

# Basic Configuration with MikroTik CLI

**bdNOG11**

# Introduction to MikroTik CLI

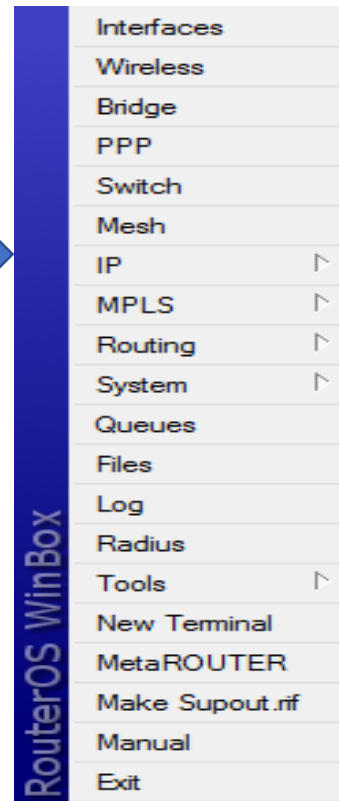
**MikroTik** allows both **GUI** & **CLI** to manage MikroTik RouterOS. The **CLI** allows the Configuration of the Router's settings using Text Commands.

## Pre Requisites:

- ✓ Familiar with MikroTik Menu

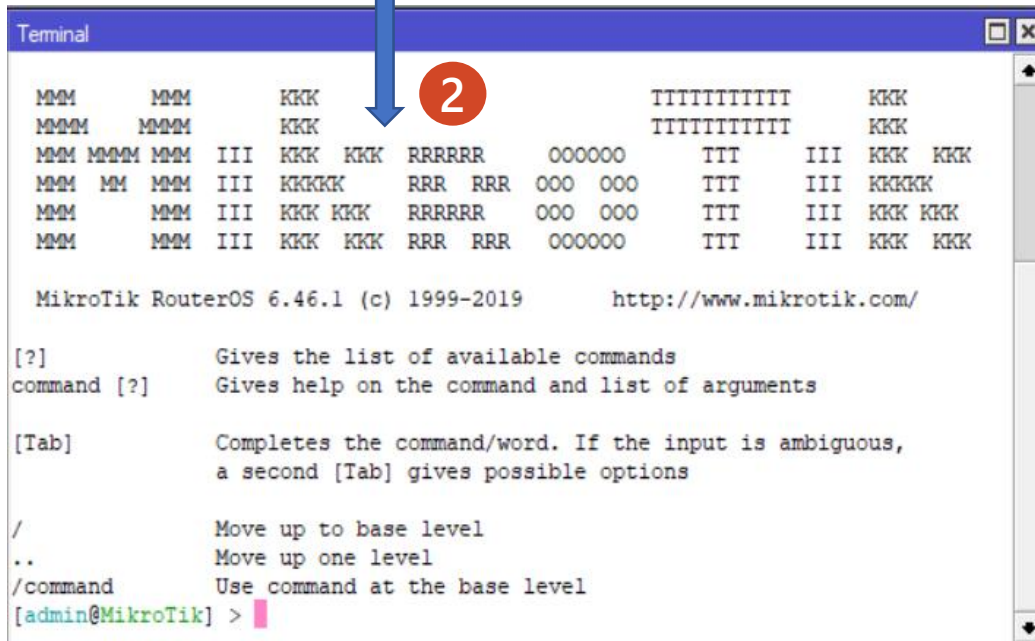
## Methods:

- ✓ Telnet
- ✓ SSH
- ✓ Terminal



# First time Startup with MikroTik CLI

- To get **CLI Console** of Router, You can use **telnet** or, **ssh**
- You can also get **CLI Platform** from **Terminal** of Router's Menu



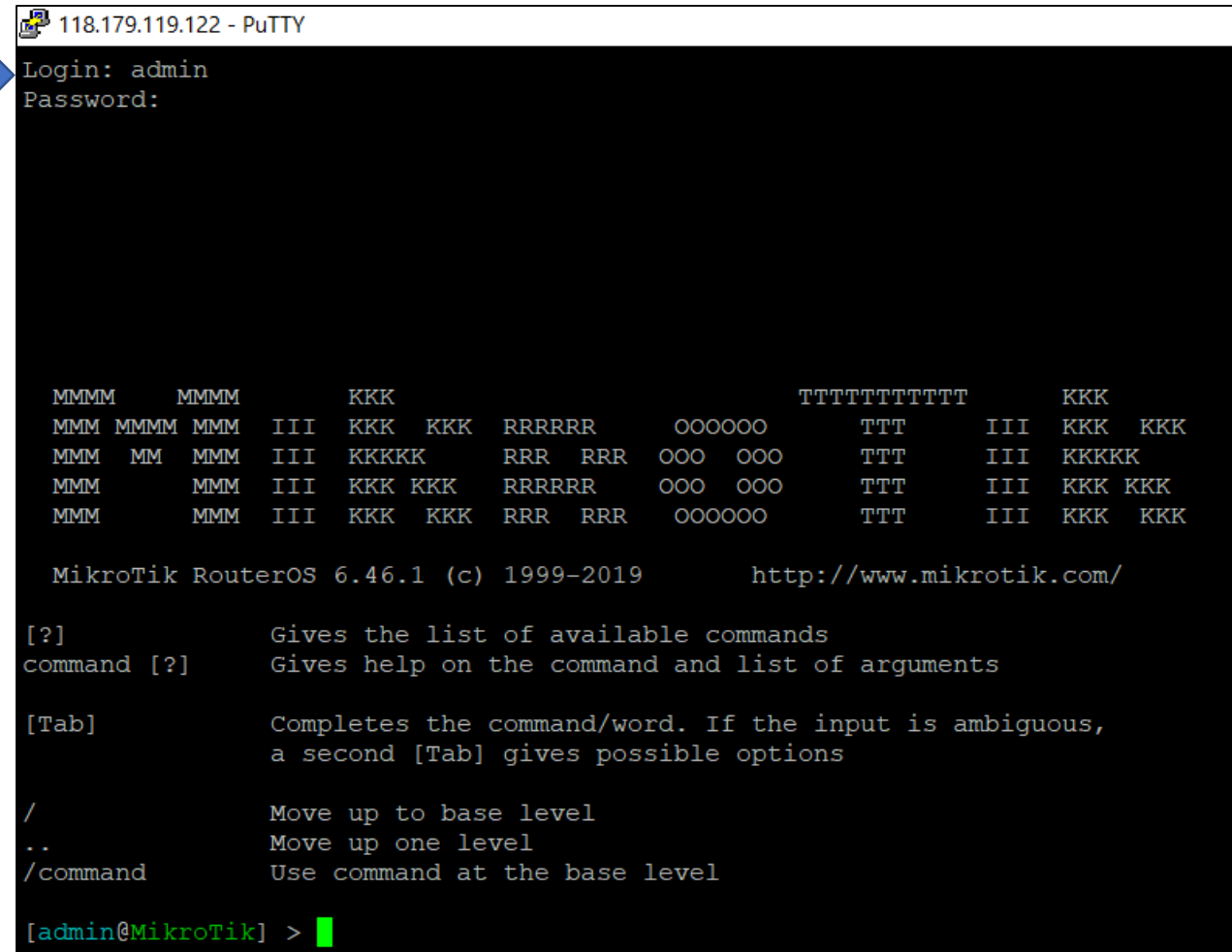
```
Terminal
MMM   MMM   KKK   TTTTTTTTTT   KKK
MMMM  MMM   KKK   TTTTTTTTTT   KKK
MMM MMM MMM III KKK KKK RRRRRR   OOOOOO   TTT   III KKK KKK
MMM MM  MMM III KKKKK   RRR RRR   OOO OOO   TTT   III KKKKK
MMM   MMM III KKK KKK   RRRRRR   OOO OOO   TTT   III KKK KKK
MMM   MMM III KKK KKK   RRR RRR   OOOOOO   TTT   III KKK KKK

MikroTik RouterOS 6.46.1 (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
[admin@MikroTik] >
```



```
118.179.119.122 - PuTTY
Login: admin
Password:

MMMM   MMMM   KKK   TTTTTTTTTTTT   KKK
MMM MMMM MMM III KKK KKK RRRRRR   OOOOOO   TTT   III KKK KKK
MMM MM  MMM III KKKKK   RRR RRR   OOO OOO   TTT   III KKKKK
MMM   MMM III KKK KKK   RRRRRR   OOO OOO   TTT   III KKK KKK
MMM   MMM III KKK KKK   RRR RRR   OOOOOO   TTT   III KKK KKK

MikroTik RouterOS 6.46.1 (c) 1999-2019      http://www.mikrotik.com/

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/           Move up to base level
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/command   Use command at the base level

[admin@MikroTik] >
```

# 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*\_

```
[admin@MikroTik] > interface set e[Tab]_
```

```
[admin@MikroTik] > interface set ether[Tab]_
```

```
[admin@MikroTik] > interface set ether[Tab]_
```

```
ether1 ether2 ether3 ether4 ether5
```

**[?]** – display all possible commands | help

# Quick Typing! – Example

**Another way to press fewer keys while typing:**

```
[admin@MikroTik] > pin 10.1 c 100 si 1500
```

**Equals to:**

```
[admin@MikroTik] > ping 10.0.0.1 count 100 size 1500
```

# The 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 or matching statement | - action

**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 are the Initial Arrangement or Minimum Configuration which we must do in every Router!

## 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
- ✓ Customize Group Policy with minimum Permission
- ✓ 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” – Issue the Command from Terminal:

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

## Creating a New User and New Group 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=*****
```

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

```
Flags: X - disabled
```

#	NAME	GROUP	ADDRESS	LAST-LOGGED-IN
0	admin	full		jan/05/2020 17:39:15
1	pavel	full		jan/05/2020 17:14:32
2	nmc	monitor		

```
[admin@MikroTik] > █
```

# User Administration (Cont.)

**Deactivating a User:** [admin@MikroTik] > user disable 2

```
[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] > █
```

**Activating a User:** [admin@MikroTik] > user enable 2

```
[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 Operational Users of MikroTik 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
```

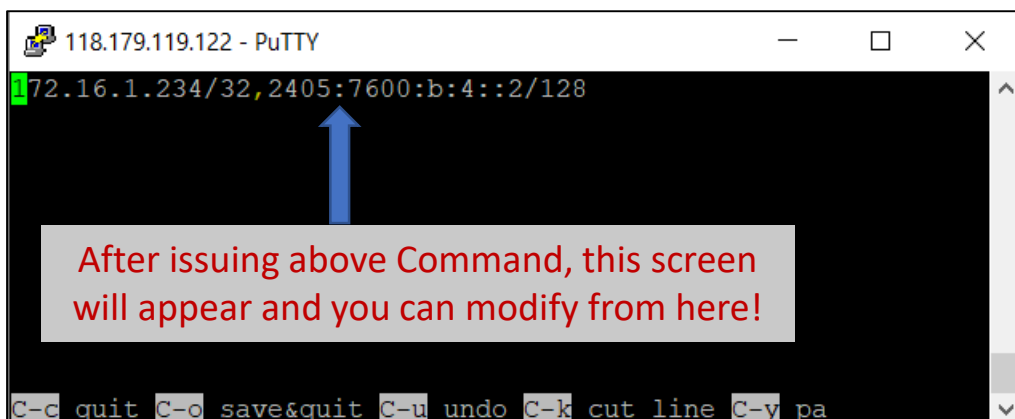
```
Flags: X - disabled
```

#	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.)

If you want to modify/remove IP Restriction for any Operational User of MikroTik, then we need to issue the below Command:

```
[admin@MikroTik]> /user edit pavel address
```



118.179.119.122 - PuTTY

```
172.16.1.234/32,2405:7600:b:4::2/128
```

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

C-c quit C-o save&quit C-u undo C-k cut line C-v pa

You should able to login your Router via telnet or ssh

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

Flags: X - disabled

#	NAME	GROUP	ADDRESS	LAST-LOGGED-IN
0	admin	full		jan/06/2020 10:28:39
1	pavel	full	172.16.1.234/32 2405:7600:b:4::...	jan/05/2020 17:14:32
2	nmc	monitor		

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

# 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.**

**Configuring Hostname of your Router:**

```
[admin@MikroTik] > system identity set name=bdNOG11-IPv6
```

```
[admin@bdNOG11-IPv6] >
```

# IP Addressing

## Configuring IPv4 Address in an Interface:

```
[admin@bdNOG11-IPv6] > ip address add address=118.179.111.2/30 interface=ether1 comment=WAN
```

## Configuring IPv6 Address in an Interface:

```
[admin@bdNOG11-IPv6] > ipv6 address add address=2405:7600:b::2/64 interface=ether1 comment=WAN
```

# Default Route Configuration

## Default Route for IPv4:

```
[admin@bdNOG11-IPv6] > ip route add dst-address=0.0.0.0/0 gateway=118.179.111.1
```

## Default Route for IPv6:

```
[admin@bdNOG11-IPv6] > ipv6 route add dst-address=::/0 gateway= 2405:7600:b::1
```

# Creating “loopback” Interface

In MikroTik, there is no **loopback** Interface by default. We just create a **bridge** with Zero (0) member ports and it will always be active so that it will function as a regular loopback Interface.

```
/interface bridge add name=loopback0
```

```
/ip address add address=1.1.1.1/32 interface=loopback0 comment=RID
```



# DNS Settings

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

**MikroTik Router has both DNS Client and DNS Server features.**

```
/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:**

```
/ip firewall filter add chain=input protocol=tcp dst-port=53 in-interface=ether1-WAN action=drop
```

```
/ip firewall filter add chain=input protocol=udp dst-port=53 in-interface=ether1-WAN action=drop
```

```
/ipv6 firewall filter add chain=input protocol=tcp dst-port=53 in-interface=ether1-WAN action=drop
```

```
/ipv6 firewall filter add chain=input protocol=udp dst-port=53 in-interface=ether1-WAN action=drop
```

# Bandwidth Management Scripts

## Day=Regular\_Package

```
/queue type set [find name=Pkg1-DL] pcq-rate=10M
```

```
/queue type set [find name=Pkg1-UL] pcq-rate=10M
```

```
/queue type set [find name=Pkg2-DL] pcq-rate=20M
```

```
/queue type set [find name=Pkg2-UL] pcq-rate=20M
```

## Night=Double\_Bandwidth

```
/queue type set [find name=Pkg1-DL] pcq-rate=20M
```

```
/queue type set [find name=Pkg1-UL] pcq-rate=20M
```

```
/queue type set [find name=Pkg2-DL] pcq-rate=40M
```

```
/queue type set [find name=Pkg2-UL] pcq-rate=40M
```



# 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).

```
/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] >
```

# Have Fun with MikroTik CLI

## Creating Multiple VLANs in a Single Command:

```
[admin@bdNOG11-IPv6]> :for i from=101 to=199 do={interface vlan add name=("vlan$i") vlan-id=$i interface=ether5}
```

ether5	Ethernet	1500	1580	0 bps	0 bps	0	0
↔vlan101	VLAN	1500	1576	0 bps	0 bps	0	0
↔vlan102	VLAN	1500	1576	0 bps	0 bps	0	0
↔vlan103	VLAN	1500	1576	0 bps	0 bps	0	0
↔vlan104	VLAN	1500	1576	0 bps	0 bps	0	0
↔vlan105	VLAN	1500	1576	0 bps	0 bps	0	0
↔vlan106	VLAN	1500	1576	0 bps	0 bps	0	0
↔vlan107	VLAN	1500	1576	0 bps	0 bps	0	0
↔vlan108	VLAN	1500	1576	0 bps	0 bps	0	0
↔vlan109	VLAN	1500	1576	0 bps	0 bps	0	0

## Transferring VLANs from one Interface to Another:

```
[admin@bdNOG11-IPv6]> interface vlan set [find interface=ether5] interface=ether4
```

# Have Fun with MikroTik CLI (Cont.)

## Changing ARP Interface:

```
[admin@bdNOG11-IPv6]> ip arp set [find interface=ether4] interface=ether5
```











## Shifting IP Address from one Interface to Another:

```
[admin@bdNOG11-IPv6]> ip address set [find interface=ether4] interface=ether5
```

# Have Fun with MikroTik CLI (Cont.)

## A Script to add multiple Queues in a Single Command:

```
[admin@bdNOG11-IPv6]> :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}
```

 Total-BW	172.16.1.0/24	100M	100M
 PC-2	172.16.1.2	10M	10M
 PC-3	172.16.1.3	10M	10M
 PC-4	172.16.1.4	10M	10M
 PC-5	172.16.1.5	10M	10M
 PC-6	172.16.1.6	10M	10M
 PC-7	172.16.1.7	10M	10M
 PC-8	172.16.1.8	10M	10M
 PC-9	172.16.1.9	10M	10M
 PC-10	172.16.1.10	10M	10M

# Backup Restoration

The Backup is option allows you to save a file containing all your Router's Configuration Settings, like WAN Setup, Wireless Settings, Port Forwarding, Firewall etc. to a file on your Computer. This file can then be used to Restore your settings if the Router is Reset to the Factory Default Settings.

**To take the Router Backup – execute the Command below:**

```
[admin@bdNOG11-IPv6]> export file=bdNOG11-IPv6-MikroTik-BKP-11-01-2020
```

**To Restore Backup into a Router – execute the Command below:**

```
[admin@bdNOG11-IPv6]> import file=bdNOG11-IPv6-MikroTik-BKP-11-01-2020
```

# Taking Backup for a Particular Module

You can also take Backup for a Particular Module like Queues, Filter Rules, NAT, PPPoE Secrets, IP Addresses or any other you want.

## **Taking the Backup for Filter Rules:**

```
[admin@bdNOG11-IPv6]>ip firewall filter
```

```
[admin@bdNOG11-IPv6]/ip firewall filter>export file=bdNOG11-IPv6-Filter-Rules-11-01-2020
```

## **Restoring the Backup for Filter Rules:**

```
[admin@bdNOG11-IPv6]>import file=bdNOG11-IPv6 -Filter-Rules-11-01-2020
```



# The “export” Command

The “**export**” Command will help you to get the Router Backup and it will also help you find the correspond Command executed in a Particular Module like Firewall, Mangle, Queues, etc.

```
[admin@bdNOG11-IPv6] /ip firewall mangle> export
# jan/06/2020 13:16:31 by RouterOS 6.46.1
# software id = VFLI-R9L8
#
# model = CCR1036-12G-4S
# serial number = 529A04E9FBB7
/ip firewall mangle
add action=mark-packet chain=prerouting new-packet-mark=FaceBook passthrough=yes src-address-list=Facebook
add action=mark-packet chain=prerouting dst-address-list=Facebook new-packet-mark=FaceBook passthrough=yes
add action=mark-packet chain=prerouting new-packet-mark=YouTube passthrough=yes src-address-list=Youtube
add action=mark-packet chain=prerouting dst-address-list=Youtube new-packet-mark=YouTube passthrough=yes
[admin@bdNOG11-IPv6] /ip firewall mangle> █
```