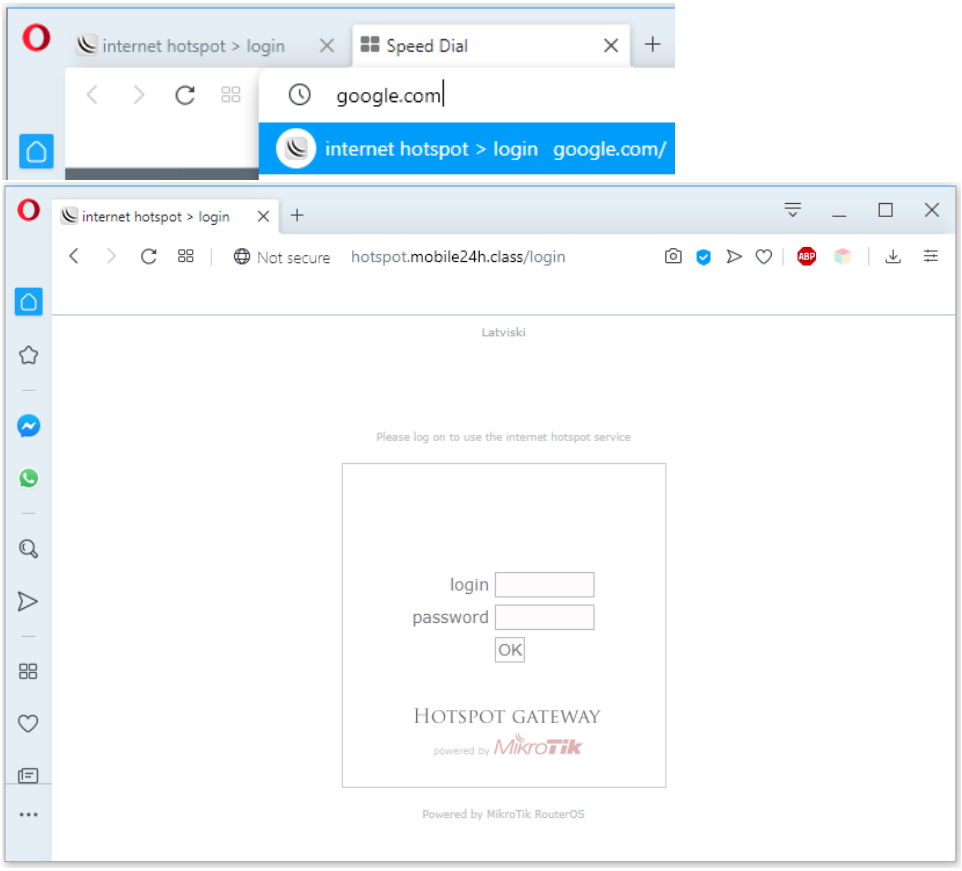
Trước khi máy tính đăng nhập vào giao diện WiFi Hotspot.

```
C:\Users\buipham> ping 8.8.4.4

Pinging 8.8.4.4 with 32 bytes of data:
Reply from 192.168.1.1: Destination net unreachable.
```

```
Reply from 192.168.1.1: Destination net unreachable.
Reply from 192.168.1.1: Destination net unreachable.
Reply from 192.168.1.1: Destination net unreachable.

Ping statistics for 8.8.4.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

C:\Users\buipham>
```

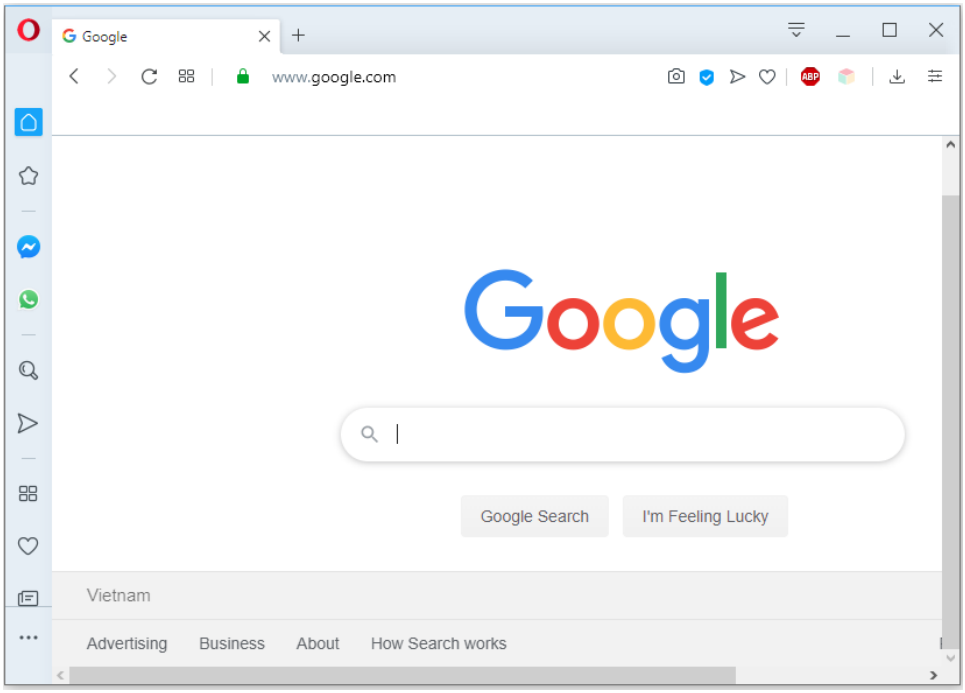
```
C:\Users\buipham> ping 192.168.1.1

Pinging 192.168.1.1 with 32 bytes of data:
Reply from 192.168.1.1: Destination net unreachable.
Reply from 192.168.1.1: Destination net unreachable.
Reply from 192.168.1.1: Destination net unreachable.
Reply from 192.168.1.1: Destination net unreachable.

Ping statistics for 192.168.1.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

C:\Users\buipham>
```

Khi người dùng truy cập vào trang google.com thì ngay lập tức sẽ chuyển sang giao diện WiFi Hotpot.

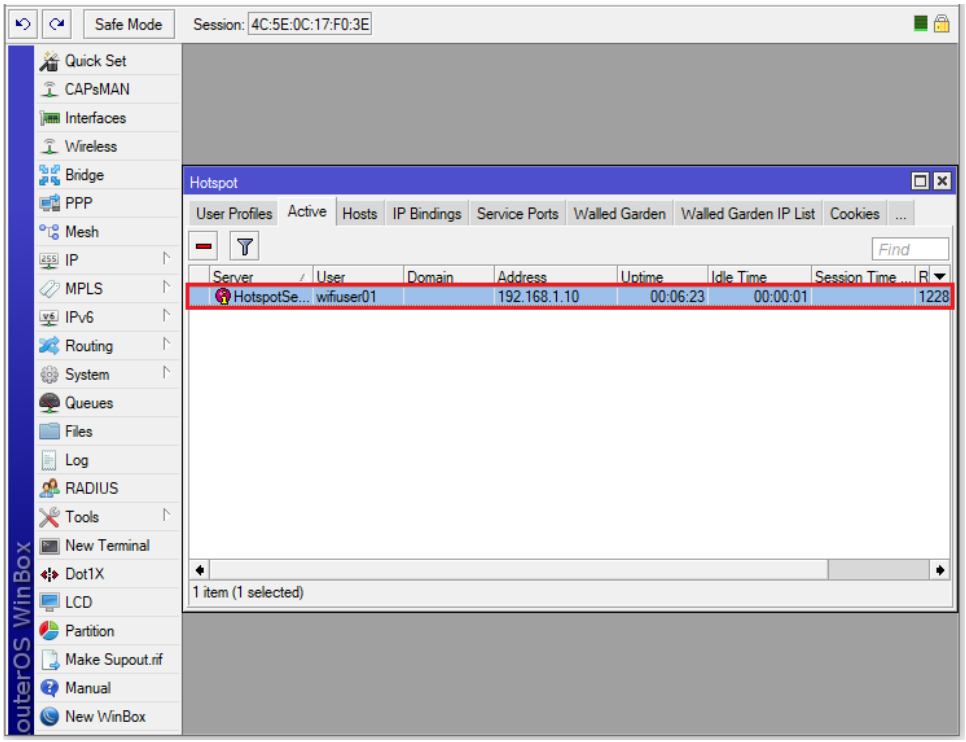


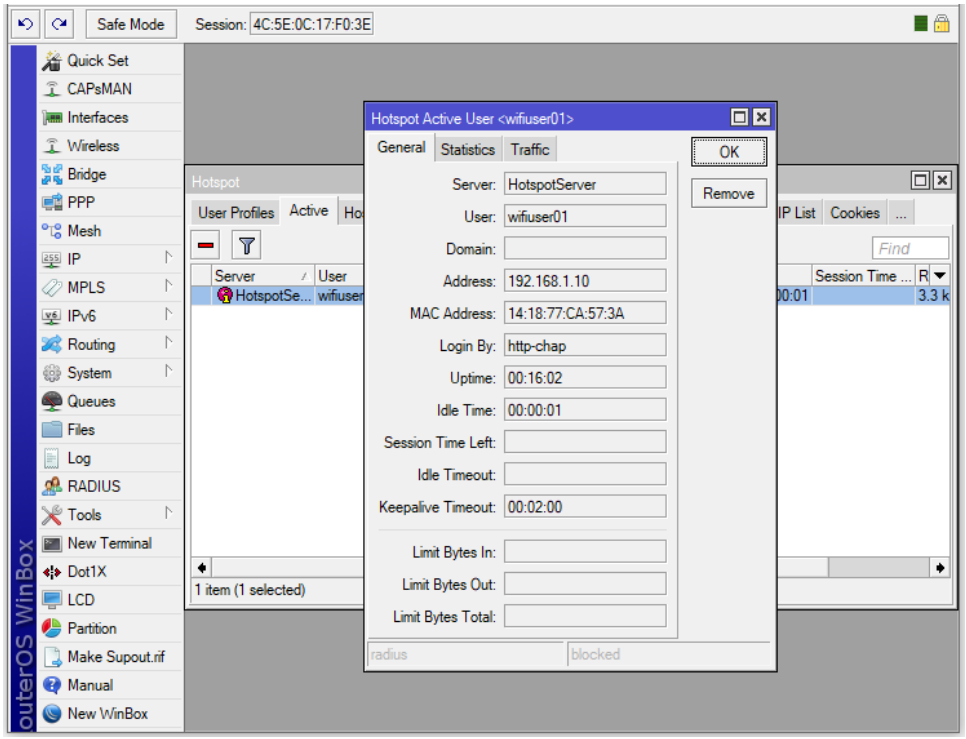
Sau khi khai báo tài khoản xác thực thành công thì ngay lập tức người dùng có thể truy cập Internet.

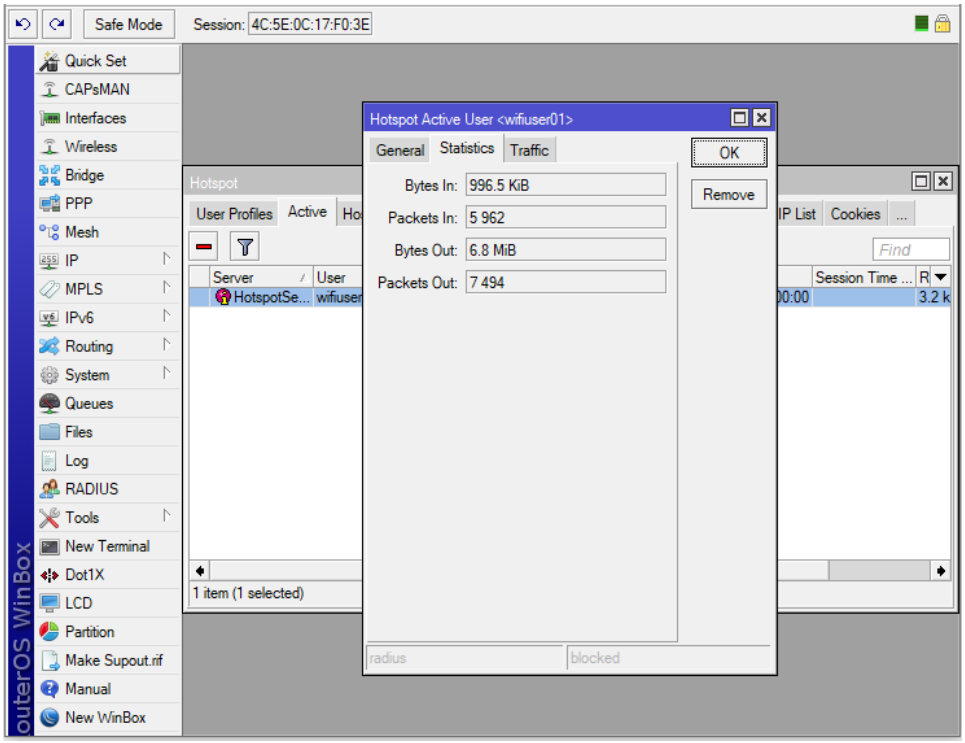
```
C:\Users\buipham> ping 192.168.1.1

Pinging 192.168.1.1 with 32 bytes of data:
Reply from 192.168.1.1: bytes=32 time=1ms TTL=64
Reply from 192.168.1.1: bytes=32 time<1ms TTL=64
Reply from 192.168.1.1: bytes=32 time<1ms TTL=64
Reply from 192.168.1.1: bytes=32 time<1ms TTL=64

Ping statistics for 192.168.1.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\Users\buipham>
```

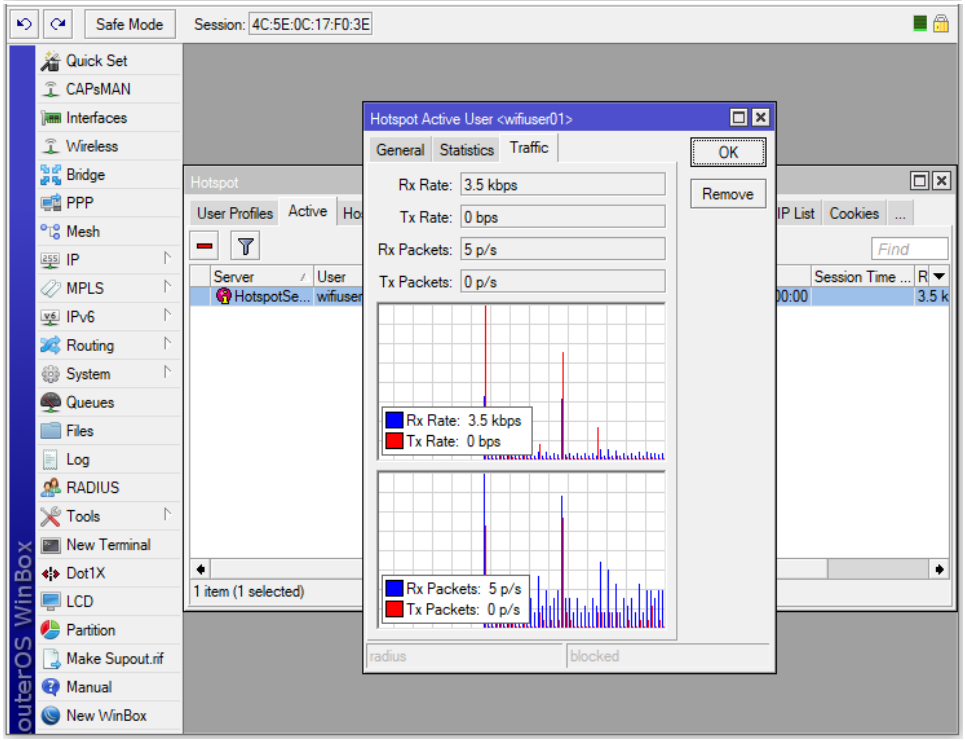


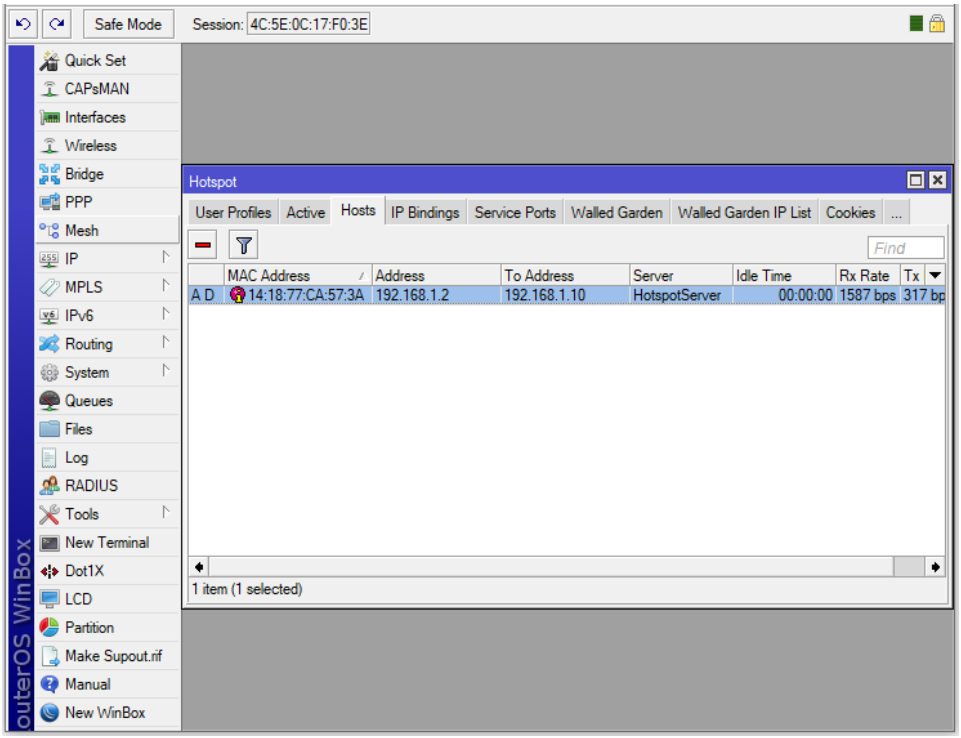
Bước 9. Giám sát danh sách End User đang truy cập dịch vụ WiFi Hotspot trên Router MikroTik.

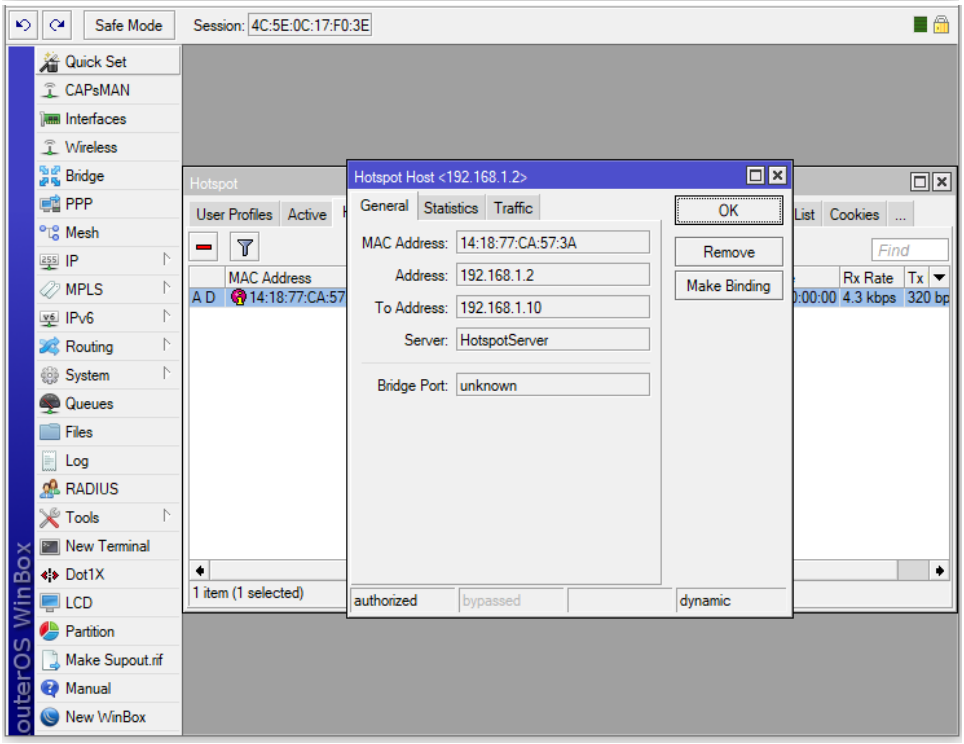

Safe Mode
Session: 4C:5E:0C:17:F0:3E
Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Mesh
IP
MPLS
IPv6
Routing
System
Queues
Files
Log
RADIUS
Tools
New Terminal
Dot1X
LCD
Partition
Make Supout.rif
Manual
New WinBox
outerOS WinBox
Hotspot
User Profiles
Active
Hosts
IP Bindings
Service Ports
Walled Garden
Walled Garden IP List
Cookies
Find
Server
User
Domain
Address
Uptime
Idle Time
Session Time ...
HotspotSe...
wifiuser01
192.168.1.10
00:06:23
00:00:01
1228
1 item (1 selected)

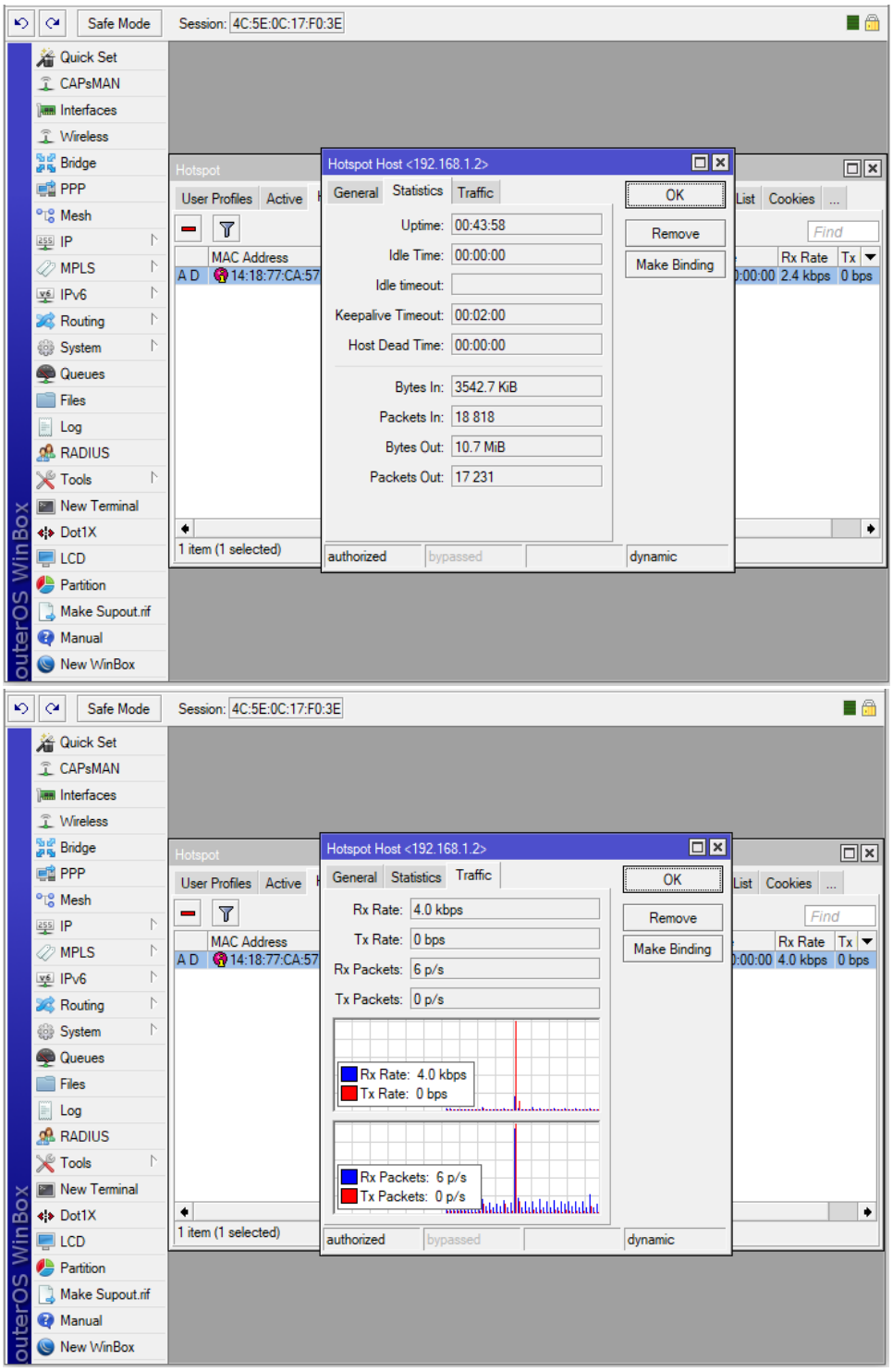

Safe Mode
Session: 4C:5E:0C:17:F0:3E
Hotspot Active User <wifiuser01>
General
Statistics
Traffic
OK
Remove
Server: HotspotServer
User: wifiuser01
Domain:
Address: 192.168.1.10
MAC Address: 14:18:77:CA:57:3A
Login By: http-chap
Uptime: 00:16:02
Idle Time: 00:00:01
Session Time Left:
Idle Timeout:
Keepalive Timeout: 00:02:00
Limit Bytes In:
Limit Bytes Out:
Limit Bytes Total:
radius
blocked
Hotspot
1 item (1 selected)


Safe Mode
Session: 4C:5E:0C:17:F0:3E
Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Mesh
IP
MPLS
IPv6
Routing
System
Queues
Files
Log
RADIUS
Tools
New Terminal
Dot1X
LCD
Partition
Make Supout.rif
Manual
New WinBox
outerOS WinBox
Hotspot
User Profiles
Active
IP List
Cookies
Find
Server
User
Session Time ...
HotspotSe...
wifiuser
3.2 k
1 item (1 selected)
Hotspot Active User <wifiuser01>
General
Statistics
Traffic
OK
Remove
Bytes In: 996.5 KiB
Packets In: 5 962
Bytes Out: 6.8 MiB
Packets Out: 7 494
radius
blocked

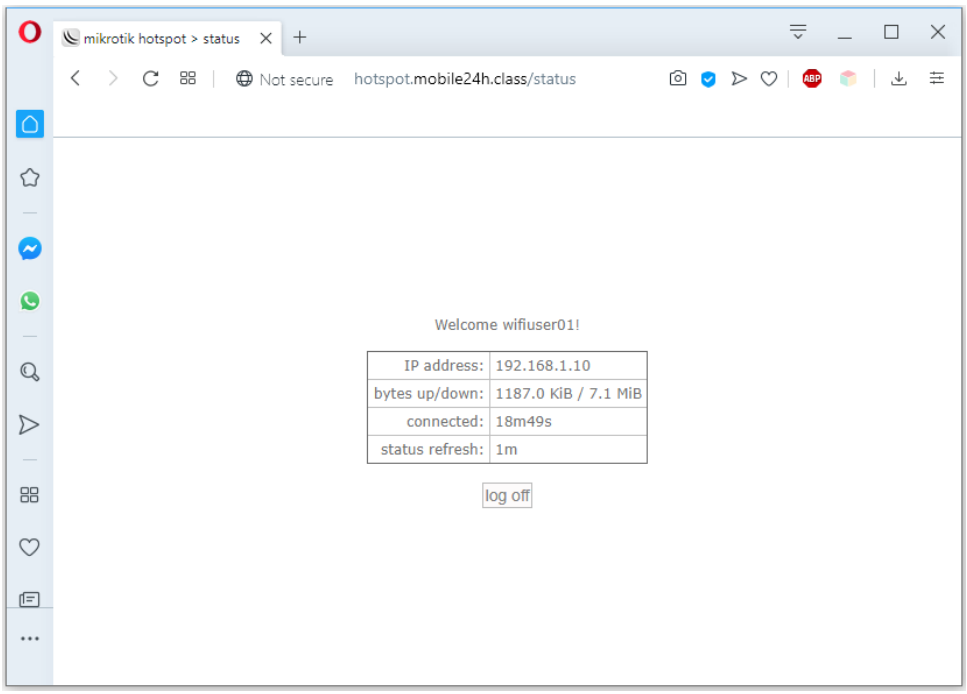

Safe Mode
Session: 4C:5E:0C:17:F0:3E
Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Mesh
IP
MPLS
IPv6
Routing
System
Queues
Files
Log
RADIUS
Tools
New Terminal
Dot1X
LCD
Partition
Make Supout.rif
Manual
New WinBox
outerOS WinBox
Hotspot
User Profiles
Active
IP List
Cookies
Find
Server
User
Session Time ...
HotspotSe...
wifiuser
3.5 k
1 item (1 selected)
Hotspot Active User <wifiuser01>
General
Statistics
Traffic
OK
Remove
Rx Rate: 3.5 kbps
Tx Rate: 0 bps
Rx Packets: 5 p/s
Tx Packets: 0 p/s
Rx Rate: 3.5 kbps
Tx Rate: 0 bps
Rx Packets: 5 p/s
Tx Packets: 0 p/s
radius
blocked


Safe Mode
Session: 4C:5E:0C:17:F0:3E
Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Mesh
IP
MPLS
IPv6
Routing
System
Queues
Files
Log
RADIUS
Tools
New Terminal
Dot1X
LCD
Partition
Make Supout.rif
Manual
New WinBox
RouterOS WinBox
Hotspot
User Profiles
Active
Hosts
IP Bindings
Service Ports
Walled Garden
Walled Garden IP List
Cookies
Find
MAC Address
Address
To Address
Server
Idle Time
Rx Rate
Tx
A D
14:18:77:CA:57:3A
192.168.1.2
192.168.1.10
HotspotServer
00:00:00
1587 bps
317 bp
1 item (1 selected)


Safe Mode
Session: 4C:5E:0C:17:F0:3E
Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Mesh
IP
MPLS
IPv6
Routing
System
Queues
Files
Log
RADIUS
Tools
New Terminal
Dot1X
LCD
Partition
Make Supout.rif
Manual
New WinBox
RouterOS WinBox
Hotspot
User Profiles
Active
MAC Address
A D
14:18:77:CA:57
1 item (1 selected)
Hotspot Host <192.168.1.2>
General
Statistics
Traffic
OK
Remove
Make Binding
MAC Address: 14:18:77:CA:57:3A
Address: 192.168.1.2
To Address: 192.168.1.10
Server: HotspotServer
Bridge Port: unknown
authorized
bypassed
dynamic
List
Cookies
Find
Rx Rate
Tx
:00:00
4.3 kbps
320 bp



End User cũng có thể tự mình kiểm tra thống kê lưu lượng đã sử dụng và có thể chủ động Log Off khỏi tính năng WiFi Hotpot bằng cách nhấn vào nút log off.



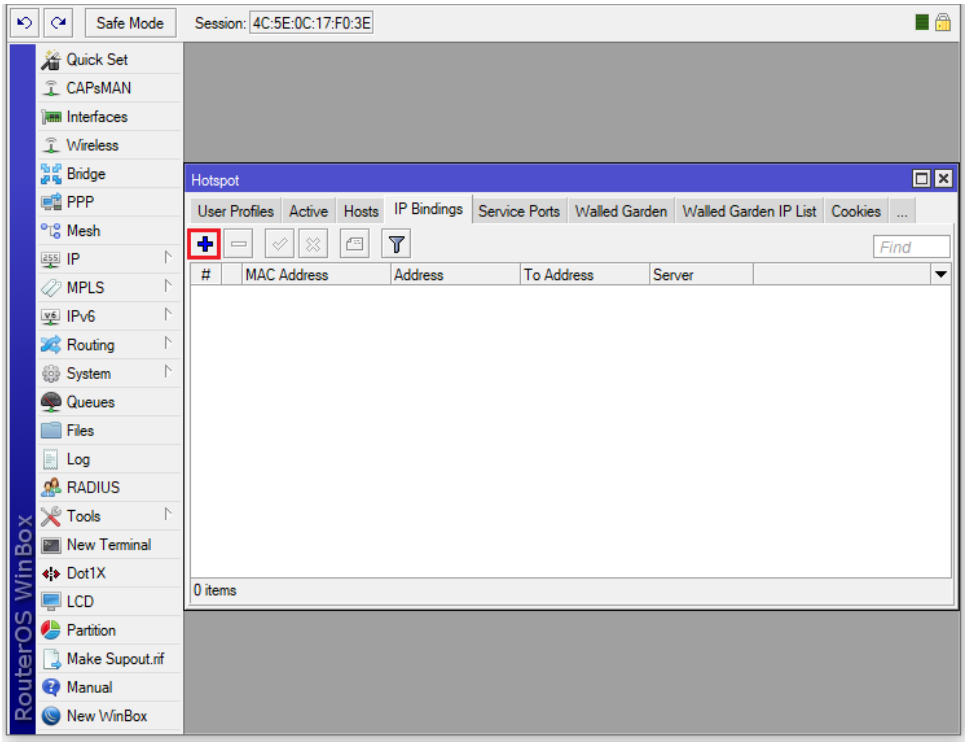
Bước 10. Thiết lập tính năng WiFi Hotspot Bypassed trên Router MikroTik.

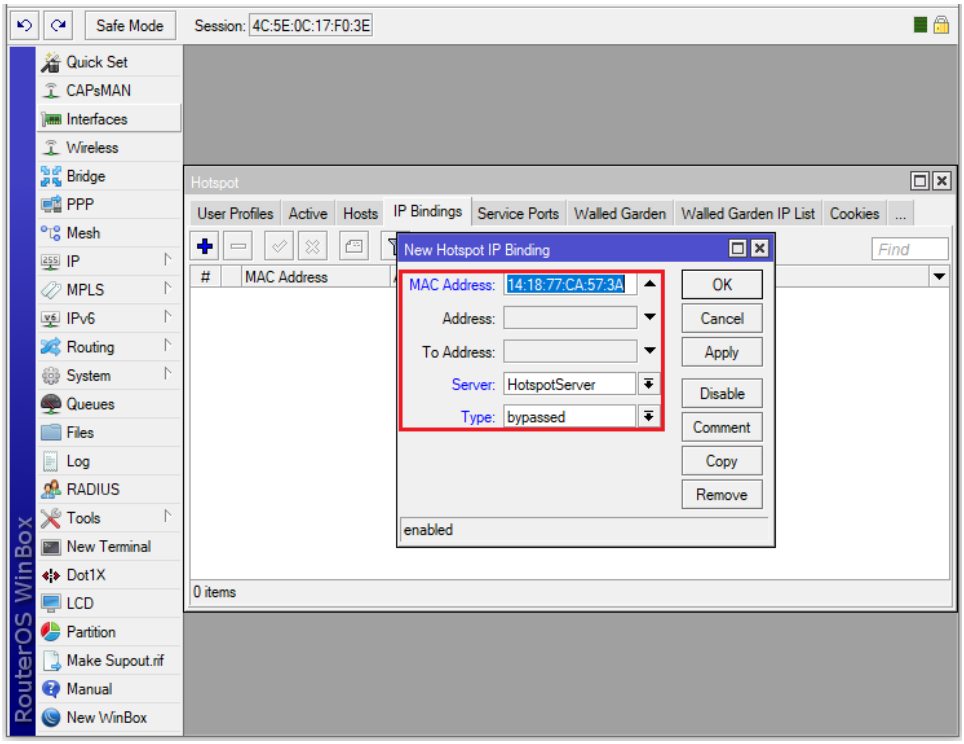
```
[admin@MikroTik] > /ip hotspot ip-binding print
Flags: X - disabled, P - bypassed, B - blocked
 #    MAC-ADDRESS       ADDRESS                         TO-ADDRESS      SERVER
 0 P 14:18:77:CA:57:3A 192.168.1.100                                   HotspotS...
[admin@MikroTik] >
```

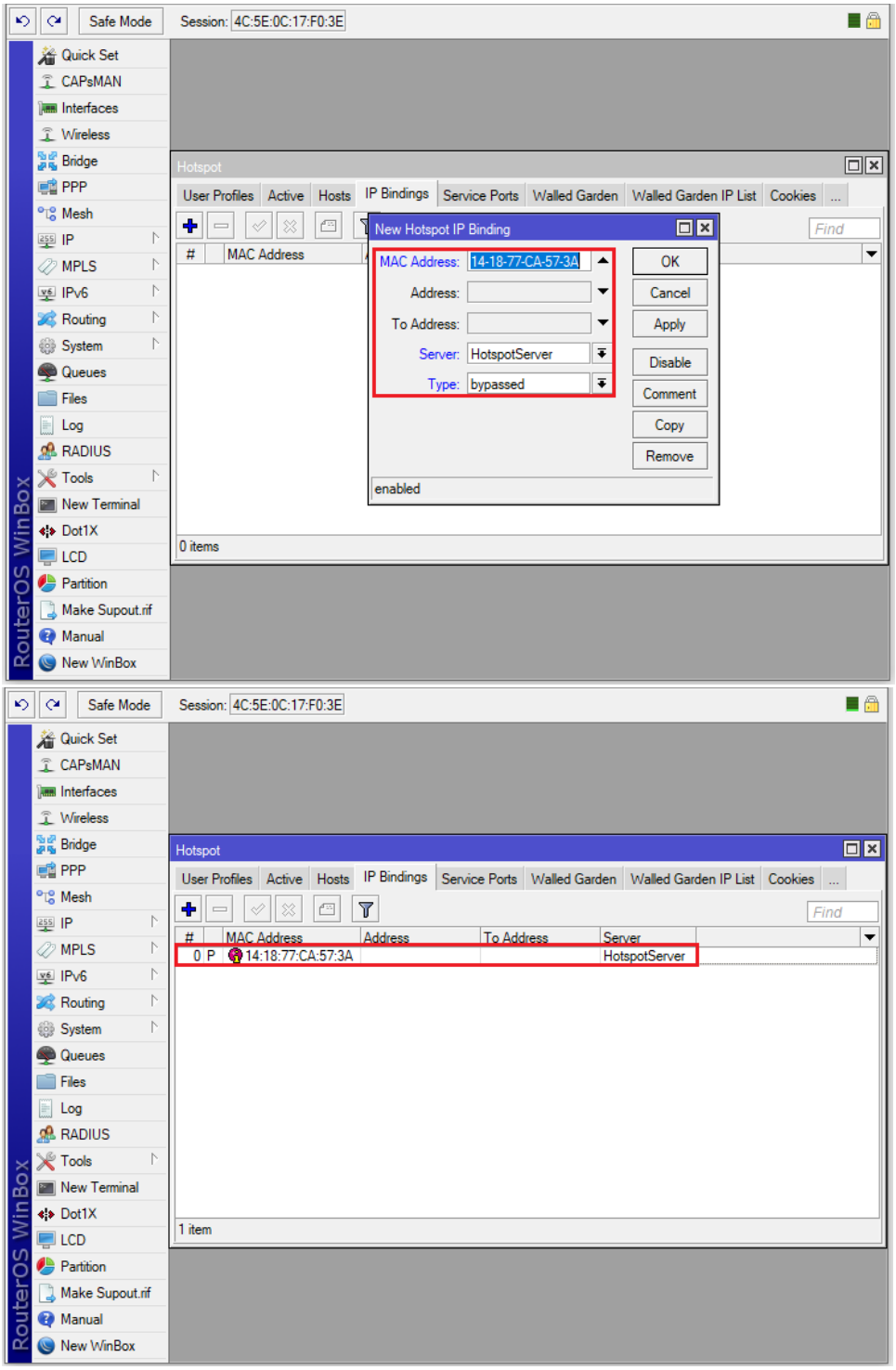
```
[admin@MikroTik] > /ip hotspot ip-binding print detail
Flags: X - disabled, P - bypassed, B - blocked
 0 P mac-address=14:18:77:CA:57:3A address=192.168.1.100 server=HotspotServer
     type=bypassed
[admin@MikroTik] >
```

```
[admin@MikroTik] >
/ip hotspot ip-binding add mac-address=14:18:77:CA:57:3A address=192.168.1.100
server=HotspotServer type=bypassed
```

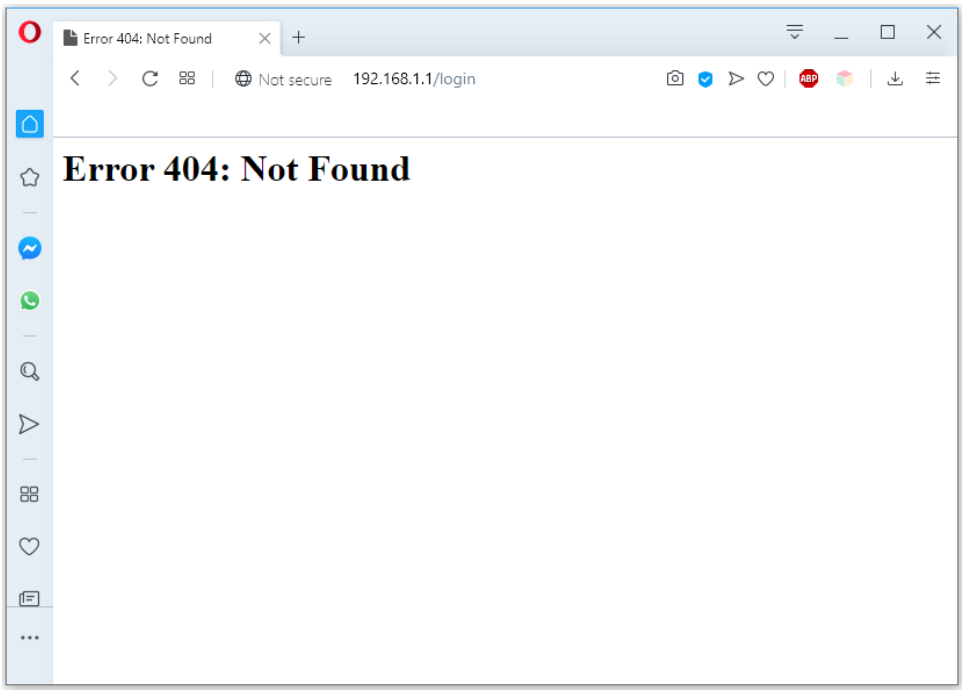
Một số thiết bị đặc biệt không cần phải đăng nhập vào giao diện WiFi Hotspot nhưng vẫn có thể truy cập Internet như thông thường thì ta có thể kích hoạt tính năng Bypassed cho các thiết bị đó dựa vào MAC hoặc IP.

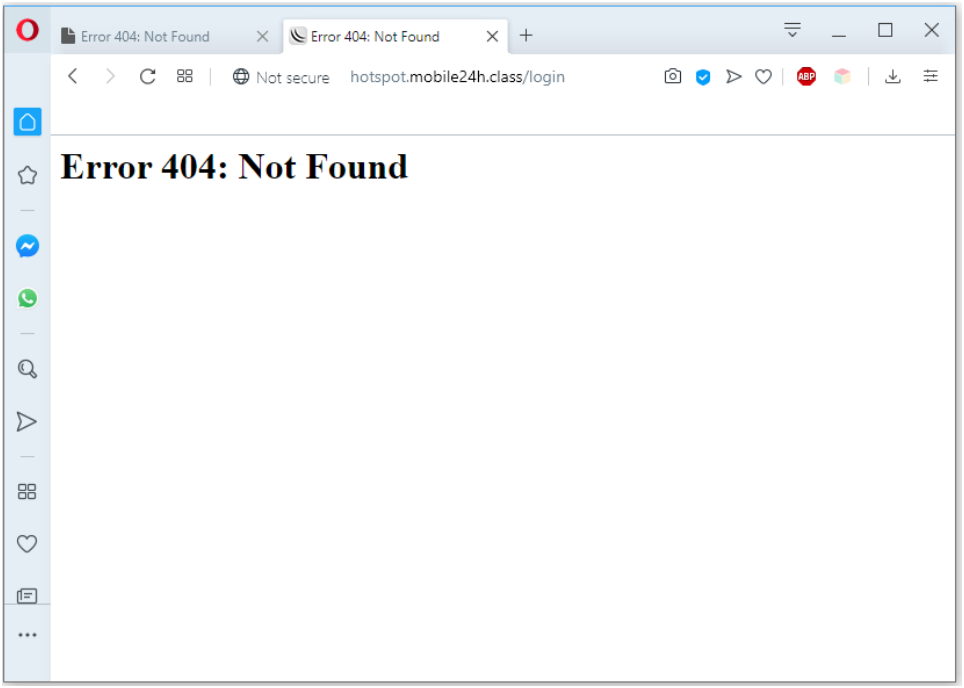

Safe Mode
Session: 4C:5E:0C:17:F0:3E
Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Mesh
IP
MPLS
IPv6
Routing
System
Queues
Files
Log
RADIUS
Tools
New Terminal
Dot1X
LCD
Partition
Make Supout.rif
Manual
New WinBox
RouterOS WinBox
Hotspot
User Profiles
Active
Hosts
IP Bindings
Service Ports
Walled Garden
Walled Garden IP List
Cookies
Find
#
MAC Address
Address
To Address
Server
0 items


Safe Mode
Session: 4C:5E:0C:17:F0:3E
Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Mesh
IP
MPLS
IPv6
Routing
System
Queues
Files
Log
RADIUS
Tools
New Terminal
Dot1X
LCD
Partition
Make Supout.rif
Manual
New WinBox
RouterOS WinBox
Hotspot
User Profiles
Active
Hosts
IP Bindings
Service Ports
Walled Garden
Walled Garden IP List
Cookies
Find
#
MAC Address
0 items
New Hotspot IP Binding
MAC Address: 14:18:77:CA:57:3A
Address:
To Address:
Server: HotspotServer
Type: bypassed
OK
Cancel
Apply
Disable
Comment
Copy
Remove
enabled

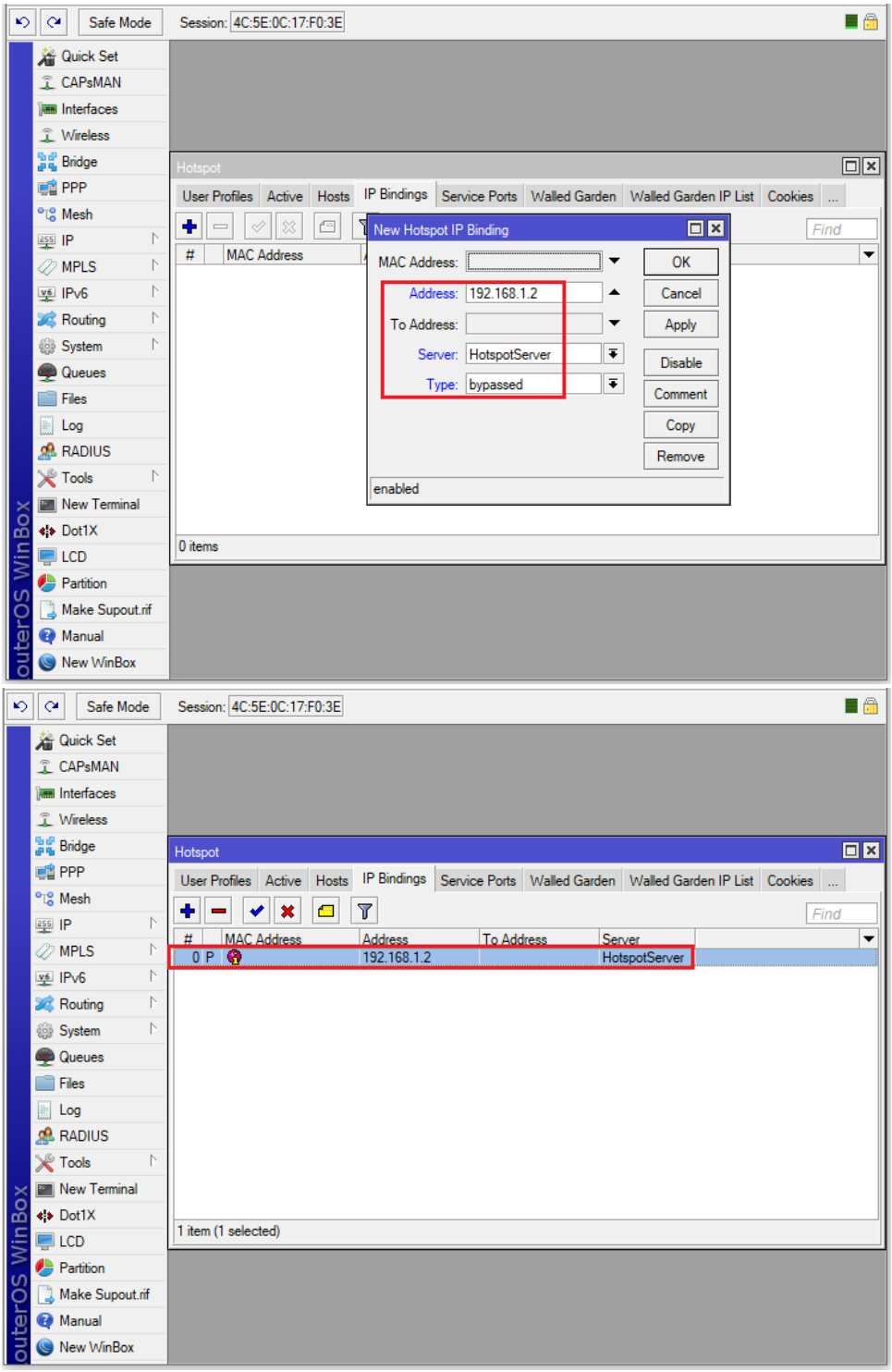


Lúc này, máy tính của End User được Bypassed sẽ không thể truy cập vào giao diện WiFi Hotspot được nữa.



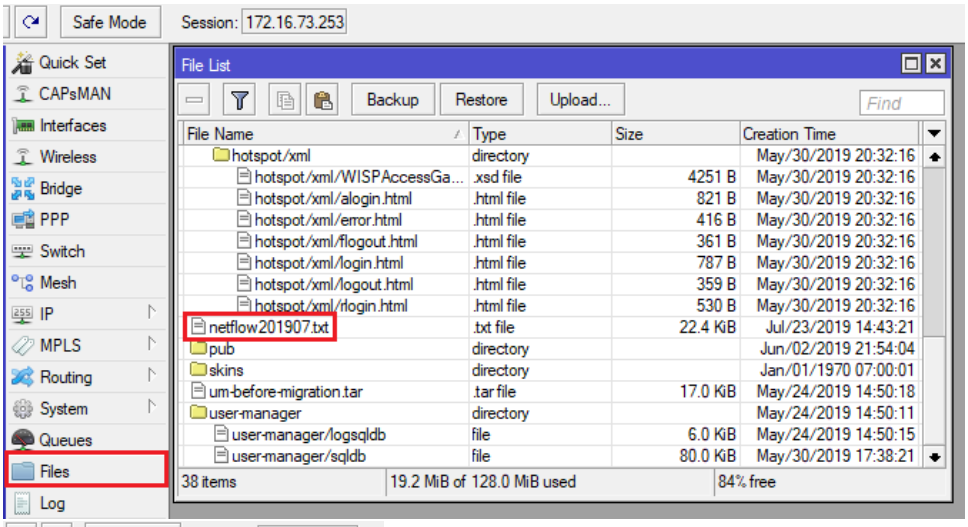


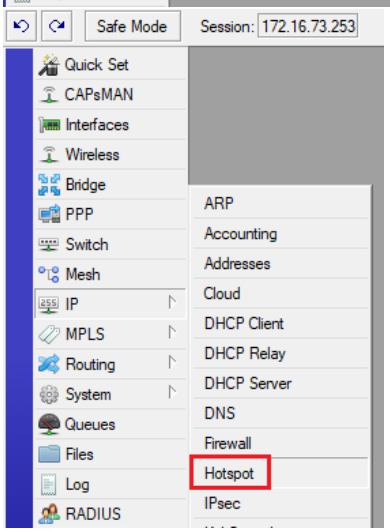
Thiết lập tính năng Bypassed dựa vào địa chỉ IP.

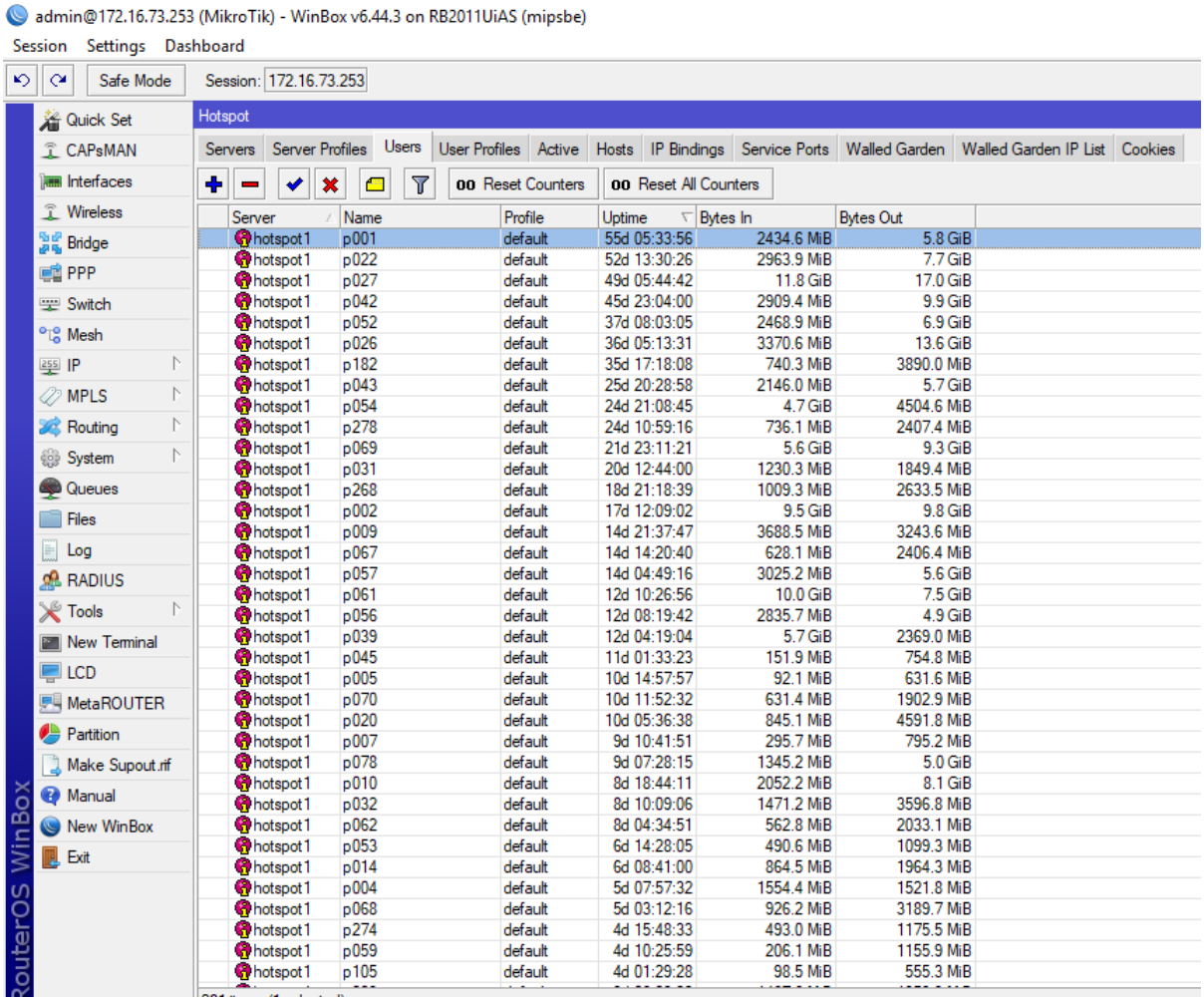


Bước 11. Thống kê lưu lượng WiFi Hotpot User.

```
[admin@MikroTik] > /ip hotspot user print bytes file=netflow201907
```

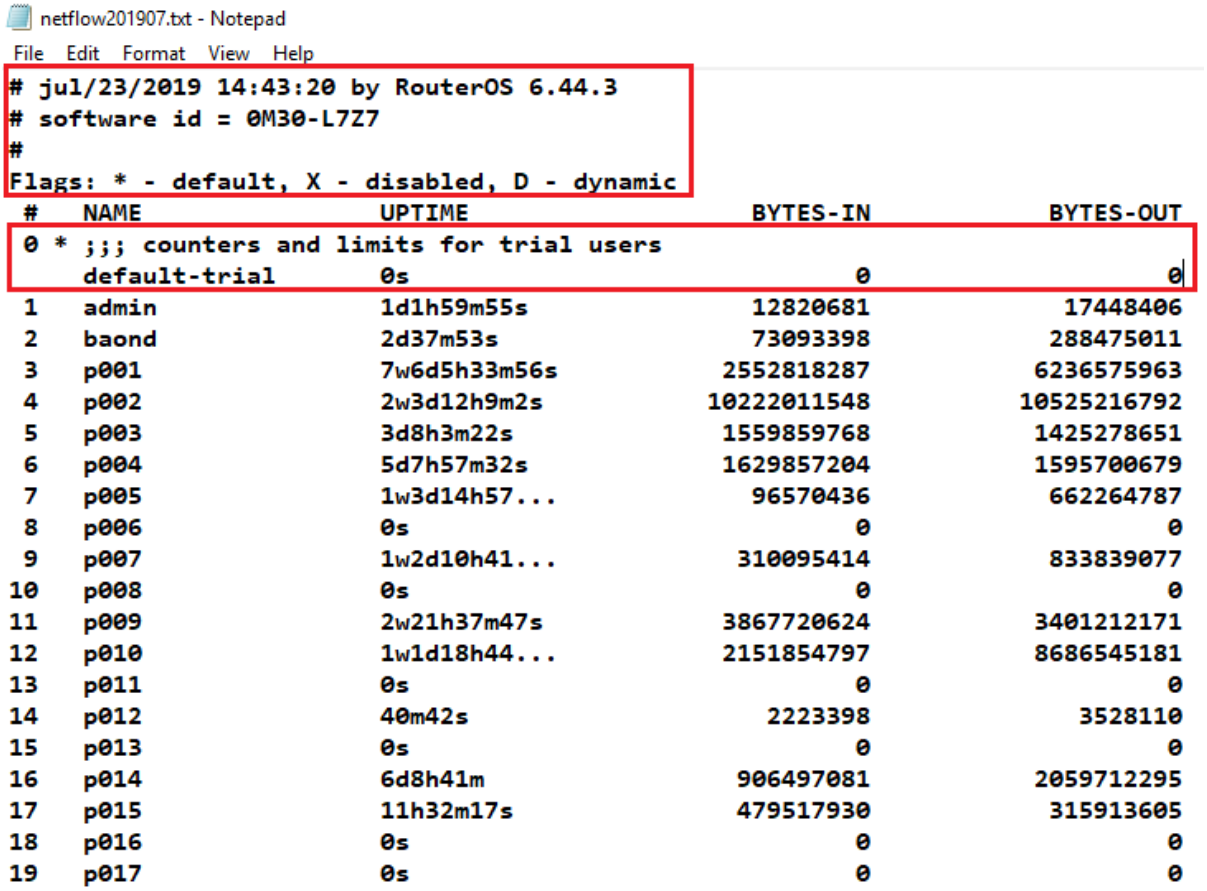

Safe Mode
Session: 172.16.73.253
Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Switch
Mesh
IP
MPLS
Routing
System
Queues
Files
Log
File List
Backup
Restore
Upload...
Find
File Name
Type
Size
Creation Time
hotspot/xml directory May/30/2019 20:32:16
hotspot/xml/WISPAccessGa... .xsd file 4251 B May/30/2019 20:32:16
hotspot/xml/alogin.html .html file 821 B May/30/2019 20:32:16
hotspot/xml/error.html .html file 416 B May/30/2019 20:32:16
hotspot/xml/flogout.html .html file 361 B May/30/2019 20:32:16
hotspot/xml/login.html .html file 787 B May/30/2019 20:32:16
hotspot/xml/logout.html .html file 359 B May/30/2019 20:32:16
hotspot/xml/rlogin.html .html file 530 B May/30/2019 20:32:16
netflow201907.txt .txt file 22.4 KiB Jul/23/2019 14:43:21
pub directory Jun/02/2019 21:54:04
skins directory Jan/01/1970 07:00:01
um-before-migration.tar .tar file 17.0 KiB May/24/2019 14:50:18
user-manager directory May/24/2019 14:50:11
user-manager/logsqldb file 6.0 KiB May/24/2019 14:50:15
user-manager/sqldb file 80.0 KiB May/30/2019 17:38:21
38 items
19.2 MiB of 128.0 MiB used
84% free


Safe Mode
Session: 172.16.73.253
Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Switch
Mesh
IP
MPLS
Routing
System
Queues
Files
Log
RADIUS
ARP
Accounting
Addresses
Cloud
DHCP Client
DHCP Relay
DHCP Server
DNS
Firewall
Hotspot
IPsec



Server	Name	Profile	Uptime	Bytes In	Bytes Out
hotspot1	p001	default	55d 05:33:56	2434.6 MiB	5.8 GiB
hotspot1	p022	default	52d 13:30:26	2963.9 MiB	7.7 GiB
hotspot1	p027	default	49d 05:44:42	11.8 GiB	17.0 GiB
hotspot1	p042	default	45d 23:04:00	2909.4 MiB	9.9 GiB
hotspot1	p052	default	37d 08:03:05	2468.9 MiB	6.9 GiB
hotspot1	p026	default	36d 05:13:31	3370.6 MiB	13.6 GiB
hotspot1	p182	default	35d 17:18:08	740.3 MiB	3890.0 MiB
hotspot1	p043	default	25d 20:28:58	2146.0 MiB	5.7 GiB
hotspot1	p054	default	24d 21:08:45	4.7 GiB	4504.6 MiB
hotspot1	p278	default	24d 10:59:16	736.1 MiB	2407.4 MiB
hotspot1	p069	default	21d 23:11:21	5.6 GiB	9.3 GiB
hotspot1	p031	default	20d 12:44:00	1230.3 MiB	1849.4 MiB
hotspot1	p268	default	18d 21:18:39	1009.3 MiB	2633.5 MiB
hotspot1	p002	default	17d 12:09:02	9.5 GiB	9.8 GiB
hotspot1	p009	default	14d 21:37:47	3688.5 MiB	3243.6 MiB
hotspot1	p067	default	14d 14:20:40	628.1 MiB	2406.4 MiB
hotspot1	p057	default	14d 04:49:16	3025.2 MiB	5.6 GiB
hotspot1	p061	default	12d 10:26:56	10.0 GiB	7.5 GiB
hotspot1	p056	default	12d 08:19:42	2835.7 MiB	4.9 GiB
hotspot1	p039	default	12d 04:19:04	5.7 GiB	2369.0 MiB
hotspot1	p045	default	11d 01:33:23	151.9 MiB	754.8 MiB
hotspot1	p005	default	10d 14:57:57	92.1 MiB	631.6 MiB
hotspot1	p070	default	10d 11:52:32	631.4 MiB	1902.9 MiB
hotspot1	p020	default	10d 05:36:38	845.1 MiB	4591.8 MiB
hotspot1	p007	default	9d 10:41:51	295.7 MiB	795.2 MiB
hotspot1	p078	default	9d 07:28:15	1345.2 MiB	5.0 GiB
hotspot1	p010	default	8d 18:44:11	2052.2 MiB	8.1 GiB
hotspot1	p032	default	8d 10:09:06	1471.2 MiB	3596.8 MiB
hotspot1	p062	default	8d 04:34:51	562.8 MiB	2033.1 MiB
hotspot1	p053	default	6d 14:28:05	490.6 MiB	1099.3 MiB
hotspot1	p014	default	6d 08:41:00	864.5 MiB	1964.3 MiB
hotspot1	p004	default	5d 07:57:32	1554.4 MiB	1521.8 MiB
hotspot1	p068	default	5d 03:12:16	926.2 MiB	3189.7 MiB
hotspot1	p274	default	4d 15:48:33	493.0 MiB	1175.5 MiB
hotspot1	p059	default	4d 10:25:59	206.1 MiB	1155.9 MiB
hotspot1	p105	default	4d 01:29:28	98.5 MiB	555.3 MiB

Tiến hành xóa các dòng không cần thiết trước khi import vào Excel.



netflow201907.txt - Notepad

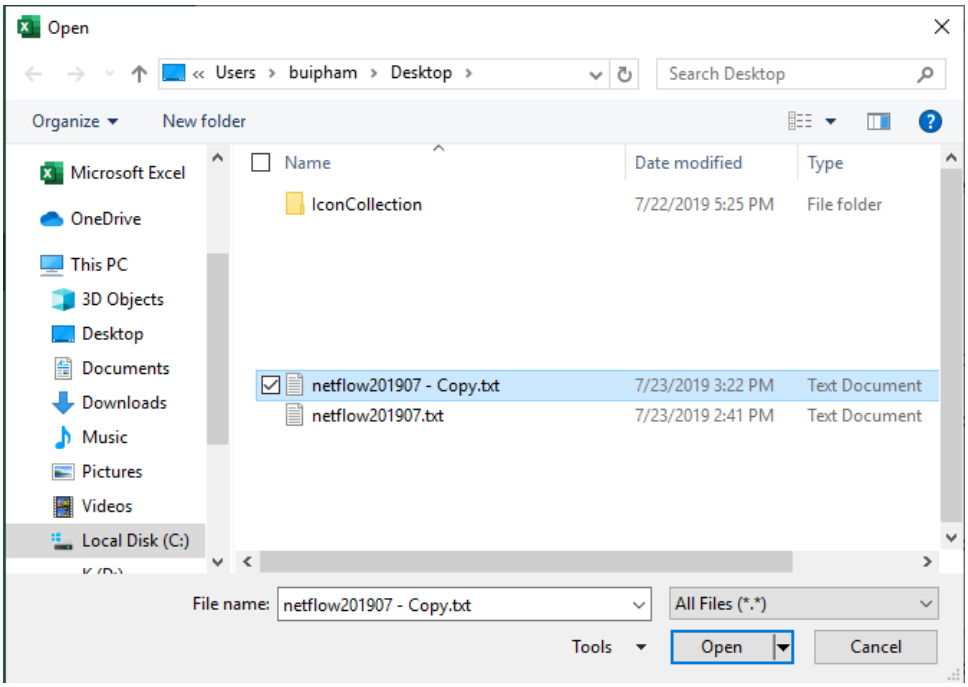
File Edit Format View Help

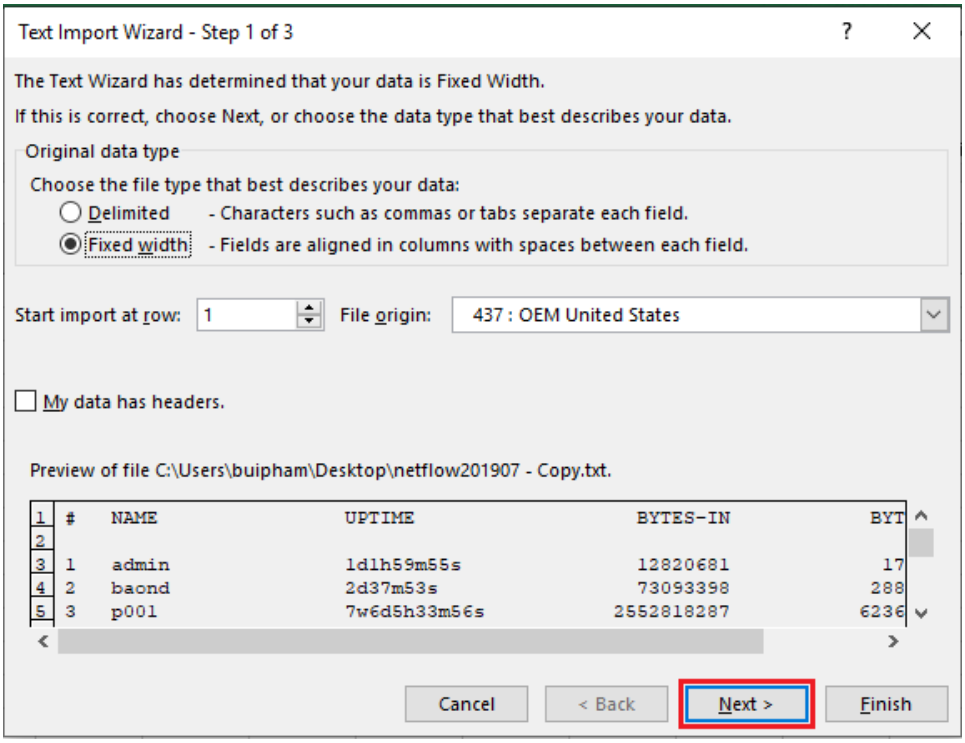
```
# jul/23/2019 14:43:20 by RouterOS 6.44.3
# software id = 0M30-L7Z7
#
Flags: * - default, X - disabled, D - dynamic
 #   NAME                UPTIME                  BYTES-IN            BYTES-OUT
 0 * ;;; counters and limits for trial users
     default-trial       0s                             0                    0
 1   admin               1d1h59m55s               12820681             17448406
 2   baond               2d37m53s                 73093398            288475011
 3   p001                7w6d5h33m56s           2552818287           6236575963
 4   p002                2w3d12h9m2s           10222011548          10525216792
 5   p003                3d8h3m22s              1559859768           1425278651
 6   p004                5d7h57m32s             1629857204           1595700679
 7   p005                1w3d14h57...             96570436            662264787
 8   p006                0s                             0                    0
 9   p007                1w2d10h41...            310095414            833839077
10   p008                0s                             0                    0
11   p009                2w21h37m47s            3867720624           3401212171
12   p010                1w1d18h44...           2151854797           8686545181
13   p011                0s                             0                    0
14   p012                40m42s                   2223398              3528110
15   p013                0s                             0                    0
16   p014                6d8h41m                906497081           2059712295
17   p015                11h32m17s              479517930            315913605
18   p016                0s                             0                    0
19   p017                0s                             0                    0
```

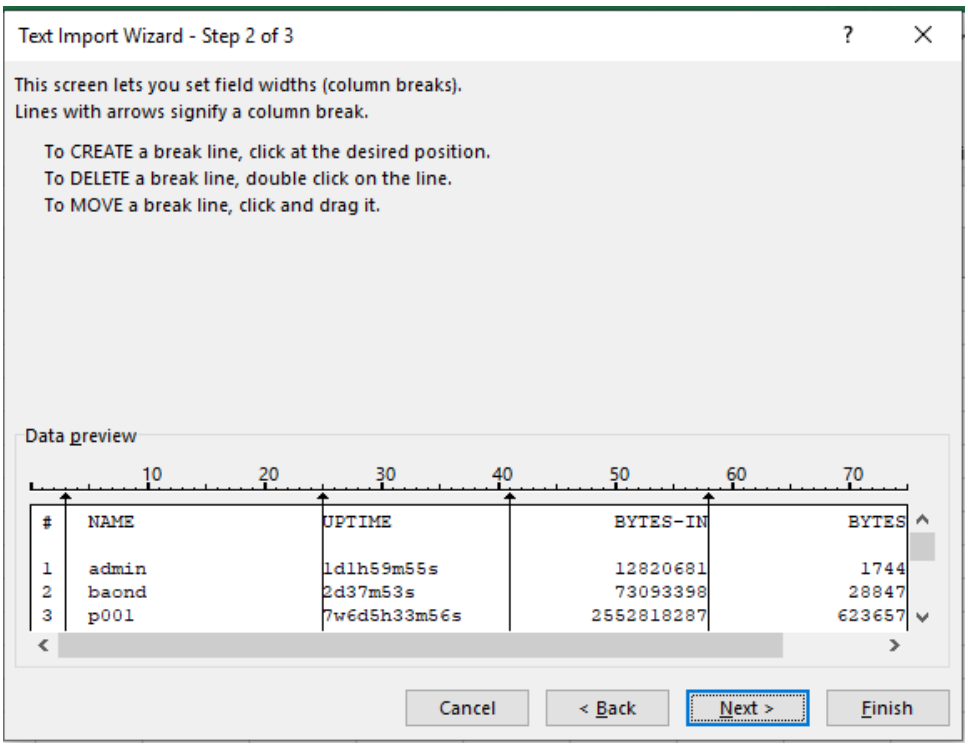
netflow201907 - Copy.txt - Notepad

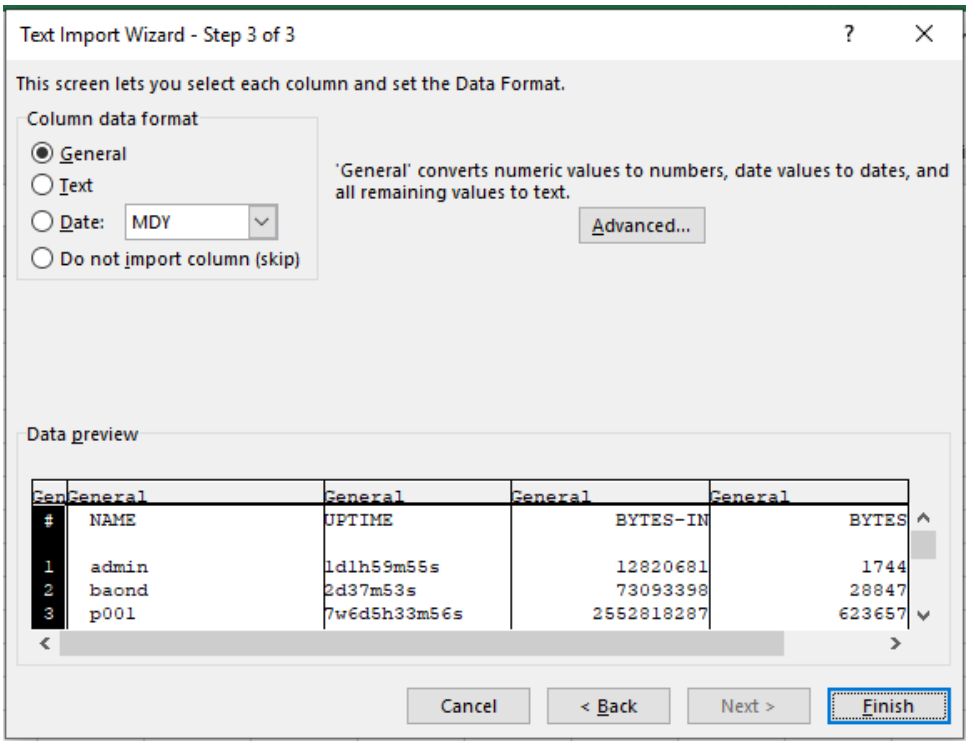
File Edit Format View Help

#	NAME	UPTIME	BYTES-IN	BYTES-OUT
1	admin	1d1h59m55s	12820681	17448406
2	baond	2d37m53s	73093398	288475011
3	p001	7w6d5h33m56s	2552818287	6236575963
4	p002	2w3d12h9m2s	10222011548	10525216792
5	p003	3d8h3m22s	1559859768	1425278651
6	p004	5d7h57m32s	1629857204	1595700679
7	p005	1w3d14h57...	96570436	662264787
8	p006	0s	0	0
9	p007	1w2d10h41...	310095414	833839077
10	p008	0s	0	0
11	p009	2w21h37m47s	3867720624	3401212171
12	p010	1w1d18h44...	2151854797	8686545181
13	p011	0s	0	0
14	p012	40m42s	2223398	3528110
15	p013	0s	0	0
16	p014	6d8h41m	906497081	2059712295
17	p015	11h32m17s	479517930	315913605
18	p016	0s	0	0
19	p017	0s	0	0
20	p018	2d2h55m3s	134452214	424879853
21	p019	29m25s	1464501	4194654
22	p020	1w3d5h36m38s	886145863	4814810386
23	p021	0s	0	0
24	p022	7w3d13h30...	3107861893	8292502064

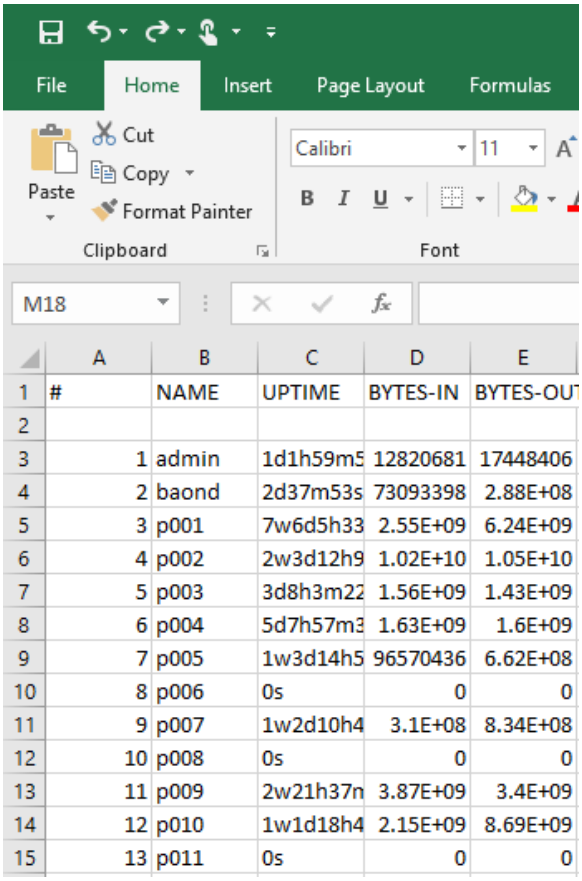



Text Import Wizard - Step 1 of 3
The Text Wizard has determined that your data is Fixed Width.
If this is correct, choose Next, or choose the data type that best describes your data.
Original data type
Choose the file type that best describes your data:
Delimited - Characters such as commas or tabs separate each field.
Fixed width - Fields are aligned in columns with spaces between each field.
Start import at row: 1
File origin: 437 : OEM United States
My data has headers.
Preview of file C:\Users\buipham\Desktop\netflow201907 - Copy.txt.
1 # NAME UPTIME BYTES-IN BYT
2
3 1 admin 1d1h59m55s 12820681 17
4 2 baond 2d37m53s 73093398 288
5 3 p001 7w6d5h33m56s 2552818287 6236
Cancel
< Back
Next >
Finish


Text Import Wizard - Step 2 of 3
This screen lets you set field widths (column breaks).
Lines with arrows signify a column break.
To CREATE a break line, click at the desired position.
To DELETE a break line, double click on the line.
To MOVE a break line, click and drag it.
Data preview
10 20 30 40 50 60 70
NAME UPTIME BYTES-IN BYTES
1 admin 1d1h59m55s 12820681 1744
2 baond 2d37m53s 73093398 28847
3 p001 7w6d5h33m56s 2552818287 623657
Cancel
< Back
Next >
Finish

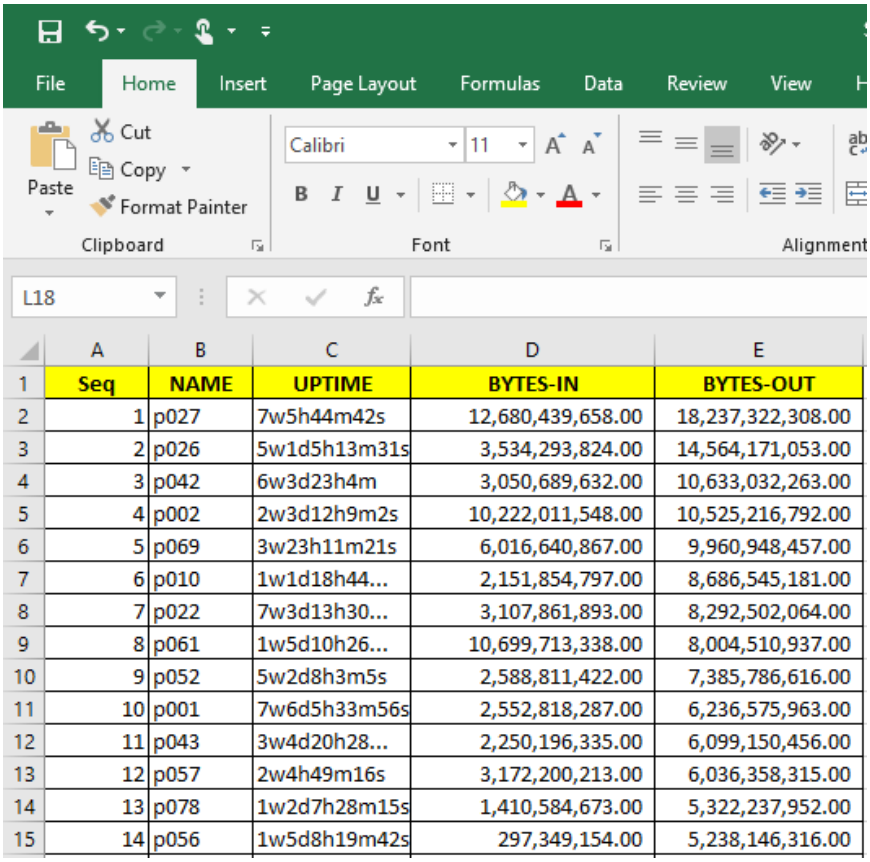


Gen	General	General	General	General
#	NAME	UPTIME	BYTES-IN	BYTES
1	admin	1d1h59m55s	12820681	1744
2	baond	2d37m53s	73093398	28847
3	p001	7w6d5h33m56s	2552818287	623657



	A	B	C	D	E
1	#	NAME	UPTIME	BYTES-IN	BYTES-OU
2					
3	1	admin	1d1h59m5	12820681	17448406
4	2	baond	2d37m53s	73093398	2.88E+08
5	3	p001	7w6d5h33	2.55E+09	6.24E+09
6	4	p002	2w3d12h9	1.02E+10	1.05E+10
7	5	p003	3d8h3m22	1.56E+09	1.43E+09
8	6	p004	5d7h57m3	1.63E+09	1.6E+09
9	7	p005	1w3d14h5	96570436	6.62E+08
10	8	p006	0s	0	0
11	9	p007	1w2d10h4	3.1E+08	8.34E+08
12	10	p008	0s	0	0
13	11	p009	2w21h37n	3.87E+09	3.4E+09
14	12	p010	1w1d18h4	2.15E+09	8.69E+09
15	13	p011	0s	0	0

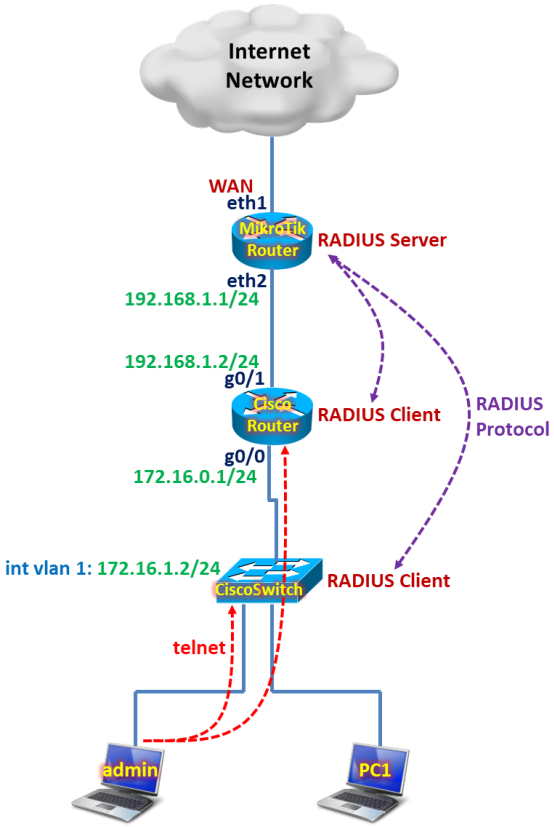
Kết quả thống kê bằng file Excel.



	A	B	C	D	E
1	Seq	NAME	UPTIME	BYTES-IN	BYTES-OUT
2	1	p027	7w5h44m42s	12,680,439,658.00	18,237,322,308.00
3	2	p026	5w1d5h13m31s	3,534,293,824.00	14,564,171,053.00
4	3	p042	6w3d23h4m	3,050,689,632.00	10,633,032,263.00
5	4	p002	2w3d12h9m2s	10,222,011,548.00	10,525,216,792.00
6	5	p069	3w23h11m21s	6,016,640,867.00	9,960,948,457.00
7	6	p010	1w1d18h44...	2,151,854,797.00	8,686,545,181.00
8	7	p022	7w3d13h30...	3,107,861,893.00	8,292,502,064.00
9	8	p061	1w5d10h26...	10,699,713,338.00	8,004,510,937.00
10	9	p052	5w2d8h3m5s	2,588,811,422.00	7,385,786,616.00
11	10	p001	7w6d5h33m56s	2,552,818,287.00	6,236,575,963.00
12	11	p043	3w4d20h28...	2,250,196,335.00	6,099,150,456.00
13	12	p057	2w4h49m16s	3,172,200,213.00	6,036,358,315.00
14	13	p078	1w2d7h28m15s	1,410,584,673.00	5,322,237,952.00
15	14	p056	1w5d8h19m42s	297,349,154.00	5,238,146,316.00

Phần 19. Cấu hình RADIUS Server trên Router MikroTik.

Phần 19.1. Cài đặt gói UserManager và các công cụ quản trị RADIUS Server trên Router MikroTik.



Tổng quan các bước thực hiện:

- **Bước 1.** Tìm hiểu tổng quan về gói cài đặt UserManager trên Router MikroTik.
- **Bước 2.** Tải gói cài đặt UserManager về máy tính của người quản trị.
- **Bước 3.** Tiến hành cài đặt gói UserManager lên Router MikroTik.
- **Bước 4.** Khởi động lại Router MikroTik sau khi cài đặt gói UserManager thành công.
- **Bước 5.** Kiểm tra gói phần mềm User Manager đã cài đặt thành công trên Router MikroTik.
- **Bước 6.** Kiểm tra dịch vụ RADIUS Server trên Router MikroTik.
- **Bước 7.** Kiểm tra và thay đổi mật khẩu đăng nhập RADIUS Server trên Router MikroTik.
- **Bước 8.** Backup Database RADIUS Server trên Router MikroTik và copy về máy tính của người quản trị.
- **Bước 9.** Upload Database của RADIUS Server từ máy tính của người quản trị và Restore lại Database của RADIUS Server trên Router MikroTik.
- **Bước 10.** Reset User Manager Database trở về mặc định Default.

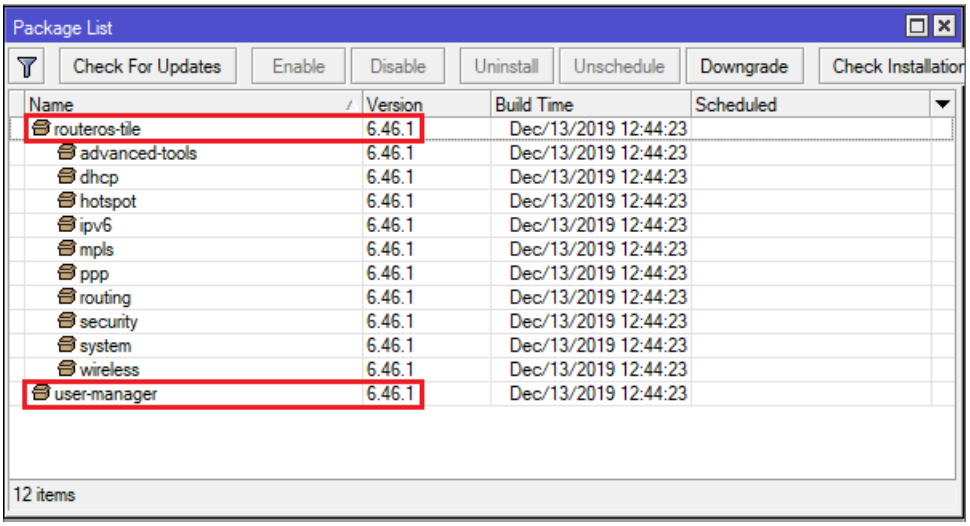
Các bước thực hiện chi tiết:

Bước 1. Tìm hiểu tổng quan về gói cài đặt UserManager trên Router MikroTik.

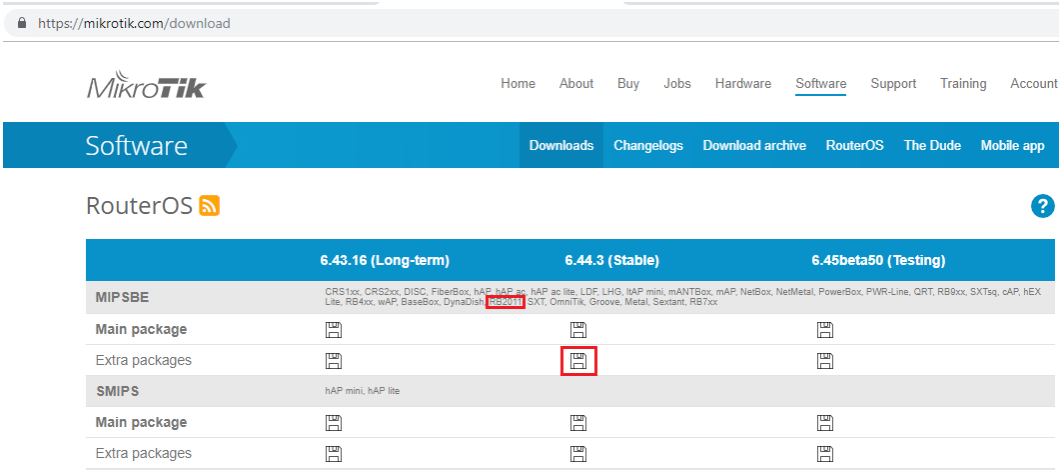
User Manager Package Requirements

User Manager RADIUS Server (User Manager RADIUS Server Package - UserMan) installation must have below minimum requirements.

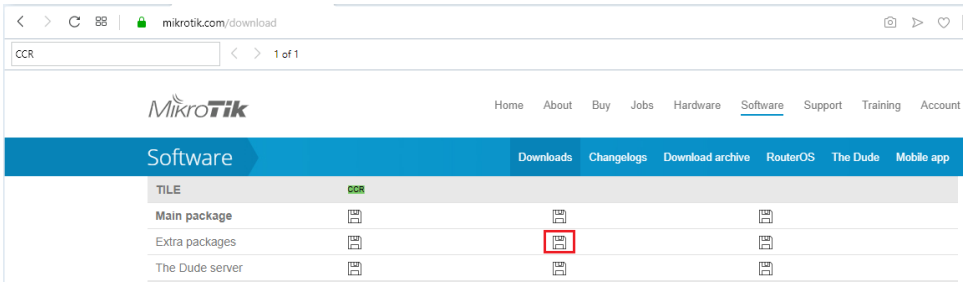
- MikroTik RouterOS and User Manager Package must have the same version.
- The router should have at least 32MB RAM and 2MB free HDD space.



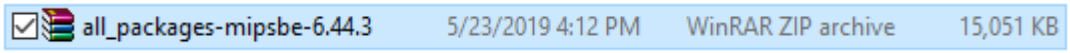
Bước 2. Tải gói cài đặt UserManager về máy tính của người quản trị.
Tải gói cài đặt user-manager-your_version.npk

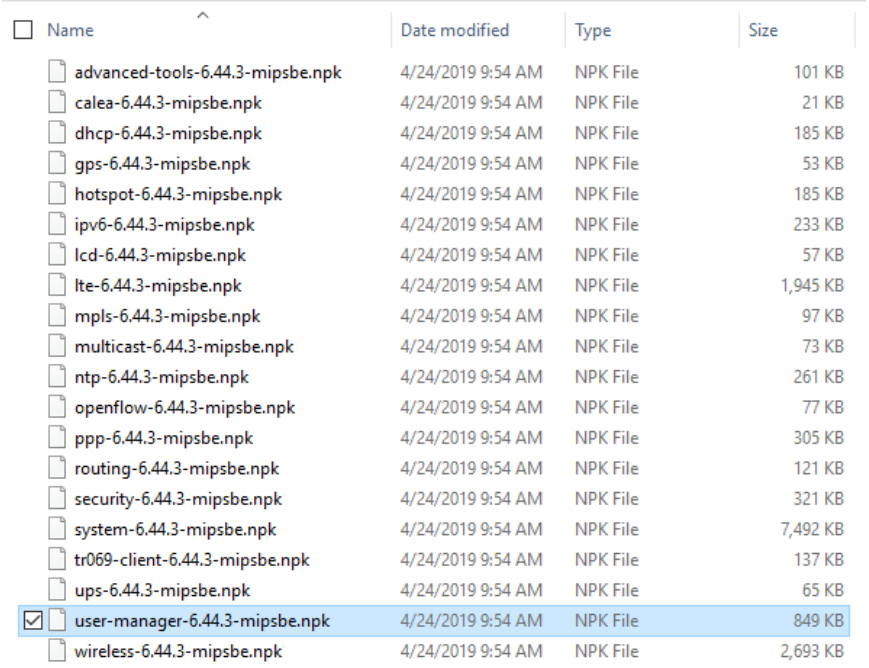


https://mikrotik.com/download



Đối với Router MikroTik CCR1016 thì tải gói này

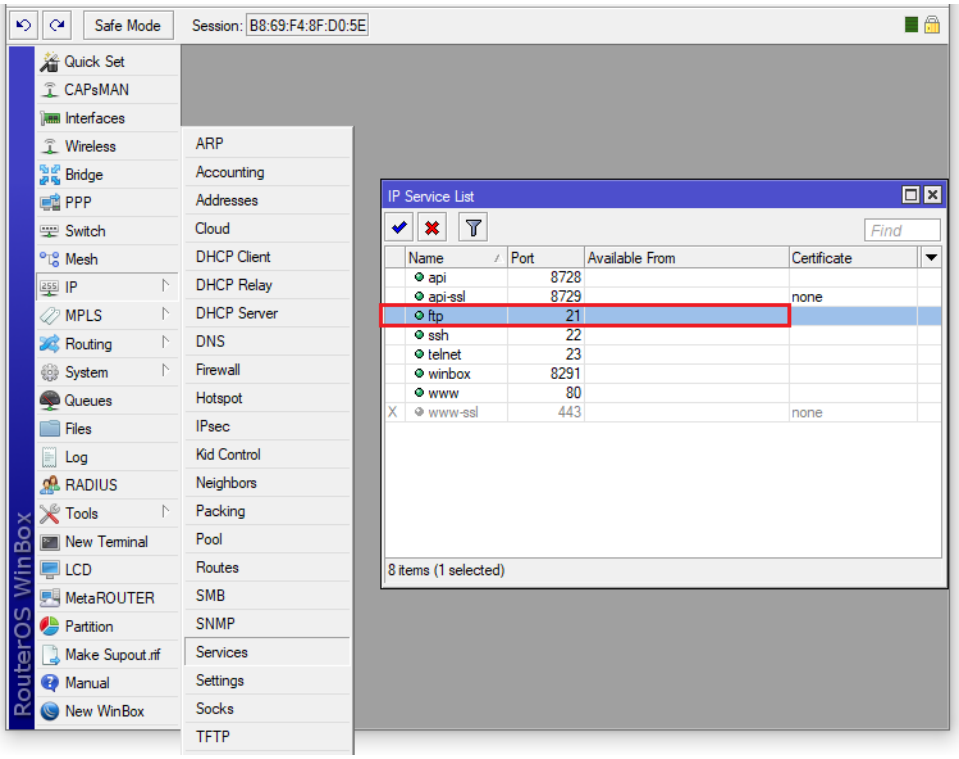




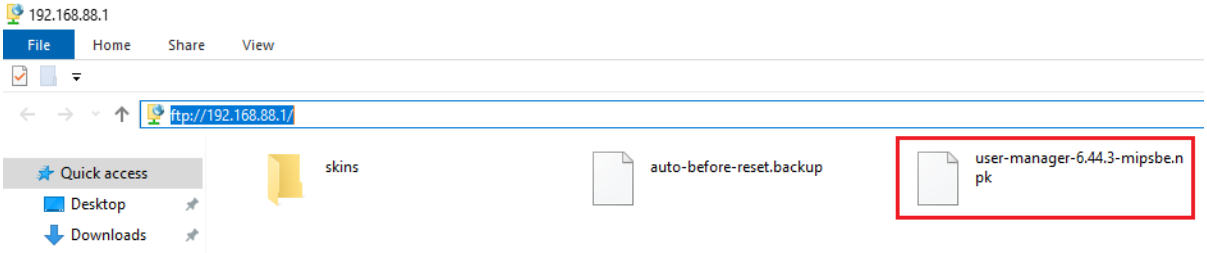
Bước 3. Tiến hành cài đặt gói UserManager lên Router MikroTik.

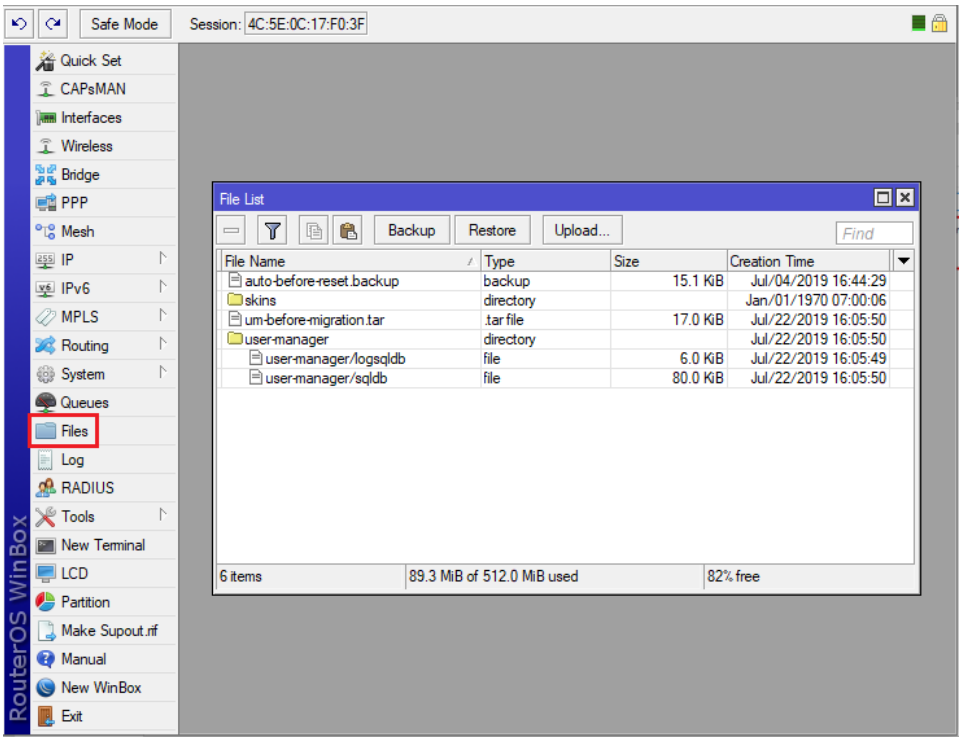
Tiến hành cài đặt gói User Manager bằng dịch vụ FPT Server có sẵn trên Router MikroTik.

- Đảm bảo dịch vụ FTP Service đang được kích hoạt sẵn trên Router MikroTik.

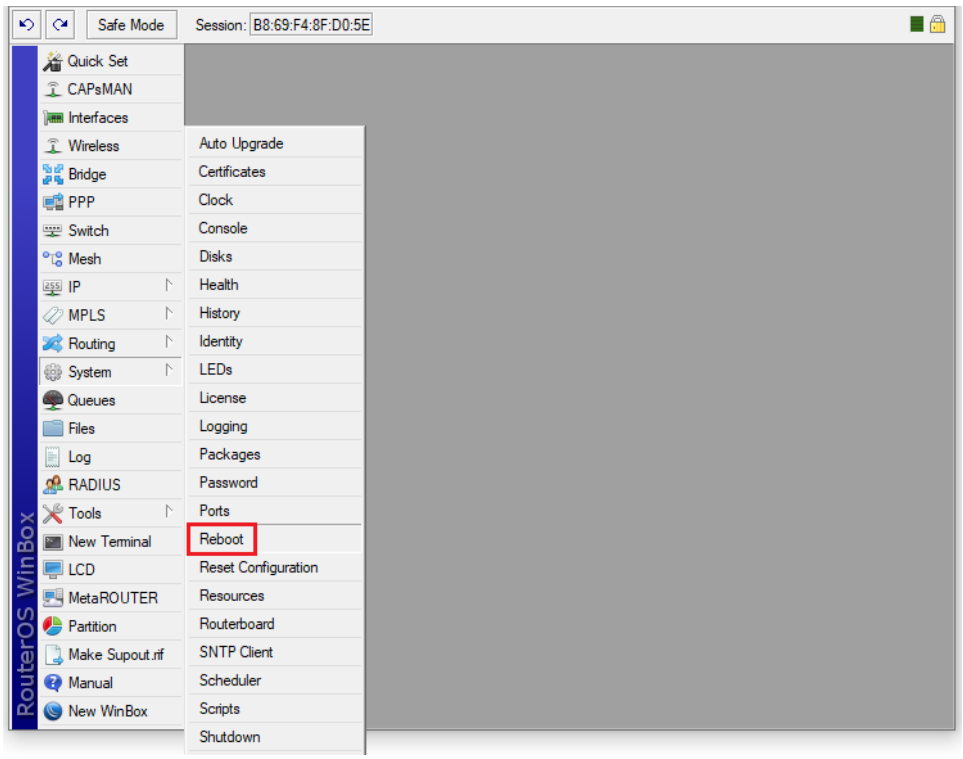


- Từ máy tính của người quản trị admin, tiến hành truy cập vào FTP Service trên Router MikroTik bằng đường dẫn “ftp://192.168.88.1/” với username mặc định là admin, password là rỗng. Sau đó copy gói phần mềm User Manager lên thiết bị và cuối cùng là khởi động lại thiết bị.

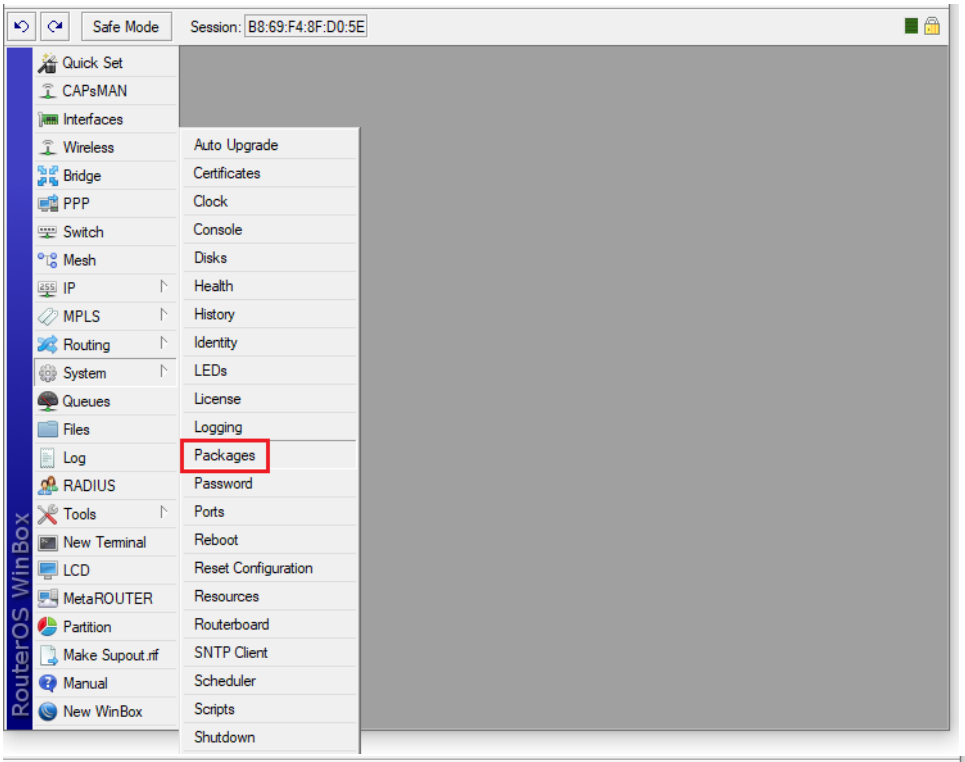


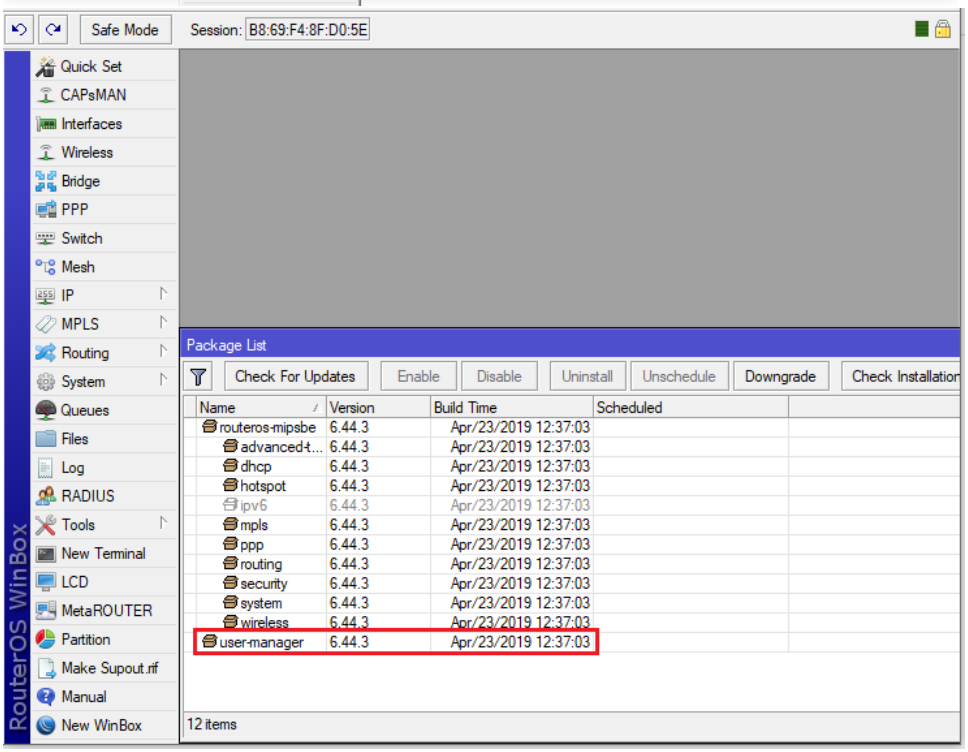


Bước 4. Khởi động lại Router MikroTik sau khi cài đặt gói UserManager thành công.
Đảm bảo trong file list không chứa các file hệ điều hành cũ và các gói user-manager phiên bản cũ rồi sau đó tiến hành reboot lại thiết bị



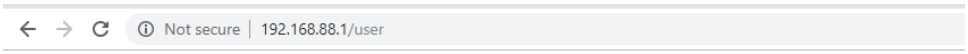
Bước 5. Kiểm tra gói phần mềm User Manager đã cài đặt thành công trên Router MikroTik.



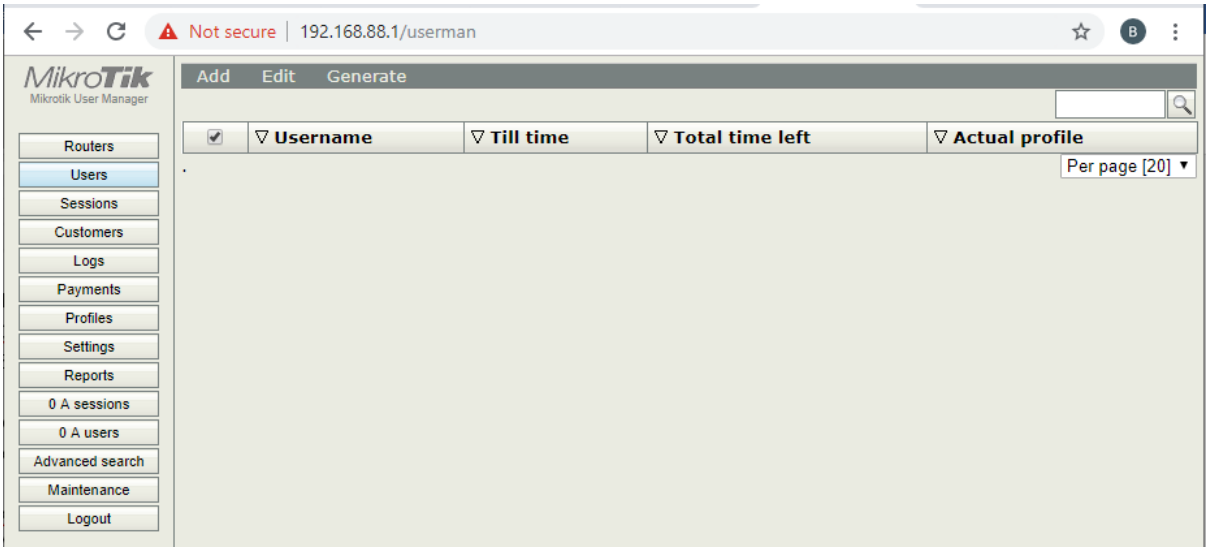


Bước 6. Kiểm tra dịch vụ RADIUS Server trên Router MikroTik.

Kiểm tra gói phần mềm User Manager đã được cài đặt thành công hay chưa thông qua đường dẫn http://192.168.88.1/user



Đăng nhập vào đường dẫn http://192.168.88.1/userman với tài khoản username mặc định là admin, password là rỗng.



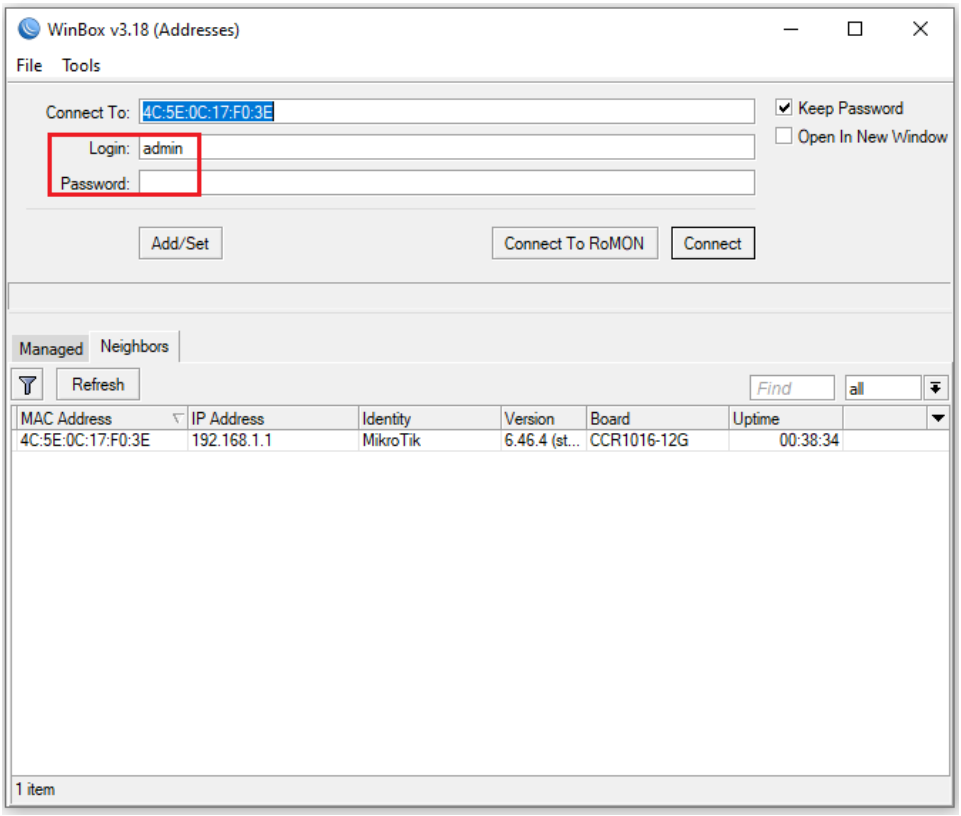
Bước 7. Kiểm tra và thay đổi mật khẩu đăng nhập RADIUS Server trên Router MikroTik.

```
[admin@MikroTik] > /tool user-manager customer print
Flags: X - disabled
 0   login="admin" password=""
     access=own-routers,own-users,own-profiles,own-limits,config-payment-gw
     backup-allowed=yes time-zone=-00:00 permissions=owner signup-allowed=no
     paypal-allowed=no paypal-secure-response=no paypal-accept-pending=no
[admin@MikroTik] >
```

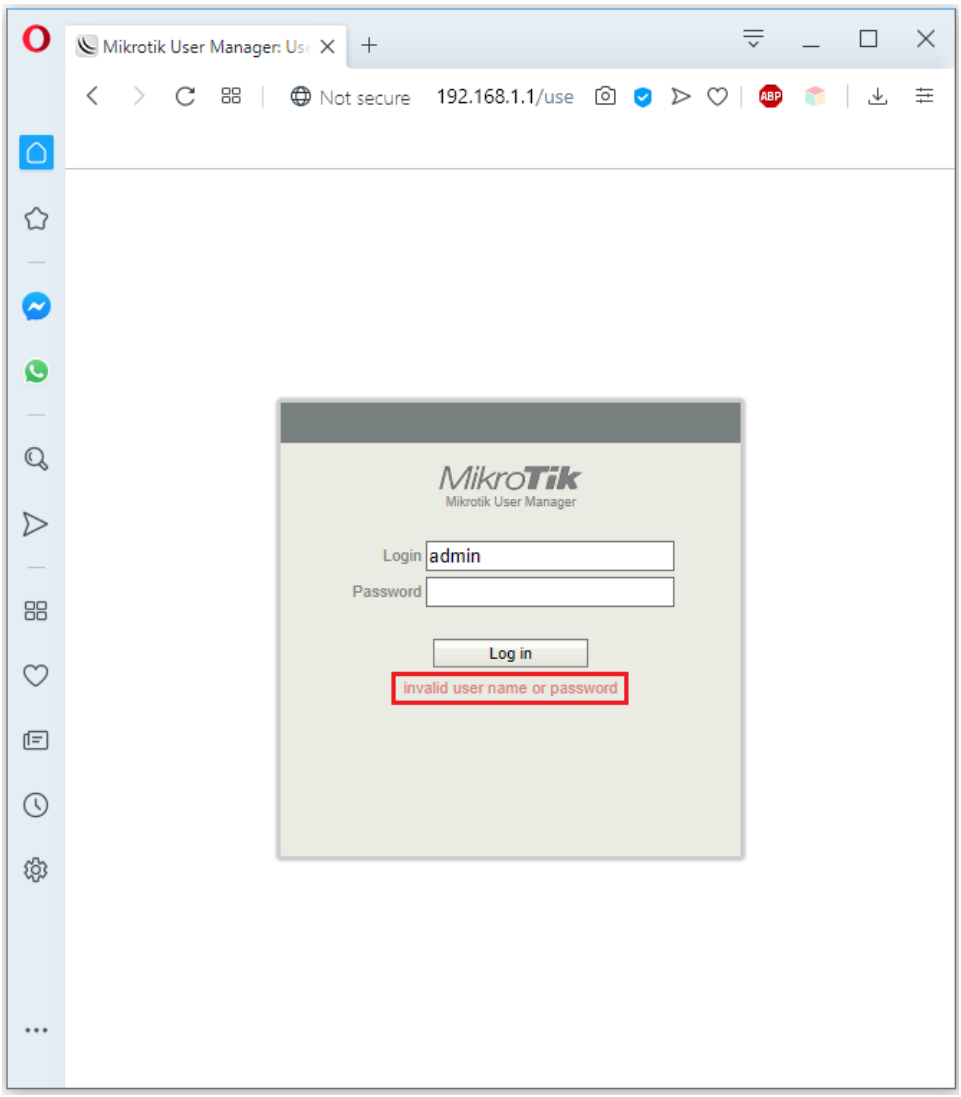
```
[admin@MikroTik] >
/tool user-manager customer set admin password=mobile24h
```

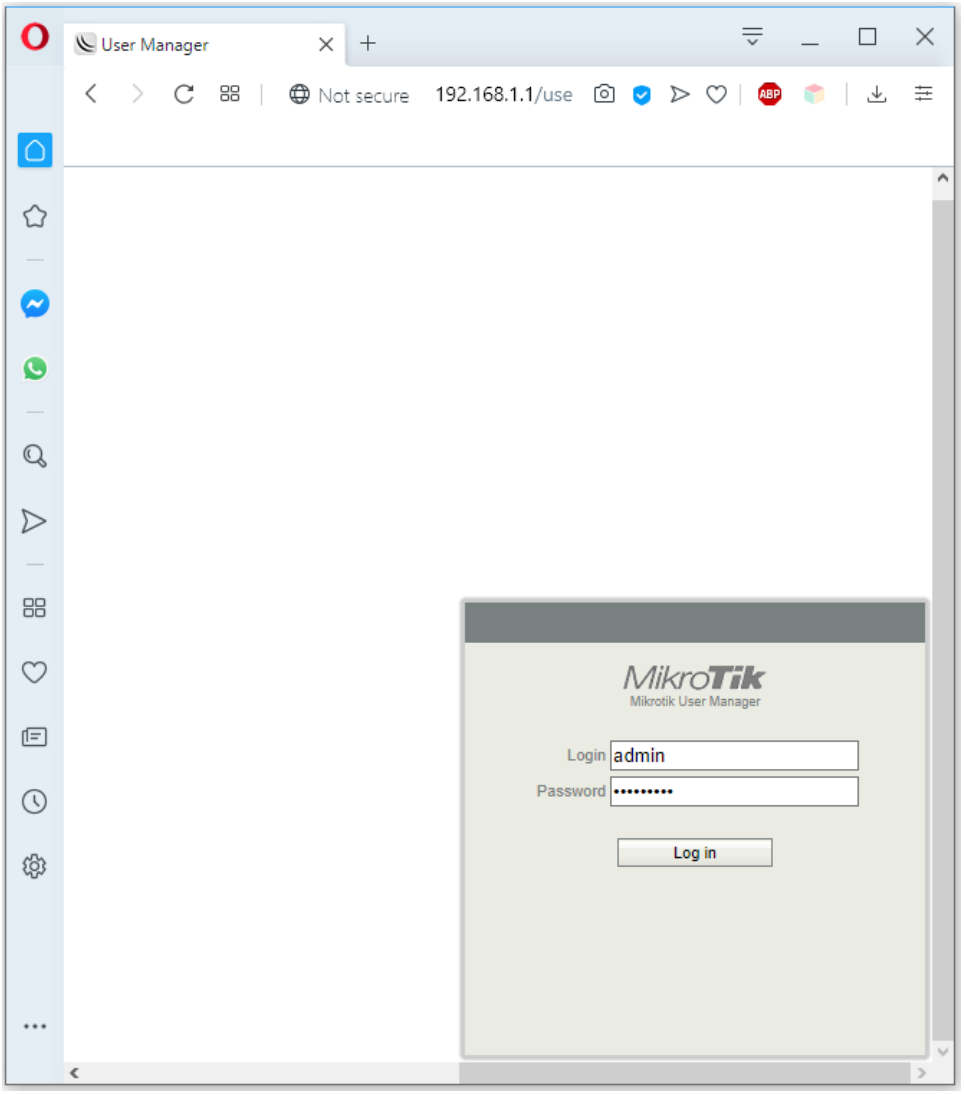
```
[admin@MikroTik] > /tool user-manager customer print
Flags: X - disabled
 0   login="admin" password="mobile24h"
     access=own-routers,own-users,own-profiles,own-limits,config-payment-gw
     backup-allowed=yes time-zone=-00:00 permissions=owner signup-allowed=no
     paypal-allowed=no paypal-secure-response=no paypal-accept-pending=no
[admin@MikroTik] >
```

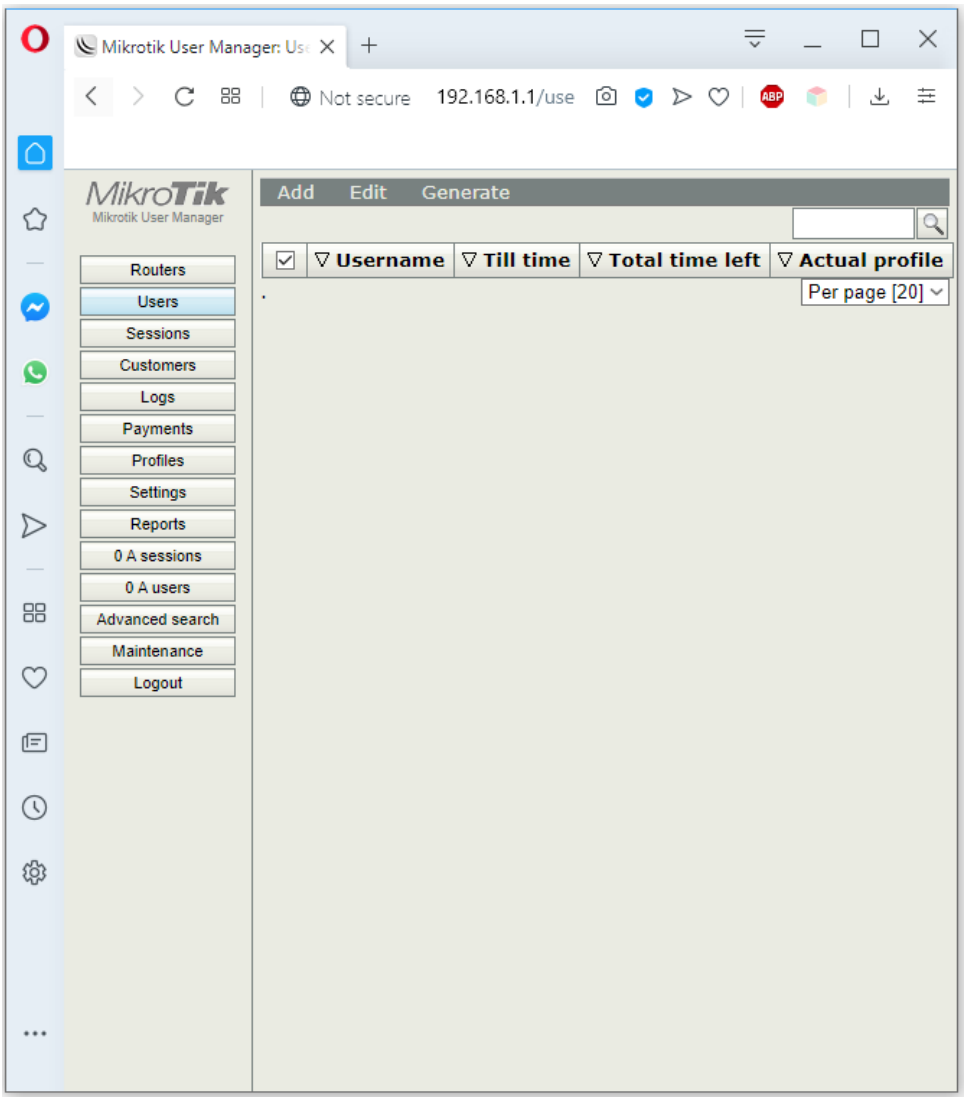
Mật khẩu user-manager không ảnh hưởng tới tiến trình đăng nhập vào Router MikroTik bằng phần mềm Winbox.



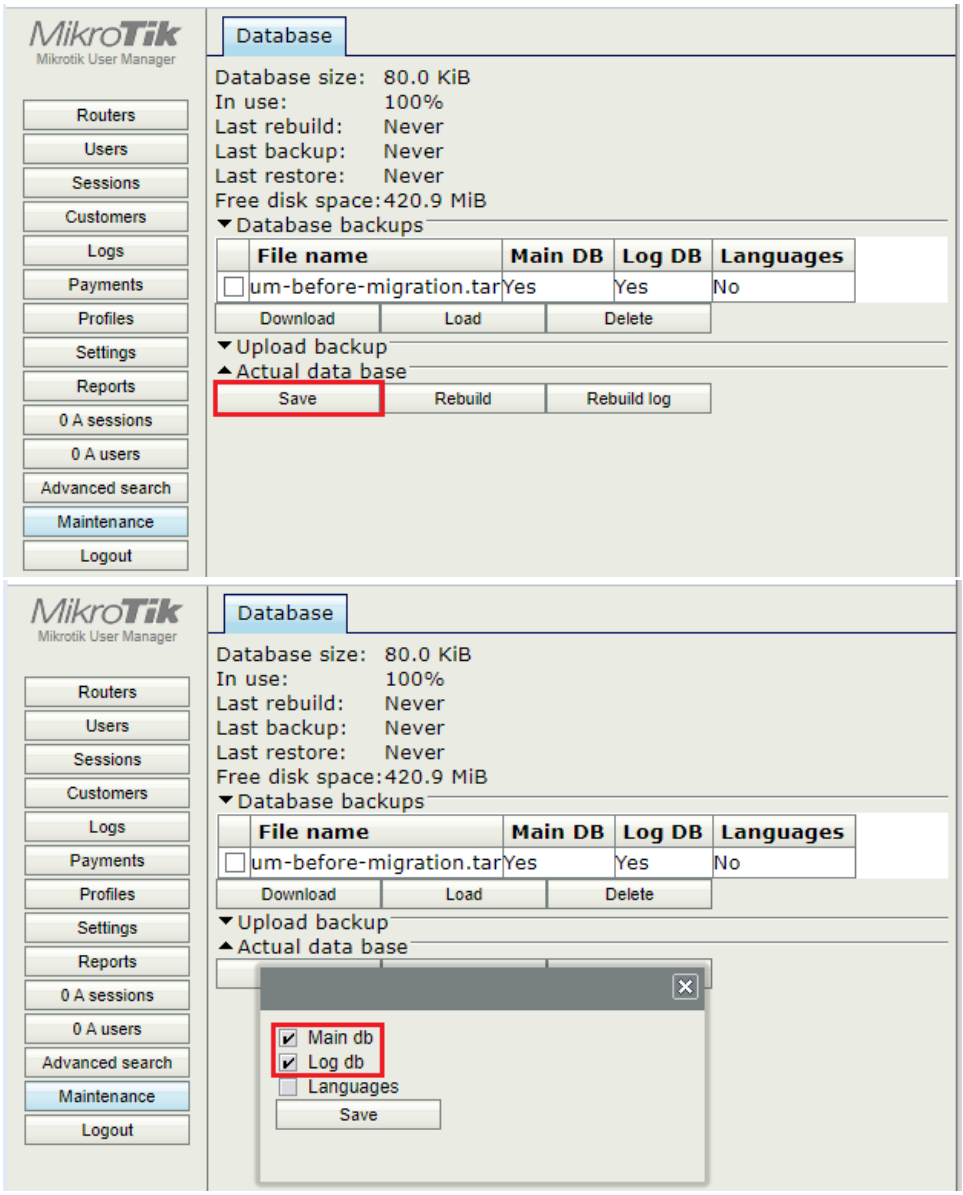
Nếu đăng nhập vào RADIUS Server bằng tài khoản admin mà không có mật mã vừa thiết lập thì sẽ không đăng nhập được.


Mikrotik User Manager: Us
Not secure
192.168.1.1/use
MikroTik
Mikrotik User Manager
Login
admin
Password
Log in
invalid user name or password

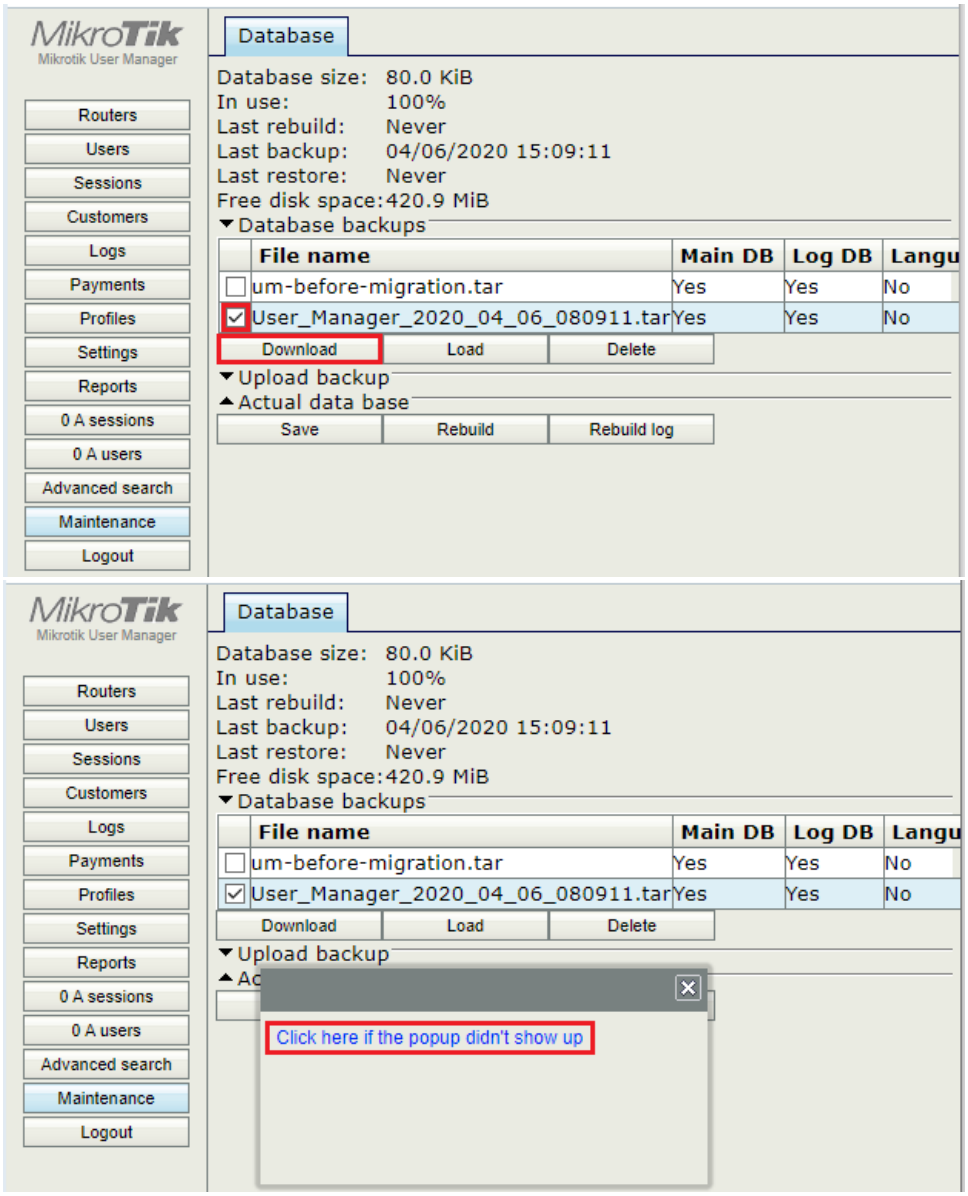

User Manager
Not secure
192.168.1.1/use
MikroTik
Mikrotik User Manager
Login
admin
Password
Log in

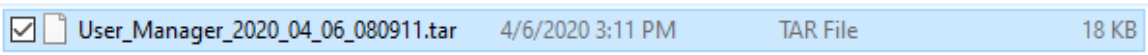


Bước 8. Backup Database RADIUS Server trên Router MikroTik và copy về máy tính của người quản trị.


MikroTik
Mikrotik User Manager
Routers
Users
Sessions
Customers
Logs
Payments
Profiles
Settings
Reports
0 A sessions
0 A users
Advanced search
Maintenance
Logout
Database
Database size: 80.0 KiB
In use: 100%
Last rebuild: Never
Last backup: Never
Last restore: Never
Free disk space: 420.9 MiB
Database backups
File name
Main DB
Log DB
Languages
um-before-migration.tar
Yes
Yes
No
Download
Load
Delete
Upload backup
Actual data base
Save
Rebuild
Rebuild log

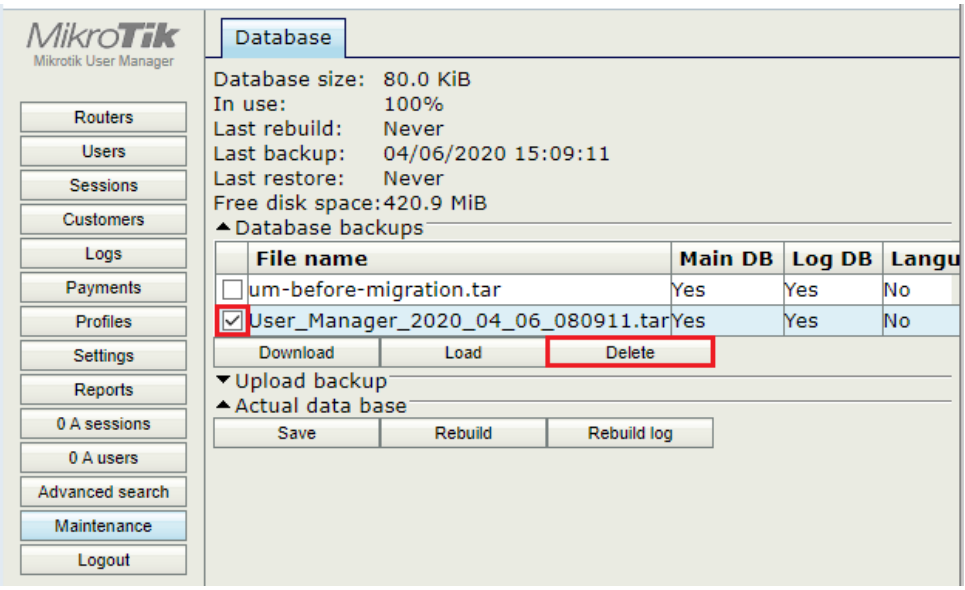
MikroTik
Mikrotik User Manager
Routers
Users
Sessions
Customers
Logs
Payments
Profiles
Settings
Reports
0 A sessions
0 A users
Advanced search
Maintenance
Logout
Database
Database size: 80.0 KiB
In use: 100%
Last rebuild: Never
Last backup: Never
Last restore: Never
Free disk space: 420.9 MiB
Database backups
File name
Main DB
Log DB
Languages
um-before-migration.tar
Yes
Yes
No
Download
Load
Delete
Upload backup
Actual data base
Main db
Log db
Languages
Save



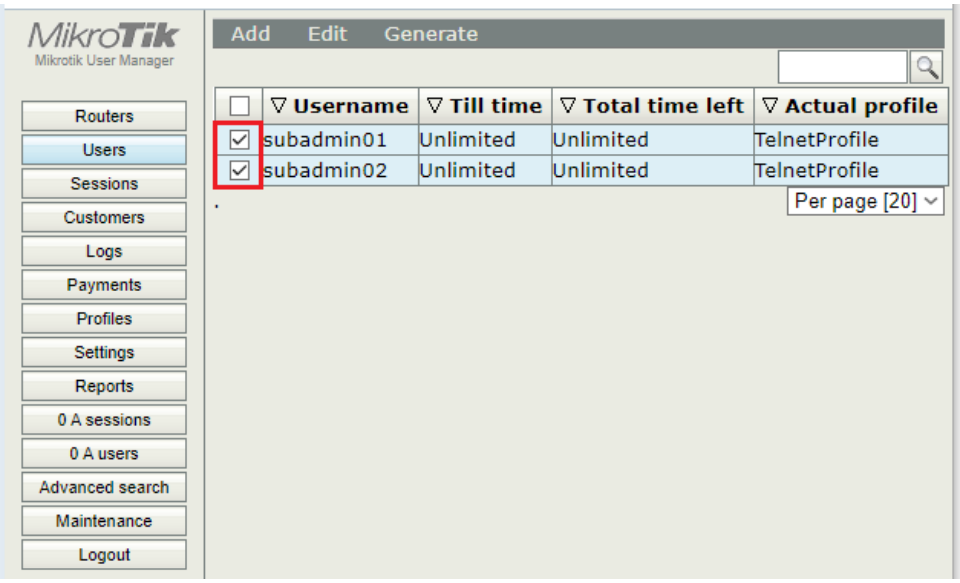


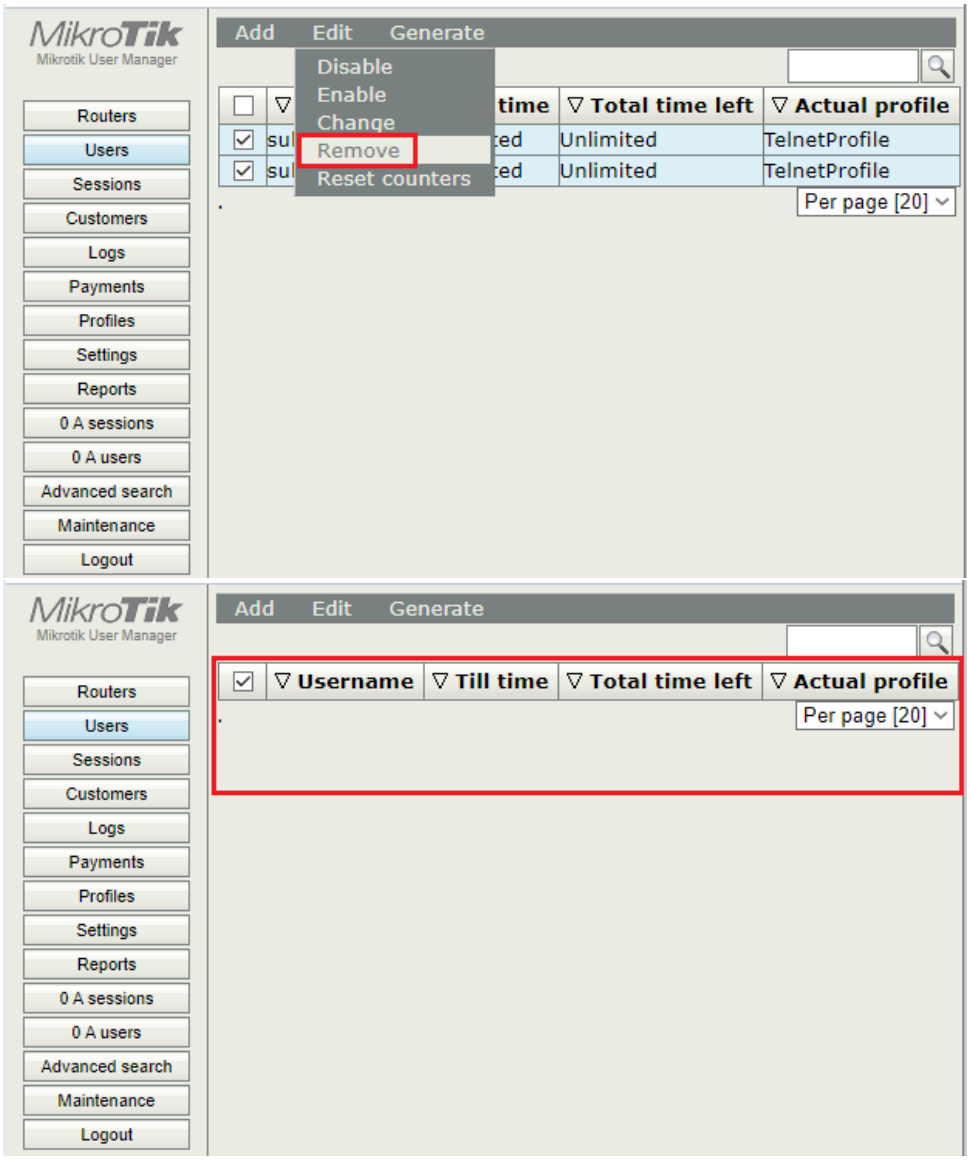
Bước 9. Upload Database của RADIUS Server từ máy tính của người quản trị và Restore lại Database của RADIUS Server trên Router MikroTik.

Xóa thử Backup Database của RADIUS Server trước khi Upload lại File này từ máy tính của người quản trị admin lên Router MikroTik.

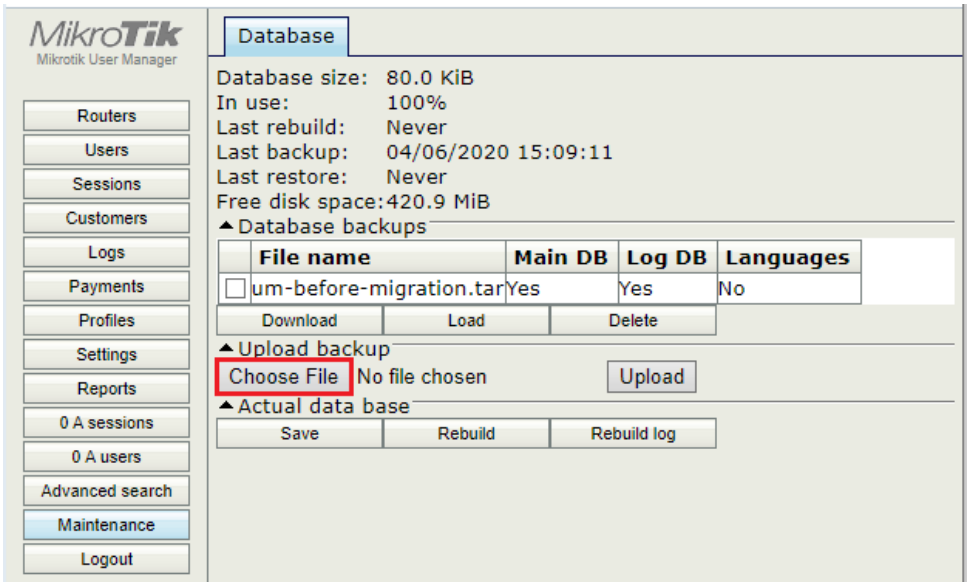


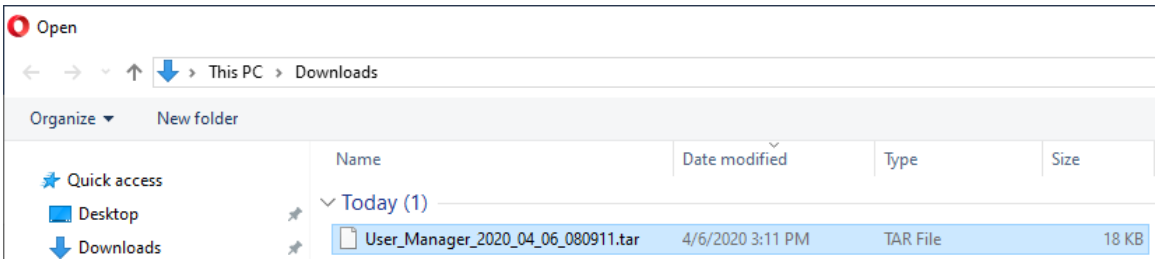
- Xóa các tài khoản user trên RADIUS Server.

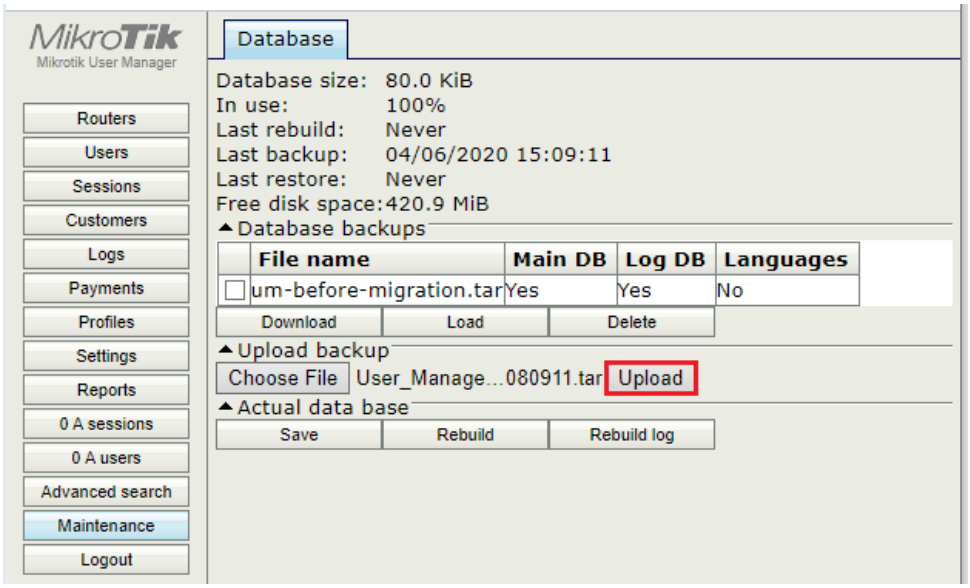


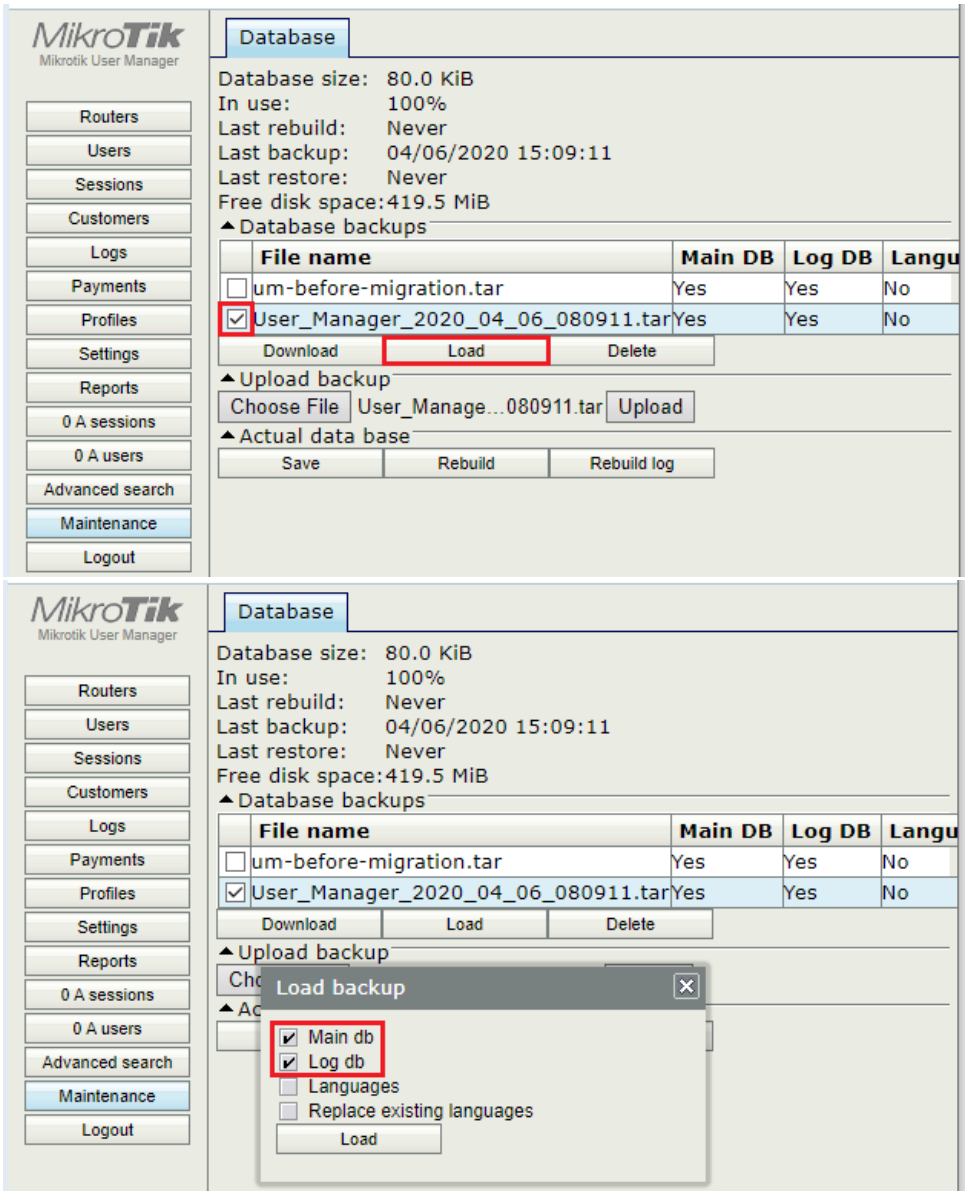


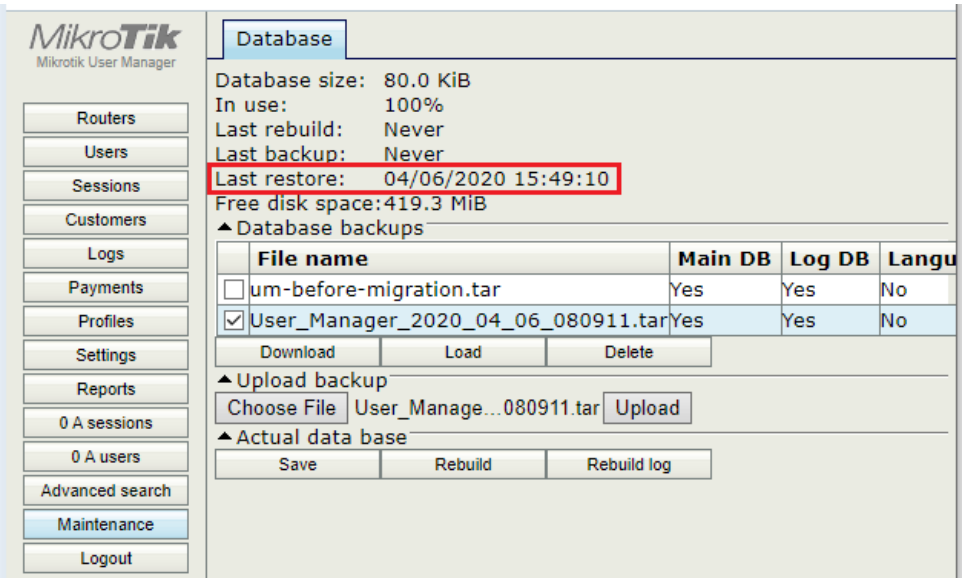
Tiến hành Upload Database của RADIUS Server từ máy tính của người quản trị admin lên Router MikroTik.


MikroTik
Mikrotik User Manager
Routers
Users
Sessions
Customers
Logs
Payments
Profiles
Settings
Reports
0 A sessions
0 A users
Advanced search
Maintenance
Logout
Database
Database size: 80.0 KiB
In use: 100%
Last rebuild: Never
Last backup: 04/06/2020 15:09:11
Last restore: Never
Free disk space: 420.9 MiB
Database backups
File name
Main DB
Log DB
Languages
um-before-migration.tar
Yes
Yes
No
Download
Load
Delete
Upload backup
Choose File
No file chosen
Upload
Actual data base
Save
Rebuild
Rebuild log

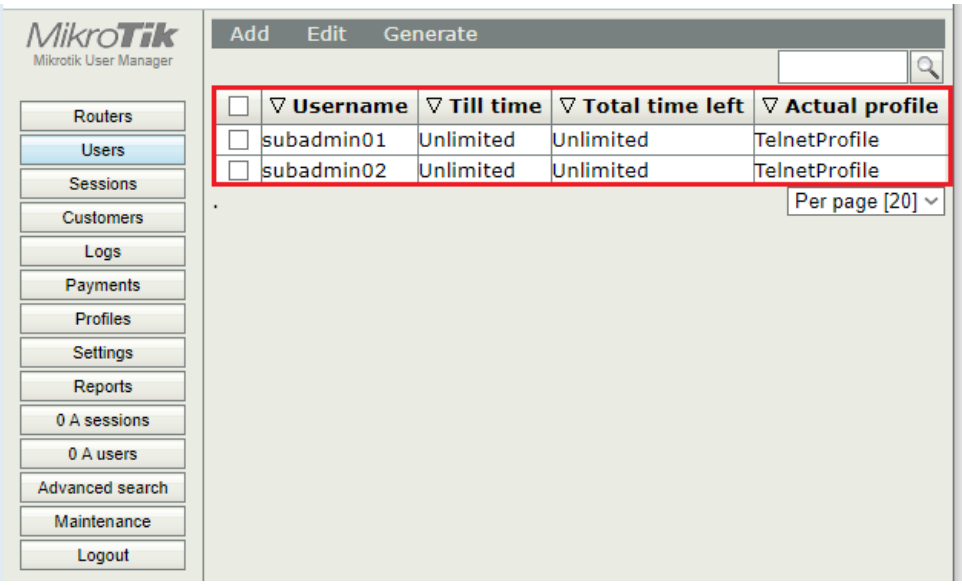

Open
This PC
Downloads
Organize
New folder
Quick access
Desktop
Downloads
Name
Date modified
Type
Size
Today (1)
User_Manager_2020_04_06_080911.tar
4/6/2020 3:11 PM
TAR File
18 KB


MikroTik
Mikrotik User Manager
Routers
Users
Sessions
Customers
Logs
Payments
Profiles
Settings
Reports
0 A sessions
0 A users
Advanced search
Maintenance
Logout
Database
Database size: 80.0 KiB
In use: 100%
Last rebuild: Never
Last backup: 04/06/2020 15:09:11
Last restore: Never
Free disk space: 420.9 MiB
Database backups
File name
Main DB
Log DB
Languages
um-before-migration.tar
Yes
Yes
No
Download
Load
Delete
Upload backup
Choose File
User_Manage...080911.tar
Upload
Actual data base
Save
Rebuild
Rebuild log


MikroTik
Mikrotik User Manager
Routers
Users
Sessions
Customers
Logs
Payments
Profiles
Settings
Reports
0 A sessions
0 A users
Advanced search
Maintenance
Logout
Database
Database size: 80.0 KiB
In use: 100%
Last rebuild: Never
Last backup: 04/06/2020 15:09:11
Last restore: Never
Free disk space: 419.5 MiB
Database backups
File name
Main DB
Log DB
Langu
um-before-migration.tar
Yes
Yes
No
User_Manager_2020_04_06_080911.tar
Yes
Yes
No
Download
Load
Delete
Upload backup
Choose File
User_Manage...080911.tar
Upload
Actual data base
Save
Rebuild
Rebuild log
MikroTik
Mikrotik User Manager
Routers
Users
Sessions
Customers
Logs
Payments
Profiles
Settings
Reports
0 A sessions
0 A users
Advanced search
Maintenance
Logout
Database
Database size: 80.0 KiB
In use: 100%
Last rebuild: Never
Last backup: 04/06/2020 15:09:11
Last restore: Never
Free disk space: 419.5 MiB
Database backups
File name
Main DB
Log DB
Langu
um-before-migration.tar
Yes
Yes
No
User_Manager_2020_04_06_080911.tar
Yes
Yes
No
Download
Load
Delete
Upload backup
Load backup
Main db
Log db
Languages
Replace existing languages
Load

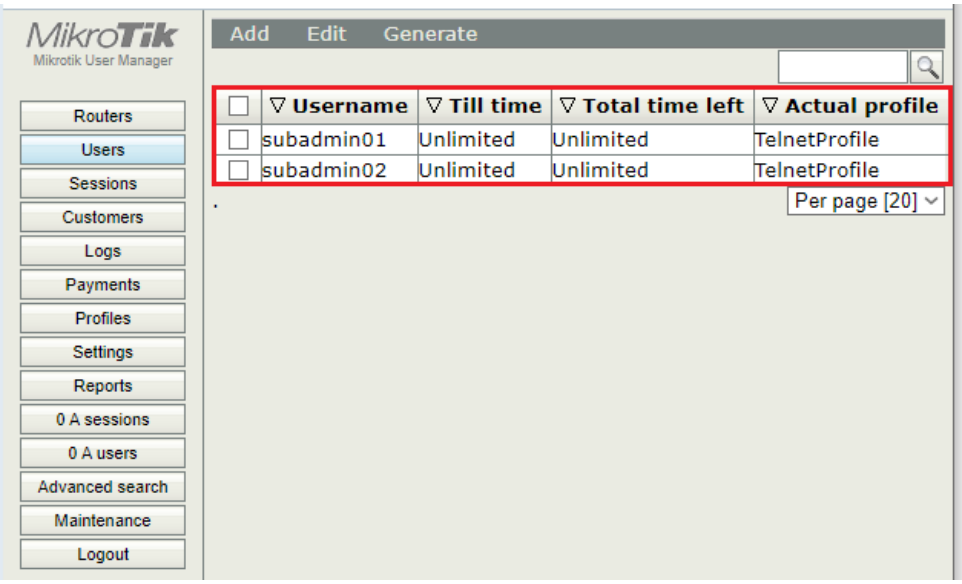


Thông tin các tài khoản đã được khôi phục lại như cũ.



Bước 10. Reset User Manager Database trở về mặc định Default.

Thông tin các tài khoản trên RADIUS Server trước khi Reset User Manager Database trở về mặc định Default.



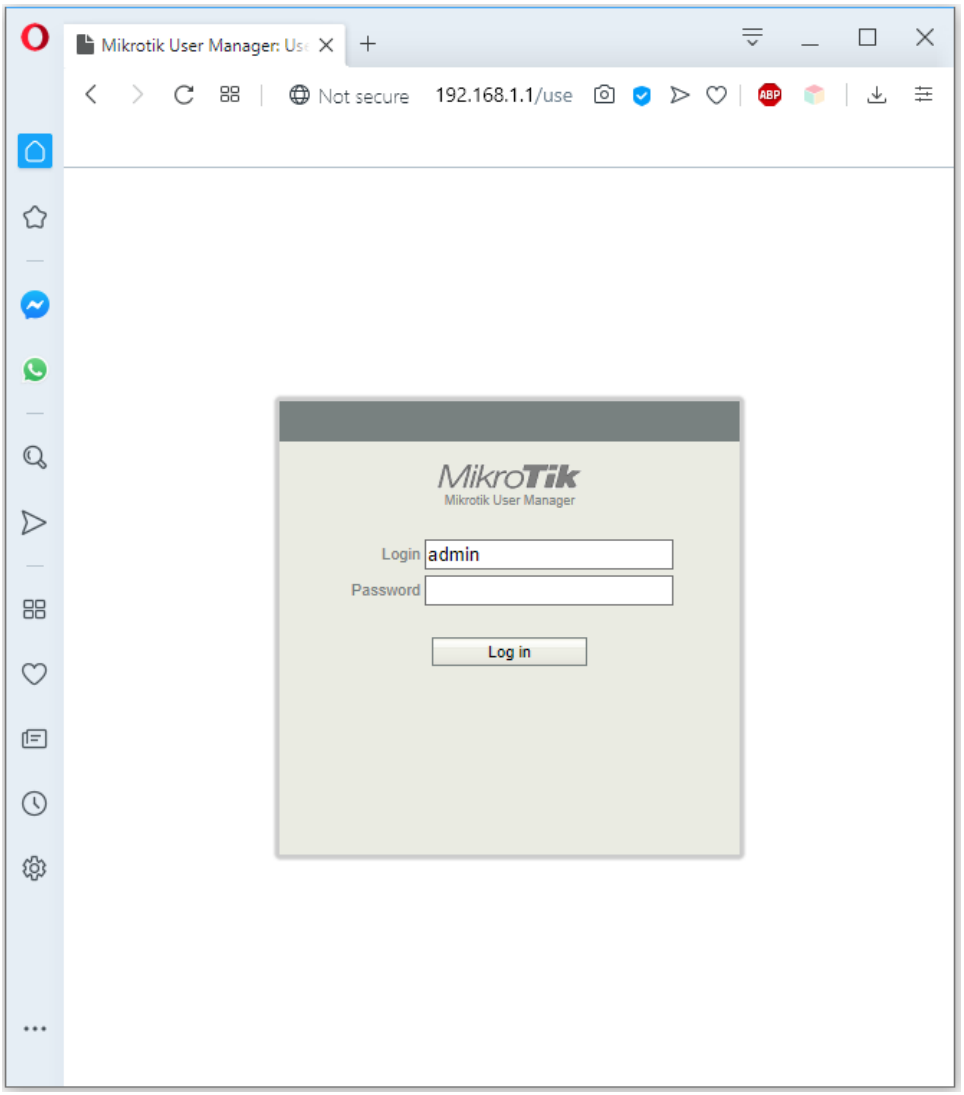

```
[admin@MikroTik] >
/tool user-manager customer set admin password=mobile24h
```

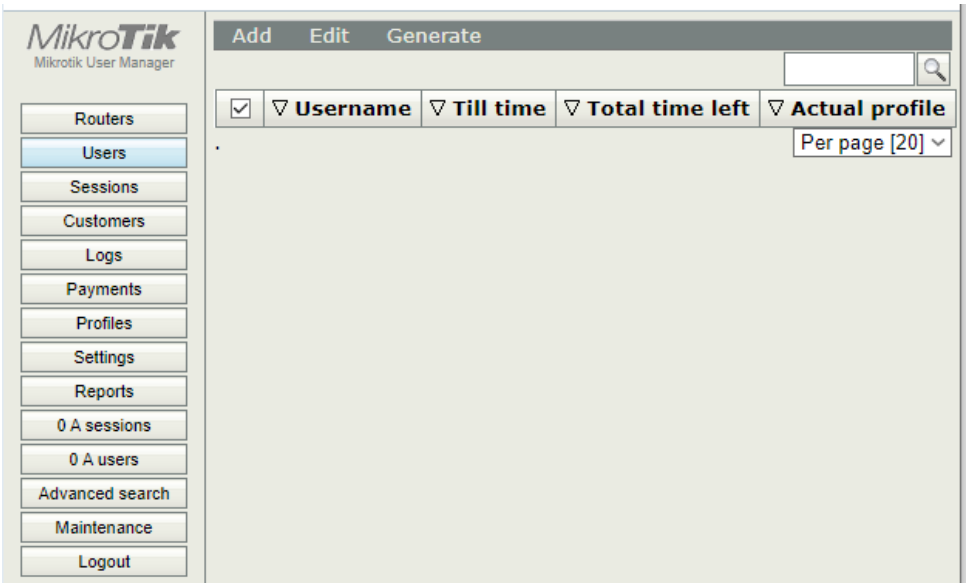
Tiến hành Reset User Manager Database trên Router MikroTik.

```
[admin@MikroTik] > /tool user-manager database clear
Dangerous! Reset whole user-manager database (except logs)? [y/N]:
y
Resetting user-manager database
user-manager database cleared
[admin@MikroTik] >
```

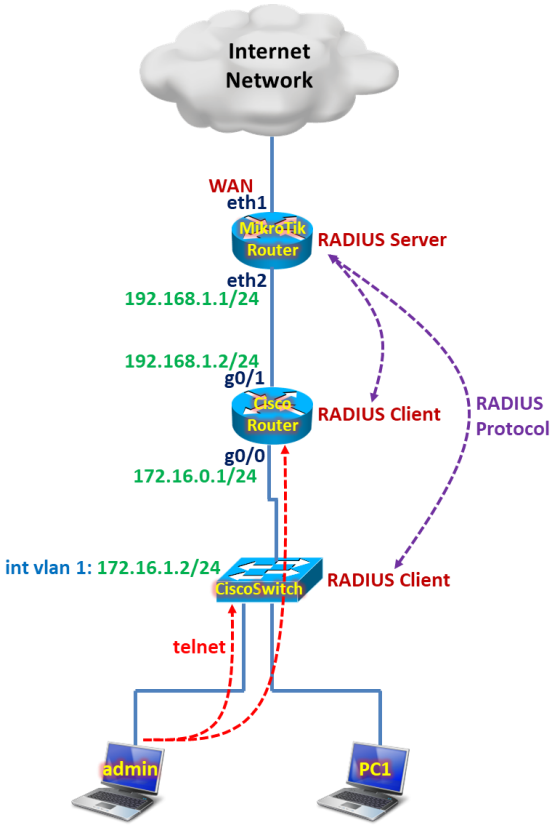
```
[admin@MikroTik] > /tool user-manager database clear-log
Dangerous! Reset user-manager log database? [y/N]:
y
Resetting user-manager log database
user-manager log database cleared
[admin@MikroTik] >
```

Thông tin mật mã password đã thiết lập cho user quản trị RADIUS Server không còn hiệu lực, các tài khoản người dùng trong User Manager Database cũng không còn nữa.


Mikrotik User Manager: Us
Not secure
192.168.1.1/use
MikroTik
Mikrotik User Manager
Login
admin
Password
Log in


MikroTik
Mikrotik User Manager
Routers
Users
Sessions
Customers
Logs
Payments
Profiles
Settings
Reports
0 A sessions
0 A users
Advanced search
Maintenance
Logout
Add
Edit
Generate
Username
Till time
Total time left
Actual profile
Per page [20]

Phần 19.2. Cấu hình RADIUS Server với vai trò xác thực tập trung các thiết bị mạng Cisco Device trên Router MikroTik.



Tổng quan các bước thực hiện:

- Bước 1. Cấu hình cơ bản trên Router MikroTik.
- Bước 2. Cấu hình trên Cisco Router.
- Bước 3. Cấu hình trên Cisco Switch.
- Bước 4. Thiết lập RADIUS Server trên Router MikroTik.
    - Bước 4.1. Truy cập vào giao diện RADIUS Server trên Router MikroTik.
    - Bước 4.2. Khởi tạo Telnet Profile trên RADIUS Server.
    - Bước 4.3. Khởi tạo các tài khoản quản trị thiết bị mạng trên RADIUS Server.
    - Bước 4.4. Khai báo thông tin của RADIUS Client trên RADIUS Server.
- Bước 5. Khảo sát quá trình Telnet tới thiết bị mạng xác thực bằng giao thức RADIUS.

Các bước thực hiện chi tiết:

Bước 1. Cấu hình cơ bản trên Router MikroTik.

Cấu hình cơ bản trên Router MikroTik.

```
[admin@MikroTik]>
/ip address add address=192.168.1.1/24 interface=ether2
/ip dhcp-client add interface=ether1 disabled=no add-default-route=yes
```

```
/ip firewall nat add chain=srcnat action=masquerade out-interface=ether1
/ip route add dst-address=172.16.0.0/24 gateway=192.168.1.2
```

Bước 2. Cấu hình trên Cisco Router.

```
hostname CiscoRT

interface g0/0
 ip address 172.16.0.1 255.255.255.0
 no shutdown
 exit
interface g0/1
 ip address 192.168.1.2 255.255.255.0
 no shutdown
 exit
ip route 0.0.0.0 0.0.0.0 192.168.1.1
aaa new-model
aaa authentication login CISCO group radius local
radius-server host 192.168.1.1 auth-port 1812
radius-server key mobile24h

username cisco privilege 15 password cisco

enable password cisco

line vty 0 4
 login authentication CISCO
 transport input telnet
 exit
```

Bước 3. Cấu hình trên Cisco Switch.

Cấu hình trên Cisco Switch.

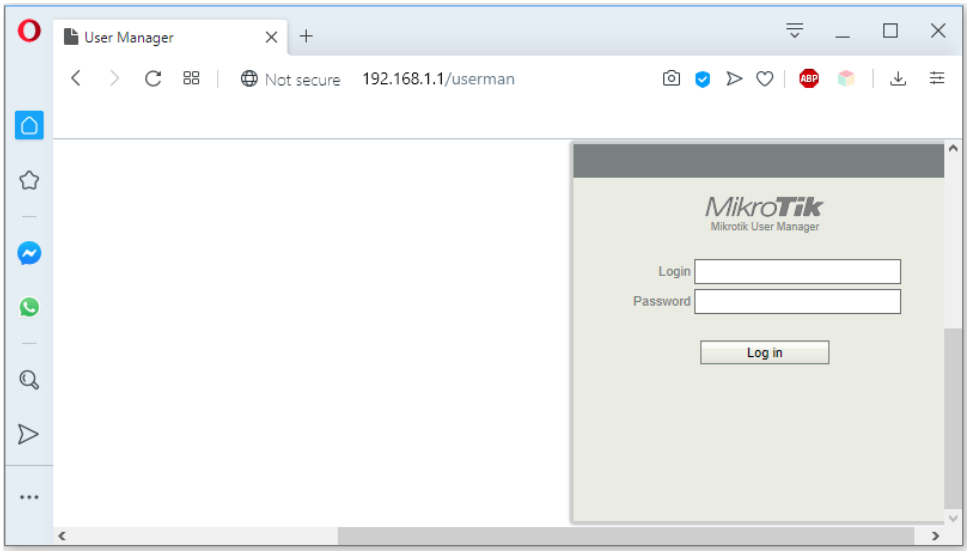
```
hostname CiscoSw

interface vlan 1
 ip address 172.16.0.2 255.255.255.0
 no shutdown
 exit
ip default-gateway 172.16.0.1

aaa new-model
aaa authentication login CISCO group radius local
radius-server host 192.168.1.1 auth-port 1812 acct-port 1646
radius-server key mobile24h

username cisco privilege 15 password cisco
enable password cisco
```

```
line vty 0 4
 login authentication CISCO
 transport input telnet
 exit
```

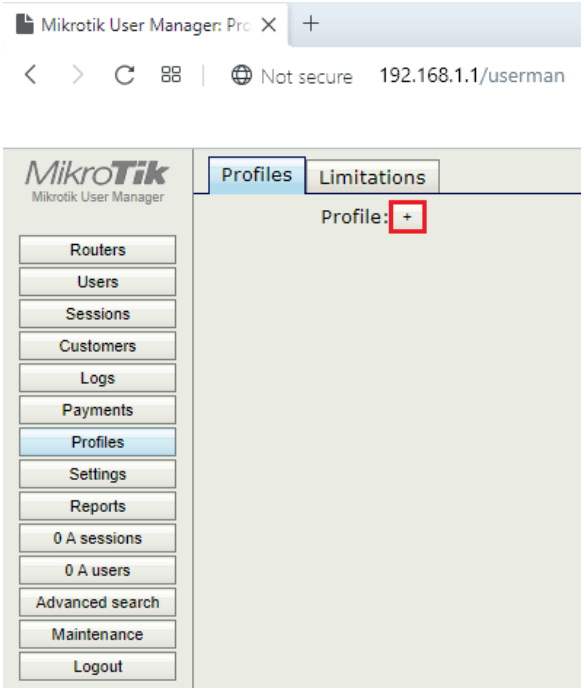
Bước 4. Thiết lập RADIUS Server trên Router MikroTik.

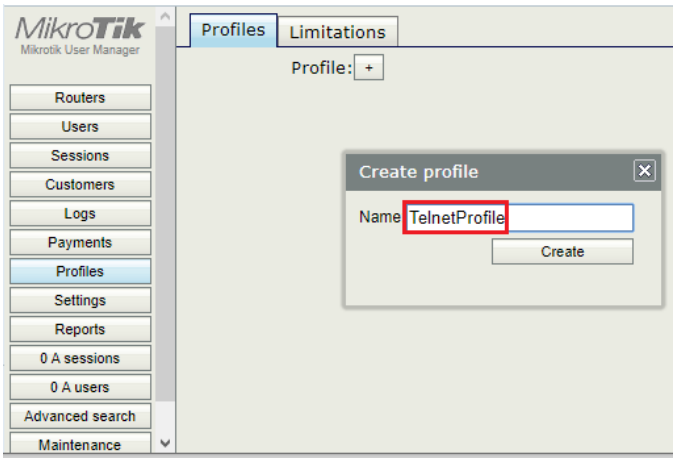
Bước 4.1. Truy cập vào giao diện RADIUS Server trên Router MikroTik.

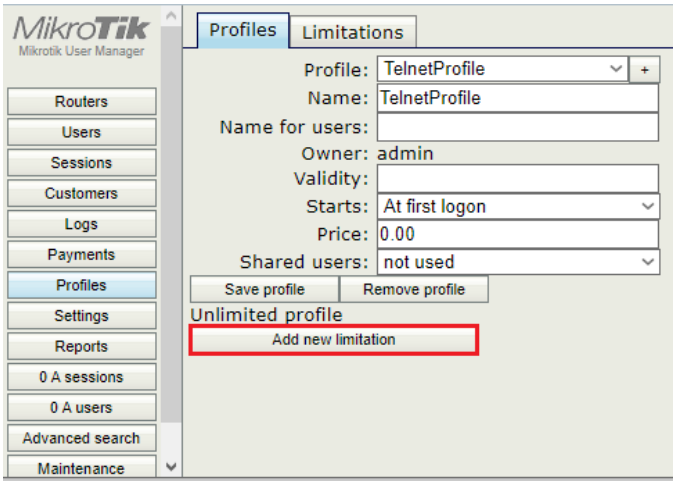
- Link: 192.168.1.1/userman



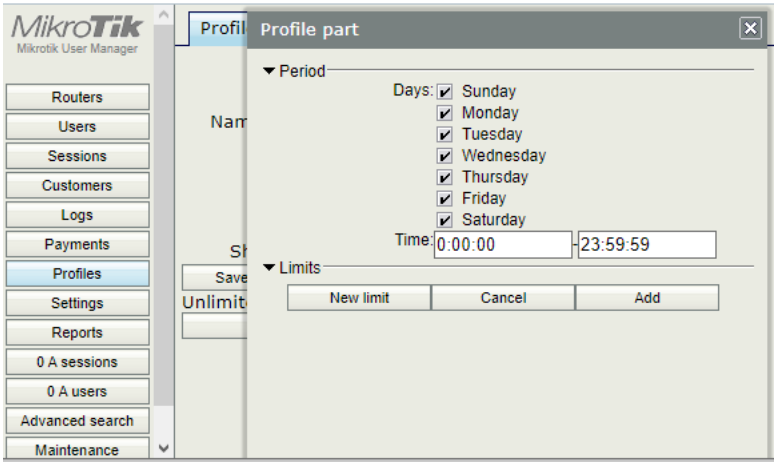
Bước 4.2. Khởi tạo Telnet Profile trên RADIUS Server.



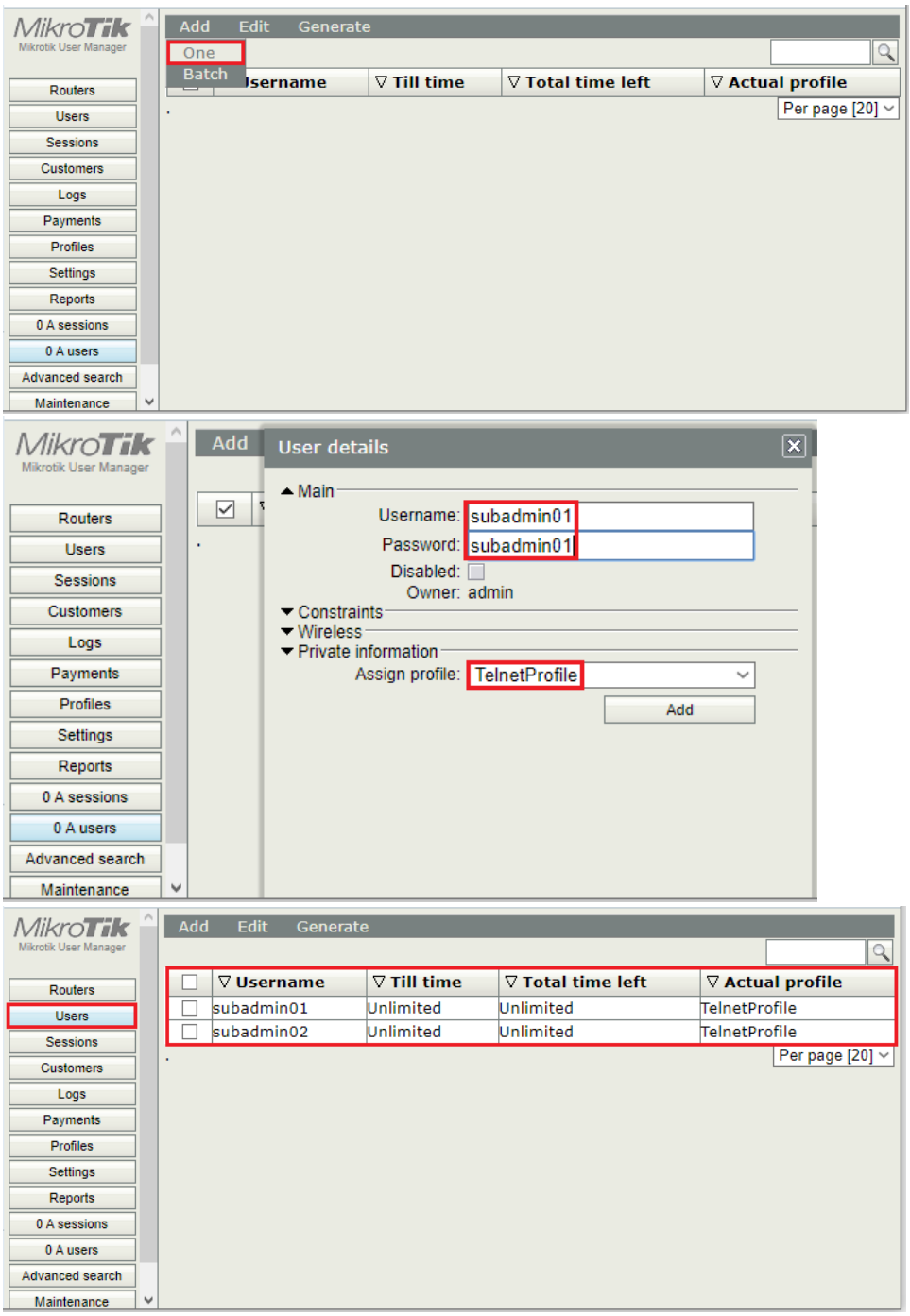




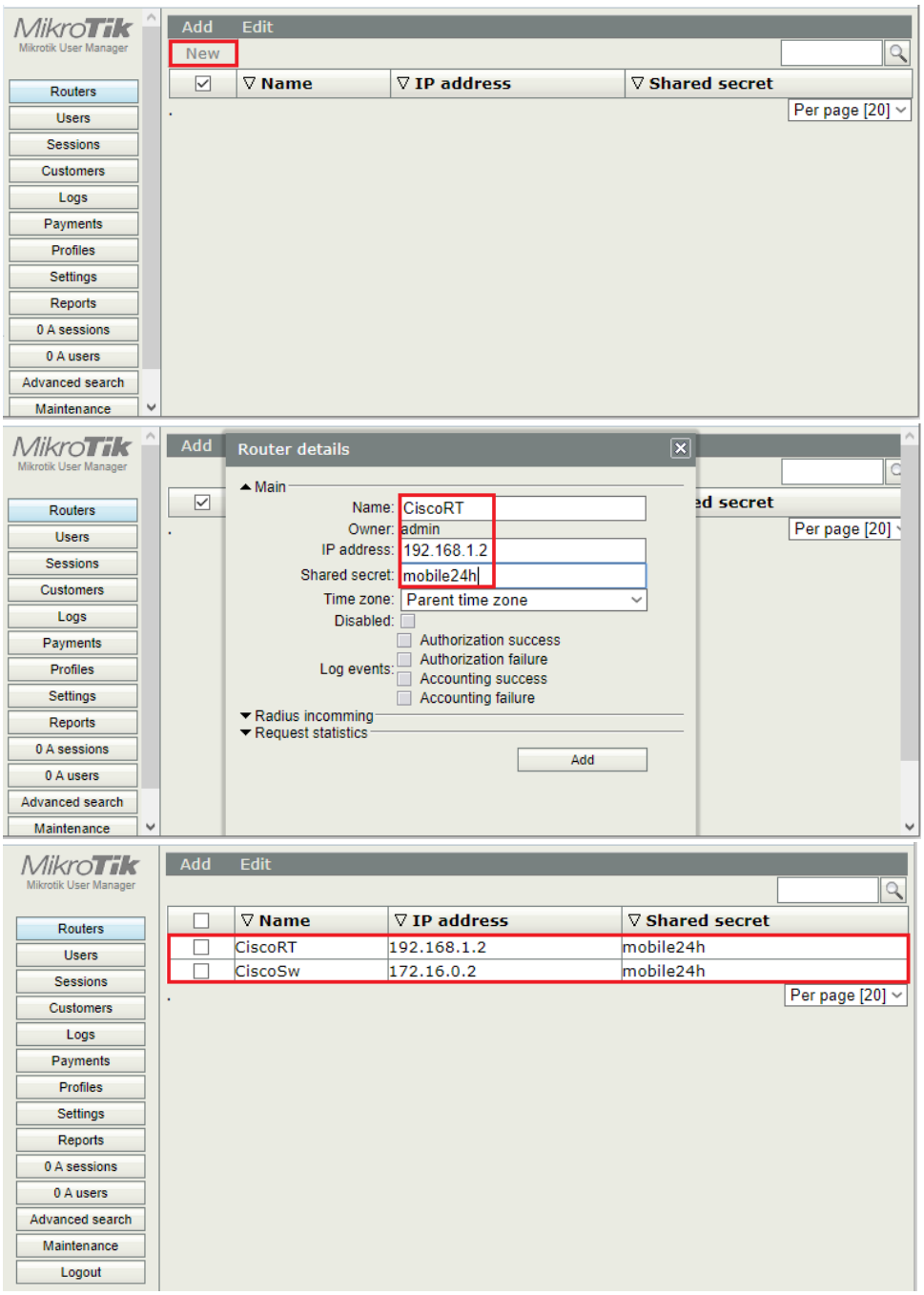
- Profile cho phép định nghĩa khoảng thời gian được phép Telnet tới các thiết bị mạng (tính năng này hiện chưa hoạt động được).



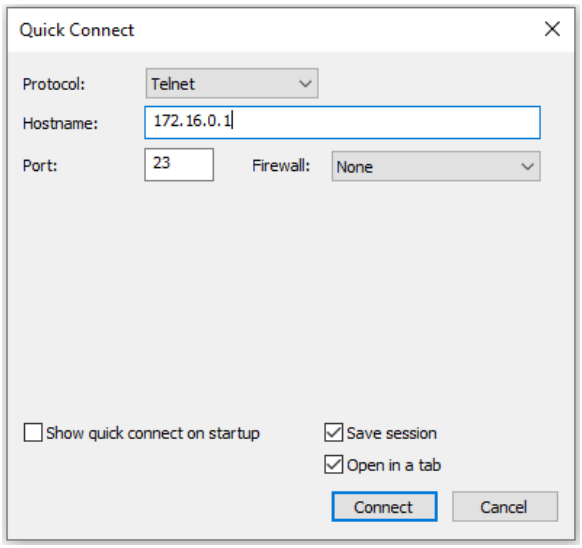
Bước 4.3. Khởi tạo các tài khoản quản trị thiết bị mạng trên RADIUS Server.



Bước 4.4. Khai báo thông tin của RADIUS Client trên RADIUS Server.



Bước 5. Khảo sát quá trình Telnet tới thiết bị mạng xác thực bằng giao thức RADIUS.
Từ máy tính của người quản trị admin, ta telnet tới Cisco Router.




```
CiscoRT# debug radius authentication
Radius protocol debugging is on
Radius protocol brief debugging is off
Radius protocol verbose debugging is off
Radius packet hex dump debugging is off
Radius packet protocol (authentication) debugging is on
Radius packet protocol (accounting) debugging is off
Radius elog debugging debugging is off
Radius packet retransmission debugging is off
Radius server fail-over debugging is off
Radius elog debugging debugging is off
CiscoRT#
```

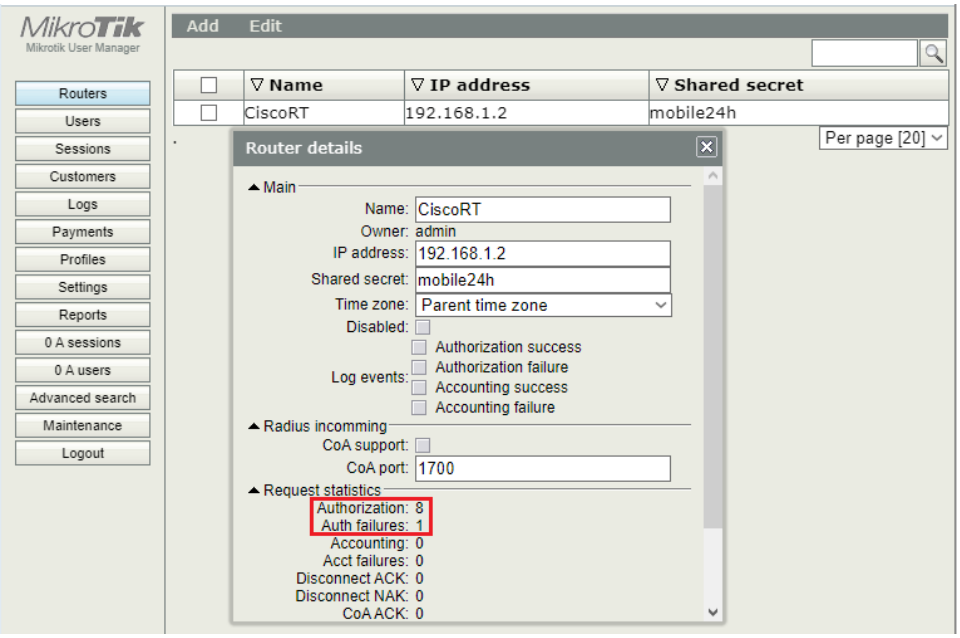
```
CiscoRT#
*Mar 26 10:50:28.503: RADIUS/ENCODE(0000000F): ask "Username: "
*Mar 26 10:50:28.503: RADIUS/ENCODE(0000000F): send packet; GET_USER
CiscoRT#
```

```
CiscoRT#
*Mar 26 10:51:38.995: RADIUS/ENCODE(00000010): ask "Password: "
```

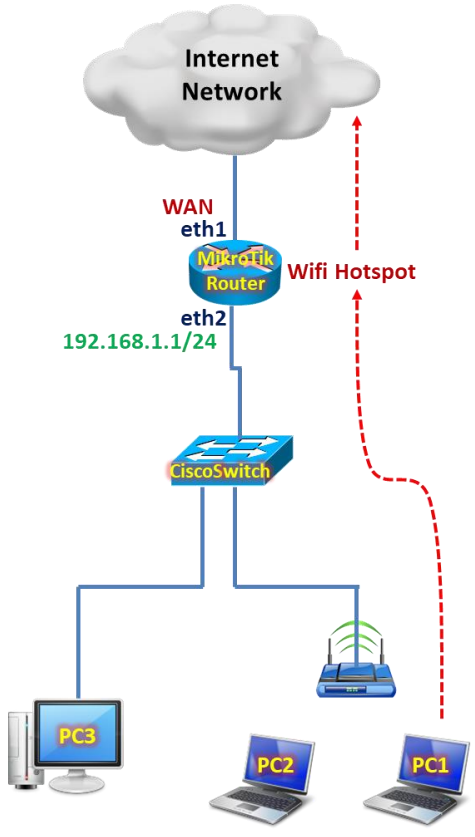
```
*Mar 26 10:51:38.995: RADIUS/ENCODE(00000010): send packet; GET_PASSWORD
CiscoRT#
```

```
CiscoRT#
*Mar 26 10:52:48.531: RADIUS/ENCODE(00000011):Orig. component type = Exec
*Mar 26 10:52:48.531: RADIUS:  AAA Unsupported Attr: interface         [209] 6
*Mar 26 10:52:48.531: RADIUS:   74 74 79 35              [ tty5]
*Mar 26 10:52:48.531: RADIUS/ENCODE(00000011): dropping service type, "radius-server
attribute 6 on-for-login-auth" is off
*Mar 26 10:52:48.535: RADIUS(00000011): Config NAS IP: 0.0.0.0
*Mar 26 10:52:48.535: RADIUS/ENCODE(00000011): acct_session_id: 5
*Mar 26 10:52:48.535: RADIUS(00000011): sending
*Mar 26 10:52:48.535: RADIUS/ENCODE: Best Local IP-Address 192.168.1.2 for Radius-
Server 192.168.1.1
*Mar 26 10:52:48.535: RADIUS(00000011): Send Access-Request to 192.168.1.1:1812 id
1645/3, len 76
*Mar 26 10:52:48.535: RADIUS:  authenticator 4C CB 25 93 A3 CF 43 86 - 42 8E DF 87 AB
57 AB 8B
*Mar 26 10:52:48.535: RADIUS:  User-Name           [1]   12  "subadmin01"
*Mar 26 10:52:48.535: RADIUS:  User-Password       [2]   18  *
*Mar 26 10:52:48.535: RADIUS:  NAS-Port            [5]   6   514
*Mar 26 10:52:48.535: RADIUS:  NAS-Port-Id         [87]  8   "tty514"
*Mar 26 10:52:48.535: RADIUS:  NAS-Port-Type       [61]  6   Virtual
[5]
*Mar 26 10:52:48.535: RADIUS:  NAS-IP-Address      [4]   6   192.168.1.2
*Mar 26 10:52:48.535: RADIUS(00000011): Started 5 sec timeout
*Mar 26 10:52:48.539: RADIUS: Received from id 1645/3 192.168.1.1:1812, Access-Accept,
len 26
*Mar 26 10:52:48.539: RADIUS:  authenticator 02 FE EA 5D 0F 31 7C 58 - 50 33 0D 53 A0
4F D9 6E
*Mar 26 10:52:48.539: RADIUS:  Acct-Interim-Interva[85]  6   60
*Mar 26 10:52:48.539: RADIUS(00000011): Received from id 1645/3
CiscoRT#
```

Quan sát thông tin thống kê số lần Telnet tới thiết bị mạng trên RADIUS Server.



Phần 19.3. Khởi tạo cùng lúc nhiều tài khoản End User và mã Vouchers cho dịch vụ Hotspot trên RADIUS Server cài đặt trên Router MikroTik.



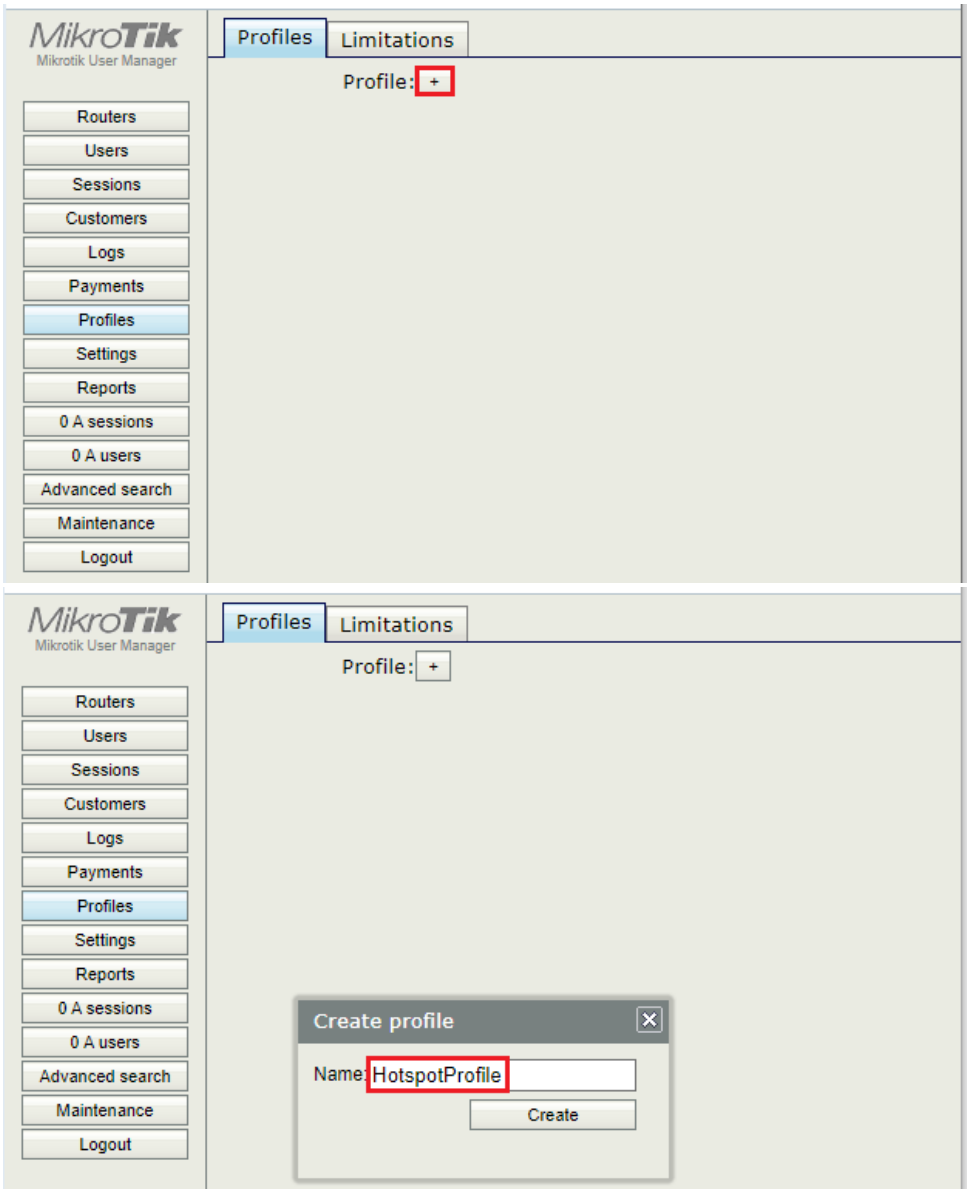
Tổng quan các bước thực hiện:

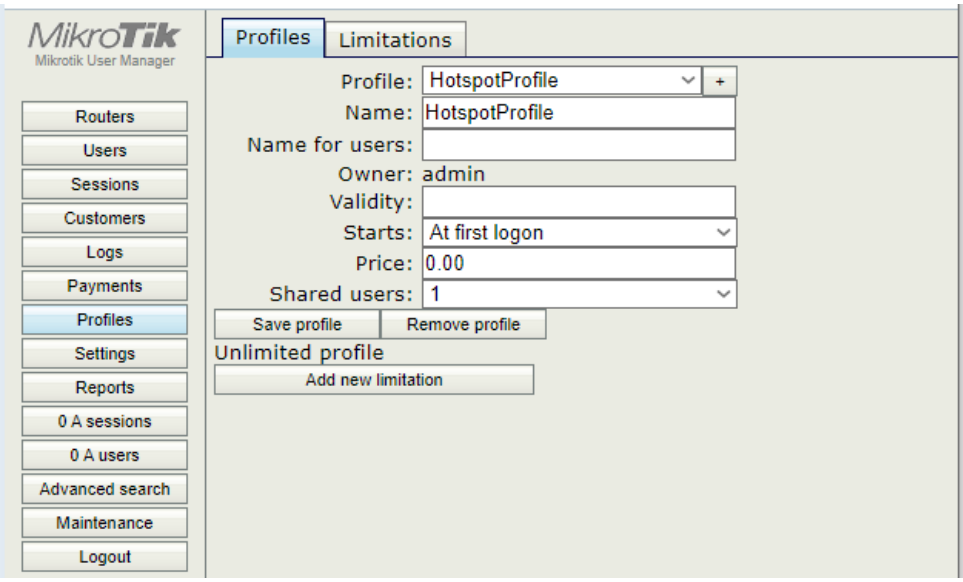
- **Bước 1.** Thiết lập cùng lúc nhiều tài khoản End User trên RADIUS Server.
- **Bước 2.** Xuất danh sách các tài khoản End User dưới dạng File Excel CSV.
- **Bước 3.** Xuất danh sách các tài khoản End User dưới dạng mã Vouchers.

Các bước thực hiện chi tiết:

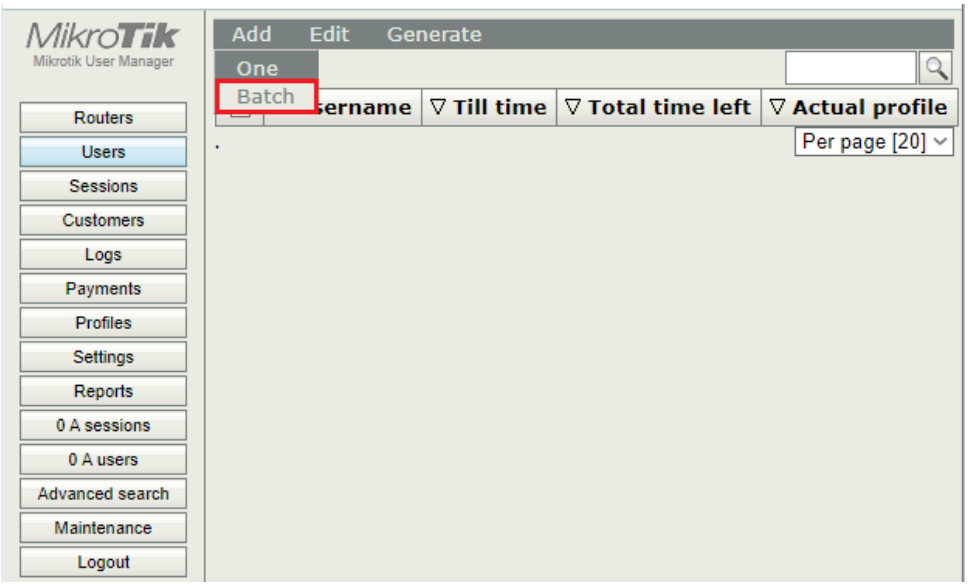
Bước 1. Thiết lập cùng lúc nhiều tài khoản End User trên RADIUS Server.

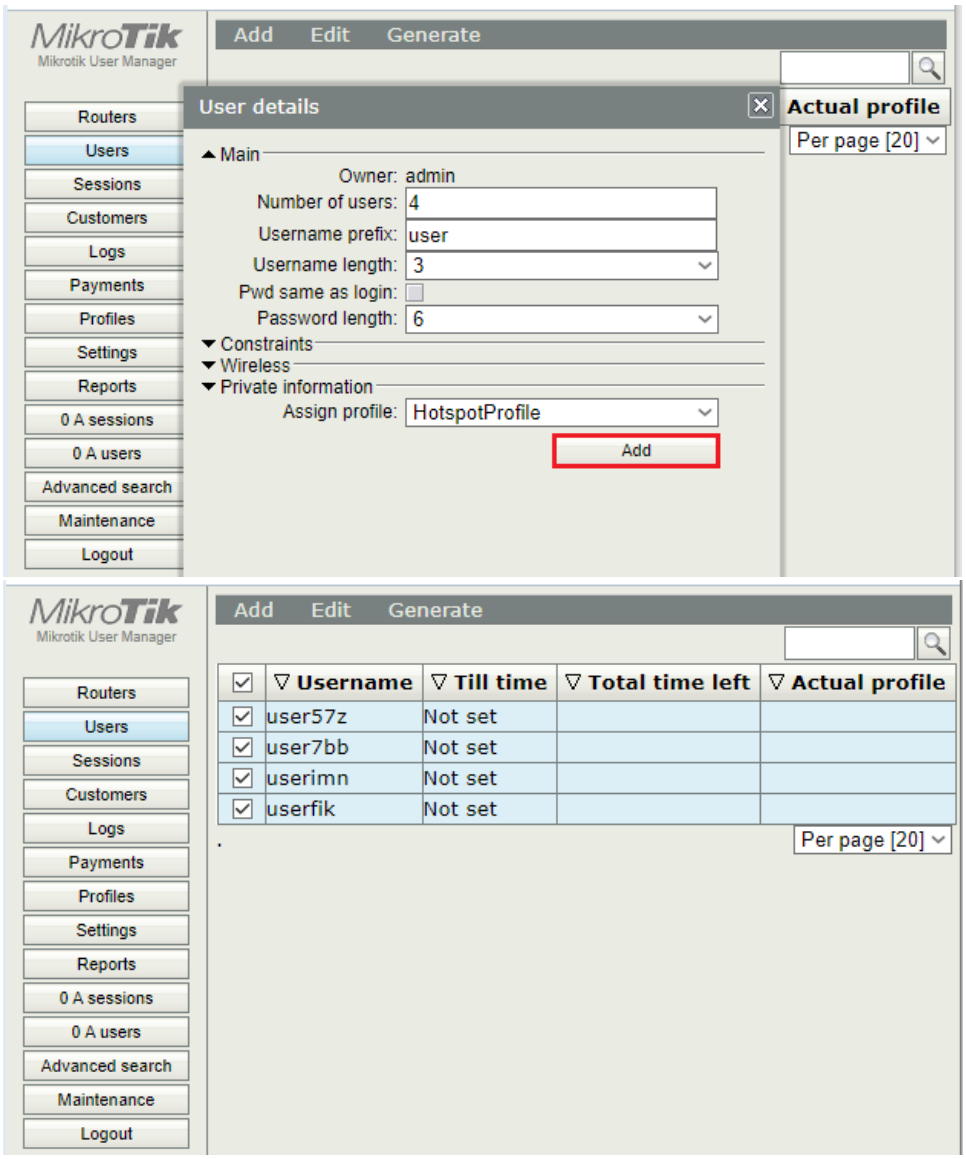
Thiết lập Hotspot Profile trước khi khởi tạo các tài khoản End User.



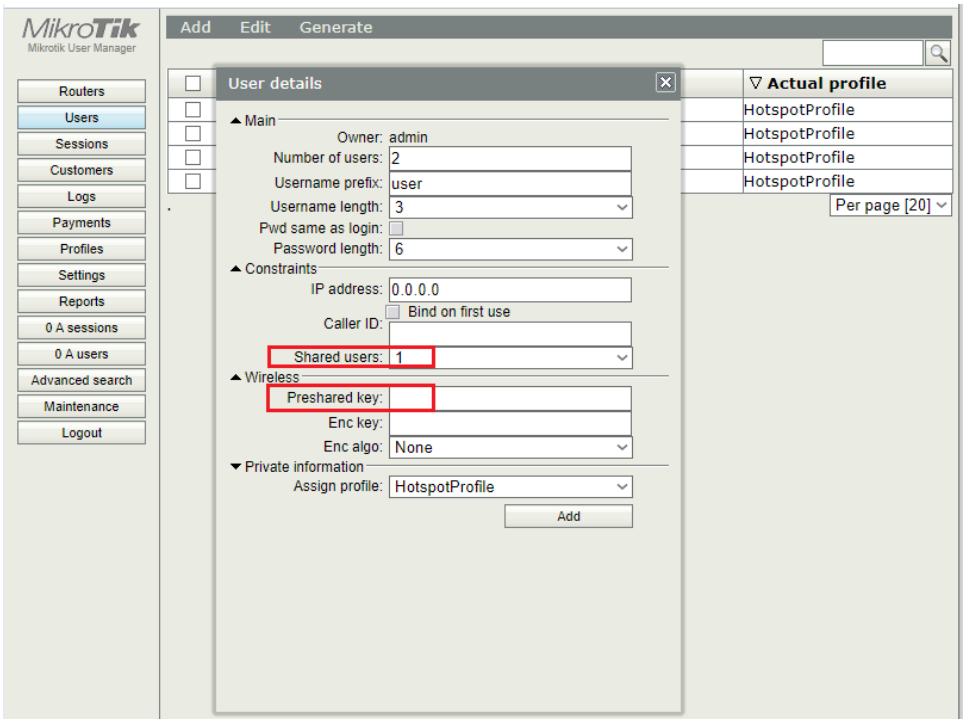


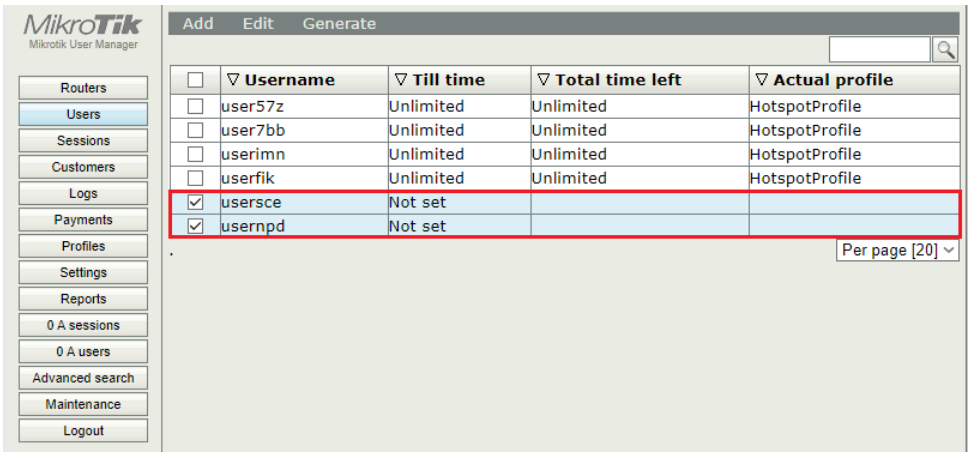
Khởi tạo các tài khoản End User.

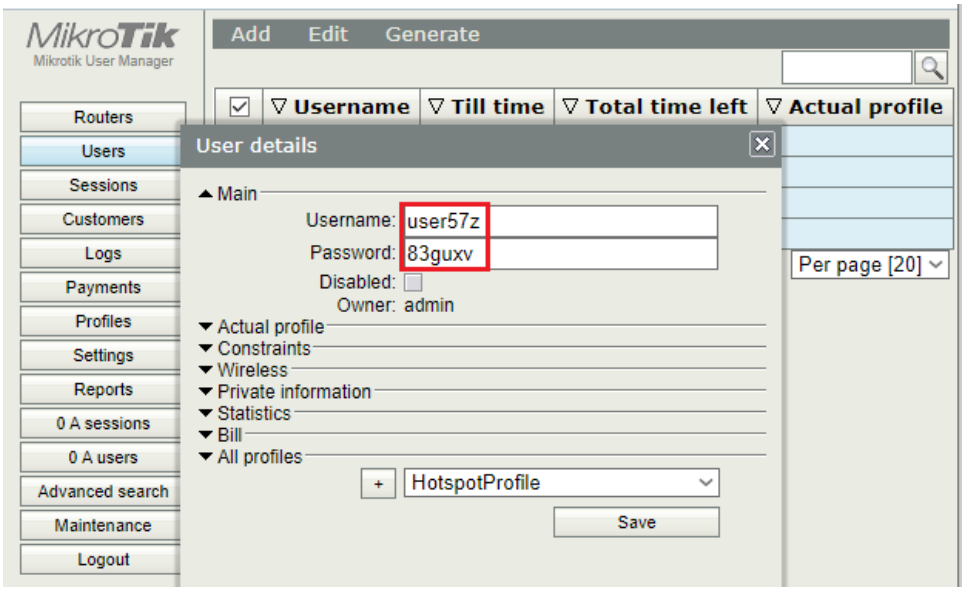




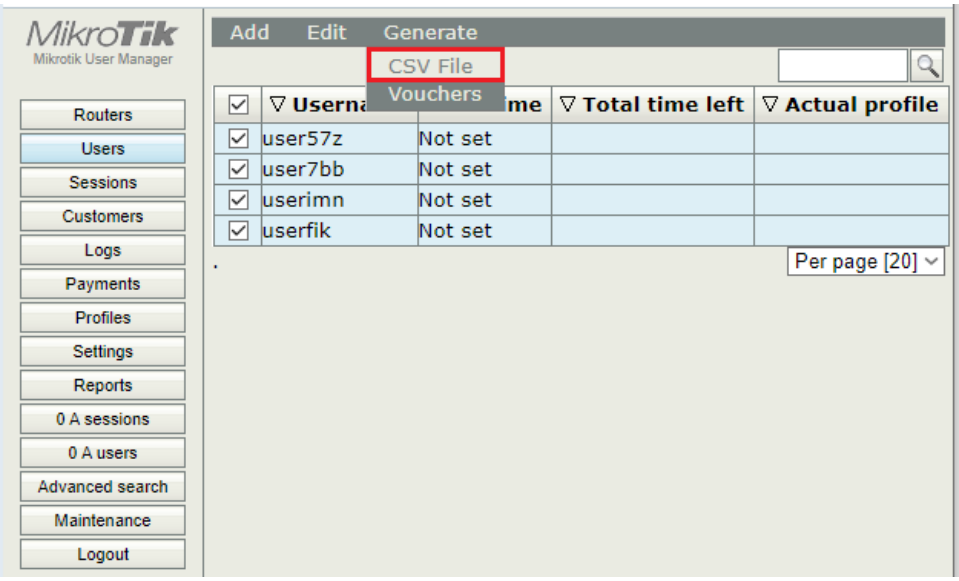
Tham khảo thêm các thiết lập mở rộng trên RADIUS Server khi khởi tạo nhanh các tài khoản End User.

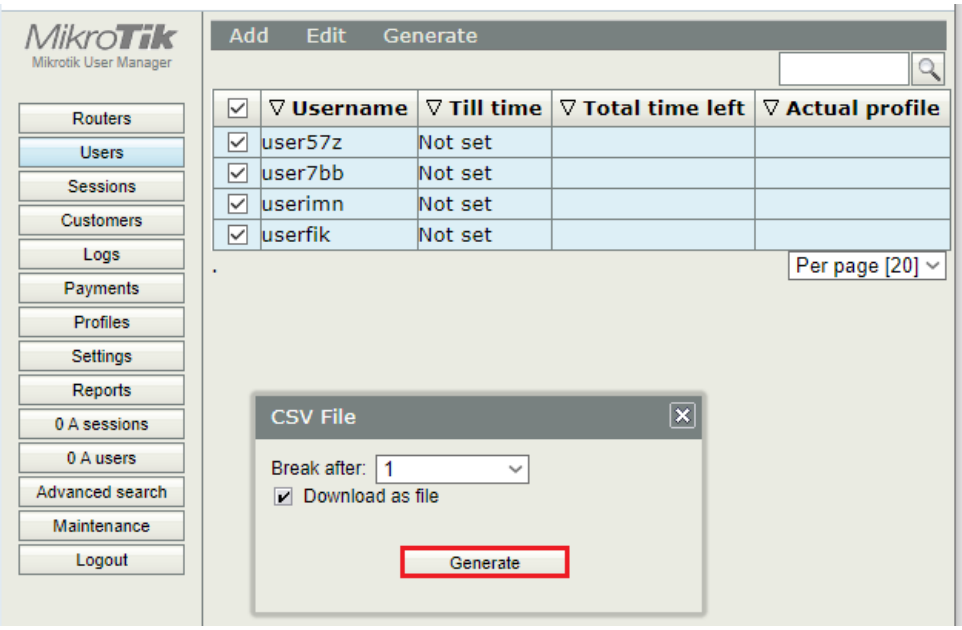

MikroTik
Mikrotik User Manager
Routers
Users
Sessions
Customers
Logs
Payments
Profiles
Settings
Reports
0 A sessions
0 A users
Advanced search
Maintenance
Logout
Add
Edit
Generate
Actual profile
HotspotProfile
HotspotProfile
HotspotProfile
HotspotProfile
Per page [20]
User details
Main
Owner: admin
Number of users: 2
Username prefix: user
Username length: 3
Pwd same as login:
Password length: 6
Constraints
IP address: 0.0.0.0
Bind on first use
Caller ID:
Shared users: 1
Wireless
Preshared key:
Enc key:
Enc algo: None
Private information
Assign profile: HotspotProfile
Add


MikroTik
Mikrotik User Manager
Routers
Users
Sessions
Customers
Logs
Payments
Profiles
Settings
Reports
0 A sessions
0 A users
Advanced search
Maintenance
Logout
Add
Edit
Generate
Username
Till time
Total time left
Actual profile
user57z Unlimited Unlimited HotspotProfile
user7bb Unlimited Unlimited HotspotProfile
userimn Unlimited Unlimited HotspotProfile
userfik Unlimited Unlimited HotspotProfile
usersce Not set
usernpd Not set
Per page [20]

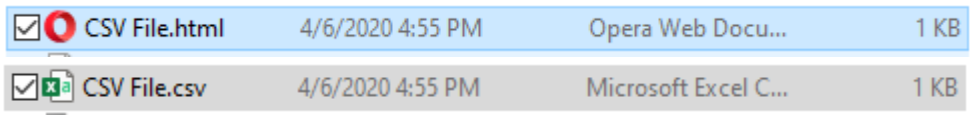


Bước 2. Xuất danh sách các tài khoản End User dưới dạng File Excel CSV.

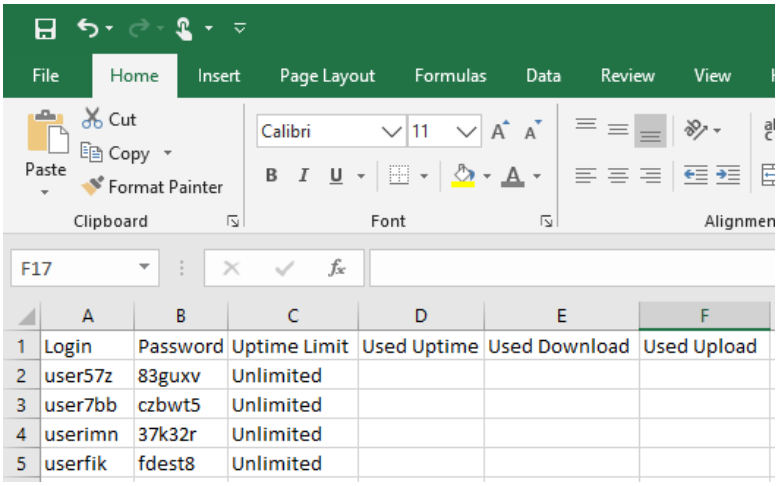


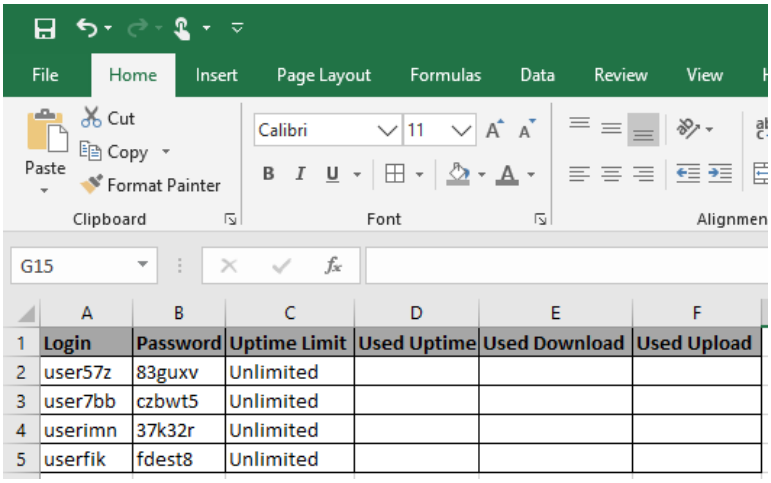


Đổi đuôi file từ .html thành .csv



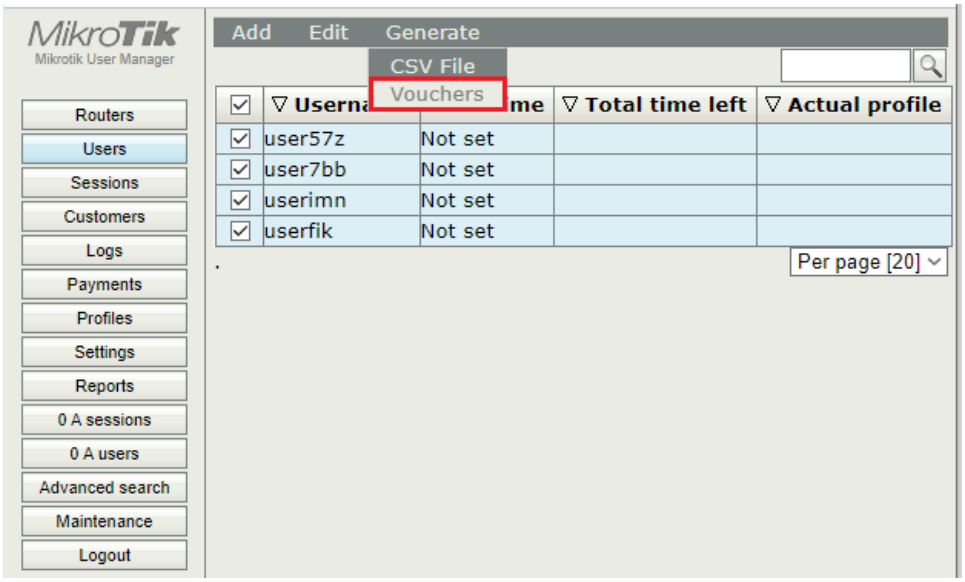
Nội dung file CSV File.csv

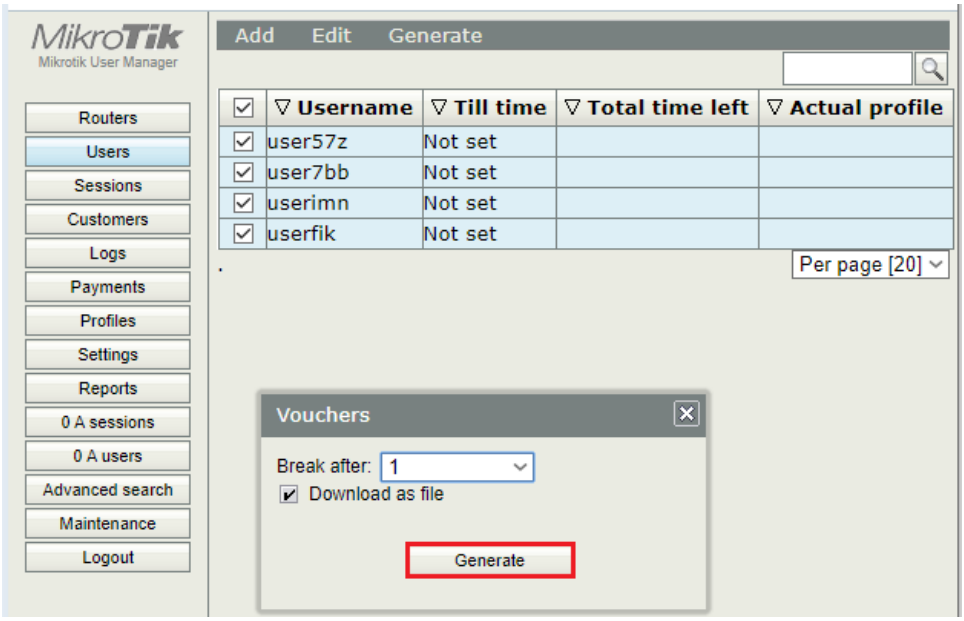


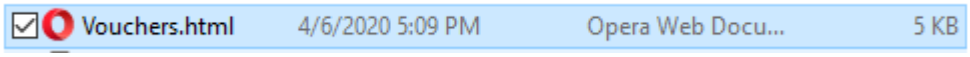


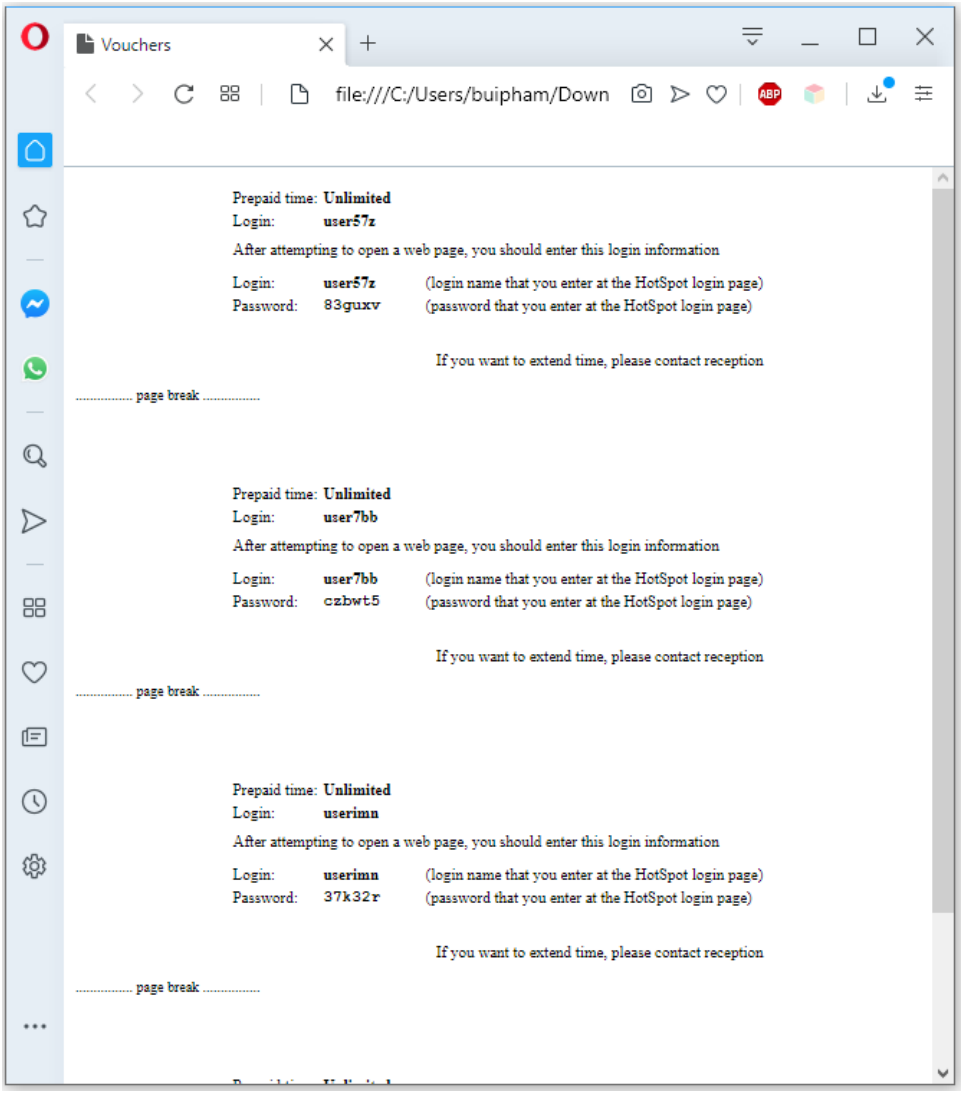
	A	B	C	D	E	F
1	Login	Password	Uptime Limit	Used Uptime	Used Download	Used Upload
2	user57z	83guxv	Unlimited			
3	user7bb	czbwt5	Unlimited			
4	userimn	37k32r	Unlimited			
5	userfik	fdest8	Unlimited			

Bước 3. Xuất danh sách các tài khoản End User dưới dạng mã Vouchers.




MikroTik
Mikrotik User Manager
Routers
Users
Sessions
Customers
Logs
Payments
Profiles
Settings
Reports
0 A sessions
0 A users
Advanced search
Maintenance
Logout
Add
Edit
Generate
Username
Till time
Total time left
Actual profile
user57z
Not set
user7bb
Not set
userimn
Not set
userfik
Not set
Per page [20]
Vouchers
Break after: 1
Download as file
Generate


Vouchers.html
4/6/2020 5:09 PM
Opera Web Docu...
5 KB



Phần 20. Giám sát hoạt động của Router MikroTik.

Phần 20.1. Kích hoạt SNMP trên Router MikroTik.

Kiểm tra SNMP đã được kích hoạt trên Router MikroTik hay chưa.

```
[admin@MikroTik] > /snmp print
           enabled: no
           contact:
          location:
         engine-id:
      trap-target:
   trap-community: public
     trap-version: 1
  trap-generators: temp-exception
[admin@MikroTik] >
```

```
[admin@MikroTik] > /snmp set enabled=yes
```

```
[admin@MikroTik] > /snmp print
           enabled: yes
           contact:
          location:
         engine-id:
      trap-target:
   trap-community: public
     trap-version: 1
  trap-generators: temp-exception
[admin@MikroTik] >
```

Kiểm tra giá trị SNMP Community.

```
[admin@MikroTik] > /snmp community print
```

```
[admin@MikroTik] > /snmp community print
Flags: * - default
 #   NAME                                            ADDRESSES
 0 * public                                          ::/0
[admin@MikroTik] >
```

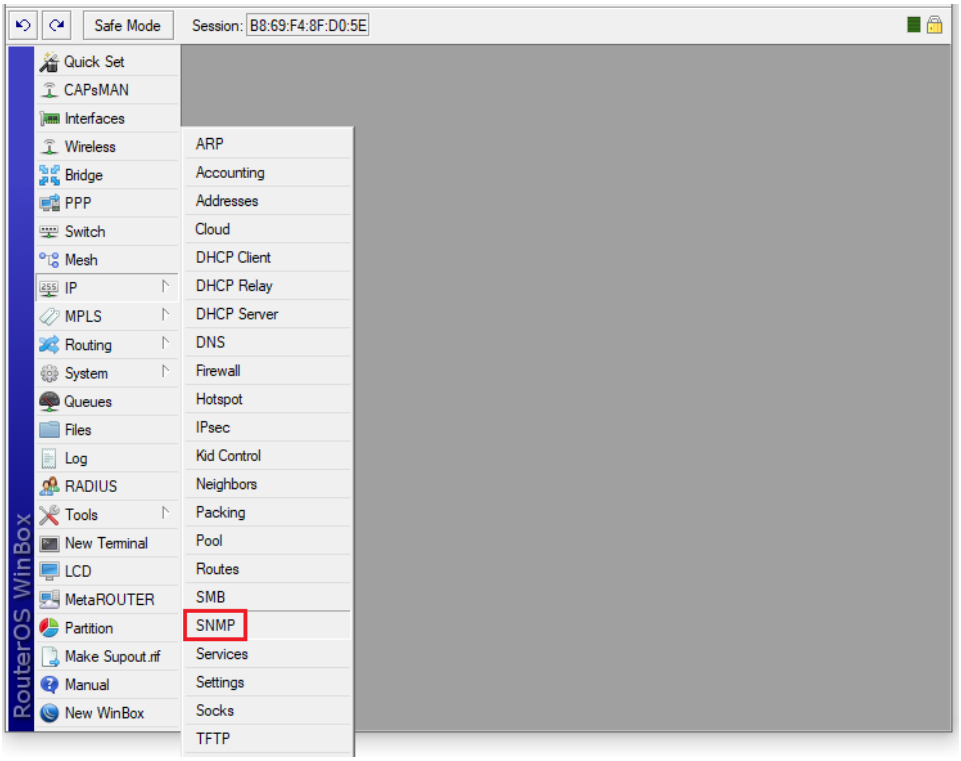
```
[admin@MikroTik] > /ip service print
```

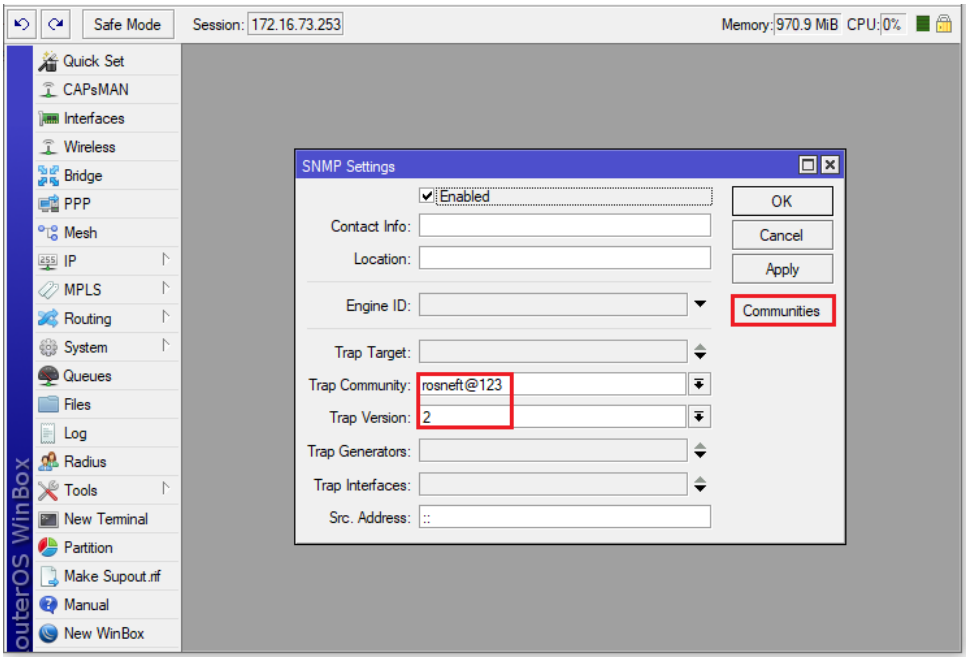
```
[admin@MikroTik] > /ip service print
Flags: X - disabled, I - invalid
 #    NAME                                       PORT ADDRESS
 0    telnet                                       23
 1    ftp                                          21
 2    www                                          80
 3    ssh                                          22
 4 XI www-ssl                                      443
 5    api                                        8728
 6    winbox                                     8291
 7    api-ssl                                    8729
[admin@MikroTik] >
```

```
[admin@MikroTik] > /snmp community add name=rosneft@123 addresses=0.0.0.0/0
```

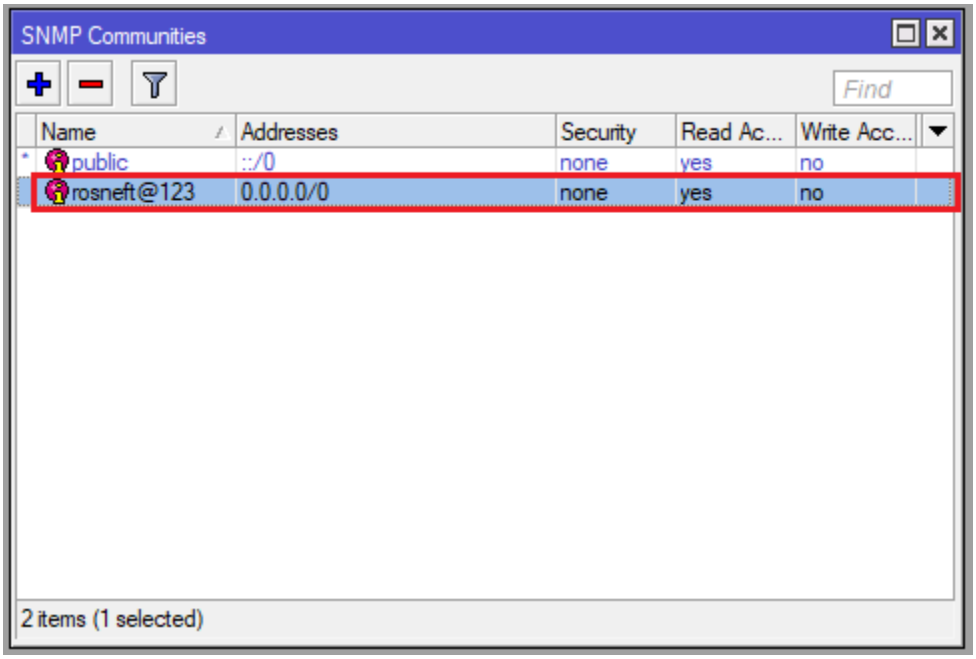
```
[admin@MikroTik] > /snmp community remove 1
```

```
[admin@MikroTik] > /snmp community print
Flags: * - default
 #   NAME                                            ADDRESSES
 0 * public                                          ::/0
 1   rosneft@123                                     0.0.0.0/32
[admin@MikroTik] > /snmp community remove 1
[admin@MikroTik] >
```

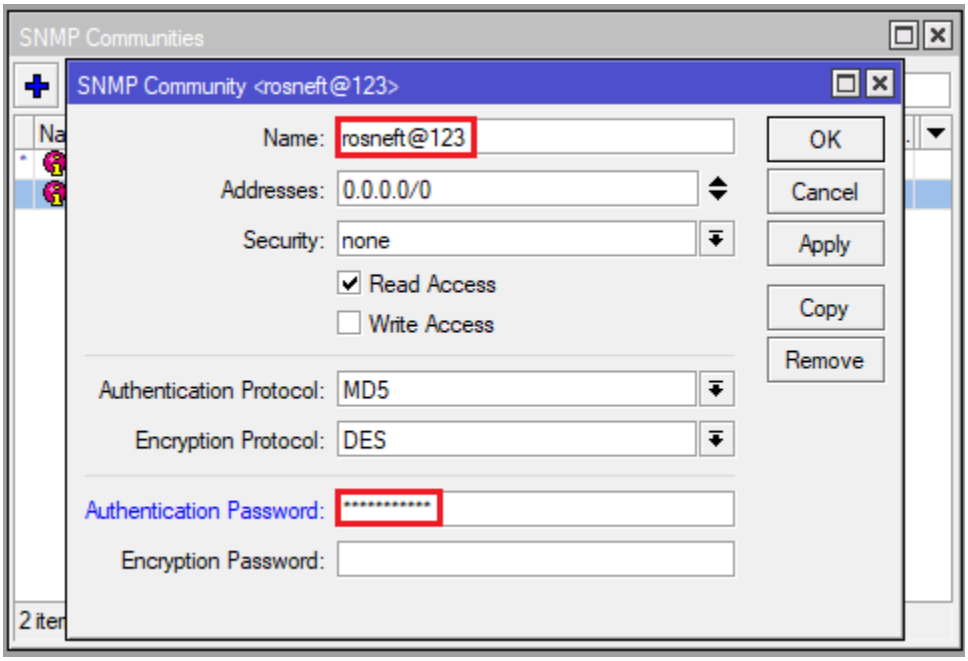

Safe Mode
Session: B8:69:F4:8F:D0:5E
Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Switch
Mesh
IP
MPLS
Routing
System
Queues
Files
Log
RADIUS
Tools
New Terminal
LCD
MetaROUTER
Partition
Make Supout.rif
Manual
New WinBox
RouterOS WinBox
ARP
Accounting
Addresses
Cloud
DHCP Client
DHCP Relay
DHCP Server
DNS
Firewall
Hotspot
IPsec
Kid Control
Neighbors
Packing
Pool
Routes
SMB
SNMP
Services
Settings
Socks
TFTP


Safe Mode
Session: 172.16.73.253
Memory: 970.9 MiB
CPU: 0%
Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Mesh
IP
MPLS
Routing
System
Queues
Files
Log
Radius
Tools
New Terminal
Partition
Make Supout.rif
Manual
New WinBox
outerOS WinBox
SNMP Settings
Enabled
Contact Info:
Location:
Engine ID:
Trap Target:
Trap Community:
rosneft@123
Trap Version:
2
Trap Generators:
Trap Interfaces:
Src. Address:
::
OK
Cancel
Apply
Communities

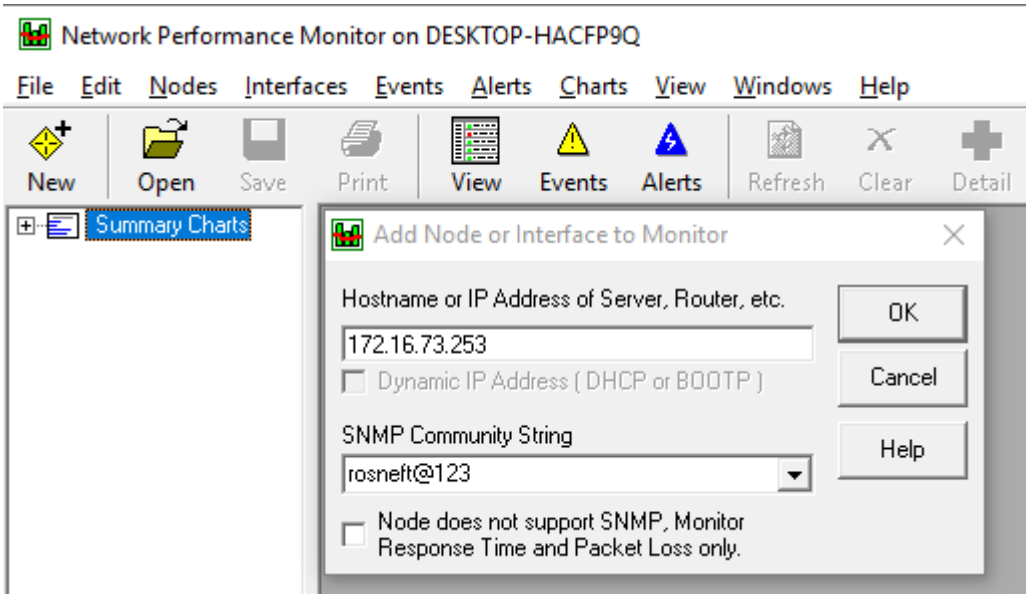
rosneft@123

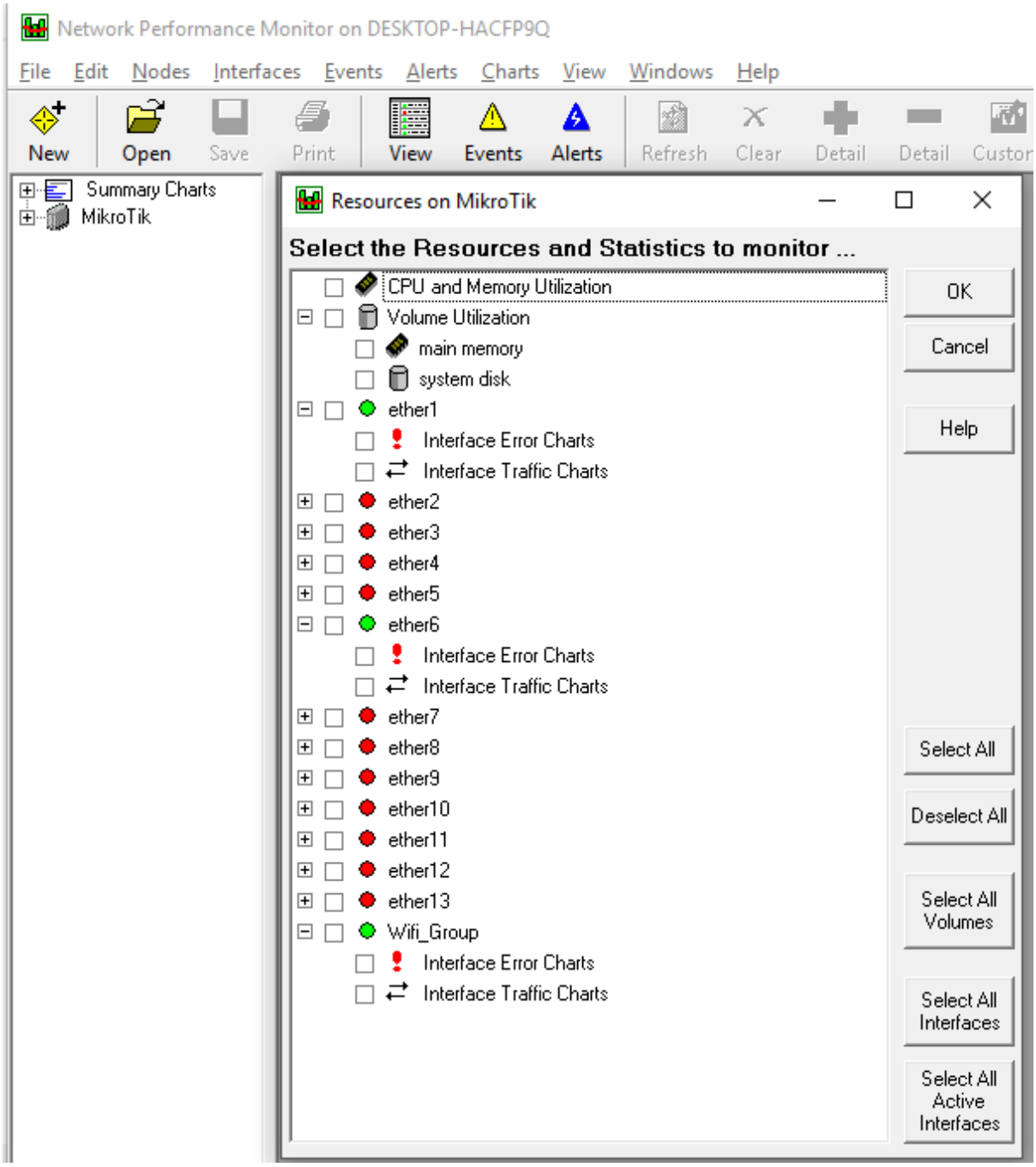


Be sure that the name and Authentication fields match!



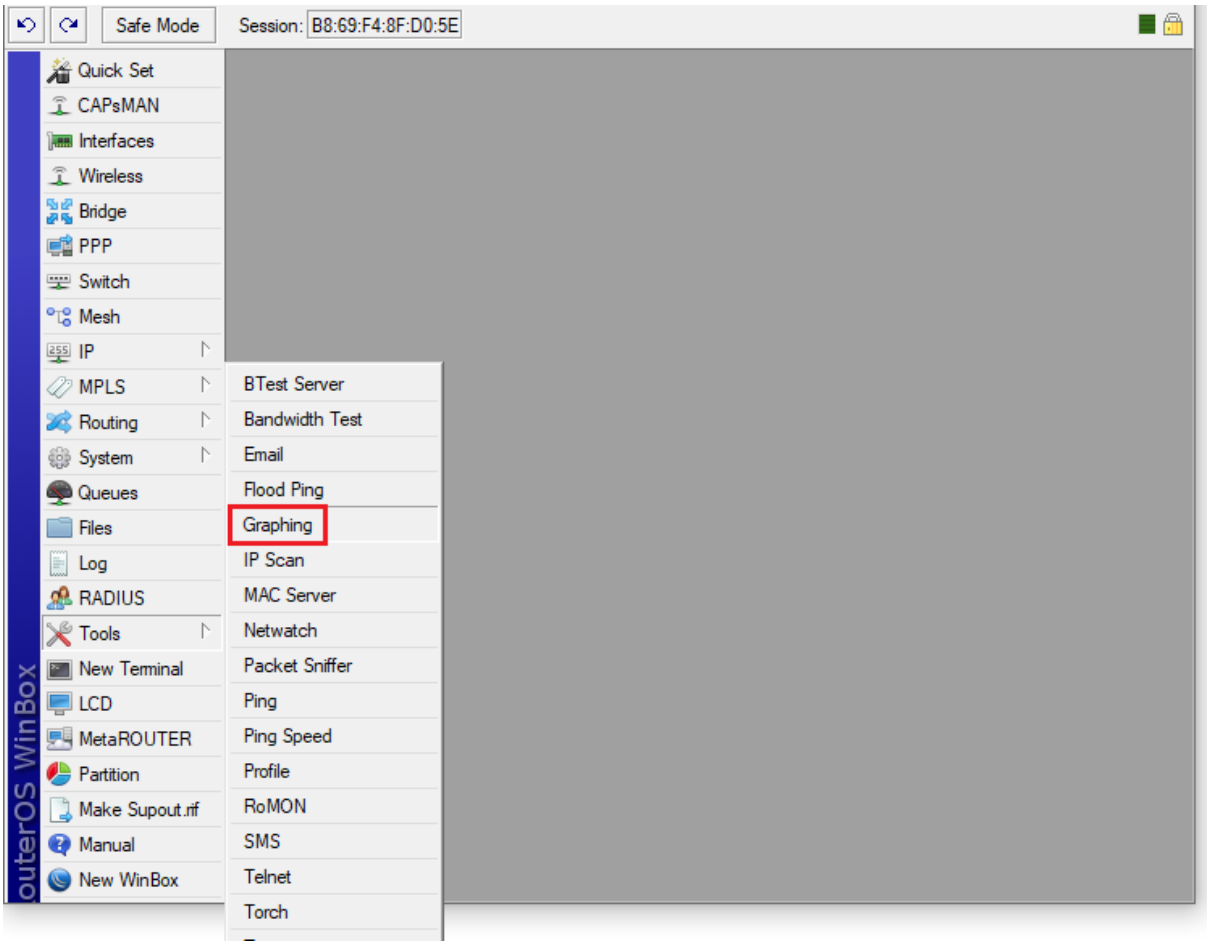
Sử dụng PRTG để connect tới Router MikroTik.

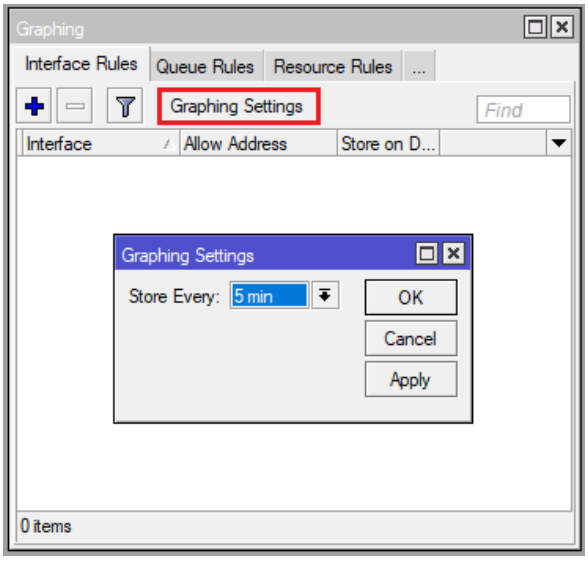

Network Performance Monitor on DESKTOP-HACFP9Q
File Edit Nodes Interfaces Events Alerts Charts View Windows Help
New Open Save Print View Events Alerts Refresh Clear Detail
Summary Charts
Add Node or Interface to Monitor
Hostname or IP Address of Server, Router, etc.
172.16.73.253
Dynamic IP Address (DHCP or BOOTP)
SNMP Community String
rosneft@123
Node does not support SNMP, Monitor Response Time and Packet Loss only.
OK
Cancel
Help

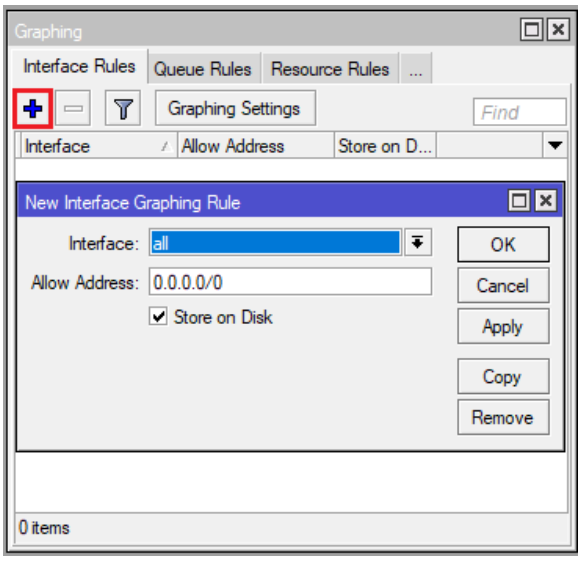


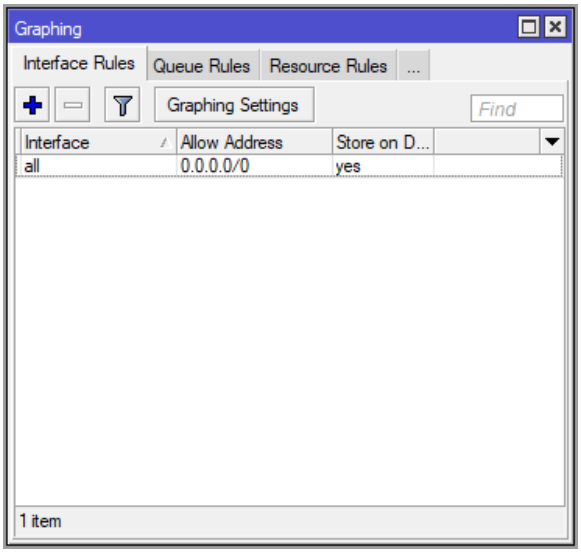
Phần 20.2. Giám sát lưu lượng trên các cổng giao tiếp của Router MikroTik.

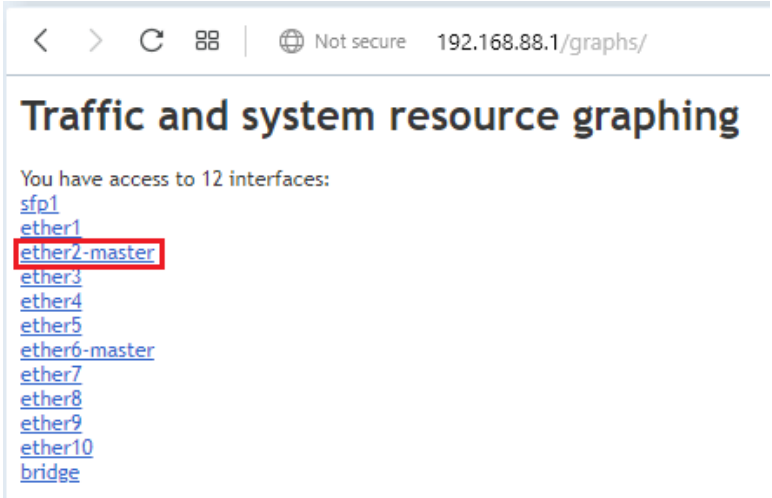
Giám sát lưu lượng trên các cổng giao tiếp của Router MikroTik.


Safe Mode
Session: B8:69:F4:8F:D0:5E
Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Switch
Mesh
IP
MPLS
Routing
System
Queues
Files
Log
RADIUS
Tools
New Terminal
LCD
MetaROUTER
Partition
Make Supout.rif
Manual
New WinBox
outerOS WinBox
BTest Server
Bandwidth Test
Email
Flood Ping
Graphing
IP Scan
MAC Server
Netwatch
Packet Sniffer
Ping
Ping Speed
Profile
RoMON
SMS
Telnet
Torch


Graphing
Interface Rules
Queue Rules
Resource Rules
...
Graphing Settings
Find
Interface
Allow Address
Store on D...
Graphing Settings
Store Every:
5 min
OK
Cancel
Apply
0 items


Graphing
Interface Rules
Queue Rules
Resource Rules
...
Graphing Settings
Find
Interface
Allow Address
Store on D...
New Interface Graphing Rule
Interface: all
Allow Address: 0.0.0.0/0
Store on Disk
OK
Cancel
Apply
Copy
Remove
0 items


Graphing
Interface Rules
Queue Rules
Resource Rules
...
Graphing Settings
Find
Interface
Allow Address
Store on D...
all
0.0.0.0/0
yes
1 item

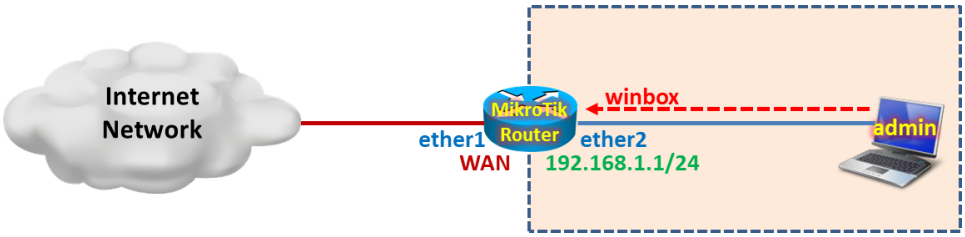

Not secure
192.168.88.1/graphs/
Traffic and system resource graphing
You have access to 12 interfaces:
sfp1
ether1
ether2-master
ether3
ether4
ether5
ether6-master
ether7
ether8
ether9
ether10
bridge

Phần 20.3. Reset mật khẩu Password trên Router MikroTik.

https://wiki.mikrotik.com/wiki/Manual:Reset

Bước 1. Tháo nguồn thiết bị.
Bước 2. Nhấn và giữ button reset trong vòng 5 giây ngay sau khi gắn nguồn thiết bị. USER LED màu xanh lá sẽ bắt đầu chớp liên tục. Lưu ý, nếu để đèn LED ngừng nhấp nháy rồi sau đó mới nhả button reset thì thiết bị sẽ khởi động sang chế độ Netinstall mode để cài đặt lại RouterOS.
Bước 3. Nhả button reset để xóa cấu hình.

Phần 20.4. Thiết lập thời gian khởi động Router MikroTik.

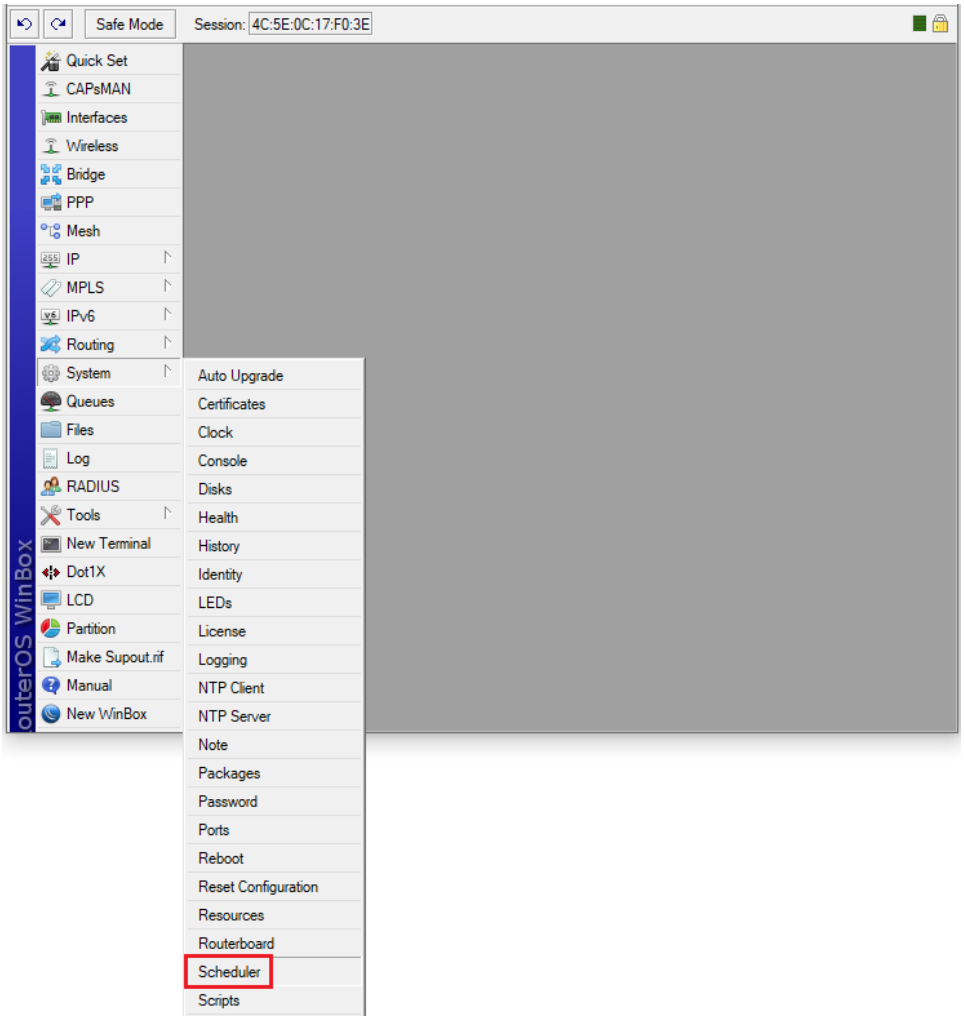


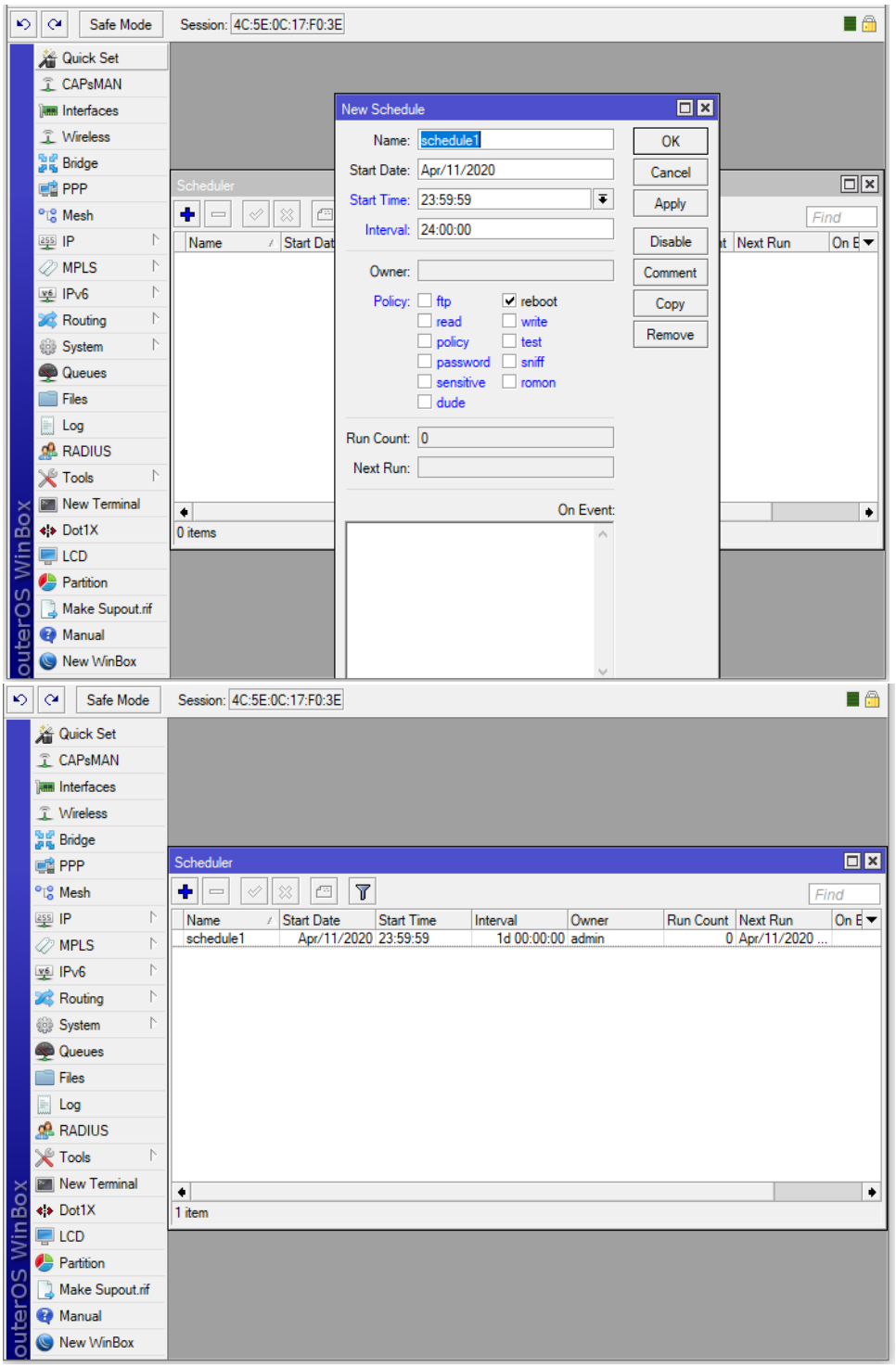
Thiết lập thời gian tự động khởi động Router MikroTik.

```
[admin@MikroTik] >
/system scheduler add name="schedule1" start-date=apr/11/2020 start-time=23:59:59
interval=1d
```

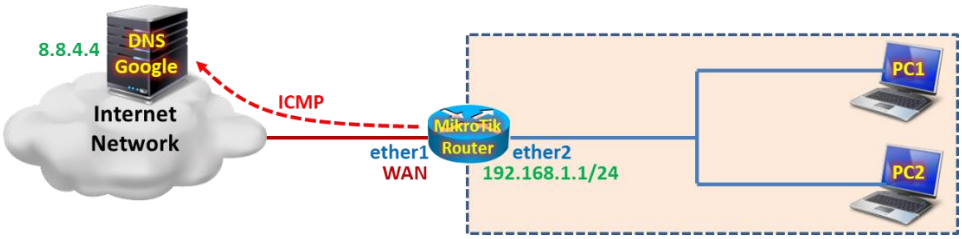
```
[admin@MikroTik] > /system scheduler print
Flags: X - disabled
 #    NAME     START-DATE  START-TIME     INTERVAL             ON-EVENT      RUN-COUNT
 0    sche...  apr/11/2020 23:59:59       1d                                        0
[admin@MikroTik] >
```

```
[admin@MikroTik] > /system scheduler print detail
Flags: X - disabled
 0   name="schedule1" start-date=apr/11/2020 start-time=23:59:59 interval=1d
     on-event="" owner="admin" policy=reboot run-count=0 next-run=23:59:59
[admin@MikroTik] >
```





Phần 20.5. Giám sát kết nối Internet và các thiết bị trên hạ tầng mạng bằng tính năng Netwatch trên Router MikroTik và tự động gửi Email khi có sự cố phát sinh.



Tổng quan các bước thực hiện:

- Bước 1. Cấu hình cơ bản trên thiết bị Router MikroTik.
- Bước 2. Thiết lập tiến trình Ping tới địa chỉ IP bất kỳ ở ngoài Internet thông qua tính năng Netwatch.
- Bước 3. Kiểm tra Log sự kiện trên Router MikroTik.

Các bước thực hiện chi tiết:

Bước 1. Cấu hình cơ bản trên thiết bị Router MikroTik.

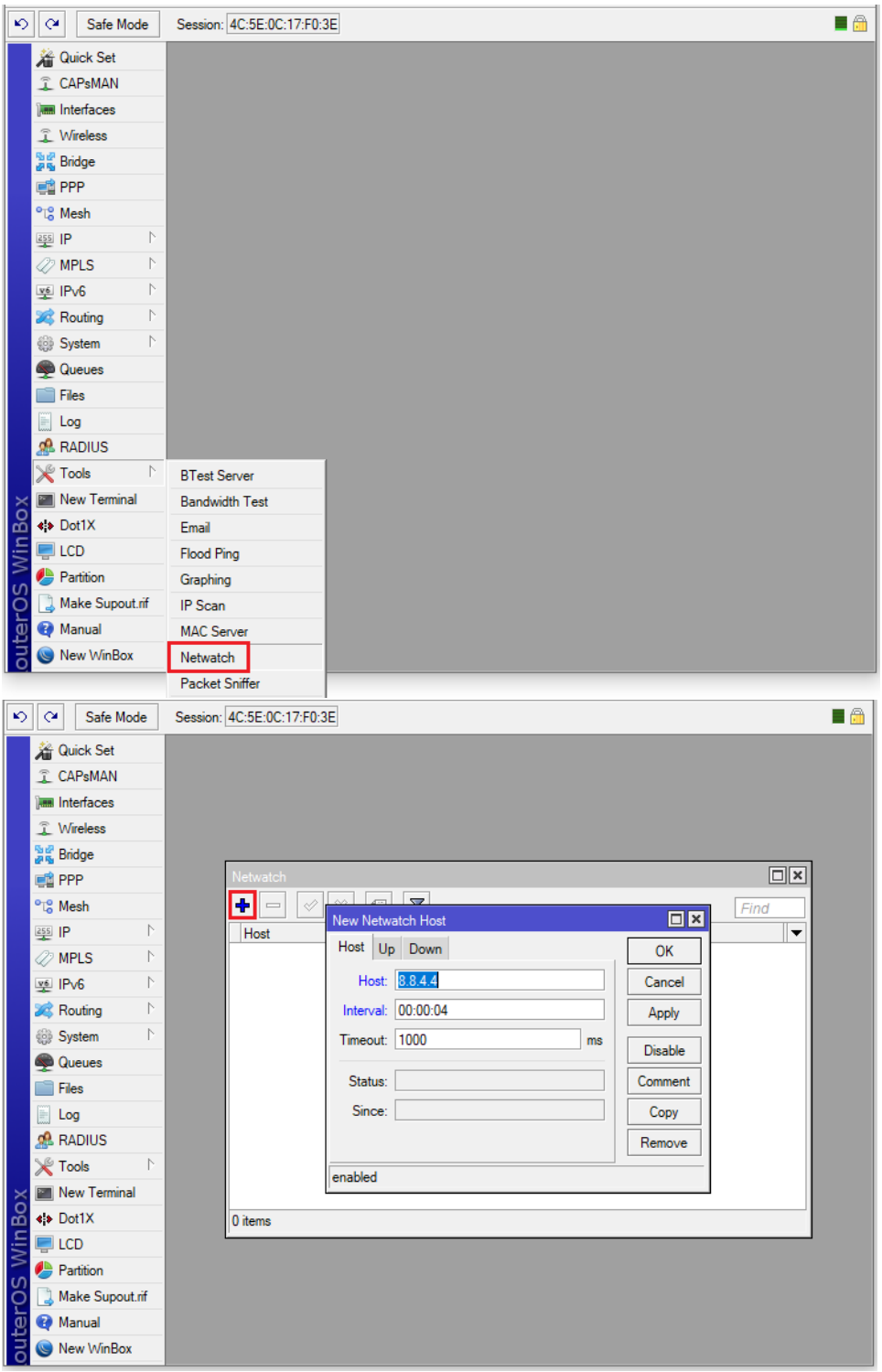
```
[admin@MikroTik]>
/ip address add address=192.168.1.1/24 interface=ether2
/ip dhcp-client add interface=ether1 disabled=no add-default-route=yes

/ip firewall nat add chain=srcnat action=masquerade out-interface=ether1

/ip pool add name=PoolLAN ranges=192.168.1.10-192.168.1.100
/ip dhcp-server network add address=192.168.1.0/24 gateway=192.168.1.1 dns-server=8.8.4.4
/ip dhcp-server add name=DHCPserv interface=ether2 address-pool=PoolLAN disabled=no
```

Bước 2. Thiết lập tiến trình Ping tới địa chỉ IP bất kỳ ở ngoài Internet thông qua tính năng Netwatch.

```
[admin@MikroTik] >
/tool netwatch add host=8.8.4.4 timeout=1s interval=4s
```

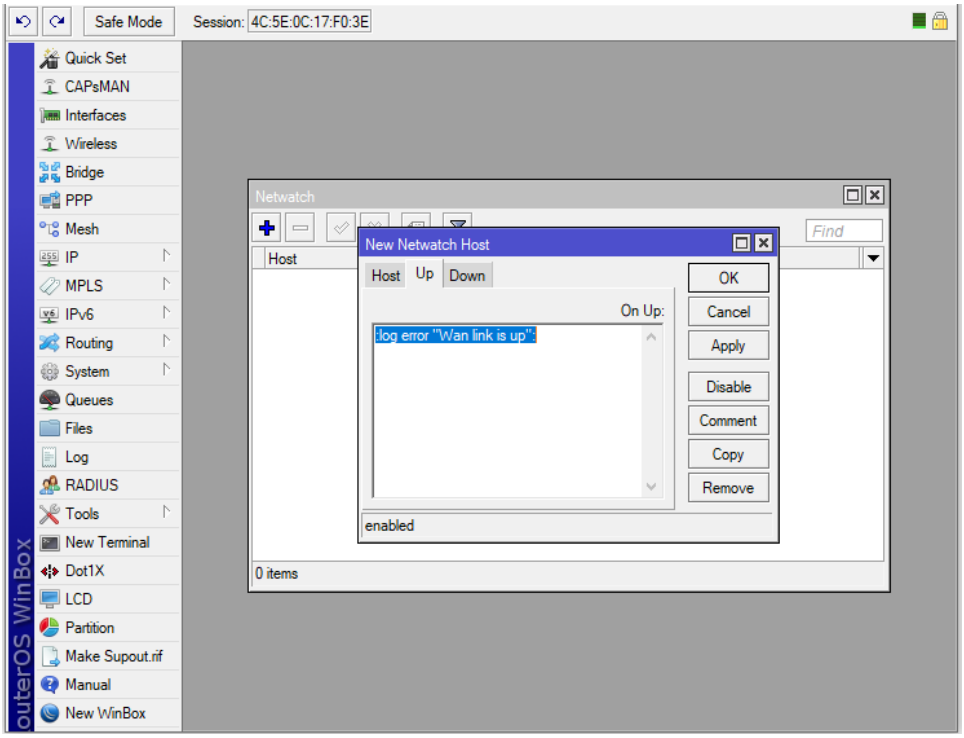
```
[admin@MikroTik] > /tool netwatch print
Flags: X - disabled
 #    HOST                 TIMEOUT              INTERVAL             STATUS
 0    8.8.4.4              1s                   4s                   up
[admin@MikroTik] >
```

```
[admin@MikroTik] > /tool netwatch print detail
Flags: X - disabled
 0    host=8.8.4.4 timeout=1s interval=4s since=apr/11/2020 19:36:44 status=up
      up-script=:log error "Wan link is up";
      down-script=:log error "Wan link is down";
[admin@MikroTik] >
```



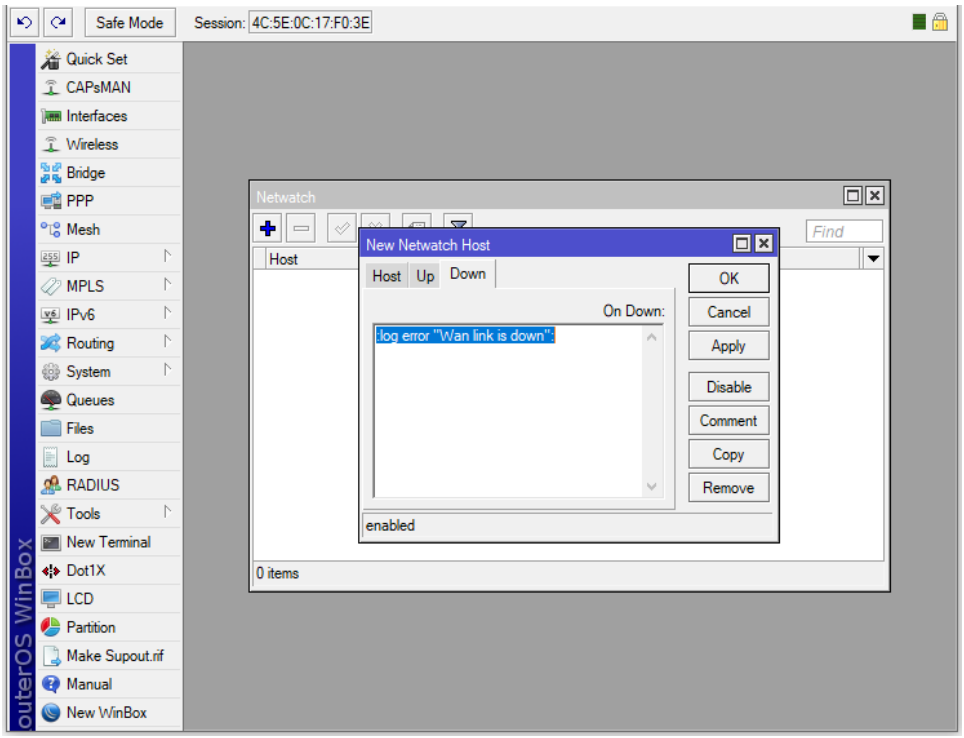
Ghi lại Log nếu quá trình ping 8.8.4.4 thành công.

:log error "Wan link is up";



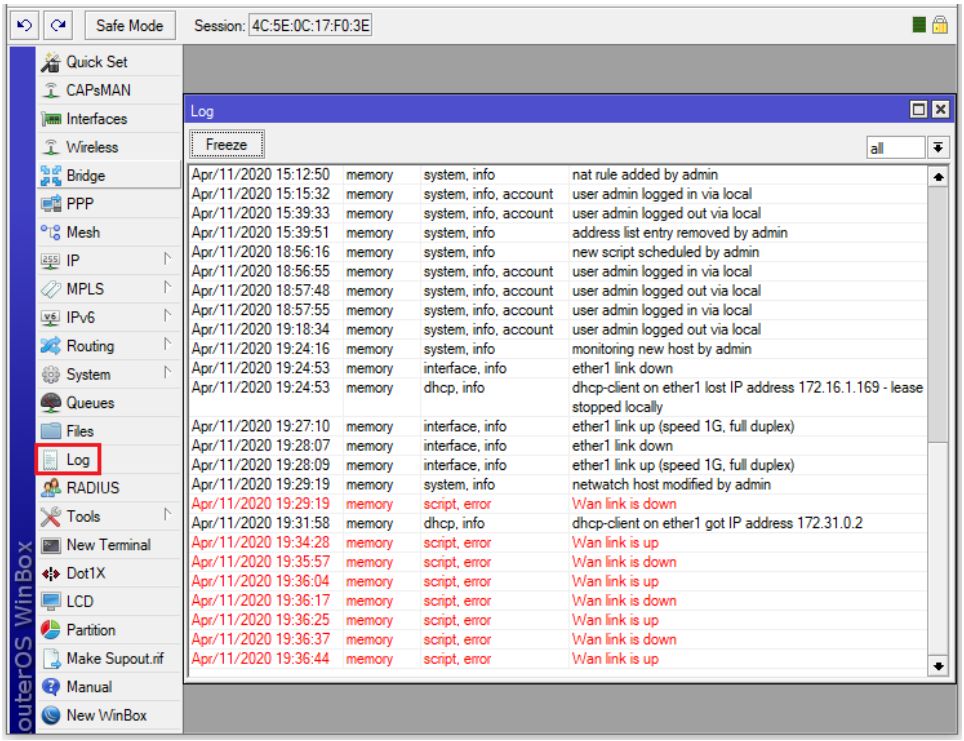
Ghi lại Log nếu quá trình ping 8.8.4.4 không thành công.

:log error "Wan link is down";

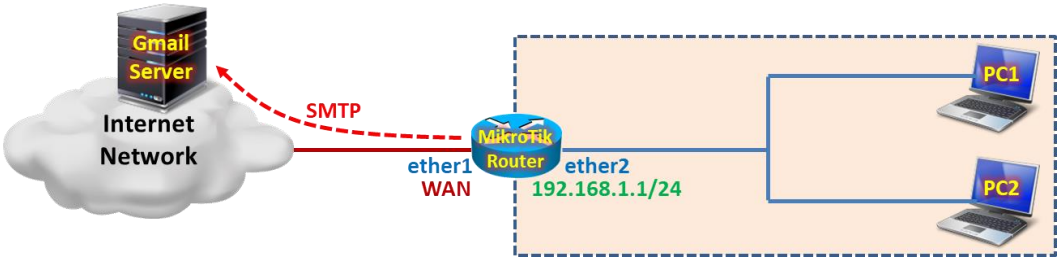


Bước 2. Thiết lập tiến trình Ping tới địa chỉ IP bất kỳ ở ngoài Internet thông qua tính năng Netwatch.

```
[admin@MikroTik]> /log print
```



Phần 20.6. Tính năng gửi Email trên Router MikroTik khi có sự cố phát sinh.



Tổng quan các bước thực hiện:

- **Bước 1.** Cấu hình cơ bản trên Router MikroTik.
- **Bước 2.** Thiết lập tính năng gửi Email trên Router MikroTik.
- **Bước 3.** Thiết lập tính năng Netwatch giám sát hệ thống Server và tự động gửi email nếu có sự cố phát sinh.
- **Bước 4.** Thiết lập Logging Rule tự động gửi email khi có sự cố liên quan đến tính năng Netwatch phát sinh.

Chi tiết các bước thực hiện:

Bước 1. Cấu hình cơ bản trên thiết bị Router MikroTik.

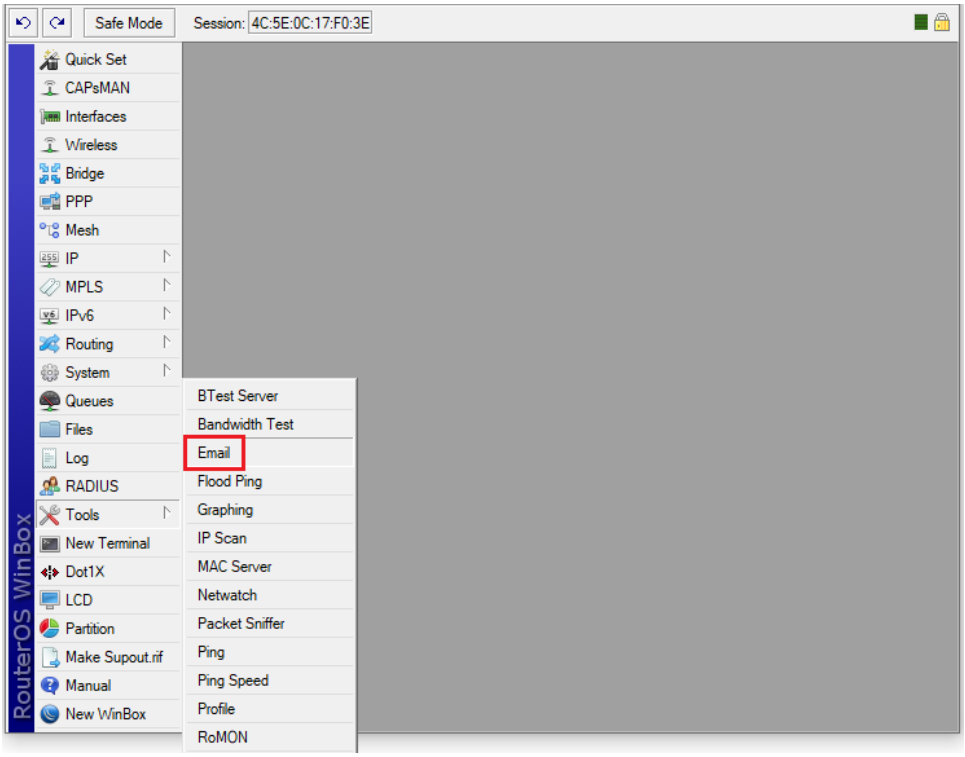
```
[admin@MikroTik]>
/ip address add address=172.31.0.254/24 interface=ether3
/ip address add address=192.168.1.1/24 interface=ether2
```

```
/ip dhcp-client add interface=ether1 disabled=no add-default-route=yes

/ip firewall nat add chain=srcnat action=masquerade out-interface=ether1

/ip pool add name=PoolLAN ranges=192.168.1.10-192.168.1.100
/ip dhcp-server network add address=192.168.1.0/24 gateway=192.168.1.1 dns-server=8.8.4.4
/ip dhcp-server add name=DHCPserv interface=ether2 address-pool=PoolLAN disabled=no
```

Bước 2. Thiết lập tính năng gửi Email trên Router MikroTik.

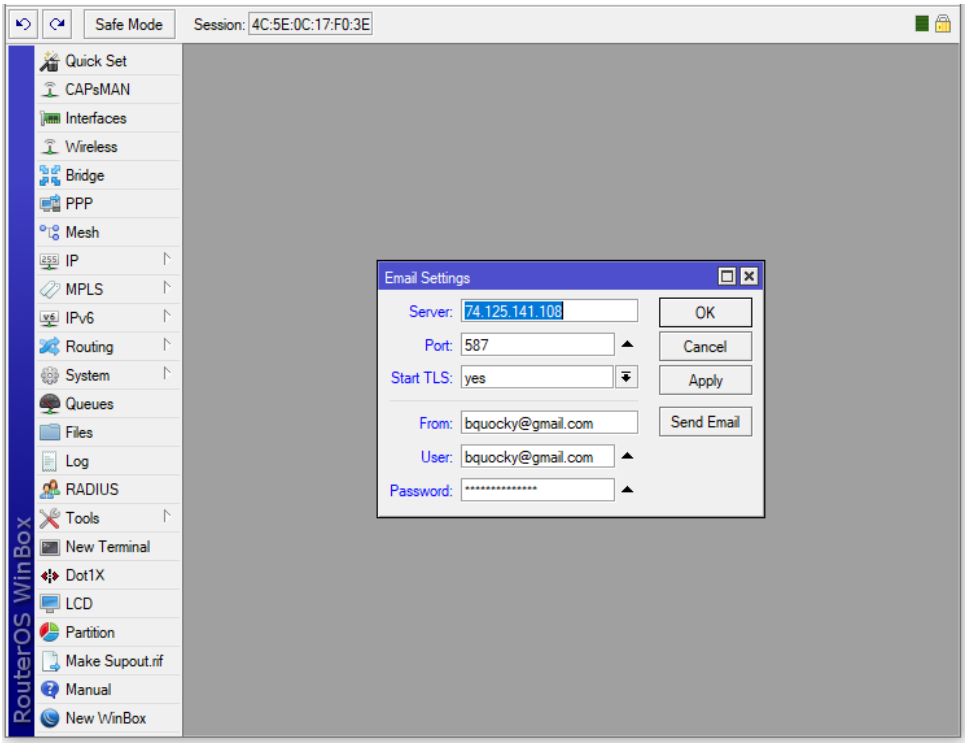
```
[admin@MikroTik]>
/tool e-mail set address=74.125.141.108 port=587 start-tls=yes from=bquocky@gmail.com
user=bquocky@gmail.com password=123456
```

```
[admin@MikroTik] > /tool e-mail print
      address: 74.125.141.108
         port: 587
    start-tls: yes
         from: bquocky@gmail.com
         user: bquocky@gmail.com
     password: 123456
  last-status: succeeded
[admin@MikroTik] >
```

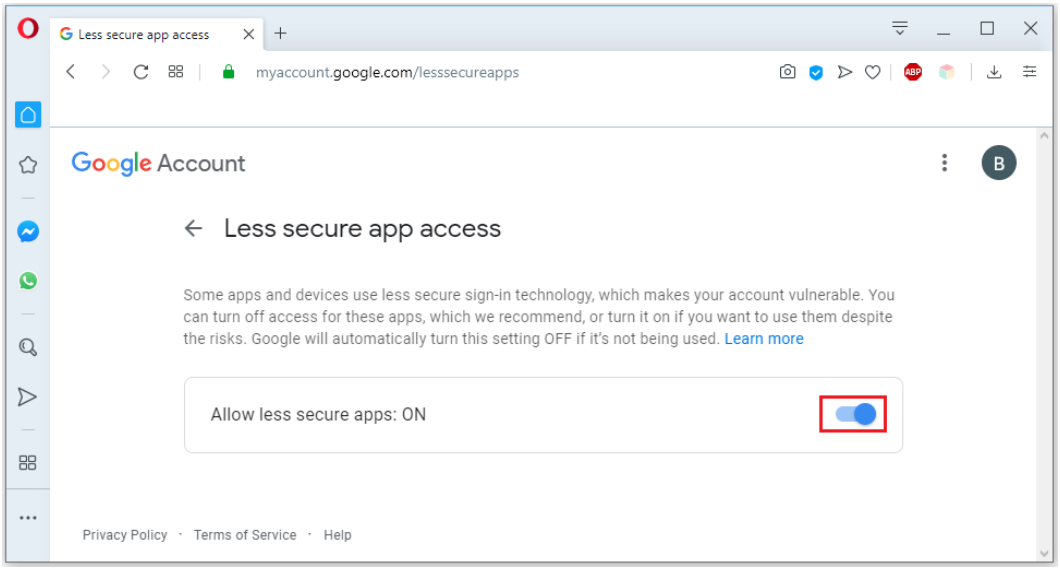


Gmail Server: 74.125.141.108

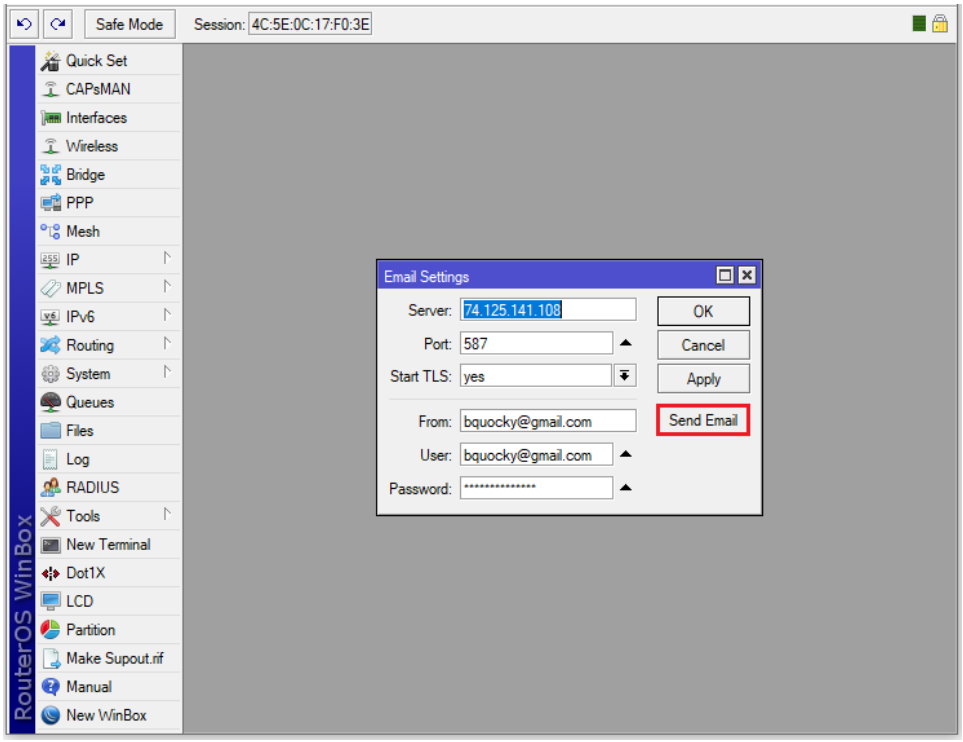
Port: 587

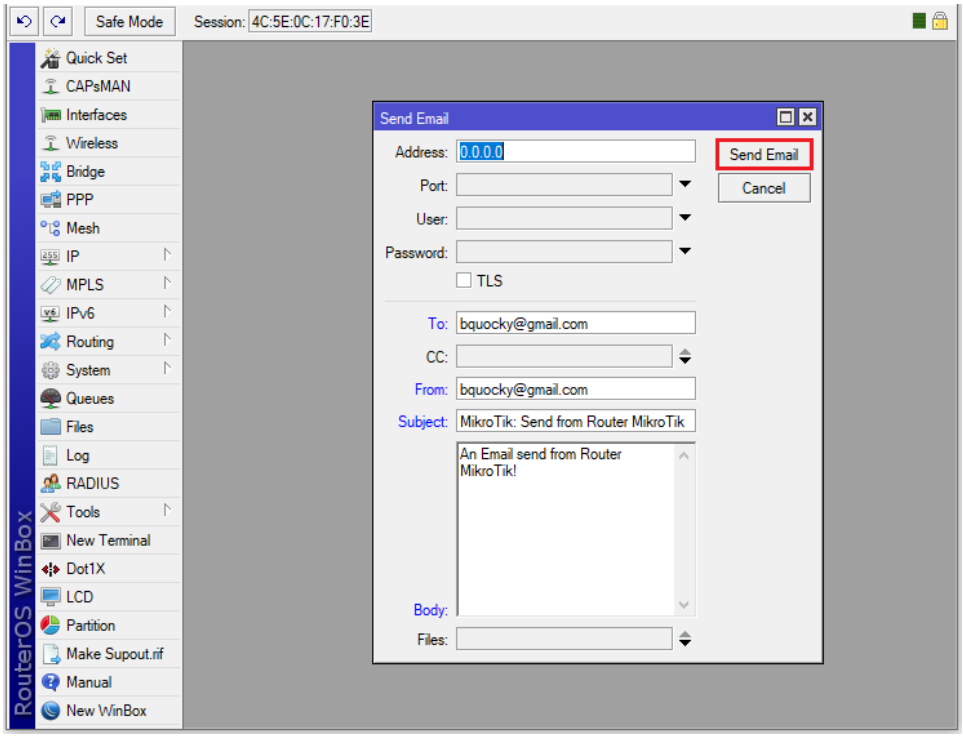


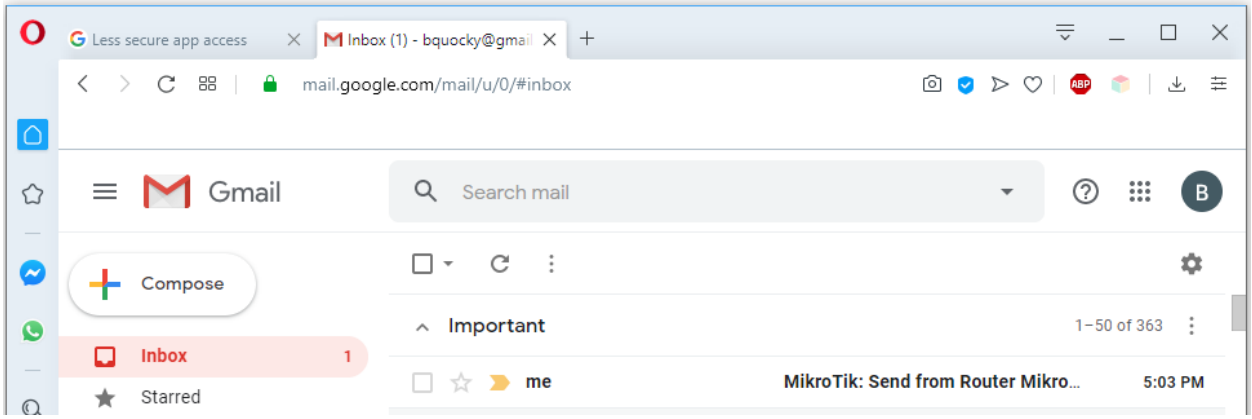
Thiết lập trên Gmail cho phép Router MikroTik gửi Email tới.
https://myaccount.google.com/lesssecureapps

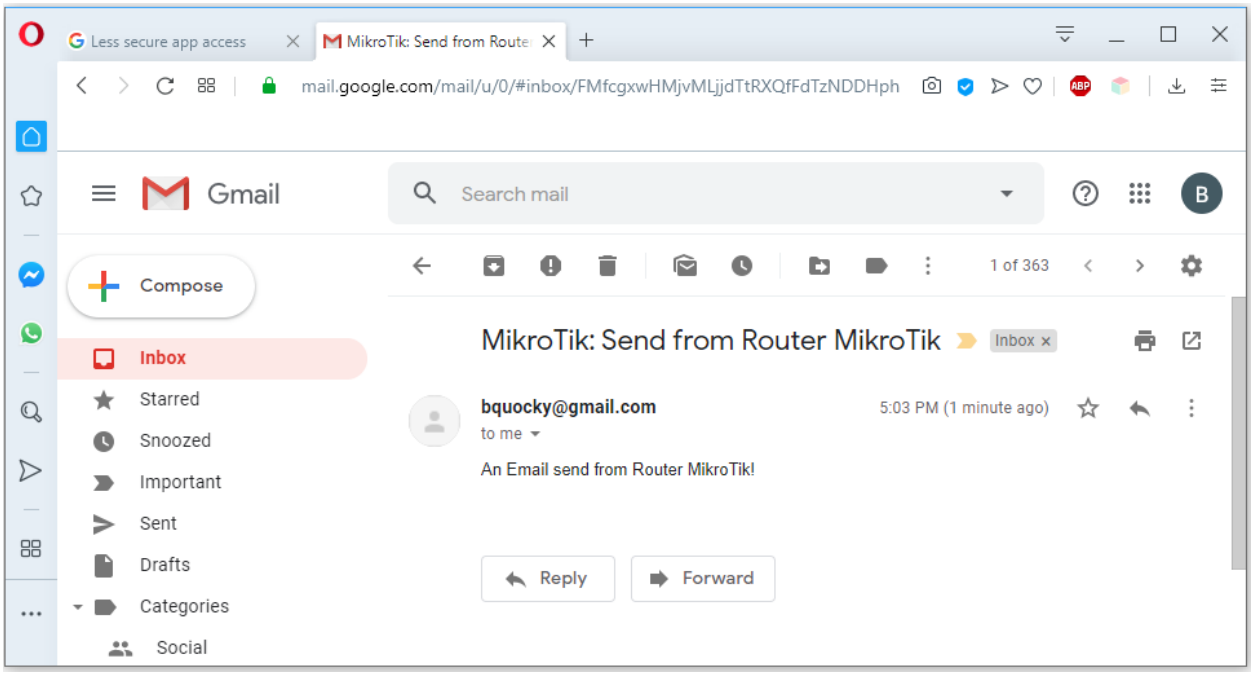


Tiến hành gửi Email từ Router MikroTik.

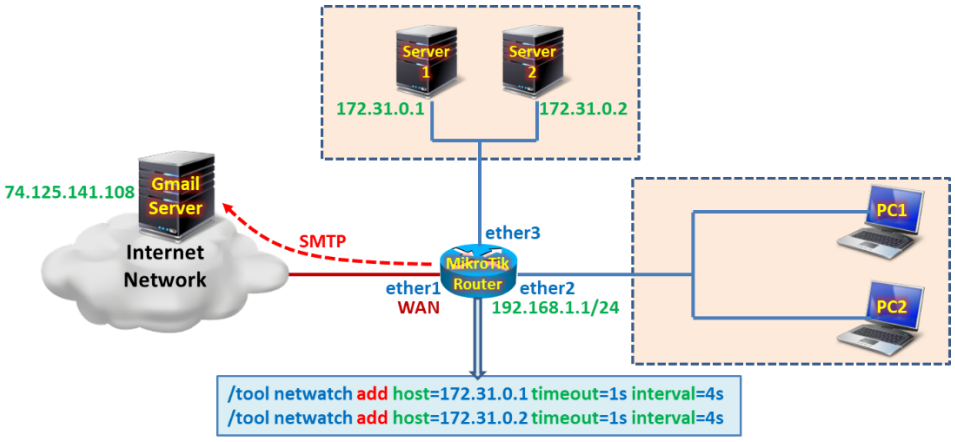

Safe Mode
Session: 4C:5E:0C:17:F0:3E
Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Mesh
IP
MPLS
IPv6
Routing
System
Queues
Files
Log
RADIUS
Tools
New Terminal
Dot1X
LCD
Partition
Make Supout.rif
Manual
New WinBox
RouterOS WinBox
Email Settings
Server: 74.125.141.108
Port: 587
Start TLS: yes
From: bquocky@gmail.com
User: bquocky@gmail.com
Password:
OK
Cancel
Apply
Send Email


Safe Mode
Session: 4C:5E:0C:17:F0:3E
Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Mesh
IP
MPLS
IPv6
Routing
System
Queues
Files
Log
RADIUS
Tools
New Terminal
Dot1X
LCD
Partition
Make Supout.rif
Manual
New WinBox
RouterOS WinBox
Send Email
Address: 0.0.0.0
Port:
User:
Password:
TLS
To: bquocky@gmail.com
CC:
From: bquocky@gmail.com
Subject: MikroTik: Send from Router MikroTik
An Email send from Router MikroTik!
Body:
Files:
Send Email
Cancel





Bước 3. Thiết lập tính năng Netwatch giám sát hệ thống Server và tự động gửi email nếu có sự cố phát sinh.

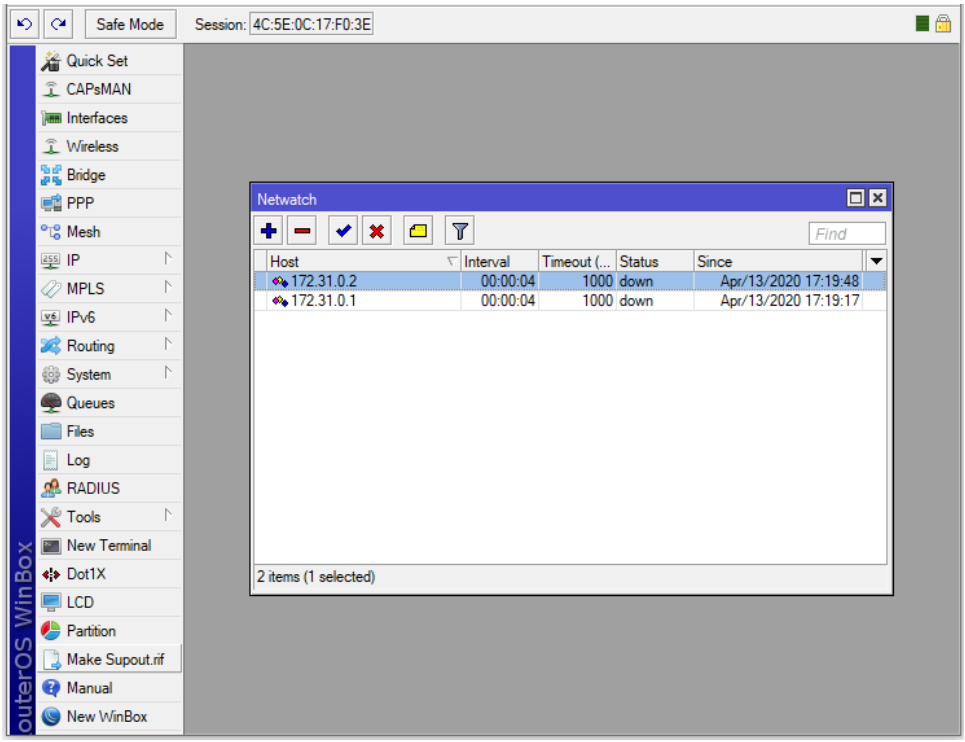


Thiết lập tính năng Netwatch trên Router MikroTik giám sát các Server.

```
[admin@MikroTik] >
/tool netwatch add host=172.31.0.1 interval=4s timeout=1s
/tool netwatch add host=172.31.0.2 interval=4s timeout=1s
```

```
[admin@MikroTik] > /tool netwatch print
Flags: X - disabled
 #    HOST                 TIMEOUT              INTERVAL             STATUS
 0    172.31.0.1           1s                   4s                   down
 1    172.31.0.2           1s                   4s                   down
[admin@MikroTik] >
```

```
[admin@MikroTik] > /tool netwatch print detail
Flags: X - disabled
 0   host=172.31.0.1 timeout=1s interval=4s since=apr/13/2020 17:19:17 status=down
     up-script=:log error "Server1 is up";
     down-script=:log error "Server1 is down";

 1   host=172.31.0.2 timeout=1s interval=4s since=apr/13/2020 17:19:48 status=down
     up-script=:log error "Server2 is up";
     down-script=:log error "Server2 is down";
[admin@MikroTik] >
```



- Nội dung Tab Up.

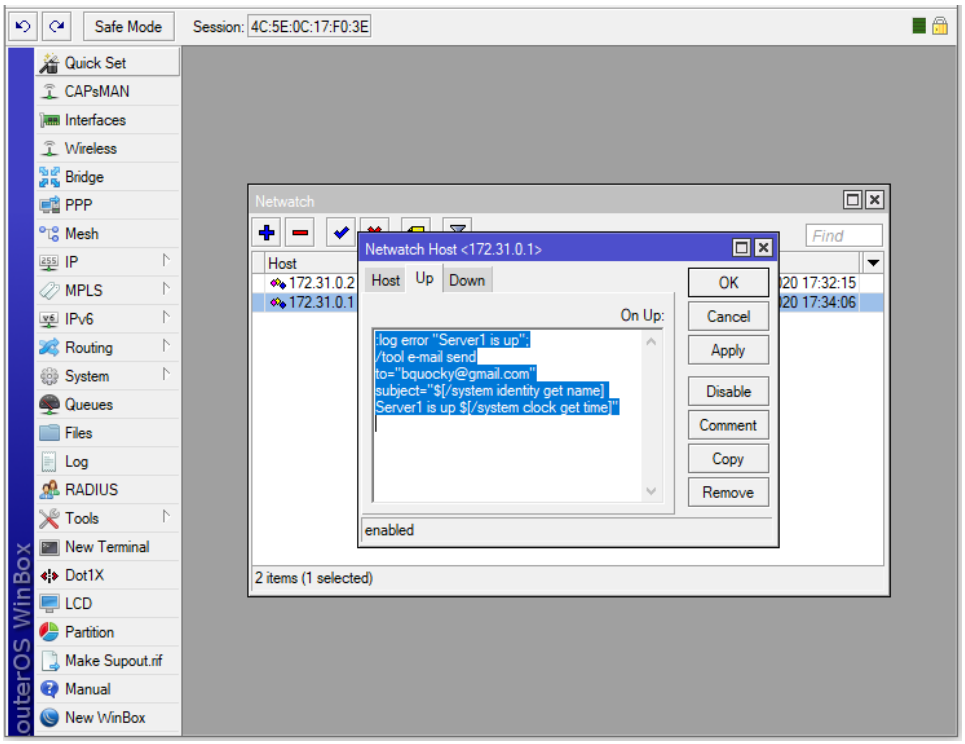
```
:log error "Server1 is up";
/tool e-mail send to="bquocky@gmail.com" subject="$[/system identity get name] Server1 is up
$[/system clock get time]"
```

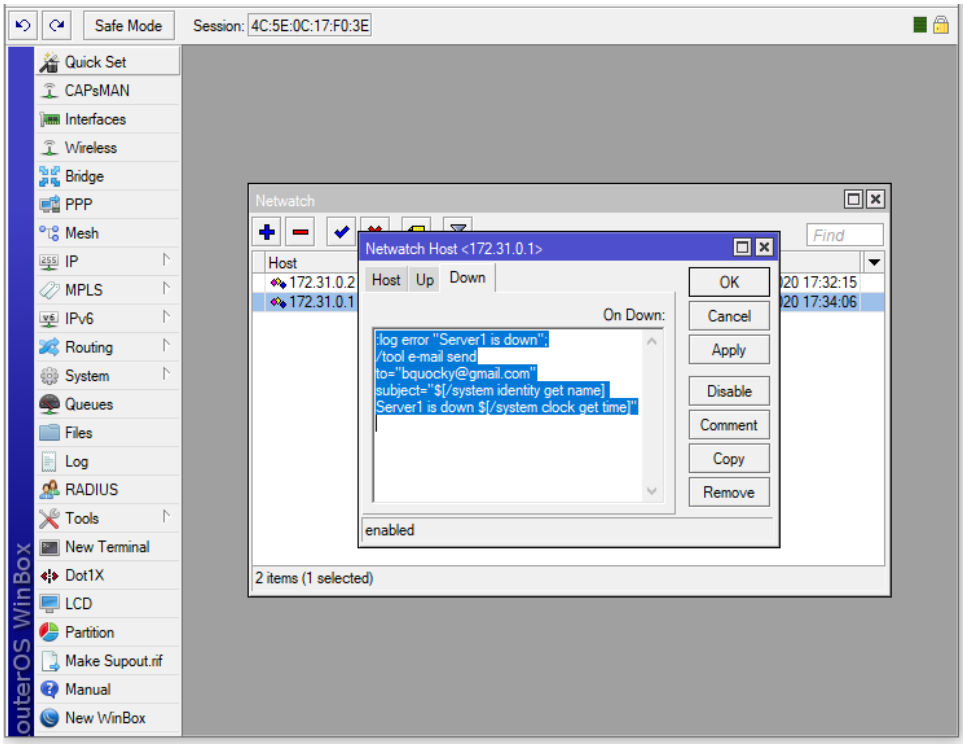
```
:log error "Server2 is up";
/tool e-mail send to="bquocky@gmail.com" subject="$[/system identity get name] Server2 is up
$[/system clock get time]"
```

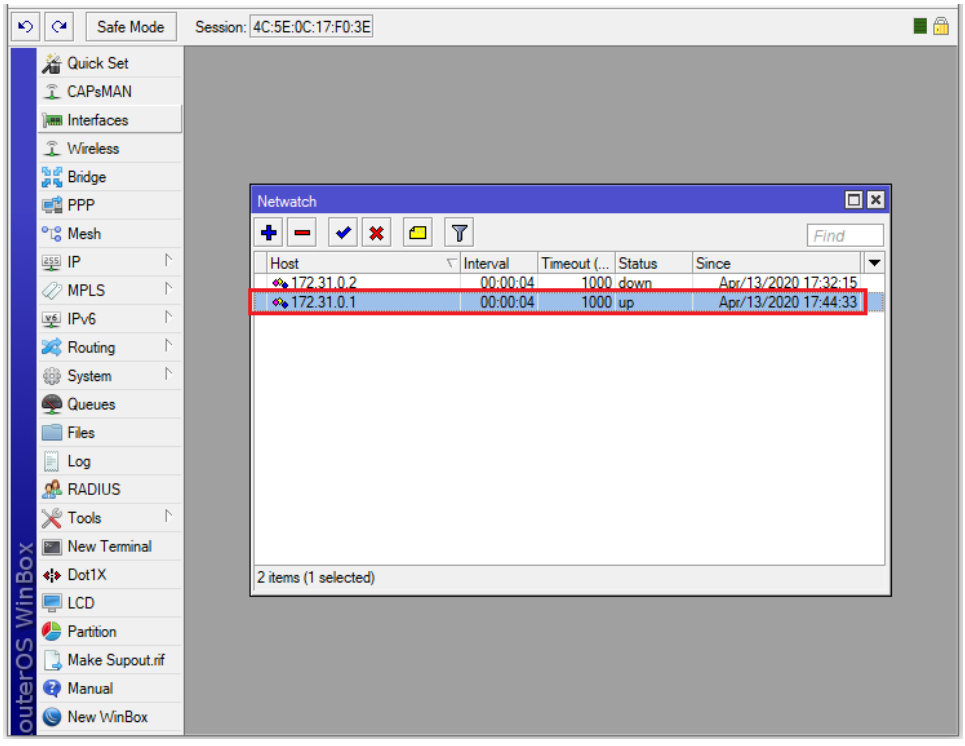
- Nội dung Tab Down.

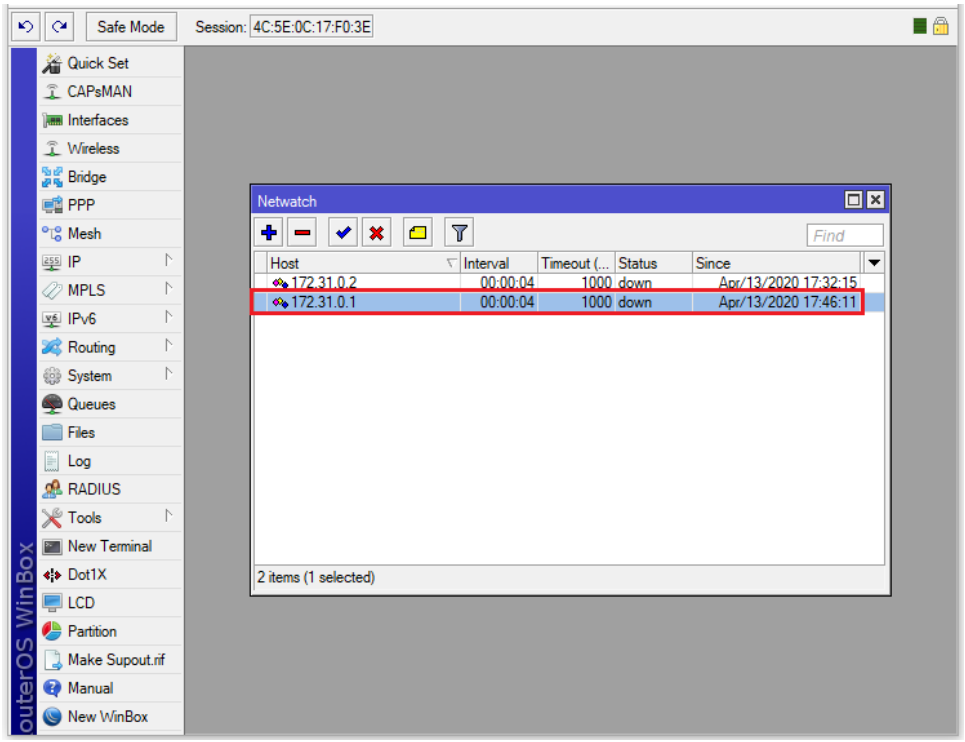
```
:log error "Server1 is down";
/tool e-mail send to="bquocky@gmail.com" subject="$[/system identity get name] Server1 is down
$[/system clock get time]"
```

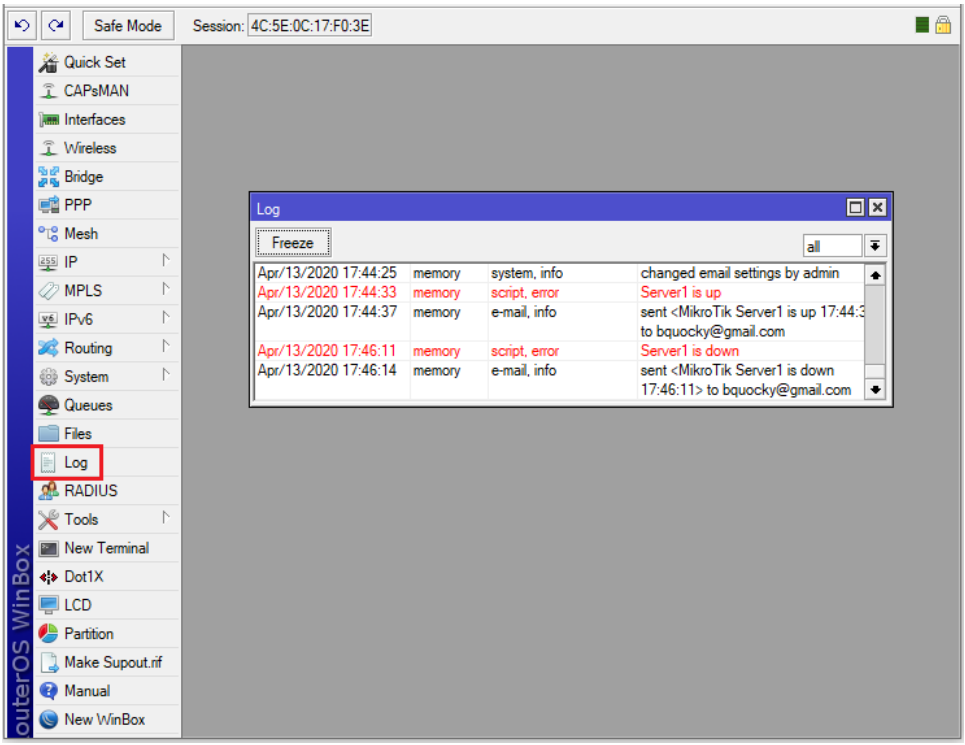
```
:log error "Server2 is down";
/tool e-mail send to="bquocky@gmail.com" subject="$[/system identity get name] Server2 is down
$[/system clock get time]"
```

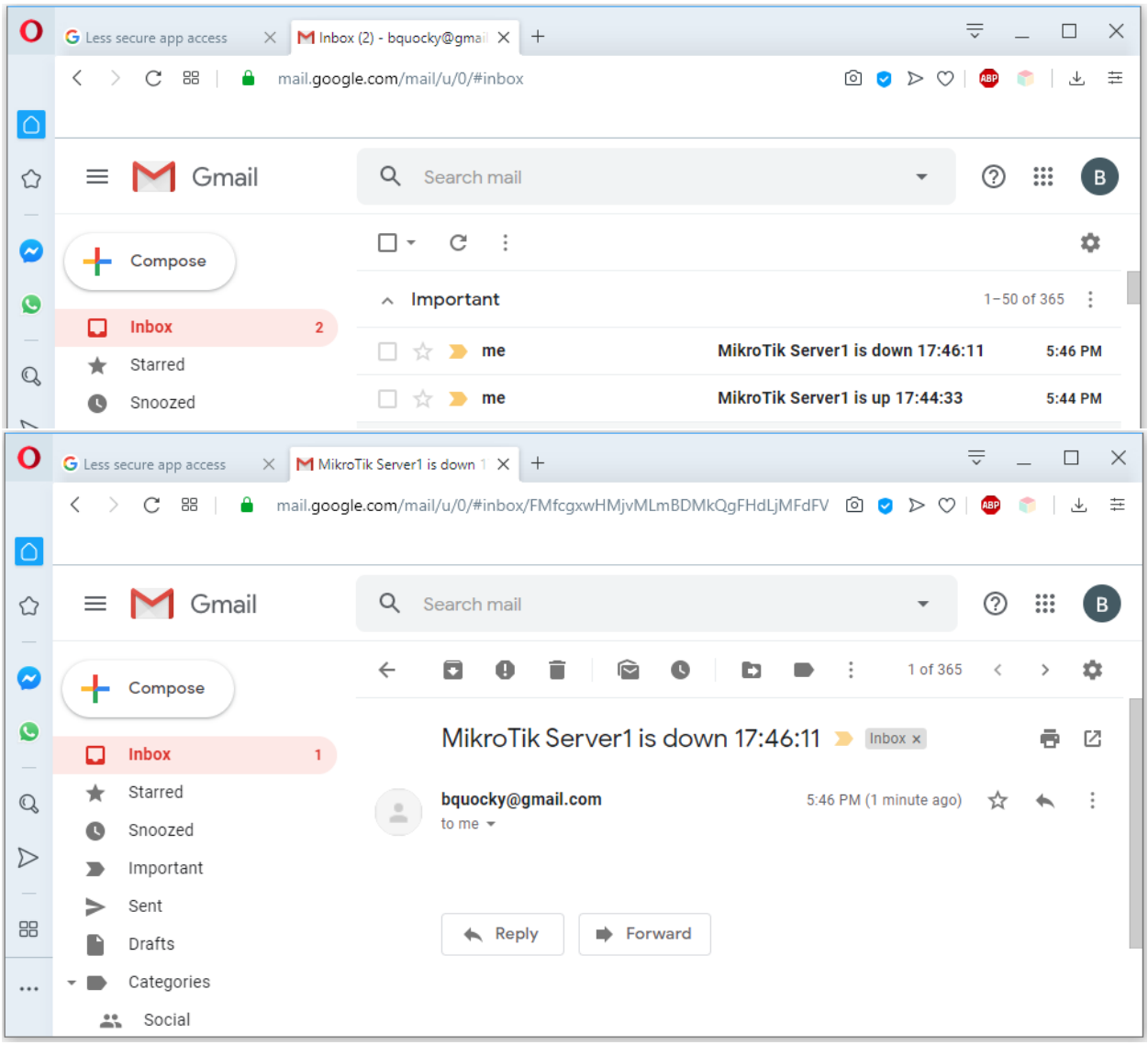



Safe Mode
Session: 4C:5E:0C:17:F0:3E
Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Mesh
IP
MPLS
IPv6
Routing
System
Queues
Files
Log
RADIUS
Tools
New Terminal
Dot1X
LCD
Partition
Make Supout.rif
Manual
New WinBox
outerOS WinBox
Netwatch
Find
Host
172.31.0.2
172.31.0.1
Netwatch Host <172.31.0.1>
Host
Up
Down
On Down:
:log error "Server1 is down";
/tool e-mail send
to="bquocky@gmail.com"
subject="$[/system identity get name]
Server1 is down $[/system clock get time]"
OK
Cancel
Apply
Disable
Comment
Copy
Remove
enabled
2 items (1 selected)


Safe Mode
Session: 4C:5E:0C:17:F0:3E
Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Mesh
IP
MPLS
IPv6
Routing
System
Queues
Files
Log
RADIUS
Tools
New Terminal
Dot1X
LCD
Partition
Make Supout.rif
Manual
New WinBox
outerOS WinBox
Netwatch
Find
Host
Interval
Timeout (...
Status
Since
172.31.0.2
00:00:04
1000
down
Apr/13/2020 17:32:15
172.31.0.1
00:00:04
1000
up
Apr/13/2020 17:44:33
2 items (1 selected)


Safe Mode
Session: 4C:5E:0C:17:F0:3E
Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Mesh
IP
MPLS
IPv6
Routing
System
Queues
Files
Log
RADIUS
Tools
New Terminal
Dot1X
LCD
Partition
Make Supout.rif
Manual
New WinBox
outerOS WinBox
Netwatch
Find
Host
Interval
Timeout (...
Status
Since
172.31.0.2 00:00:04 1000 down Apr/13/2020 17:32:15
172.31.0.1 00:00:04 1000 down Apr/13/2020 17:46:11
2 items (1 selected)


Safe Mode
Session: 4C:5E:0C:17:F0:3E
Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Mesh
IP
MPLS
IPv6
Routing
System
Queues
Files
Log
RADIUS
Tools
New Terminal
Dot1X
LCD
Partition
Make Supout.rif
Manual
New WinBox
outerOS WinBox
Log
Freeze
all
Apr/13/2020 17:44:25 memory system, info changed email settings by admin
Apr/13/2020 17:44:33 memory script, error Server1 is up
Apr/13/2020 17:44:37 memory e-mail, info sent <MikroTik Server1 is up 17:44:3 to bquocky@gmail.com
Apr/13/2020 17:46:11 memory script, error Server1 is down
Apr/13/2020 17:46:14 memory e-mail, info sent <MikroTik Server1 is down 17:46:11> to bquocky@gmail.com



Bước 4. Thiết lập Logging Rule tự động gửi email khi có sự cố liên quan đến tính năng Netwatch phát sinh.

```
[admin@MikroTik]>
/system logging action add name="Email" target=email email-to="bquocky@gmail.com" email-start-
tls=no
```

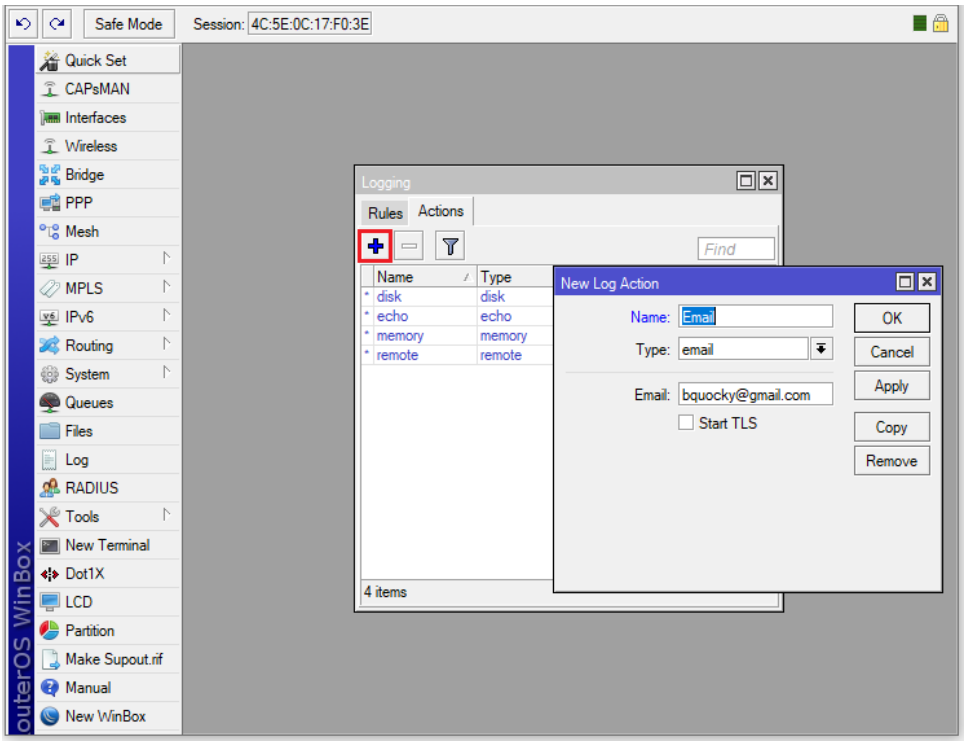
```
[admin@MikroTik] > /system logging action print
Flags: * - default
 0 * name="memory" target=memory memory-lines=1000 memory-stop-on-full=no

 1 * name="disk" target=disk disk-file-name="log" disk-lines-per-file=1000
     disk-file-count=2 disk-stop-on-full=no

 2 * name="echo" target=echo remember=yes

 3 * name="remote" target=remote remote=0.0.0.0 remote-port=514
     src-address=0.0.0.0 bsd-syslog=no syslog-time-format=bsd-syslog
```

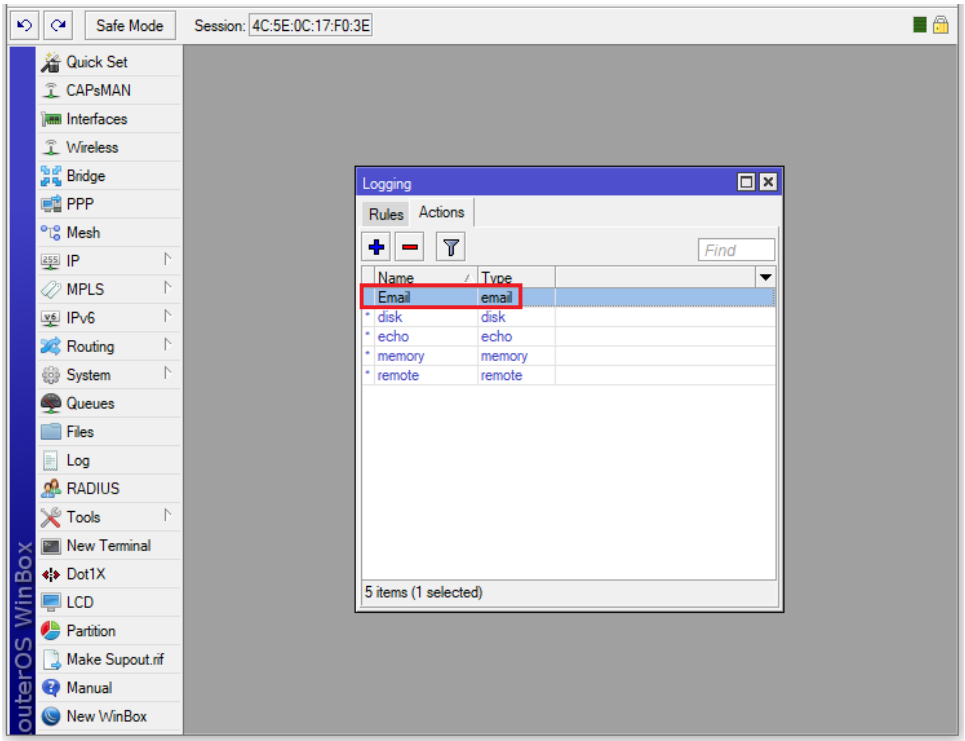
```
     syslog-facility=daemon syslog-severity=auto

 4   name="Email" target=email email-to="bquocky@gmail.com" email-start-tls=no
[admin@MikroTik] >
```

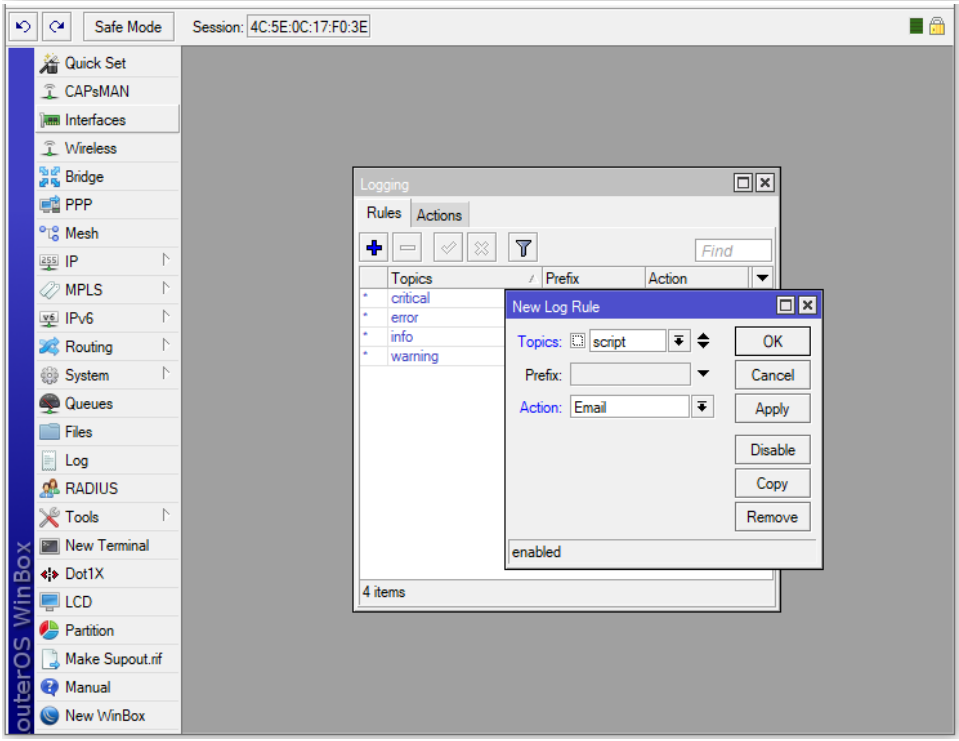
```
[admin@MikroTik]>
/system logging add topics=script action=Email
```

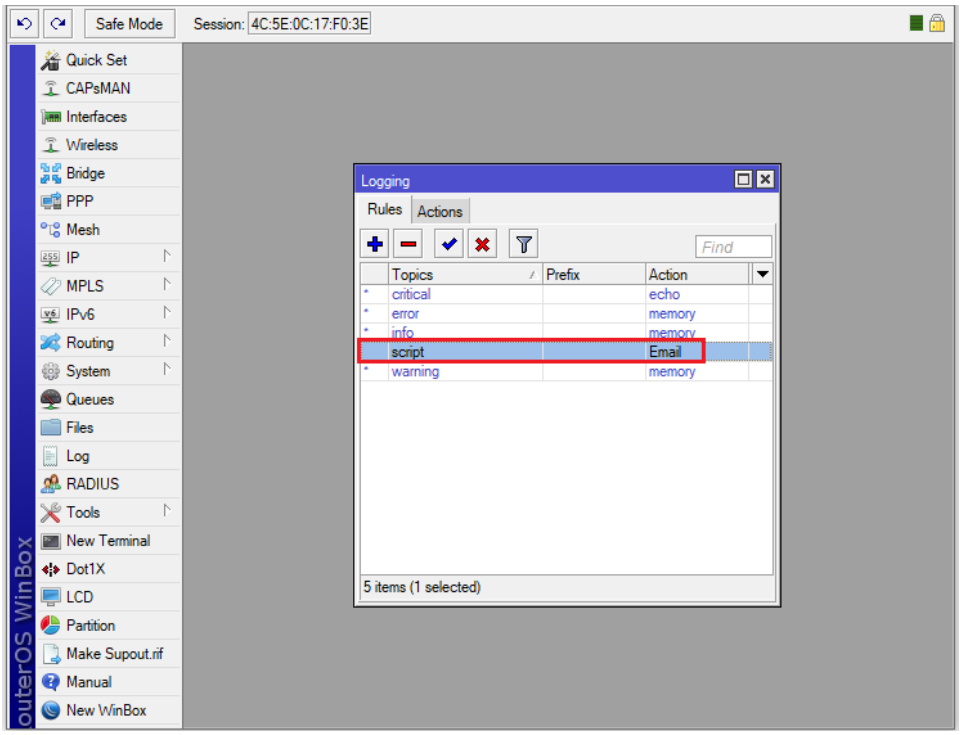
```
[admin@MikroTik] > /system logging print
Flags: X - disabled, I - invalid, * - default
 #    TOPICS                            ACTION                                PREFIX
 0  * info                              memory
 1  * error                             memory
 2  * warning                           memory
 3  * critical                          echo
 4    script                            Email
[admin@MikroTik] >
```

```
[admin@MikroTik] > /system logging print detail
Flags: X - disabled, I - invalid, * - default
 0  * topics=info prefix="" action=memory

 1  * topics=error prefix="" action=memory

 2  * topics=warning prefix="" action=memory

 3  * topics=critical prefix="" action=echo

 4    topics=script prefix="" action=Email
[admin@MikroTik] >
```

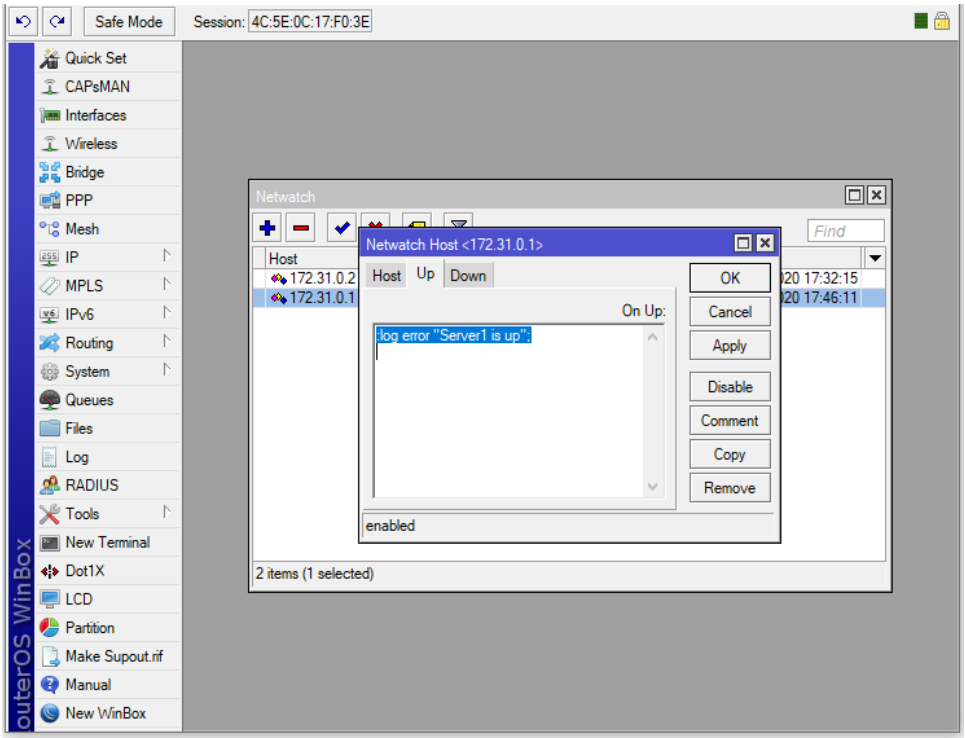


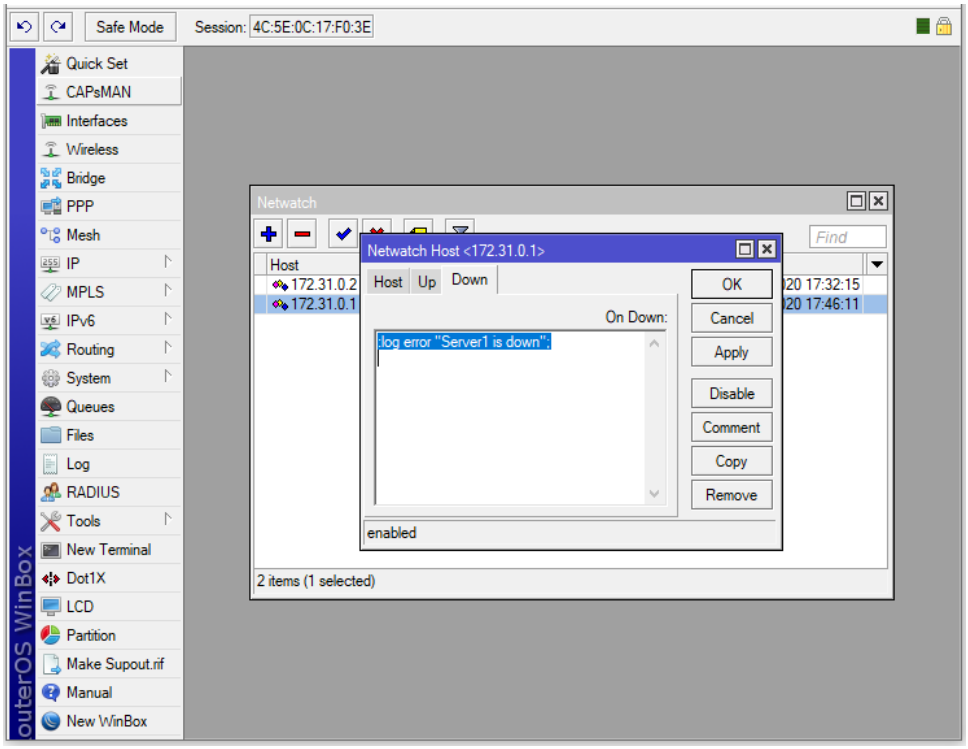

Safe Mode
Session: 4C:5E:0C:17:F0:3E
Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Mesh
IP
MPLS
IPv6
Routing
System
Queues
Files
Log
RADIUS
Tools
New Terminal
Dot1X
LCD
Partition
Make Supout.rif
Manual
New WinBox
RouterOS WinBox
Logging
Rules
Actions
Find
Name
Type
Email
email
disk
disk
echo
echo
memory
memory
remote
remote
5 items (1 selected)


Safe Mode
Session: 4C:5E:0C:17:F0:3E
Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Mesh
IP
MPLS
IPv6
Routing
System
Queues
Files
Log
RADIUS
Tools
New Terminal
Dot1X
LCD
Partition
Make Supout.rif
Manual
New WinBox
RouterOS WinBox
Logging
Rules
Actions
Find
Topics
Prefix
Action
critical
error
info
warning
4 items
New Log Rule
Topics:
script
Prefix:
Action:
Email
OK
Cancel
Apply
Disable
Copy
Remove
enabled

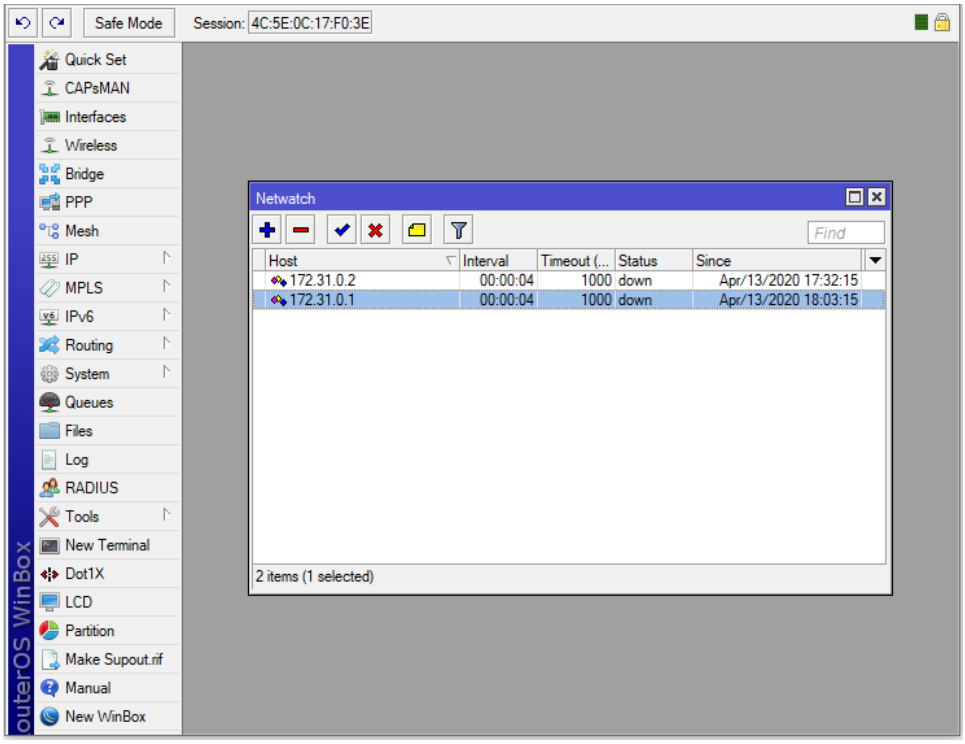


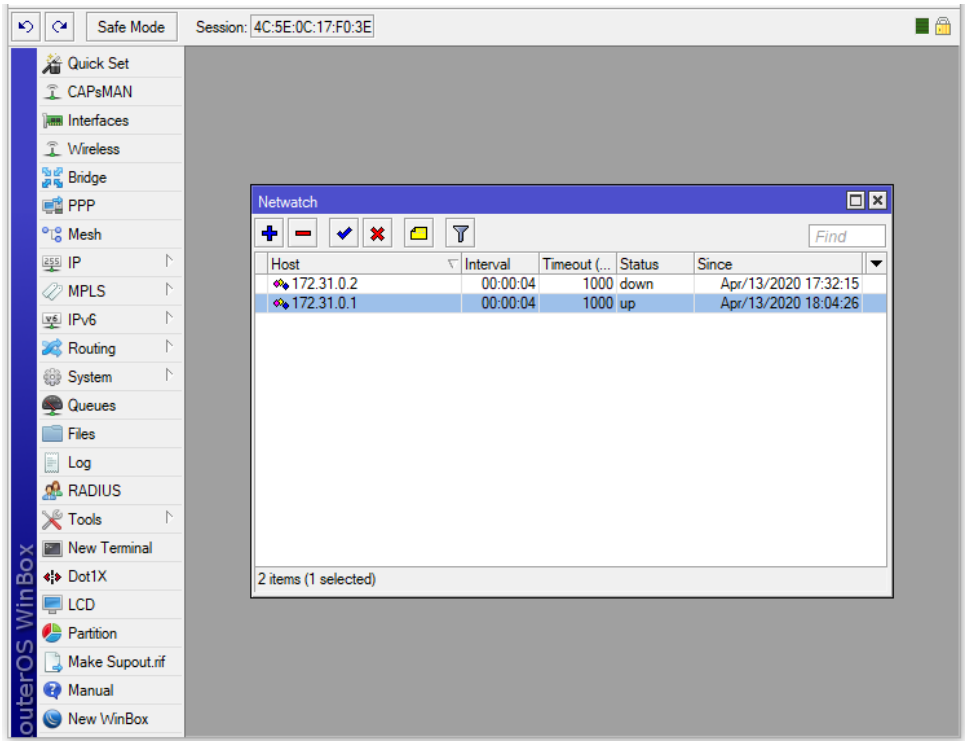
Thiết lập lại tính năng Netwatch không cần phải gửi Email nữa.

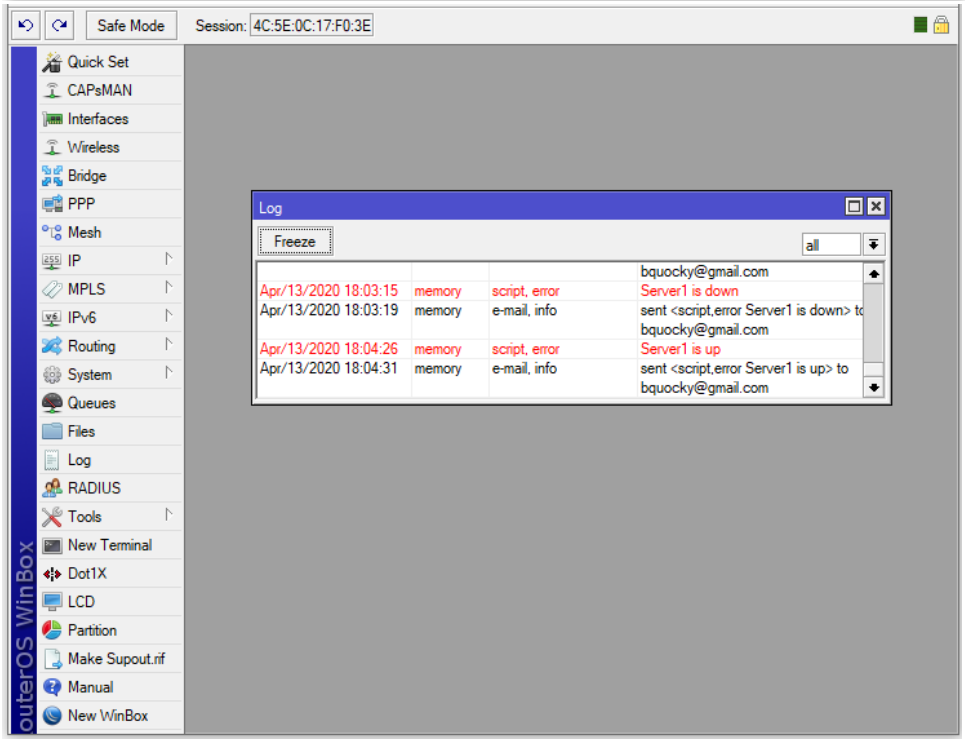


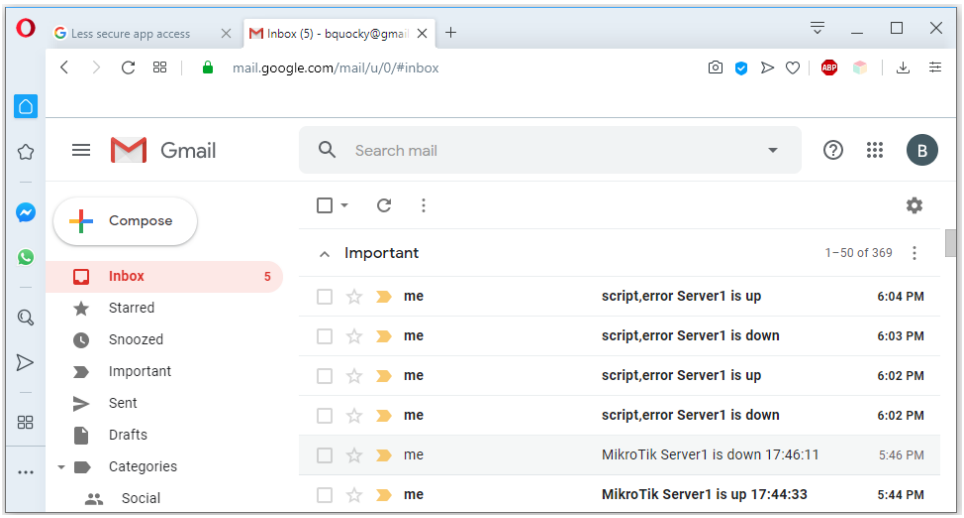


Khi Server gặp sự cố phát sinh Up/Down.

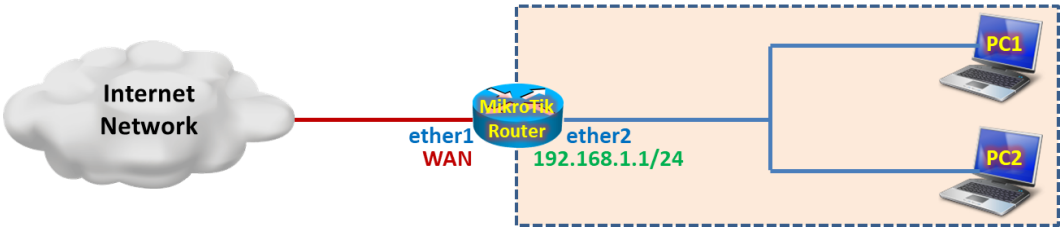



Safe Mode
Session: 4C:5E:0C:17:F0:3E
Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Mesh
IP
MPLS
IPv6
Routing
System
Queues
Files
Log
RADIUS
Tools
New Terminal
Dot1X
LCD
Partition
Make Supout.rif
Manual
New WinBox
outerOS WinBox
Netwatch
Find
Host
Interval
Timeout (...
Status
Since
172.31.0.2
00:00:04
1000
down
Apr/13/2020 17:32:15
172.31.0.1
00:00:04
1000
up
Apr/13/2020 18:04:26
2 items (1 selected)


Safe Mode
Session: 4C:5E:0C:17:F0:3E
Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Mesh
IP
MPLS
IPv6
Routing
System
Queues
Files
Log
RADIUS
Tools
New Terminal
Dot1X
LCD
Partition
Make Supout.rif
Manual
New WinBox
outerOS WinBox
Log
Freeze
all
bquocky@gmail.com
Apr/13/2020 18:03:15 memory script, error Server1 is down
Apr/13/2020 18:03:19 memory e-mail, info sent <script,error Server1 is down> to bquocky@gmail.com
Apr/13/2020 18:04:26 memory script, error Server1 is up
Apr/13/2020 18:04:31 memory e-mail, info sent <script,error Server1 is up> to bquocky@gmail.com



Phần 20.7. Tính năng giám sát và phân tích lưu lượng Torch trên Router MikroTik.



Tổng quan các bước thực hiện:

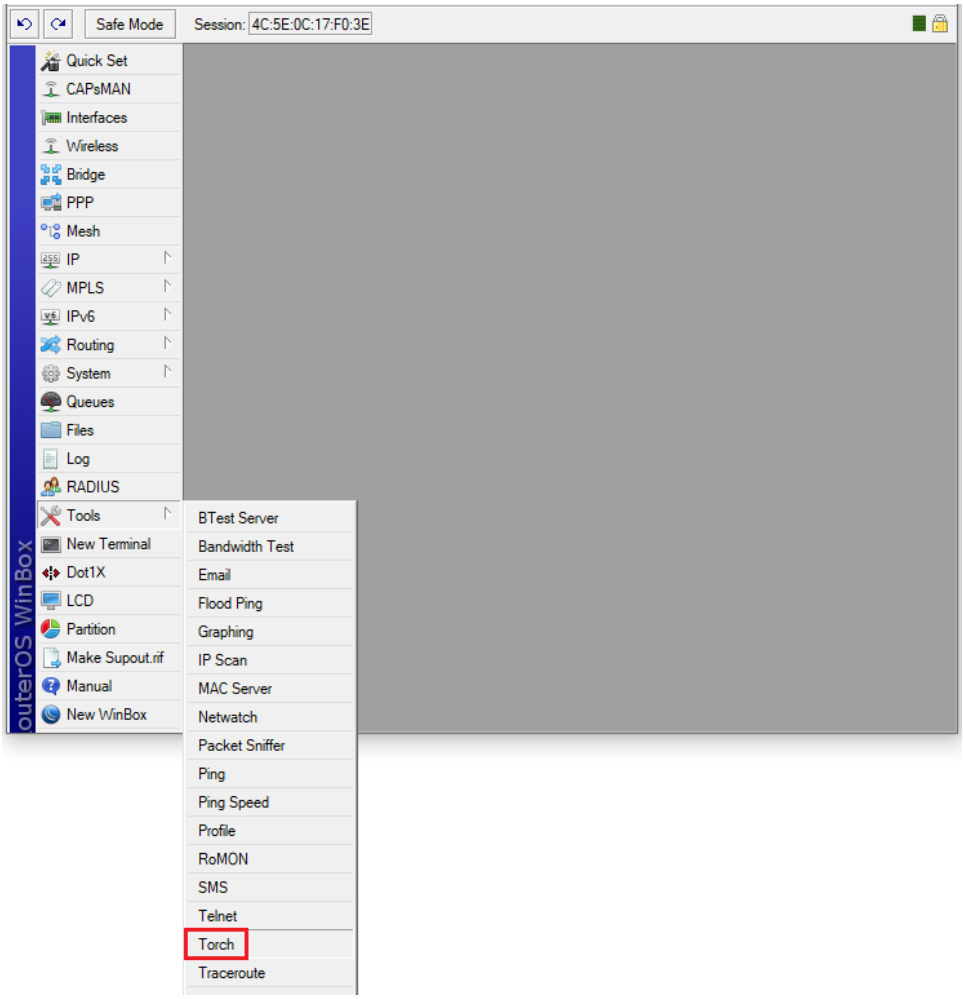
- **Bước 1.** Cấu hình cơ bản trên thiết bị Router MikroTik.
- **Bước 2.** Kích hoạt tính năng Torch trên Router MikroTik.

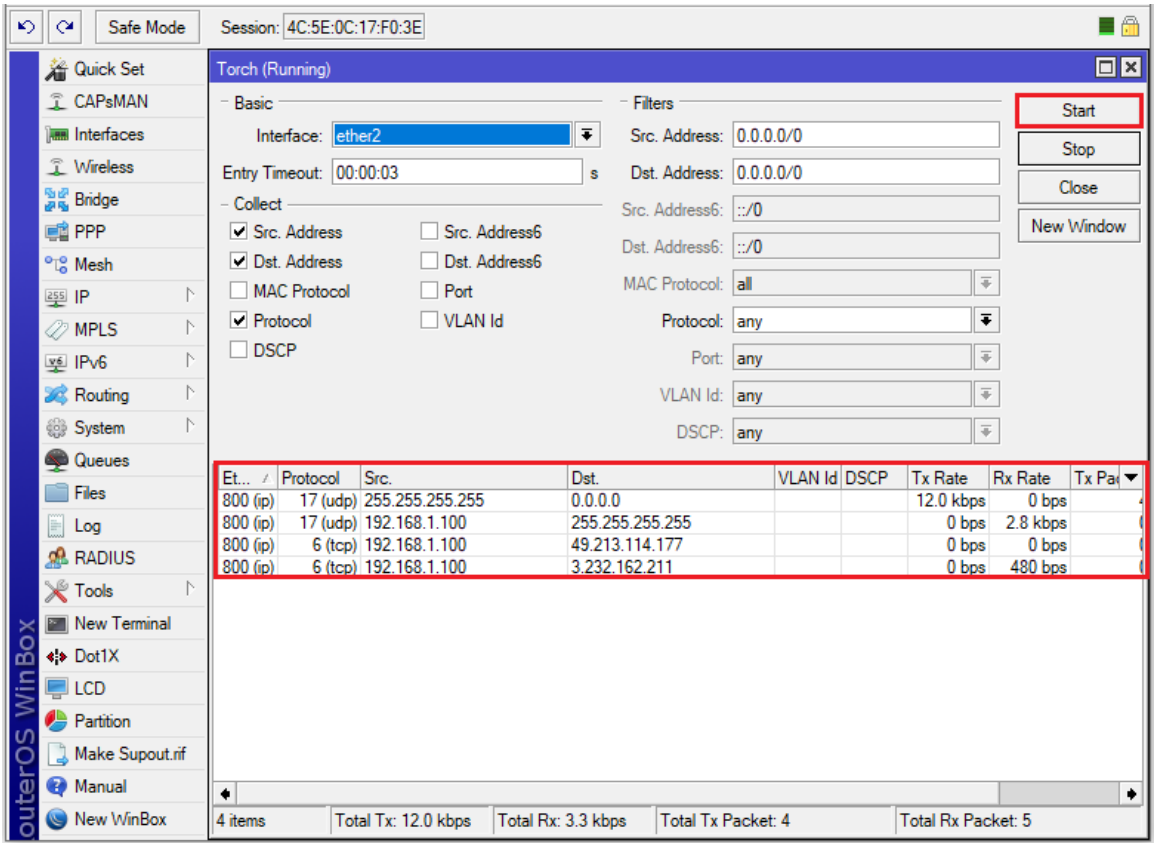
Các bước thực hiện chi tiết:

Bước 1. Cấu hình cơ bản trên thiết bị Router MikroTik.

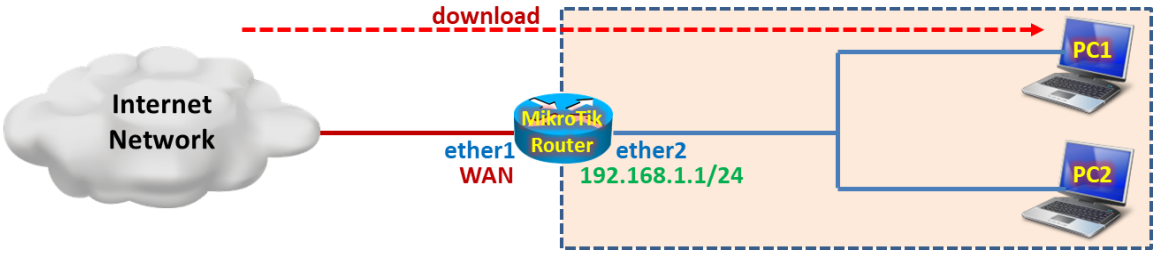
```
[admin@MikroTik]>
/ip address add address=192.168.1.1/24 interface=ether2
/ip dhcp-client add interface=ether1 disabled=no add-default-route=yes

/ip firewall nat add chain=srcnat action=masquerade out-interface=ether1

/ip pool add name=PoolLAN ranges=192.168.1.10-192.168.1.100
/ip dhcp-server network add address=192.168.1.0/24 gateway=192.168.1.1 dns-server=8.8.4.4
/ip dhcp-server add name=DHCPserv interface=ether2 address-pool=PoolLAN disabled=no
```

Bước 2. Kích hoạt tính năng Torch trên Router MikroTik.


Safe Mode
Session: 4C:5E:0C:17:F0:3E
Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Mesh
IP
MPLS
IPv6
Routing
System
Queues
Files
Log
RADIUS
Tools
New Terminal
Dot1X
LCD
Partition
Make Supout.rif
Manual
New WinBox
outerOS WinBox
BTest Server
Bandwidth Test
Email
Flood Ping
Graphing
IP Scan
MAC Server
Netwatch
Packet Sniffer
Ping
Ping Speed
Profile
RoMON
SMS
Telnet
Torch
Traceroute



Phần 20.8. Thiết lập tính năng Traffic Monitor cảnh báo khi tốc độ Download vượt quá 5M.



Tổng quan các bước thực hiện:

- **Bước 1.** Cấu hình cơ bản trên thiết bị Router MikroTik.
- **Bước 2.** Kích hoạt tính năng Traffic Monitor trên Router MikroTik.
- **Bước 3.** Khảo sát tính năng Traffic Monitor trên Router MikroTik.

Các bước thực hiện chi tiết:

Bước 1. Cấu hình cơ bản trên thiết bị Router MikroTik.

```
[admin@MikroTik]>
/ip address add address=192.168.1.1/24 interface=ether2
/ip dhcp-client add interface=ether1 disabled=no add-default-route=yes

/ip firewall nat add chain=srcnat action=masquerade out-interface=ether1

/ip pool add name=PoolLAN ranges=192.168.1.10-192.168.1.100
```

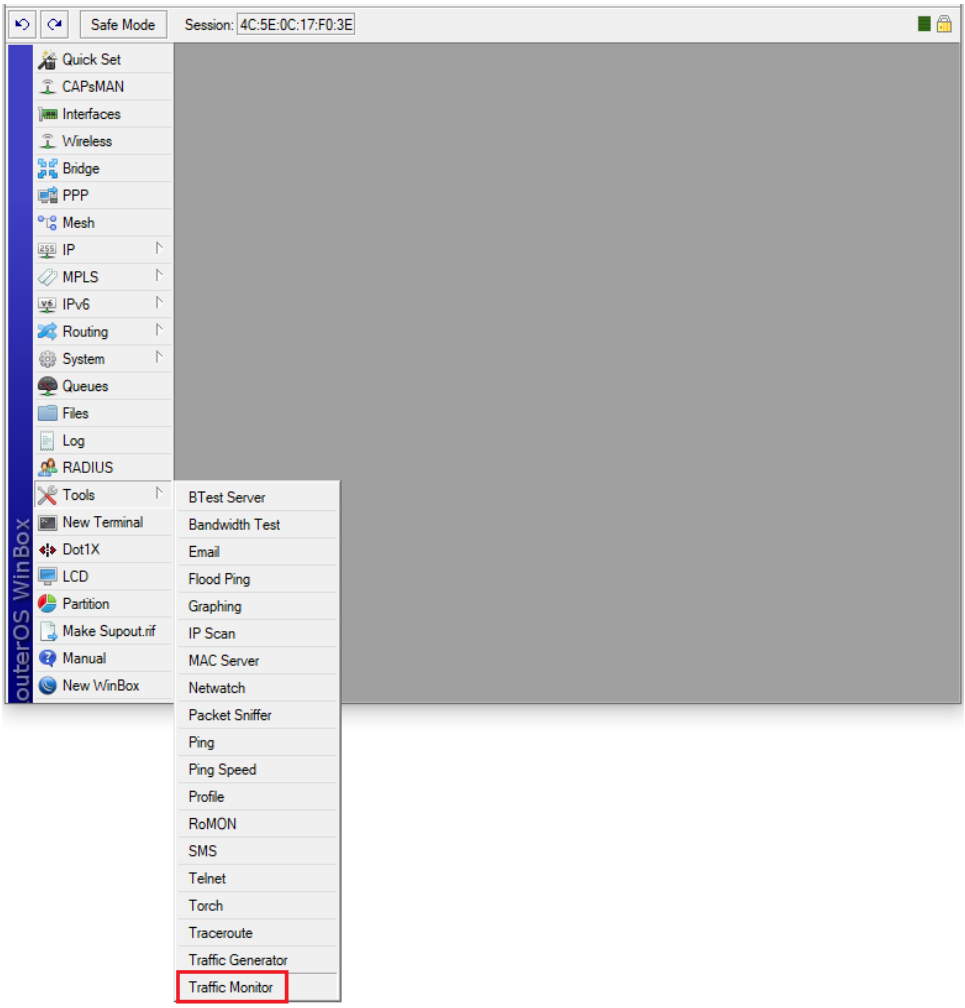
```
/ip dhcp-server network add address=192.168.1.0/24 gateway=192.168.1.1 dns-server=8.8.4.4
/ip dhcp-server add name=DHCPserv interface=ether2 address-pool=PoolLAN disabled=no
```

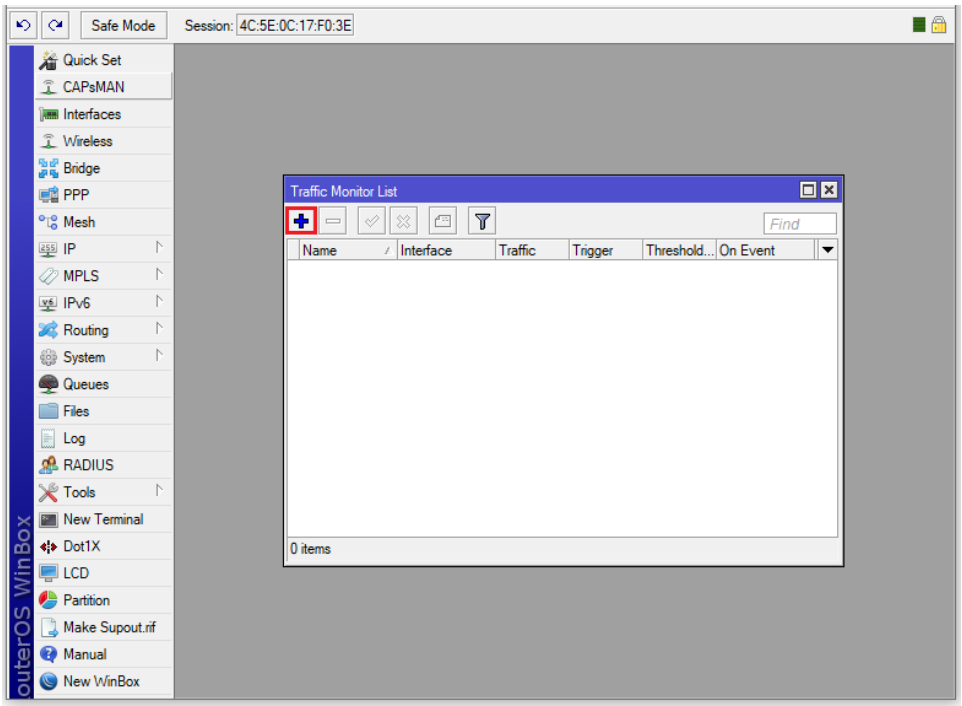
Bước 2. Kích hoạt tính năng Traffic Monitor trên Router MikroTik.

```
[admin@MikroTik]>
/tool traffic-monitor add name="DownloadTrafficeMonitor" interface=ether1 traffic=received
trigger=above threshold=5000000
```

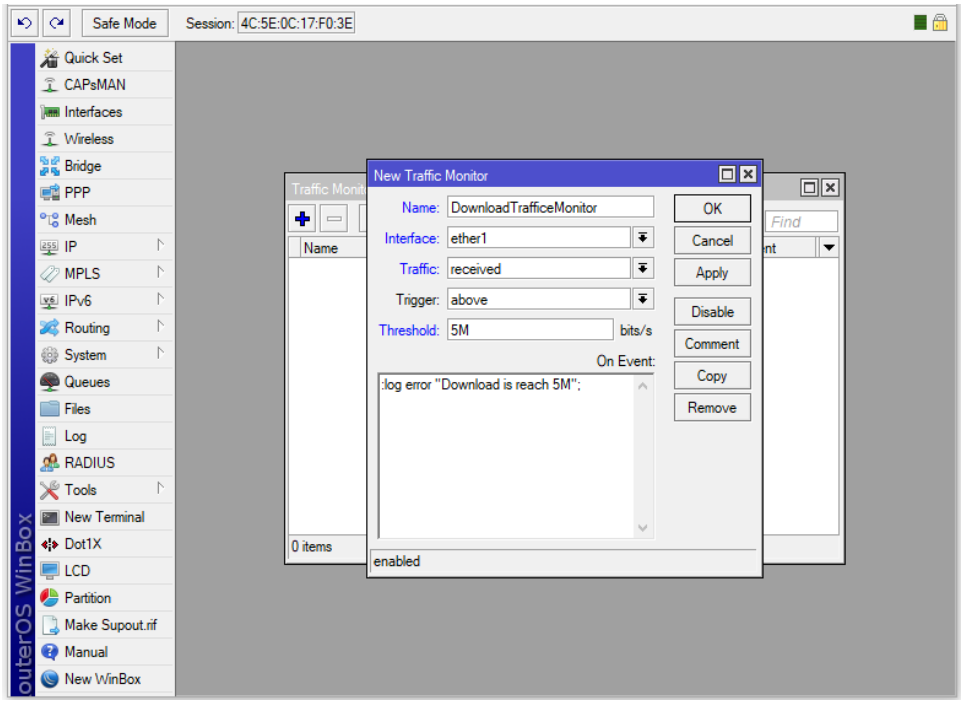
```
[admin@MikroTik] > /tool traffic-monitor print
Flags: X - disabled, I - invalid
 #    NAME            INTERFACE          TRAFFIC     TRIGGER  THRESHOLD ON-EVENT
 0    DownloadTra... ether1             received    above      5000000 :log error "Do...
[admin@MikroTik] >
```

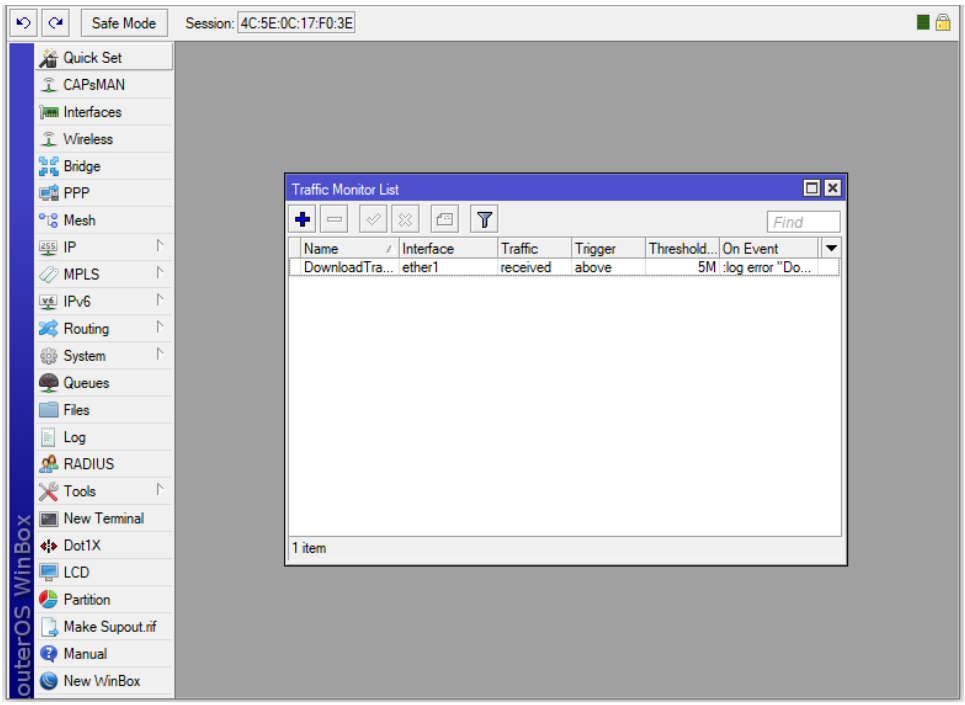
```
[admin@MikroTik] > /tool traffic-monitor print detail
Flags: X - disabled, I - invalid
 0    name="DownloadTrafficeMonitor" interface=ether1 traffic=received trigger=above
      threshold=5000000 on-event=:log error "Download is reach 5M";
[admin@MikroTik] >
```



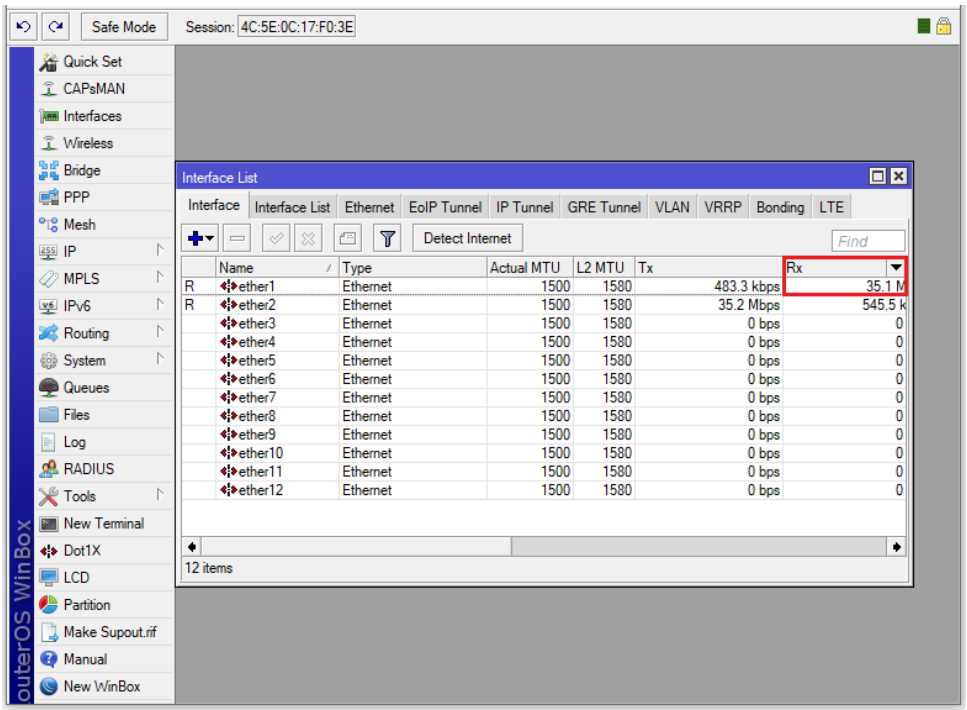


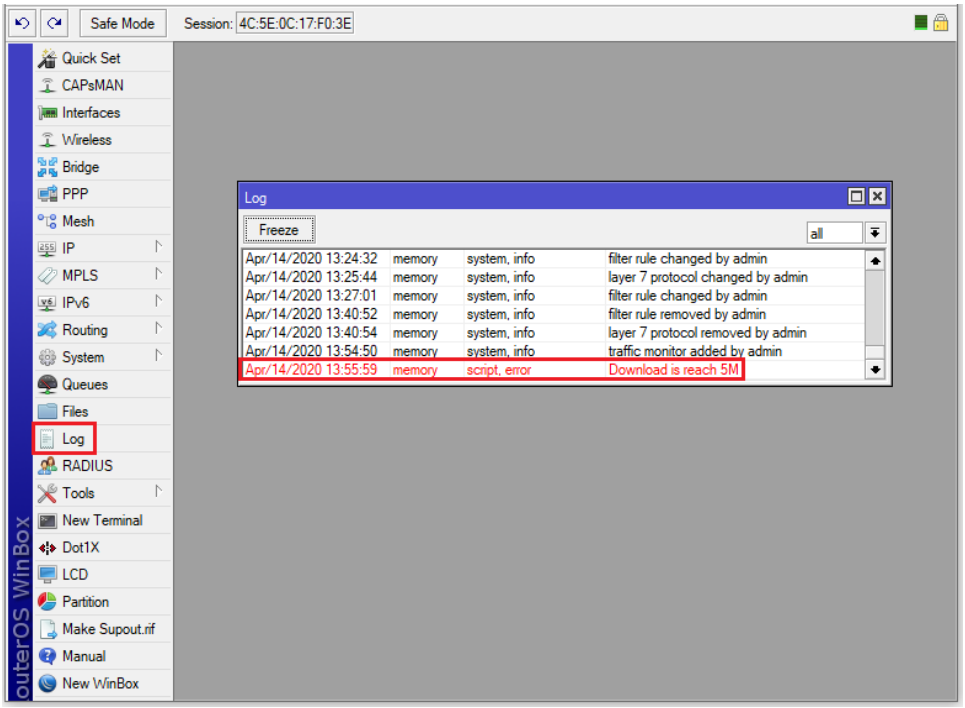
:log error "Download is reach 5M";



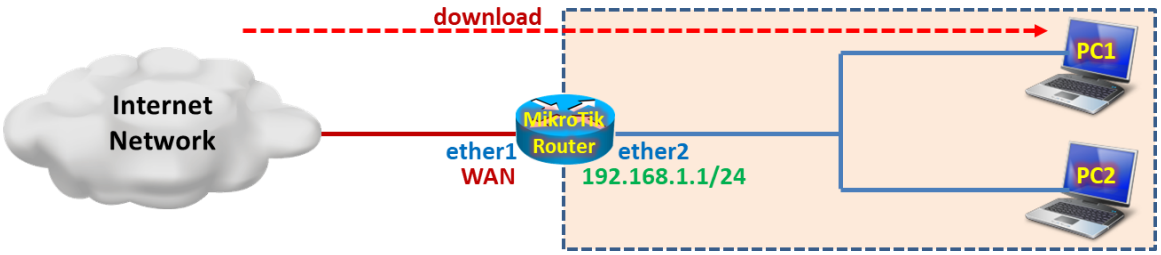


Bước 3. Khảo sát tính năng Traffic Monitor trên Router MikroTik.





Phần 20.9. Giám sát và thống kê lưu lượng Download trên Router MikroTik bằng công cụ Graphing.



Tổng quan các bước thực hiện:

- **Bước 1.** Cấu hình cơ bản trên thiết bị Router MikroTik.
- **Bước 2.** Định nghĩa danh sách các Interface sẽ giám sát lưu lượng bằng tính năng Graphing trên Router MikroTik.
- **Bước 3.** Tiến hành giám sát lưu lượng trên các cổng giao tiếp bằng tính năng Graphing trên Router MikroTik.
- **Bước 4.** Thiết lập địa chỉ IP nào được phép xem thống kê lưu lượng trên Router MikroTik.

Các bước thực hiện chi tiết:

Bước 1. Cấu hình cơ bản trên thiết bị Router MikroTik.

```
[admin@MikroTik]>
/ip address add address=192.168.1.1/24 interface=ether2
/ip dhcp-client add interface=ether1 disabled=no add-default-route=yes

/ip firewall nat add chain=srcnat action=masquerade out-interface=ether1
```

```
/ip pool add name=PoolLAN ranges=192.168.1.10-192.168.1.100
/ip dhcp-server network add address=192.168.1.0/24 gateway=192.168.1.1 dns-server=8.8.4.4
/ip dhcp-server add name=DHCPserv interface=ether2 address-pool=PoolLAN disabled=no
```

Bước 2. Định nghĩa danh sách các Interface sẽ giám sát lưu lượng bằng tính năng Graphing trên Router MikroTik.

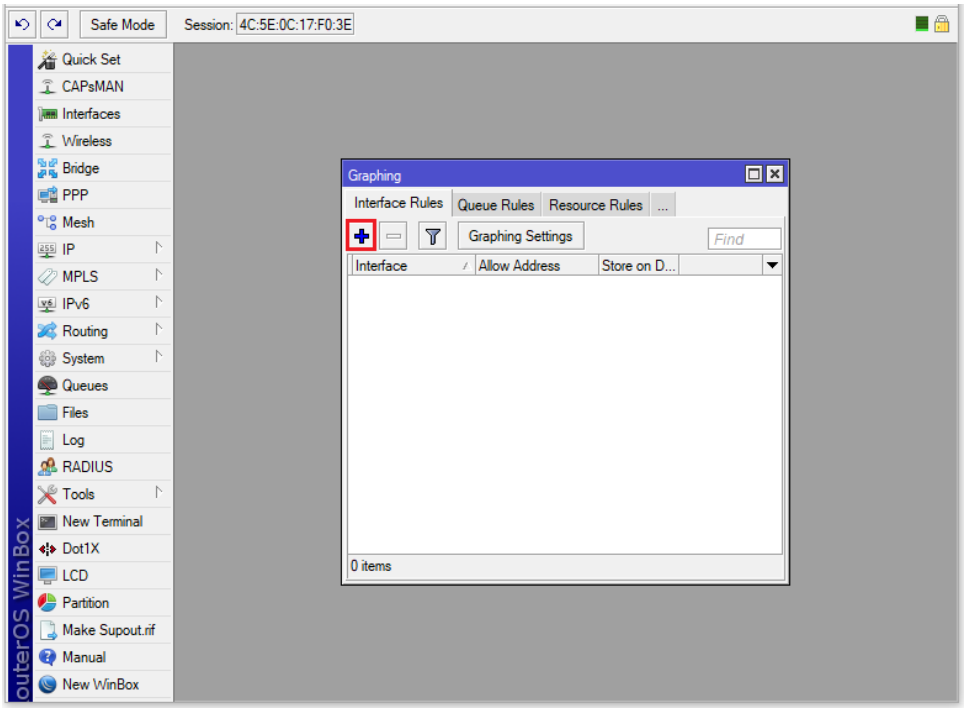
```
[admin@MikroTik]>
/tool graphing interface add interface=all allow-address=192.168.1.100/32 store-on-disk=yes
```

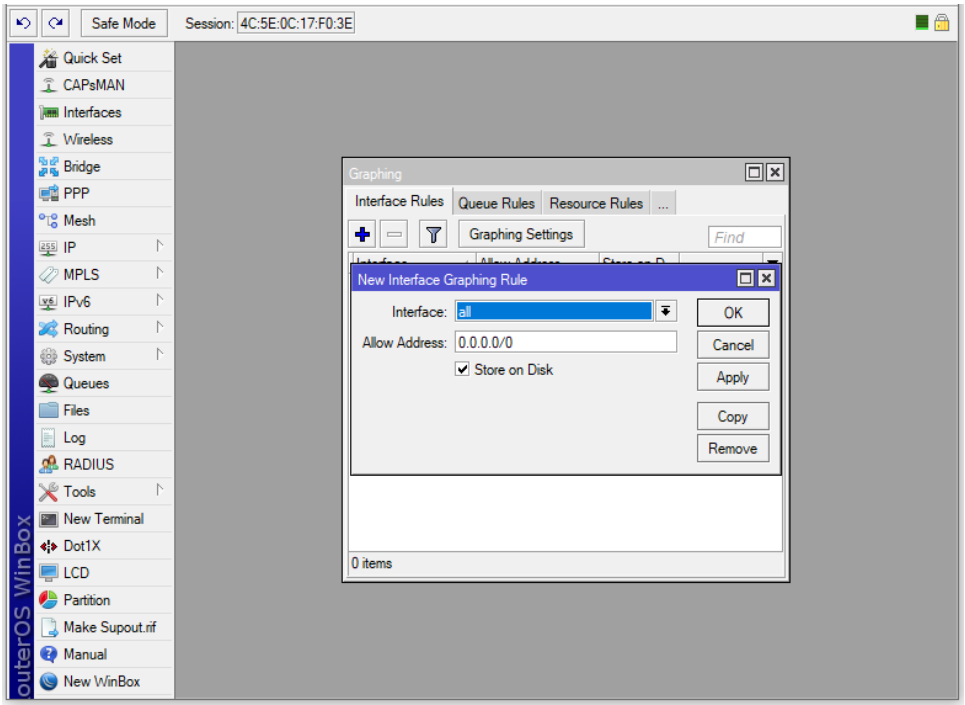
```
[admin@MikroTik] > /tool graphing interface print
Flags: X - disabled
 #    INTERFACE          ALLOW-ADDRESS                                   STORE-ON-DISK
 0    all                192.168.1.100/32                                yes
[admin@MikroTik] >
```

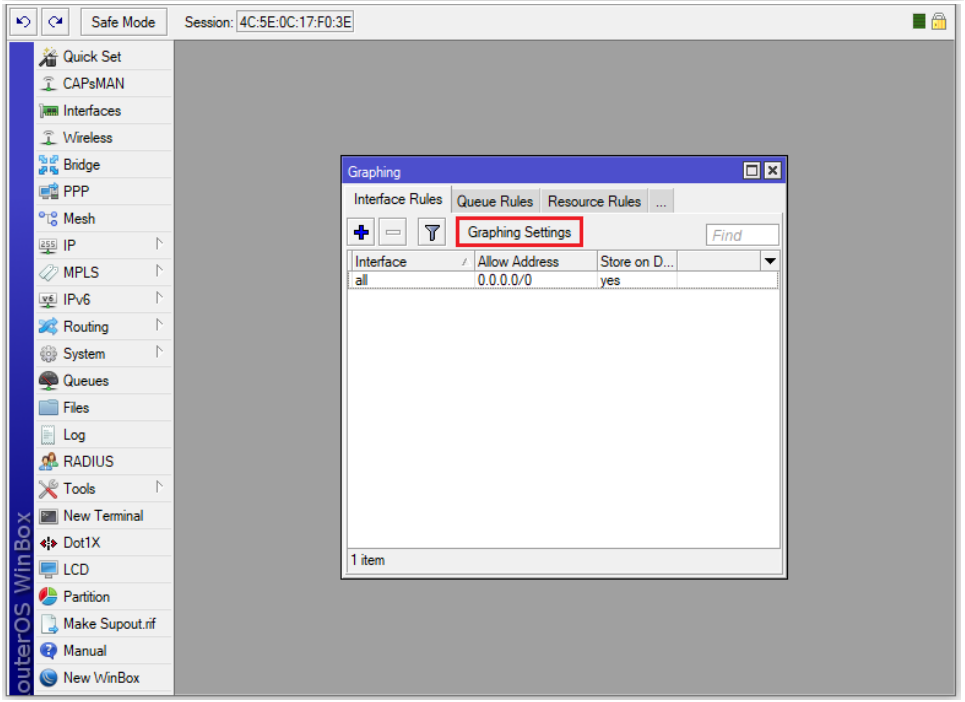
```
[admin@MikroTik] > /tool graphing interface print detail
Flags: X - disabled
 0   interface=all allow-address=192.168.1.100/32 store-on-disk=yes
[admin@MikroTik] >
```

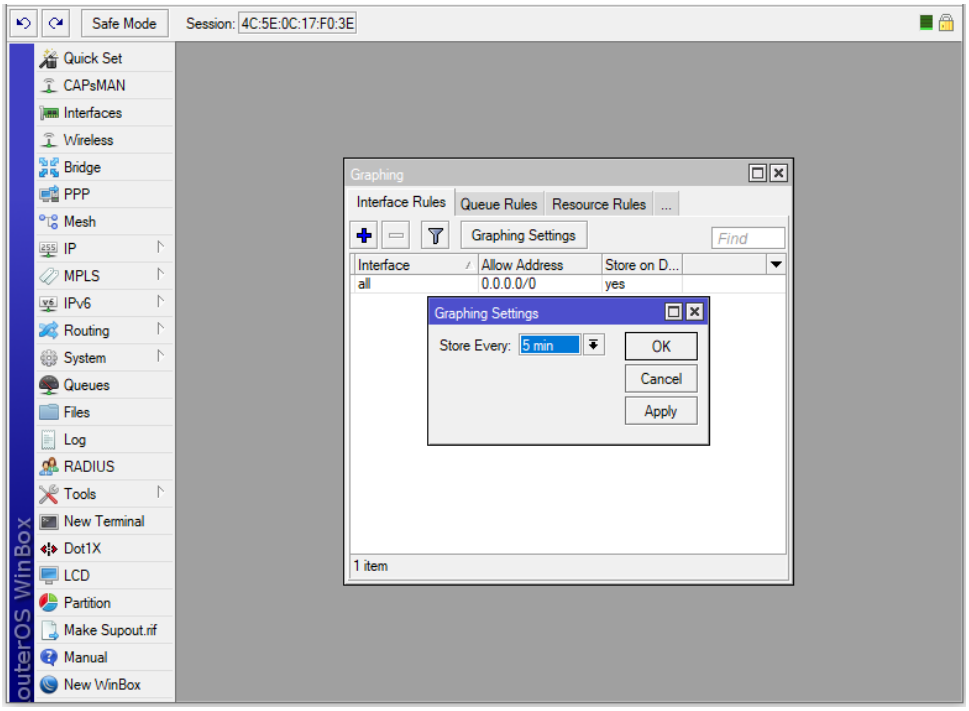
```
[admin@MikroTik] > /tool graphing print
   store-every: 5min
  page-refresh: 300
[admin@MikroTik] >
```

```
[admin@MikroTik] >
/tool graphing set store-every=5min page-refresh=300
```

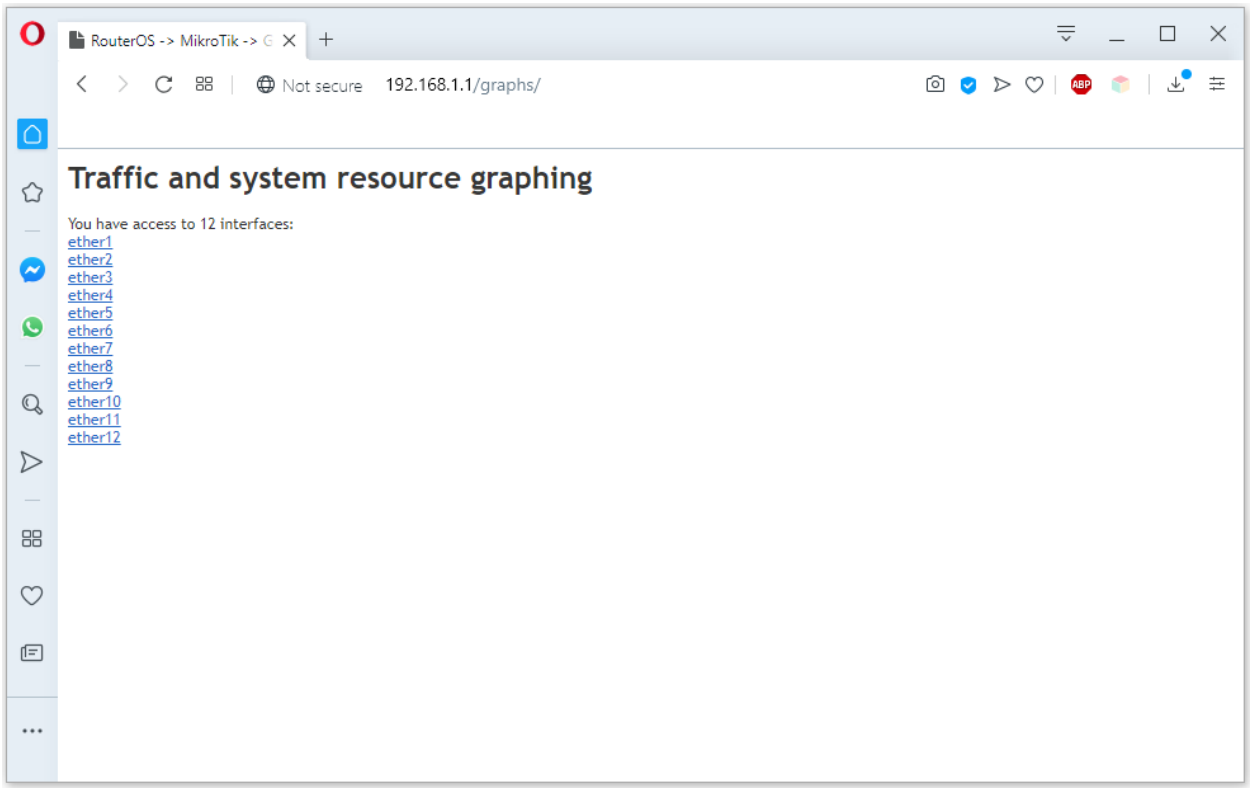


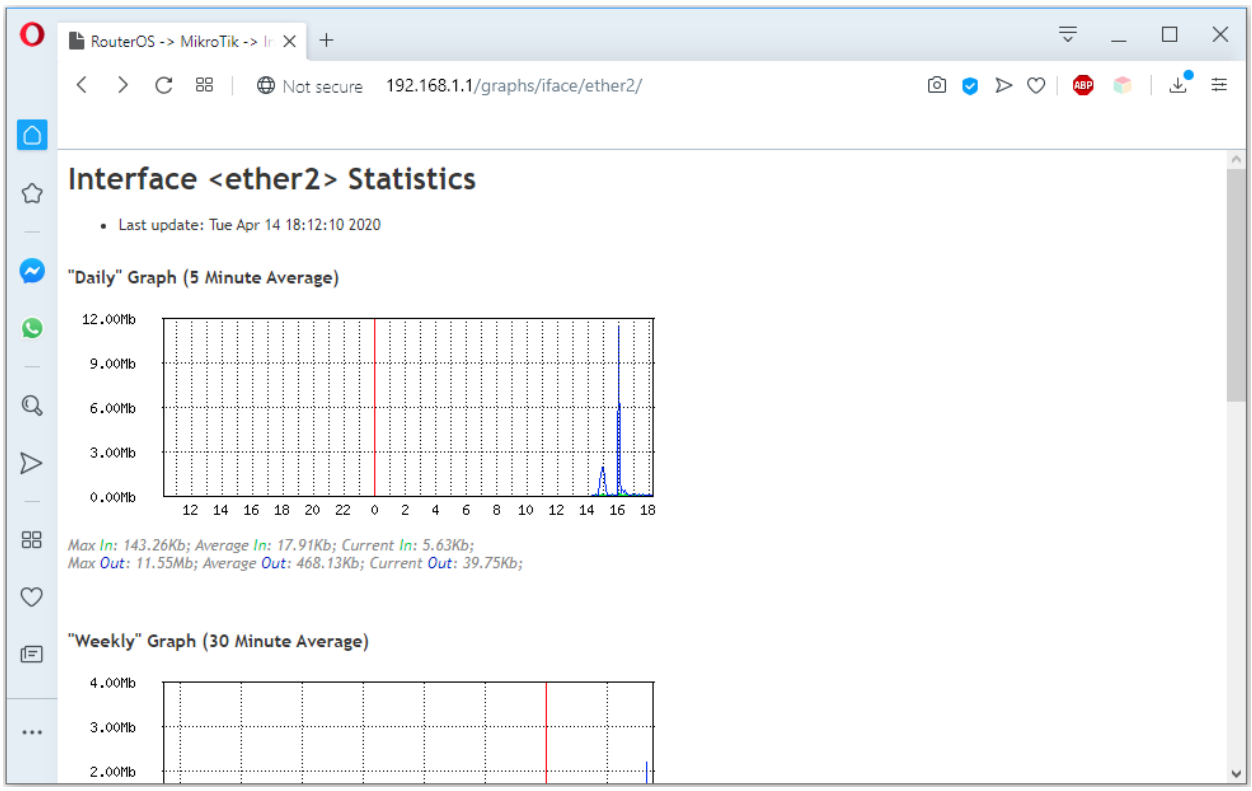

Safe Mode
Session: 4C:5E:0C:17:F0:3E
Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Mesh
IP
MPLS
IPv6
Routing
System
Queues
Files
Log
RADIUS
Tools
New Terminal
Dot1X
LCD
Partition
Make Supout.rif
Manual
New WinBox
RouterOS WinBox
Graphing
Interface Rules
Queue Rules
Resource Rules
...
Graphing Settings
Find
New Interface Graphing Rule
Interface: all
Allow Address: 0.0.0.0/0
Store on Disk
OK
Cancel
Apply
Copy
Remove
0 items


Safe Mode
Session: 4C:5E:0C:17:F0:3E
Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Mesh
IP
MPLS
IPv6
Routing
System
Queues
Files
Log
RADIUS
Tools
New Terminal
Dot1X
LCD
Partition
Make Supout.rif
Manual
New WinBox
RouterOS WinBox
Graphing
Interface Rules
Queue Rules
Resource Rules
...
Graphing Settings
Find
Interface
Allow Address
Store on D...
all
0.0.0.0/0
yes
1 item

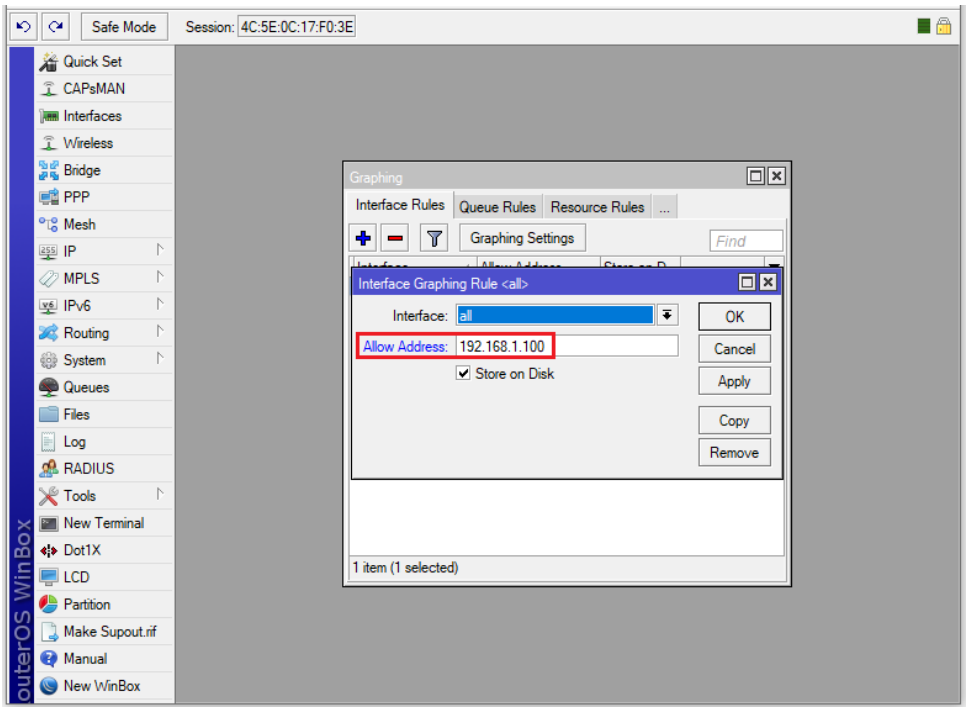


Bước 3. Tiến hành giám sát lưu lượng trên các cổng giao tiếp bằng tính năng Graphing trên Router MikroTik.

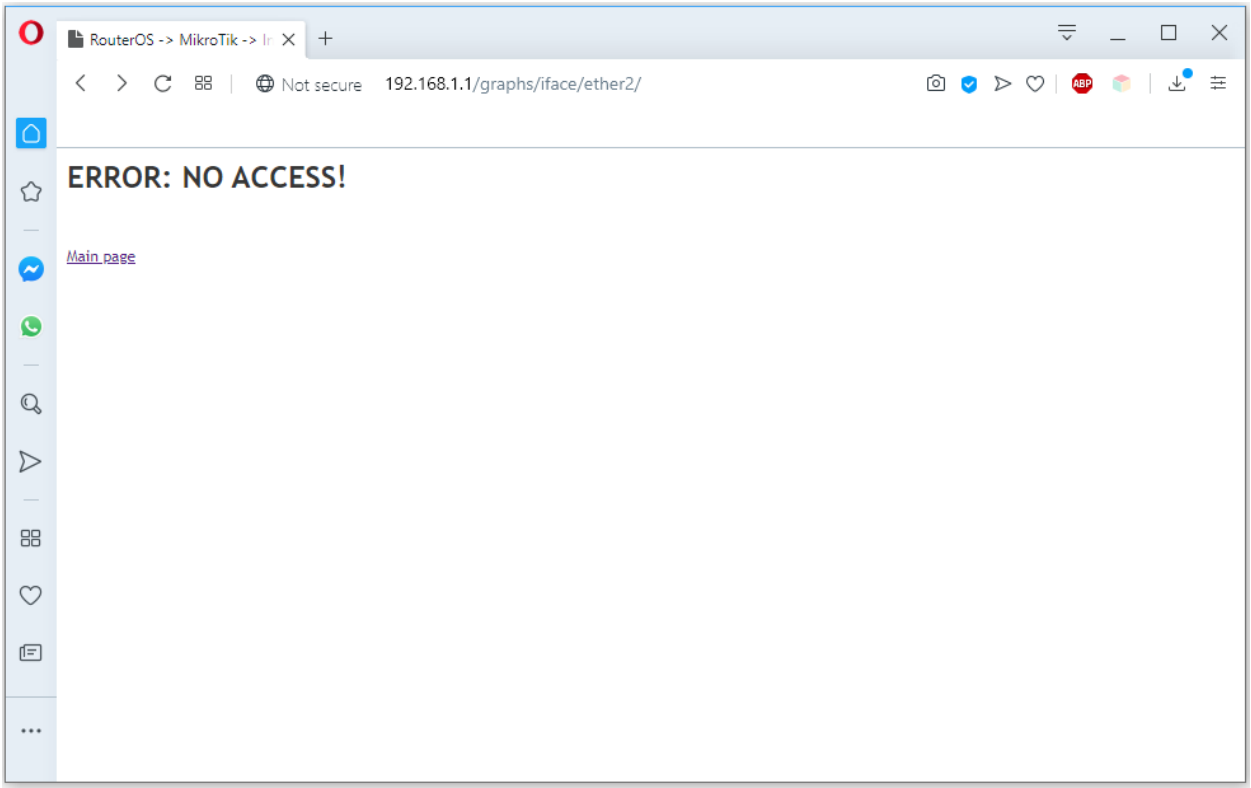


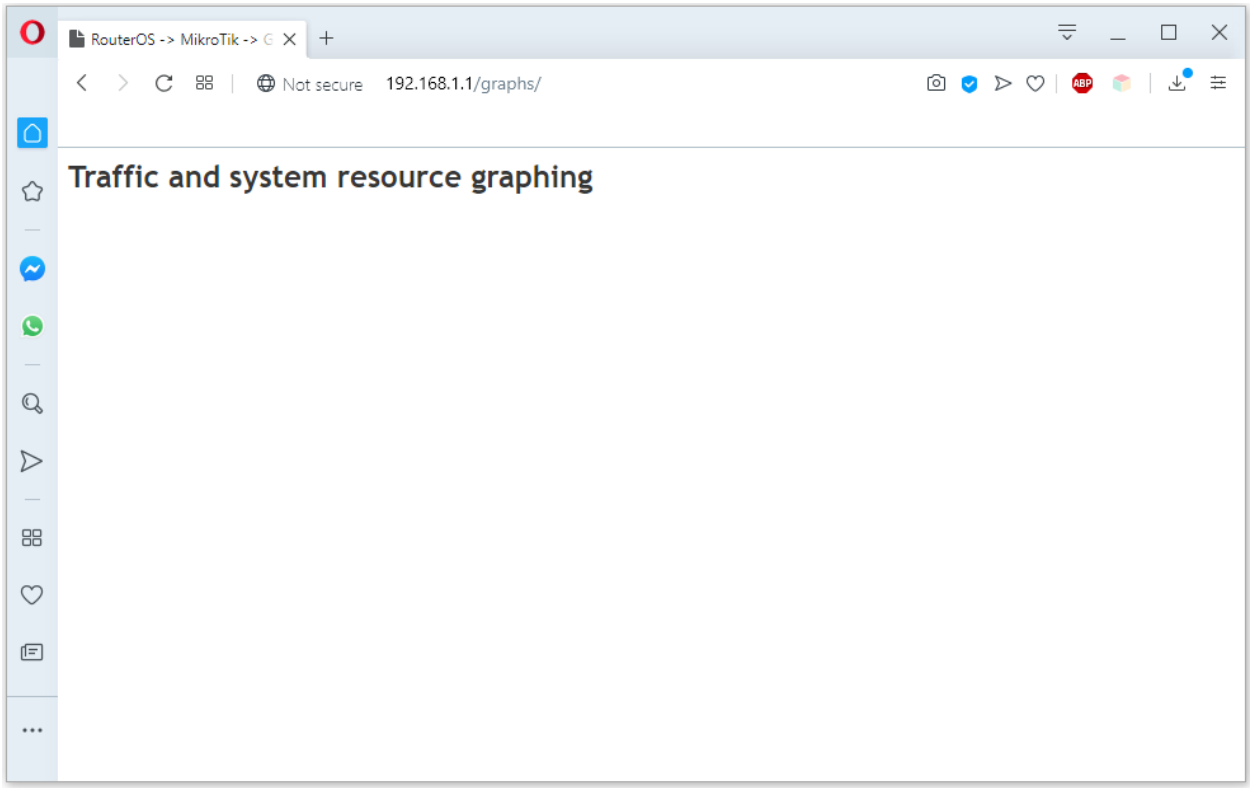


Bước 4. Thiết lập địa chỉ IP nào được phép xem thống kê lưu lượng trên Router MikroTik.



Máy tính không có địa chỉ IP là 192.168.1.100 sẽ không thể xem được thống kê lưu lượng trên Router MikroTik.





D
D

Liên kết tham khảo:

- Liên kết tham khảo ý nghĩa các Route Flags: https://wiki.mikrotik.com/wiki/Manual:IP/Route
- https://wiki.mikrotik.com/wiki/Manual:Interface/Ethernet
- Chặn Face & Youtube: https://wiki.mikrotik.com/wiki/Tips_and_Tricks_for_Beginners_and_Experienced_Users_of_RouterOS
- MikroTik 101: QoS – How to prioritise your network traffic!: https://www.miro.co.za/mikrotik-101-qos-prioritise-network-traffic/
- Manual:TOC: https://wiki.mikrotik.com/wiki/Manual:TOC
- IRONWIFI CONSOLE SETUP: https://www.ironwifi.com/mikrotik/
- MikroTik Firewall Basic Concept: https://systemzone.net/mikrotik-firewall-basic-concept/
- Main Page: https://wiki.mikrotik.com/wiki/Main_Page
- MikroTik Hotspot Tutorial - Complete Edition: https://www.youtube.com/watch?v=gwQsP0Gqde0
- API MikroTik:
    - Manual:API: https://wiki.mikrotik.com/wiki/Manual:API
    - API command notes: https://wiki.mikrotik.com/wiki/API_command_notes
- [Mikrotik] Giới thiệu và cài đặt hotspot: https://viblo.asia/p/mikrotik-gioi-thieu-va-cai-dat-hotspot-WEMkBpzxGQK
- Hướng dẫn cấu hình hotspot trên thiết bị Mikrotik: http://vntik.com/huong-dan-cau-hinh-hotspot-tren-mikrotik/
- Install MikroTik RouterOS on PC: https://systemzone.net/install-mikrotik-os-on-pc/