

Basic Configuration with MikroTik CLI

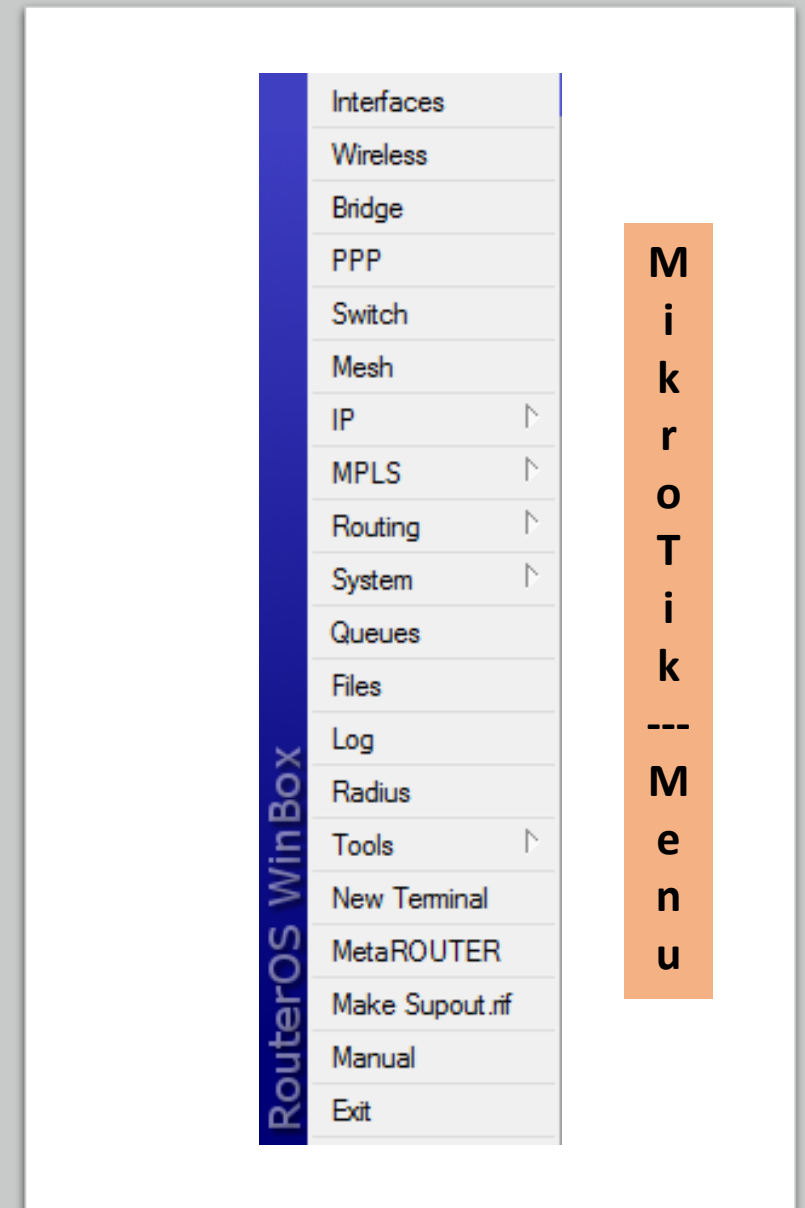


Introduction to MikroTik CLI

MikroTik allows both **GUI** & **CLI** to manage MikroTik RouterOS. The **CLI** allows the Configuration of the Router's settings using Text Commands.

Pre Requisites:

- ✓ Familiar with MikroTik Menu



Quick Typing

Use Tab Key for Quick Typing!

Example: */inte***[Tab]**_ becomes */interface* _

If there is more than one match, but they all have a common beginning, like:

*/interface set e***[Tab]**_ becomes */interface set ether*_

ether1 ether2 ether3 ether4 ether5

[?] – display all possible commands from MikroTik Dictionary

Startup with CLI

You can **telnet** or, **ssh** to the Router for getting CLI Console.

You can also get it from **Terminal** of Router's Menu.



```
MMM      MMM      KKK
MMM      MMM      KKK
MMM MMMM MMM III KKK KKK RRRRRR 000000 TTT III KKK KKK
MMM MM  MMM III KKKKK RRR RRR 000 000 TTT III KKKKK
MMM      MMM III KKK KKK RRRRRR 000 000 TTT III KKK KKK
MMM      MMM III KKK KKK RRR RRR 000000 TTT III KKK KKK

MikroTik RouterOS 6.45.7 (c) 1999-2019      http://www.mikrotik.com/

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

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

/            Move up to base level
..           Move up one level
/command     Use command at the base level
[pavel@IPv6-LAB] > █
```

```
MikroTik v6.45.7 (stable)
Login: pavel
Password:

MMM      MMM      KKK
MMM MMMM MMM III KKK KKK RRRRRR 000000 TTT III KKK KKK
MMM MM  MMM III KKKKK RRR RRR 000 000 TTT III KKKKK
MMM      MMM III KKK KKK RRRRRR 000 000 TTT III KKK KKK
MMM      MMM III KKK KKK RRR RRR 000000 TTT III KKK KKK

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[pavel@IPv6-LAB] > █
```

General Commands

print – shows all information from a particular level

add – add a new item

remove – removes specified item from a list

set – to change values of an item or parameter

find – associated with set, usually a conditional statement

enable – enable an item from list

disable – disable an item from list

comment – holds the description of an item

edit – modify values

move – changes the order of item from list

Basic Configuration

Basic Configuration is the minimum Configuration which we must do in every Router for our own Safety!

Basic Configuration includes:

- User Administration
- Hostname
- IP Addressing
- Default Route
- DNS Settings
- SNTP Settings
- Device Security

User Administration – Best Practice

- Set the “**admin**” Password after first Login
- Restrict “**admin**” Account
- Avoid too many Users with “**full**” Permission
- You can customize the User Permission also
- Better not to use “**admin**” as operational User

User Administration

Set the “admin” Password:

Every Route has a Factory Preconfigured User “**admin**” with “**empty/blank**” Password. To set the Password for “admin” User – the procedure is:

```
[admin@MikroTik] > user set admin password=*****
```

Creating a New User and New Policy:

```
[admin@MikroTik] > user add name=pavel group=full password=*****
```

```
[admin@MikroTik] > user group add name=monitor policy=read,telnet,winbox,local
```

```
[admin@MikroTik] > user add name=nmc group=monitor password=*****
```

Verification Command:

```
[admin@MikroTik] > user print
```

```
Flags: X - disabled
```

#	NAME	GROUP	ADDRESS	LAST-LOGGED-IN
0	admin	full		dec/02/2019 15:26:43
1	pavel	full		dec/02/2019 16:07:06
2	nmc	monitor		

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


User Administration (Cont.)

Deactivating a User:

[admin@MikroTik] > user print

[admin@MikroTik] > user disable 2

[admin@MikroTik] > user print

```
[admin@MikroTik] > user disable 2
[admin@MikroTik] > user print
Flags: X - disabled
#  NAME                GROUP                ADDRESS                LAST-LOGGED-IN
0  admin                full                 dec/03/2019 10:03:25
1  pavel                full                 dec/02/2019 17:09:02
2  X nmc                 monitor
[admin@MikroTik] > █
```

Activate a User:

[admin@MikroTik] > user enable 2

[admin@MikroTik] > user print

```
[admin@MikroTik] > user enable 2
[admin@MikroTik] > user print
Flags: X - disabled
#  NAME                GROUP                ADDRESS                LAST-LOGGED-IN
0  admin                full                 dec/03/2019 10:03:25
1  pavel                full                 dec/02/2019 17:09:02
2  nmc                 monitor
[admin@MikroTik] > █
```

User Administration (Cont.)

Restrict Access for Users by IP Address:

Default Firewall protects your Router from unauthorized access from Outer Networks, it is also possible to restrict User access for the specific IP Address for more security!

```
[admin@MikroTik] > user set 1 address=202.4.100.35,172.16.1.0/24,2405:7600:b:4::2
```

```
[admin@MikroTik] > user set pavel address=202.4.100.35,172.16.1.0/24,2405:7600:b:4::2
```

```
[admin@MikroTik] > user set 1 address=202.4.100.35,172.16.1.0/24,2405:7600:b:4::2
```

```
[admin@MikroTik] > user print
```

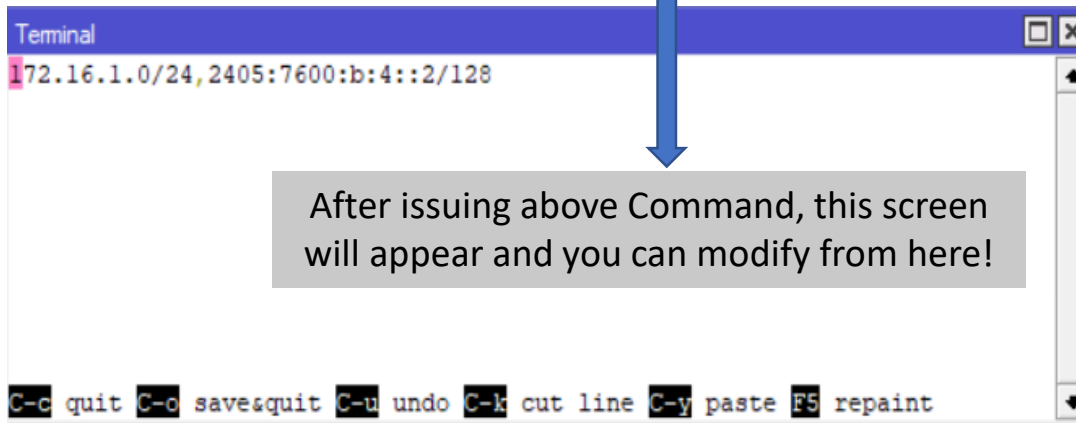
```
Flags: X - disabled
```

#	NAME	GROUP	ADDRESS	LAST-LOGGED-IN
0	admin	full		dec/03/2019 10:16:09
1	pavel	full	202.4.100.35/32 172.16.1.0/24 2405:7600:b:4:....	dec/02/2019 17:09:02
2	nmc	monitor		

User Administration (Cont.)

While applying MikroTik User security over IP Address, you entered a **Wrong!** IP/Subnet by mistake and you need to modify/remove it.

[admin@MikroTik] > user edit pavel address



```
Terminal
172.16.1.0/24, 2405:7600:b:4::2/128

After issuing above Command, this screen
will appear and you can modify from here!
```

C-c quit C-o saves&quit C-u undo C-k cut line C-y paste F5 repaint

```
[admin@MikroTik] > user print
Flags: X - disabled
# NAME GROUP ADDRESS LAST-LOGGED-IN
0 admin full
1 pavel full
2 nmc monitor
[admin@MikroTik] >
```

#	NAME	GROUP	ADDRESS	LAST-LOGGED-IN
0	admin	full		dec/03/2019 10:17:13
1	pavel	full	172.16.1.0/24 2405:7600:b:4::...	dec/02/2019 17:09:02
2	nmc	monitor		

Hostname Configuration

Hostname of a device is its **Identification**. Hostname will say you in which Router or Switch you are currently working on.

Default Hostname of MikroTik is MikroTik.

```
[pavel@MikroTik] > system identity set name=IPv6-LAB
```

```
[pavel@IPv6-LAB] >
```

IP Addressing

Configuring IPv4 Address in a MikroTik Interface:

```
[pavel@IPv6-LAB] > ip address add address=118.179.111.2/30 interface=ether1 comment=WAN
```

Configuring IPv6 Address in a MikroTik Interface:

```
[pavel@IPv6-LAB] > ipv6 address add address=2405:7600:b::2/64 interface=ether1 comment=WAN
```

Default Route

Default Route for IPv4:

```
[pavel@IPv6-LAB] > ip route add dst-address=0.0.0.0/0 gateway=118.179.111.1
```

Default Route for IPv6:

```
[pavel@IPv6-LAB] > ipv6 route add dst-address=::/0 gateway= 2405:7600:b::1
```

DNS Settings

DNS is a Client-Server protocol where DNS Client requests for the Domain Name resolution and DNS Server response on it.

MikroTik Router has both DNS Client and DNS Server features.

The DNS Client is used to resolve Domain Name to IP Address from a DNS Server. On the other hand, the DNS Server feature provides Domain Name resolution for the Clients connected to it.

```
[pavel@IPv6-LAB] > ip dns set servers=8.8.8.8,8.8.4.4,2001:4860:4860::8888,2001:4860:4860::8844
```

Firewall to protect DNS Query from Outer Networks:

```
[pavel@IPv6-LAB] > ip firewall filter add chain=input protocol=tcp dst-port=53 in-interface=ether1 action=drop
```

```
[pavel@IPv6-LAB] > ip firewall filter add chain=input protocol=udp dst-port=53 in-interface=ether1 action=drop
```

```
[pavel@IPv6-LAB] > ipv6 firewall filter add chain=input protocol=tcp dst-port=53 in-interface=ether1 action=drop
```

```
[pavel@IPv6-LAB] > ipv6 firewall filter add chain=input protocol=udp dst-port=53 in-interface=ether1 action=drop
```


SNTP Settings

Simple Network Time Protocol (SNTP) is a Networking Protocol for Clock Synchronization between Computer Systems. It is a simplified version of Network Time Protocol (NTP).

```
[pavel@IPv6-LAB] > system ntp client set enabled=yes primary-ntp=2001:4860:4860::8844 secondary-ntp=202.4.100.106
```

```
[pavel@IPv6-LAB] > system ntp client print
  enabled: yes
  primary-ntp: 2001:4860:4860::8844
  secondary-ntp: 202.4.100.106
  server-dns-names:
    mode: unicast
  poll-interval: 16s
  active-server: 2001:4860:4860::8844
[pavel@IPv6-LAB] >
```

```
[pavel@IPv6-LAB] > system clock print
  time: 12:07:31
  date: dec/03/2019
  time-zone-autodetect: yes
  time-zone-name: Asia/Dhaka
  gmt-offset: +06:00
  dst-active: no
[pavel@IPv6-LAB] >
```



Device Security

How to secure Your Router?

- Dual Authentication for Router Access
 - Implement Terminal Server
- Keep Your Router's Firmware up-to-date
- Securing Physical Access
- Hardening Services
- Loading Firewall
- Logging



Fun with MikroTik CLI

Creating Multiple VLANs in Single Command:

```
[pavel@IPv6-LAB]> :for i from=101 to=199 do={interface vlan add name=("vlan$i")  
vlan-id=$i interface=ether5}
```

Transferring VLANs from one Interface to Another:

```
[pavel@IPv6-LAB]> interface vlan set [find interface=ether5] interface=ether4
```

Fun with MikroTik CLI (Cont.)

A Script to add multiple Queues in a Single Command:

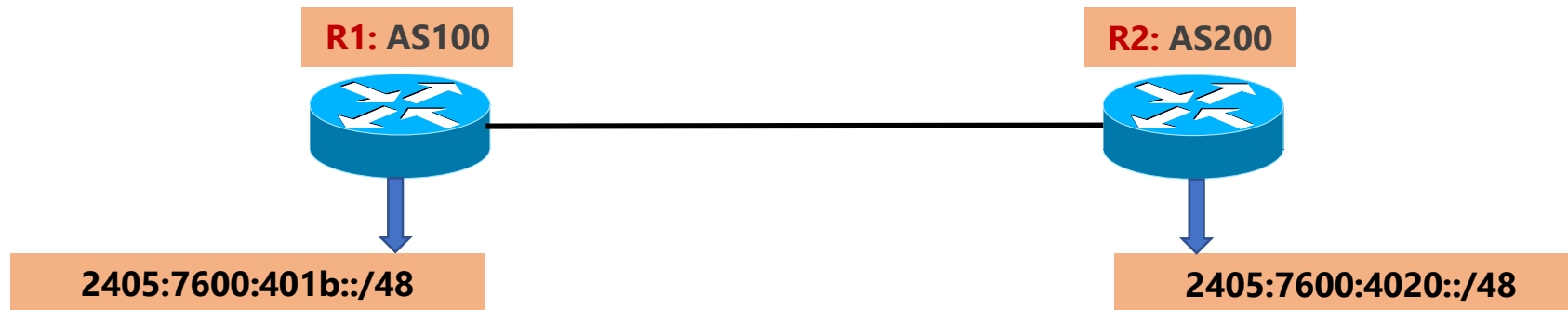
```
[pavel@IPv6-LAB]> :for i from=2 to=254 do={/queue simple add name=("PC- $\$i$ ")  
target=("172.16.1. $\$i$ ") parent=Total-BW max-limit=10M/10M limit-at=5M/5M  
time=0s-1d,sun,mon,tue,wed,thu,fri,sat}
```

A simple BGP Peer Configuration with MikroTik CLI

Peer: 2405:7600:b:4::/64
R1: 2405:7600:b:4::1/64
R2: 2405:7600:b:4::2/64
R1: AS100
R2: AS200

Tasks:

1. Configure P2P (IPv6 Address) between R1 & R2
2. Configure eBGP Peer between R1 & R2
3. Network Announcement of R1 & R2
4. Verify Routing Table
5. ICMP Test between Host to Host



A simple BGP Peer Configuration with MikroTik CLI (Cont.)

Task 1: IPv6 Addressing between R1 & R2:

[pavel@R1]> ipv6 address add address=2405:7600:b:4::1/64 comment=WAN interface=ether1

[pavel@R2]> ipv6 address add address=2405:7600:b:4::2/64 comment=WAN interface=ether1

Reachability Test between R1 & R2



```
[pavel@R1] > ping 2405:7600:b:4::2
SEQ HOST                                SIZE TTL TIME   STATUS
0 2405:7600:b:4::2                      56 255 0ms   echo reply
1 2405:7600:b:4::2                      56 255 0ms   echo reply
2 2405:7600:b:4::2                      56 255 0ms   echo reply
3 2405:7600:b:4::2                      56 255 0ms   echo reply
4 2405:7600:b:4::2                      56 255 0ms   echo reply
sent=5 received=5 packet-loss=0% min-rtt=0ms avg-rtt=0ms max-rtt=0ms

[pavel@R1] > █
```

A simple BGP Peer Configuration with MikroTik CLI (Cont.)

Task 2: Configure eBGP Peer between R1 & R2:

```
[pavel@R1]> routing bgp instance set default as=100 router-id=1.1.1.1
```

```
[pavel@R1]> routing bgp peer add name=eBGP-with-R2 remote address=2405:7600:b:4::2  
remote-as=200 address-families=ip,ipv6
```

```
[pavel@R2]> routing bgp instance set default as=200 router-id=2.2.2.2
```

```
[pavel@R2]> routing bgp peer add name=eBGP-with-R1 remote address=2405:7600:b:4::1  
remote-as=100 address-families=ip,ipv6
```

```
[pavel@R1] > routing bgp peer print
```

```
Flags: X - disabled, E - established
```

#	INSTANCE	REMOTE-ADDRESS	REMOTE-AS
0	E default	2405:7600:b:4::2	200

```
[pavel@R1] >
```

A simple BGP Peer Configuration with MikroTik CLI (Cont.)

Task 3: Network Announcement of R1 & R2

```
[pavel@R1]> routing bgp network add network=2405:7600:401b::/48 synchronize=no
```

```
[pavel@R1] > routing bgp advertisements print
```

PEER	PREFIX	NEXTHOP	AS-PATH	ORIGIN	LOCAL-PREF
eBGP-...	2405:7600:401b::/48	2405:7600:b:4::1		igp	

```
[pavel@R1] > █
```

```
[pavel@R2]> routing bgp network add network=2405:7600:4020::/48 synchronize=no
```

```
[pavel@R2] > routing bgp advertisements print
```

PEER	PREFIX	NEXTHOP	AS-PATH	ORIGIN	LOCAL-PREF
eBGP-...	2405:7600:4020::/48	2405:7600:b:4::2		igp	

```
[pavel@R2] > █
```

A simple BGP Peer Configuration with MikroTik CLI (Cont.)

Task 4: Verify Routing Table

[pavel@R1]> ipv6 route print

```
[pavel@R1] > ipv6 route print
Flags: X - disabled, A - active, D - dynamic, C - connect, S - static, r - rip, o - ospf, b - bgp,
U - unreachable
#      DST-ADDRESS      GATEWAY      DISTANCE
0 ADC  2405:7600:b:4::/64   ether1       0
1 ADb  2405:7600:4020::/48  fe80::ce2d:e0ff:fe46:...  20
[pavel@R1] >
```

[pavel@R2]> ipv6 route print

```
[pavel@R2] > ipv6 route print
Flags: X - disabled, A - active, D - dynamic, C - connect, S - static, r - rip, o - ospf, b - bgp,
U - unreachable
#      DST-ADDRESS      GATEWAY      DISTANCE
0 ADC  2405:7600:b:4::/64   ether1       0
1 ADb  2405:7600:401b::/48  fe80::e68d:8cff:fe29:...  20
2 DC   2405:7600:4020::/64   ether5       255
[pavel@R2] >
```


A simple BGP Peer Configuration with MikroTik CLI (Cont.)

Task 5: ICMP Test between Host to Host

[pavel@R1] > ping 2405:7600:4020::1

```
[pavel@R1] > ping 2405:7600:4020::1
SEQ HOST                                SIZE TTL TIME  STATUS
0 2405:7600:4020::1                    56 255 0ms  echo reply
1 2405:7600:4020::1                    56 255 0ms  echo reply
2 2405:7600:4020::1                    56 255 0ms  echo reply
3 2405:7600:4020::1                    56 255 0ms  echo reply
sent=4 received=4 packet-loss=0% min-rtt=0ms avg-rtt=0ms max-rtt=0ms
```

Thank You!!!