# Basic Configuration with MikroTik CLI

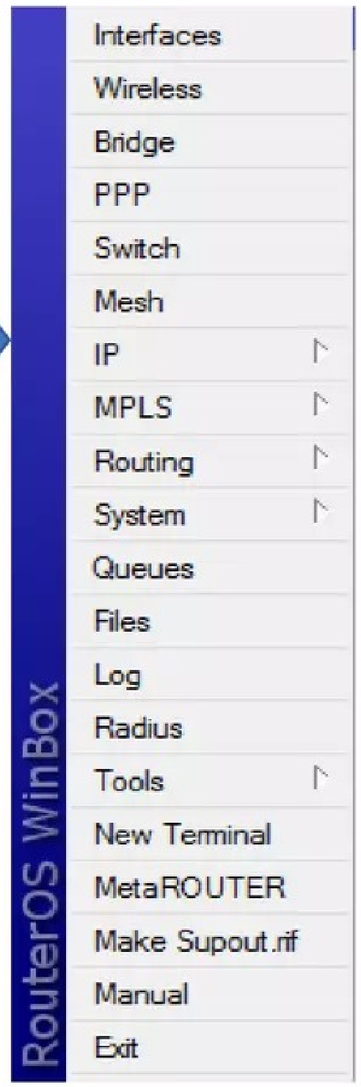
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# Introduction to MikroTik CLI

**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

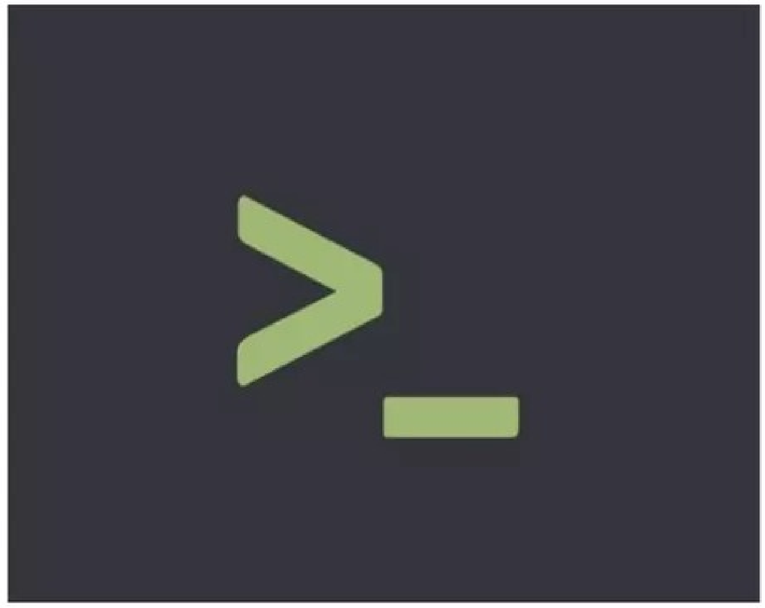



## Methods:

✓Telnet

✓SSH

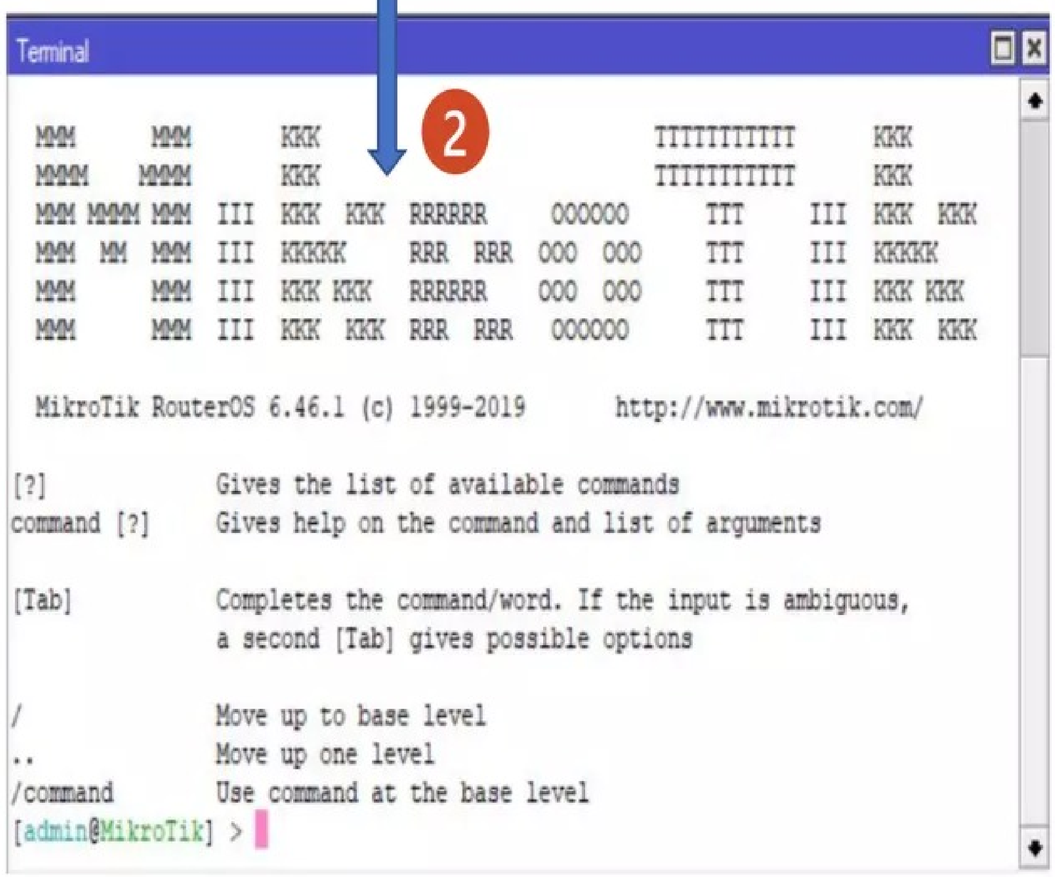
✓Terminal

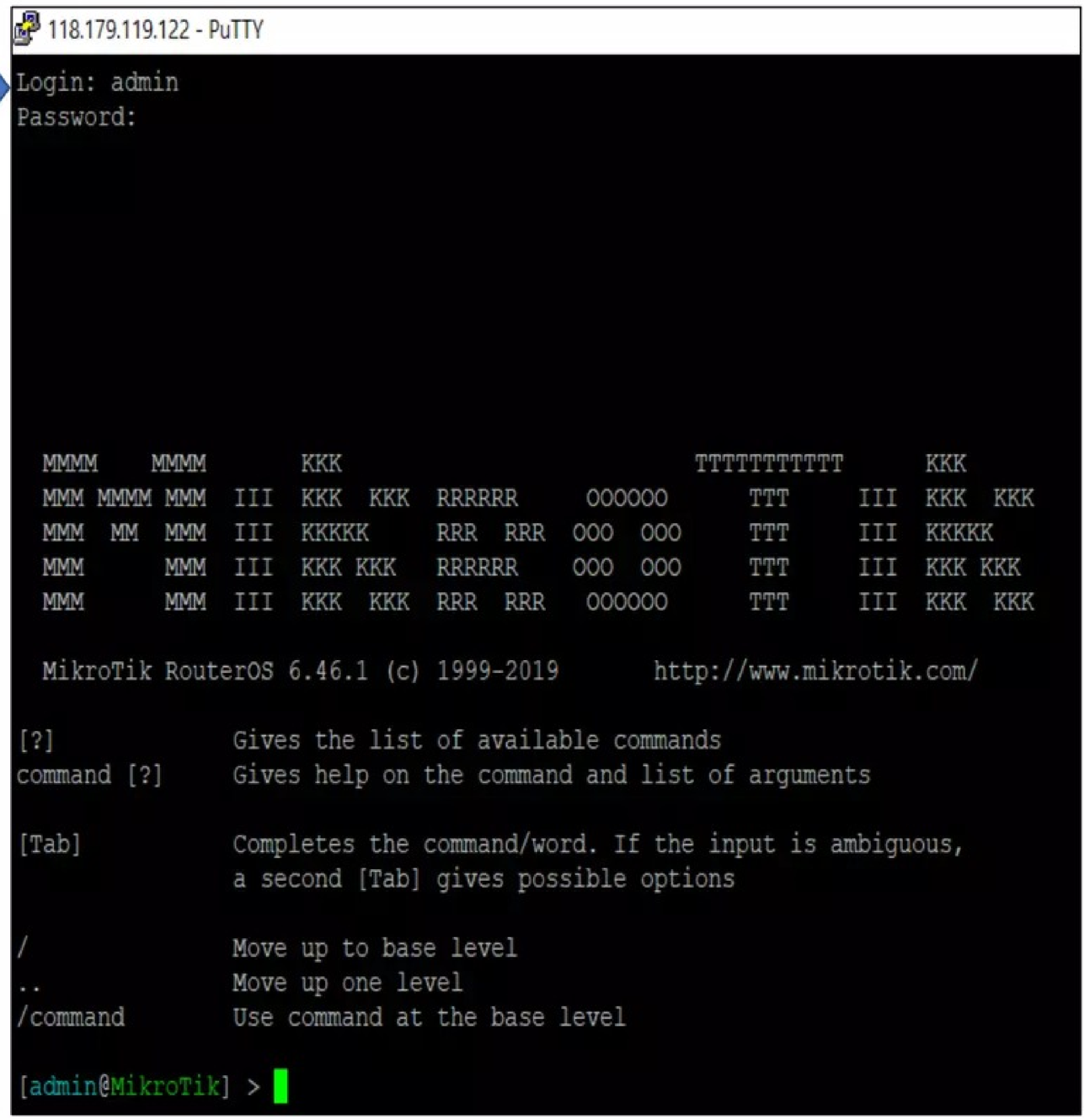


# First time Startup with MikroTik CLI

- To get **CLI Console** of Router, You can use **telnet** or, **ssh**

- You can also get **CLI Platform** from **Terminal** of Router's Menu




1

2

# 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

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# 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

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# 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



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# 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] >
```

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# 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] >
```

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# 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           dec/02/2019 17:09:02
                                                         172.16.1.0/24
                                                         2405:7600:b:4::...
 2   nmc                       monitor
```

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# 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:

You should able to login your Router via telnet or ssh

[admin@MikroTik]> /user edit pavel address




```
[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      jan/05/2020 17:14:32
                                     2405:7600:b:4::...
 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>
```