TUTORIAL MIKROTIK STEP BY STEP

By: Anung Muhandanu

MikroTik Overview

Mikrotik now widely used by ISPs, hotspot providers, or by the owner of the cafe. Mikrotik OS router makes the computer into a reliable network that is equipped with various features and tools, for both wired and wireless.

In this tutorial the author presents a discussion and a simple and simple instructions on configuring the proxy for certain purposes and the public is typically collected in server / router cafe as well as other tissues, such configuration for example, for server NAT, Bridging, BW management, and MRTG.

Mikrotik version I use for this tutorial is MikroTik RouterOS 2.9.27

Access MikroTik:

1. **via console**

   Mikrotik router board or PC can be accessed directly via the console / shell and remote access using putty (www.putty.nl)

2. **via Winbox**

   Mikrotik can also be accessed / remotely using software tools Winbox

3. **via web**

   Mikrotik can also be accessed via web / port 80 by using a browser

- **Naming MikroTik**

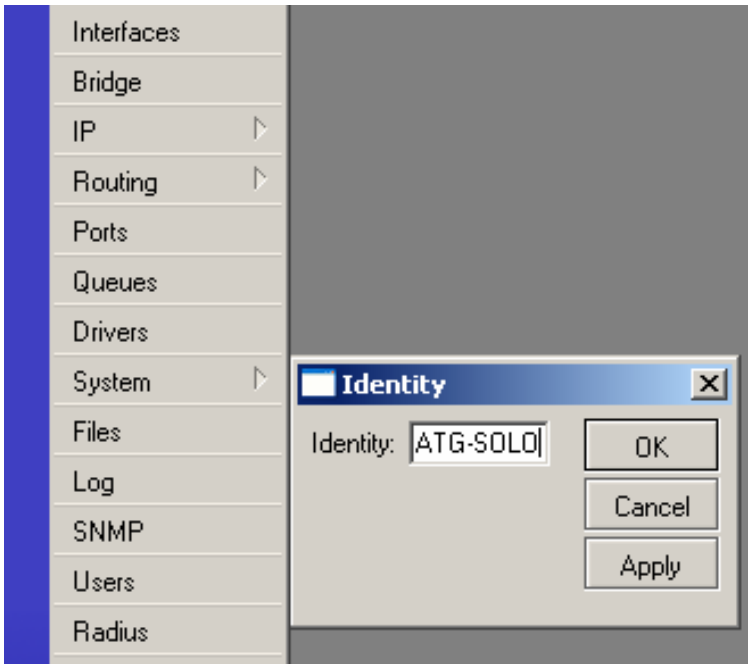
```
[ropix@IATG-SOLO] > system identity print
  name: "Mikrotik"
[ropix@IATG-SOLO] > system identity edit
value-name: name
```

Enter the editor type for example I change the name IATG-SOLO:

```
 IATG-SOLO
C-c quit C-o save&quit C-u undo C-k cut line C-y paste
```

Edit and then press Clrl-O to save and exit the editor

If using Winbox, it looks like this:



- **Changing the name of the interface:**

```
[ropix@IATG-SOLO] > /interface print
Flags: X - disabled, D - dynamic, R - running
 #    NAME          TYPE             RX-RATE    TX-RATE    MTU
 0  R ether1        ether            0          0          1500
 1  R ether2        ether            0          0          1500
[ropix@IATG-SOLO] > /interface edit 0
value-name: name
```

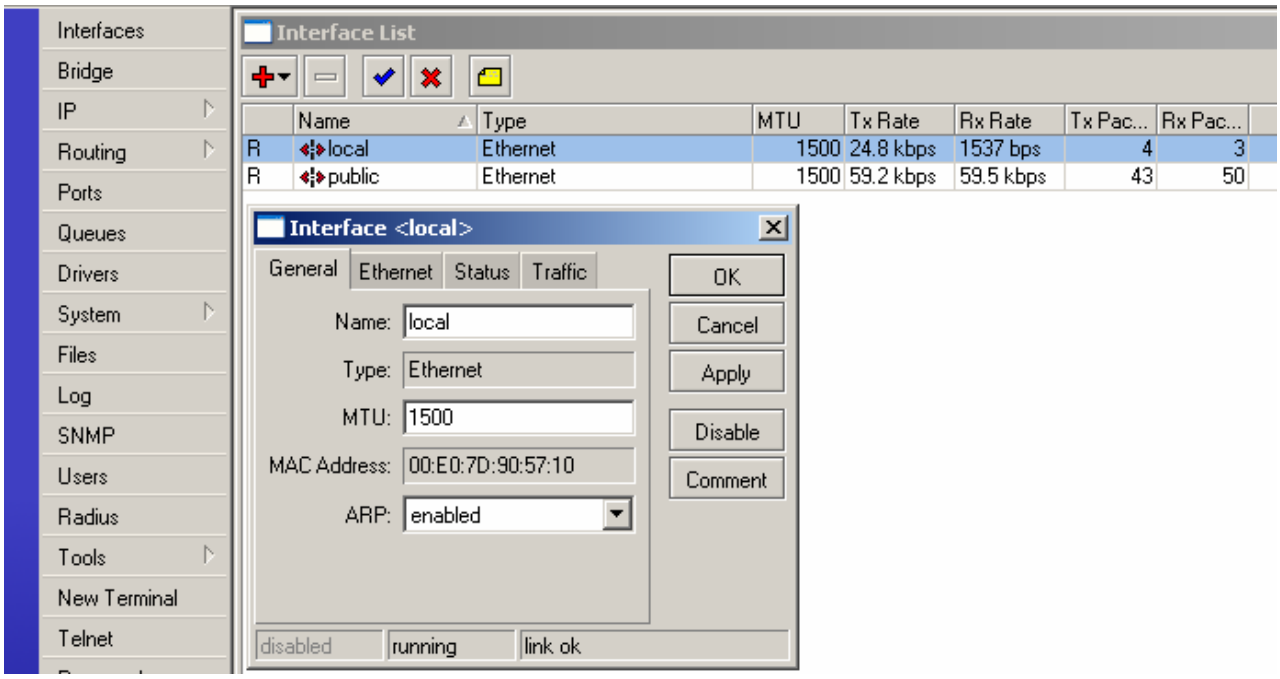
The value 0 is the value ether1, if you want to replace ethet2 value 0 replaced by 1. Entrance to the editor, for example I replace it with name local:

```
local
C-c quit C-o save&quit C-u undo C-k cut line C-y paste
```

Edit and then press Cltr-o to save and exit the editor, Do the same for interfaces ether 2, so that if seen again will appear like this:

```
[ropix@IATG-SOLO] > /interface print
Flags: X - disabled, D - dynamic, R - running
 #    NAME        TYPE             RX-RATE    TX-RATE    MTU
 0  R local       ether            0          0          1500
 1  R public      ether            0          0          1500
```

Via Winbox:



Select the menu interface, click the name of the interface that wants to be edited, so it appears the edit window interface.

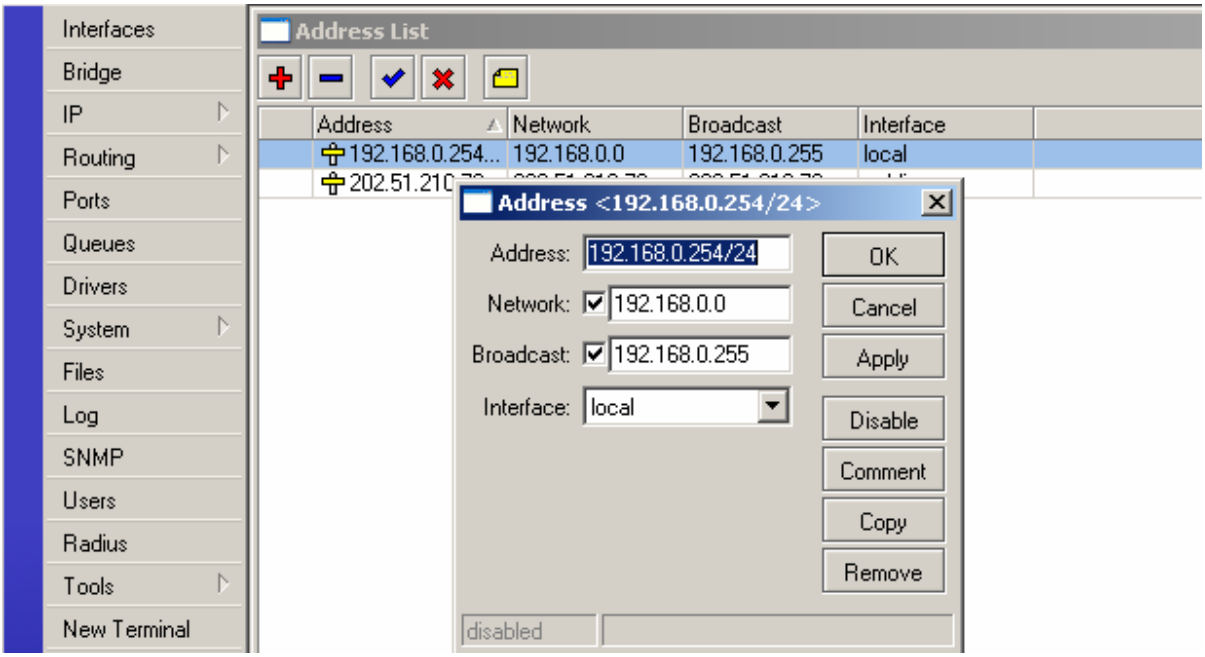
- **Setting IP Address:**

```
[ropix@IATG-SOLO] > /ip address add
address: 192.168.1.1/24
interface: local
[ropix@IATG-SOLO] > /ip address print
Flags: X - disabled, I - invalid, D - dynamic
 #   ADDRESS            NETWORK         BROADCAST       INTERFACE
 0   192.168.0.254/24   192.168.0.0     192.168.0.255   local
```

Enter the IP address value in the column address and netmask, enter the name of the interface that wants to be given an IP address. For public interface Interface 2, namely, the same way as above, so that if seen again will be 2 interfaces:`[ropix@IATG-SOLO] > /ip address print`

```
Flags: X - disabled, I - invalid, D - dynamic
 #   ADDRESS            NETWORK         BROADCAST       INTERFACE
 0   192.168.0.254/24   192.168.0.0     192.168.0.255   local
 1   202.51.192.42/29   202.51.192.40   202.51.192.47   public
```

Via Winbox:



- **Make Mikrotik NAT**

Network Address Translation or more commonly referred to as NAT is a method to connect more than one computer to the Internet network using a single IP address. Number of use of this method due to limited availability of IP addresses, the need for security , and the ease and flexibility in network administration.

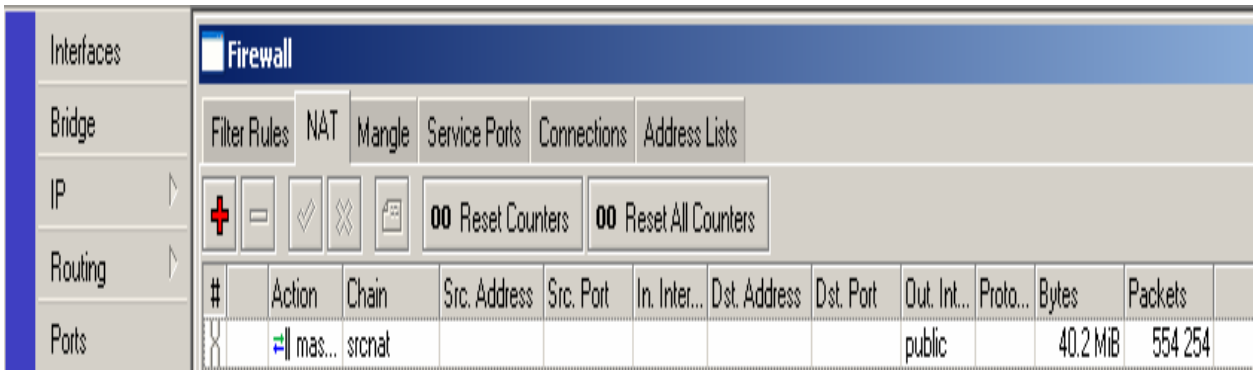
Currently, the widely used IP protocol is IP version 4 (IPv4). With a length of the address 4 bytes means that there are 2 to the power 32 = 4,294,967,296 IP addresses available. This amount is theoretically the number of computers that can directly connect to the internet. Because of this limitation most of the ISPs (Internet Service Provider) will only allocate one address for one user and this address is dynamic, meaning that a given IP address will be different every time the user connects to the Internet. This will make it difficult for businesses to lower middle class. On the one hand they need more computers are connected to the Internet, but on the other hand only one IP address which means there is only one computer that can connect to the internet. This can be overcome by using NAT. By NAT gateways that run on one computer, one IP address can be shared with several other computer and they can connect to the internet simultaneously.

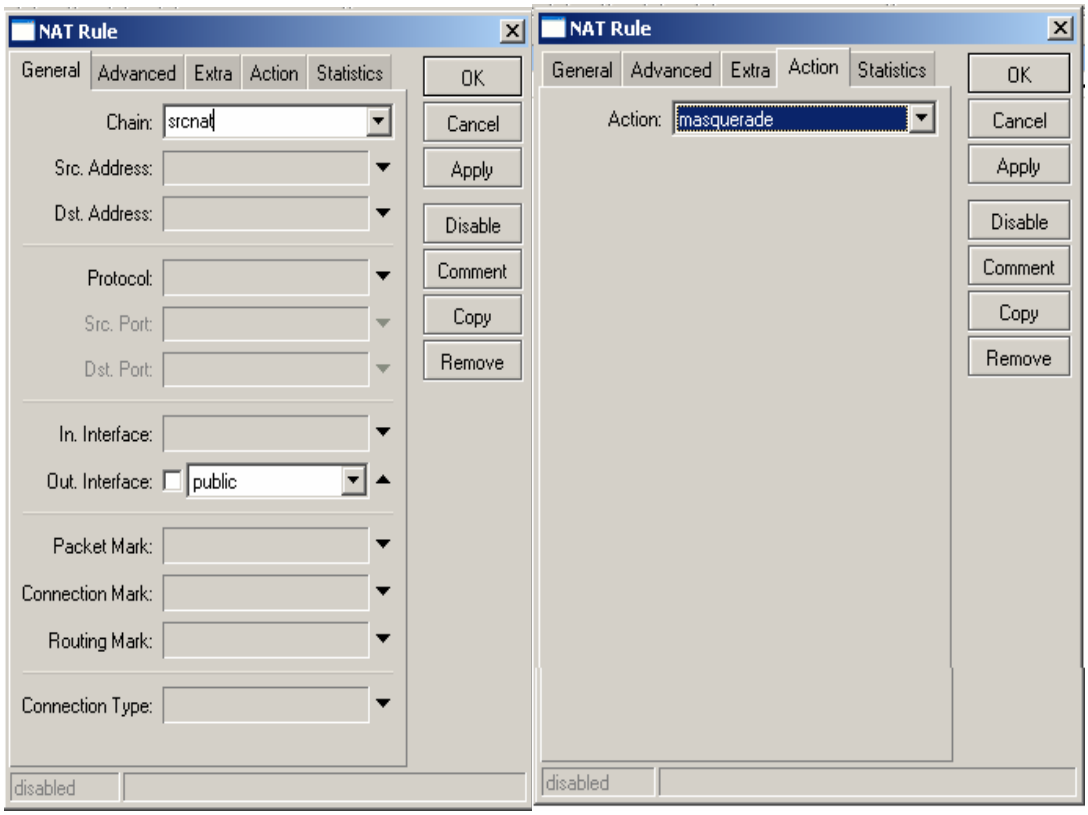
Suppose we want to hide the local network / LAN 192.168.0.0/24 202.51.192.42 behind one IP address provided by ISP, which we use is a feature of Mikrotik source network address translation (masquerading). Masquerading changes the data packets from the IP address and port from the network 192.168.0.0/24 to 202.51.192.42 henceforth be forwarded to the global Internet network.

To use masquerading, source NAT rule with action 'masquerade' should be added to the firewall configuration:

```
[ropix@IATG-SOLO] > /ip firewall nat add chain=srcnat
action=masquerade out-interface=public
```

If using Winbox, will look like this:





- **As a transparent web proxy mikrotik**

One function is to store the proxy cache. If a LAN uses a proxy to connect to the Internet, it is done by the browser when a user accesses a web server URL is to take these requests on a proxy server. Whereas if the data is not contained in the proxy server then proxies to pick up directly from the web server. Then the request is stored

in the cache proxy. Furthermore, if there are clients who make requests to the same URL , it will be taken from the cache. This will make access to the Internet faster.

How to ensure that each user accessing the Internet through a web proxy that we have enabled? To this we can apply the transparent proxy. With transparent proxy, every browser on computers that use this gateway automatically goes through a proxy.

Enabling web proxy in mikrotik fiture:

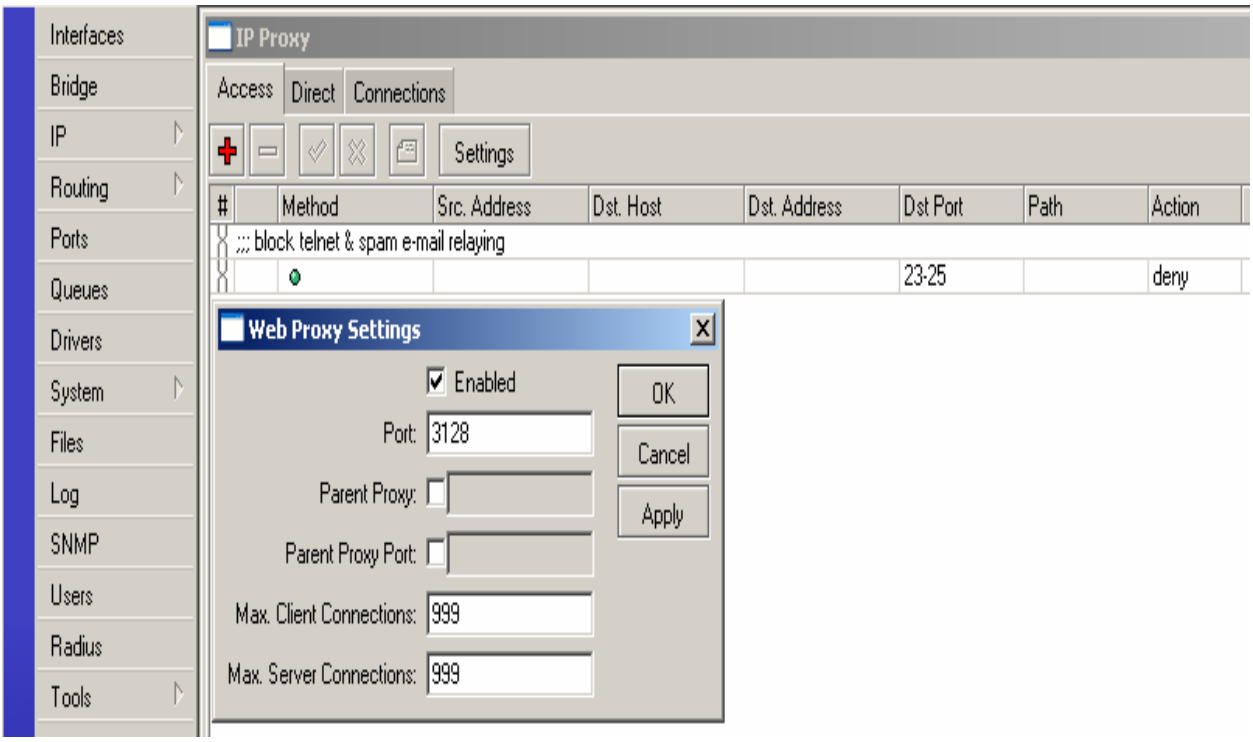
```
[ropix@IATG-SOLO] > /ip proxy set enabled=yes
[ropix@IATG-SOLO] > /ip web-proxy set
cache-administrator= ropix.fauzi@infoasia.net
[ropix@IATG-SOLO] > /ip web-proxy print

enabled: yes
src-address: 0.0.0.0
port: 3128
hostname: "IATG-SOLO"
transparent-proxy: yes
parent-proxy: 0.0.0.0:0
cache-administrator: "ropix.fauzi@infoasia.net"
max-object-size: 8192KiB
cache-drive: system
max-cache-size: unlimited
max-ram-cache-size: unlimited
status: running
reserved-for-cache: 4733952KiB
reserved-for-ram-cache: 2048KiB
```

Make a rule for transparent proxy on the firewall NAT, precisely there masquerading under the rule for NAT:

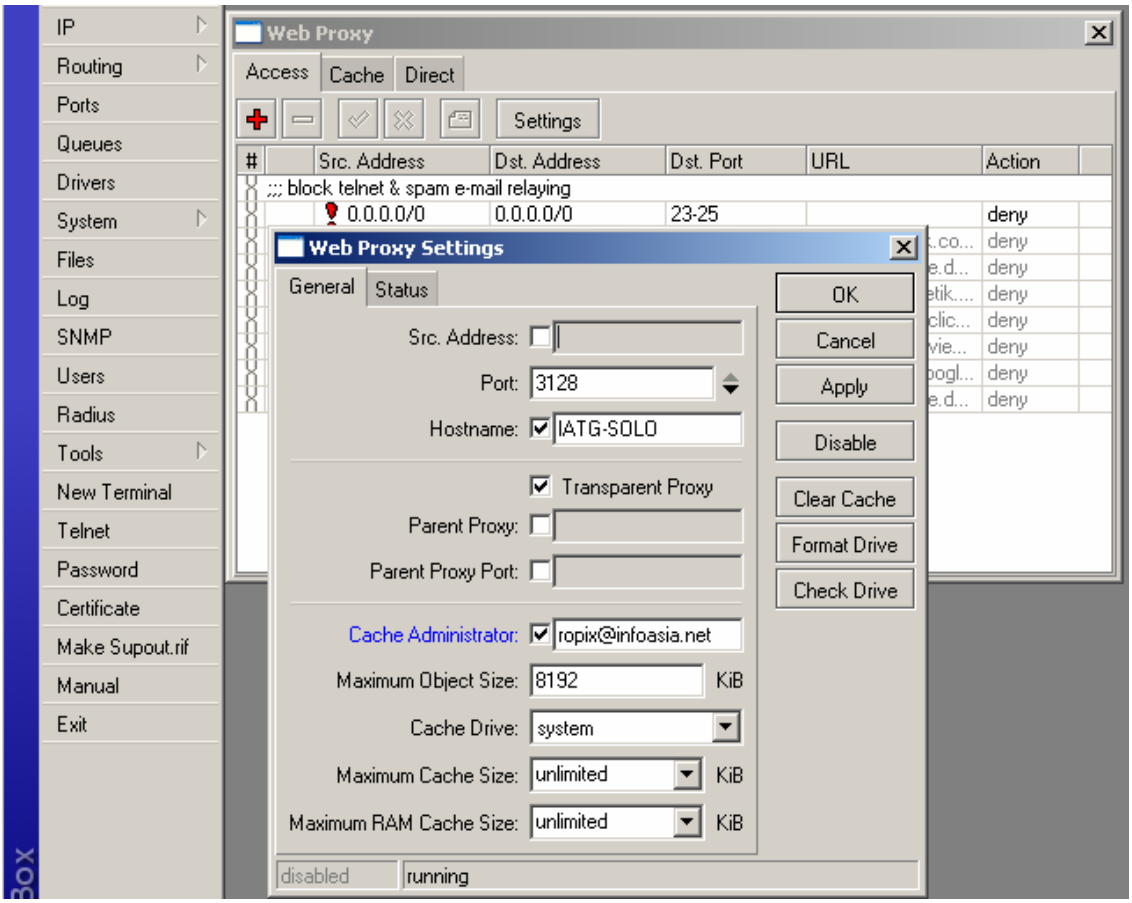
```
[ropix@IATG-SOLO] > /ip firewall nat add  chain=dstnat in-
interface=local src-address=192.168.0.0/24 protocol=tcp dst-port=80
action=redirect to-ports=3128

[ropix@IATG-SOLO] > /ip firewall nat print
Flags: X - disabled, I - invalid, D - dynamic
 0   chain=srcnat out-interface=public action=masquerade
 1   chain=dstnat in-interface=local src-address=192.168.0.0/24
protocol=tcp dst-port=80 action=redirect to-ports=3128
```

In Winbox:

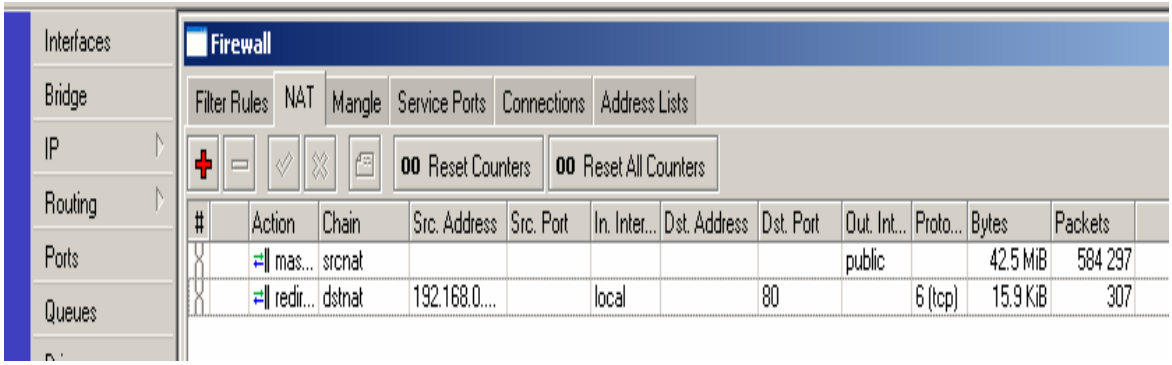
1. Enable web proxy on the menu IP> Proxy> Access> Settings (check box enabled)

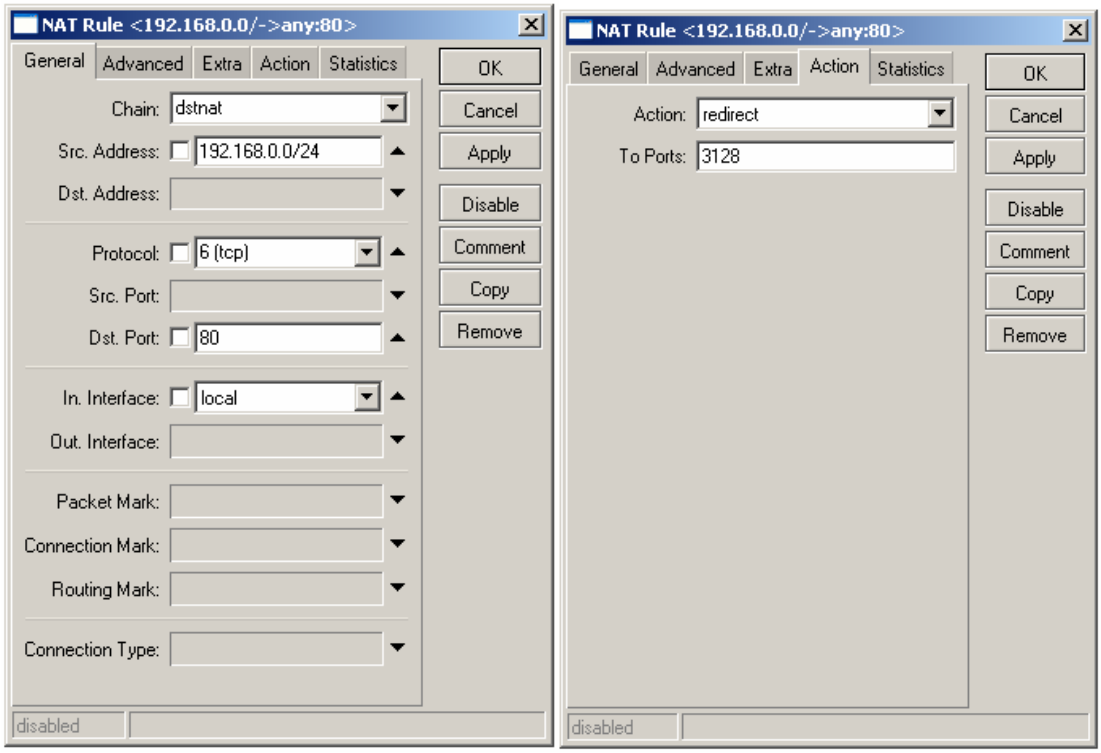


2. Parameter settings on the IP menu> Web Proxy> Access Settings> General



3. Make a rule for transparent proxy on the menu IP> Firewall> NAT





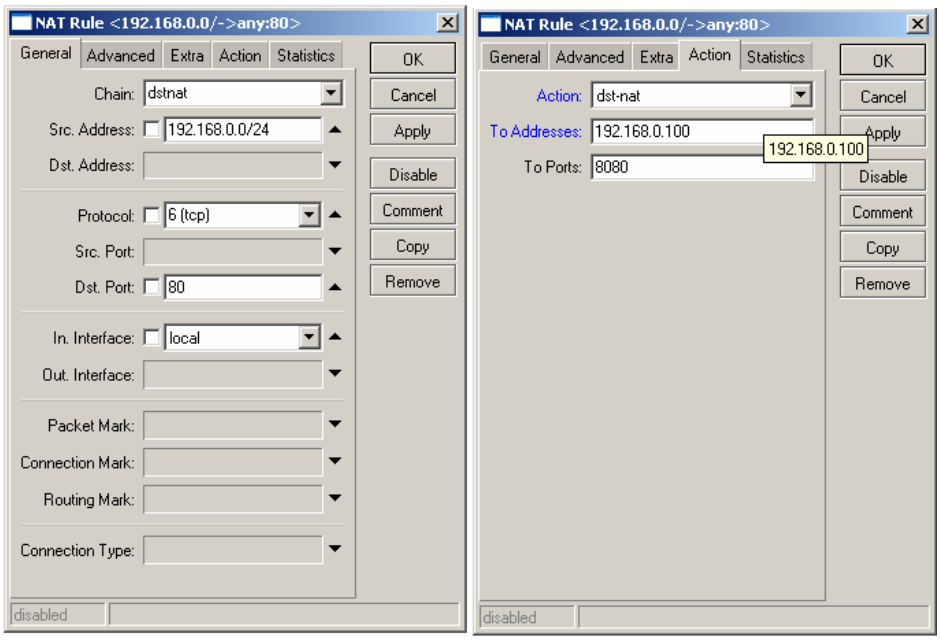
- **Transparent proxy with proxy servers separate / independent**

MikroTik Web Proxy built in according to my observations not so good compared to the squid proxy in Linux, squid in Linux has more flexibility to be modified and diconfigure, eg for delay-pool feature and ACL lists that include files, not in the proxy series 2.9.x.

Usually most people prefer to create their own proxy servers, with PC Linux / FreeBSD and live directing all clients to the PC.

Topology PC proxy can be in a local network or using public ip.

Configuration almost similar to the transparent proxy, the difference is in the action NAT rule is as follows:



In the above example 192.168.0.100 is the IP proxy server port 8080

- **Mikrotik as a bandwidth limiter**

Mikrotik can also be used for bandwidth limiter (queue). To control the data rate allocation mechanism.

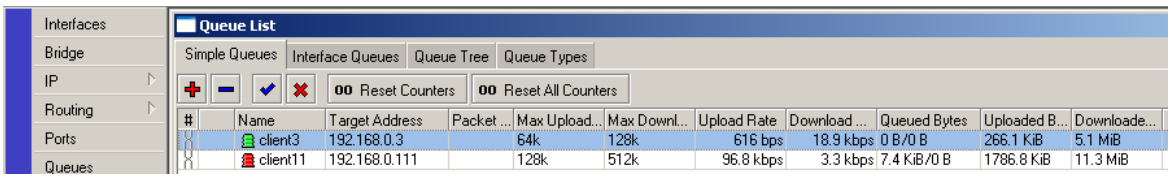
In general there are 2 types of bandwidth management at the proxy, the simple queue and queue trees. Please use one only.

The next tutorial mikrotik all settings using Winbox, because it is more user friendly and efficient.

Simple queue:

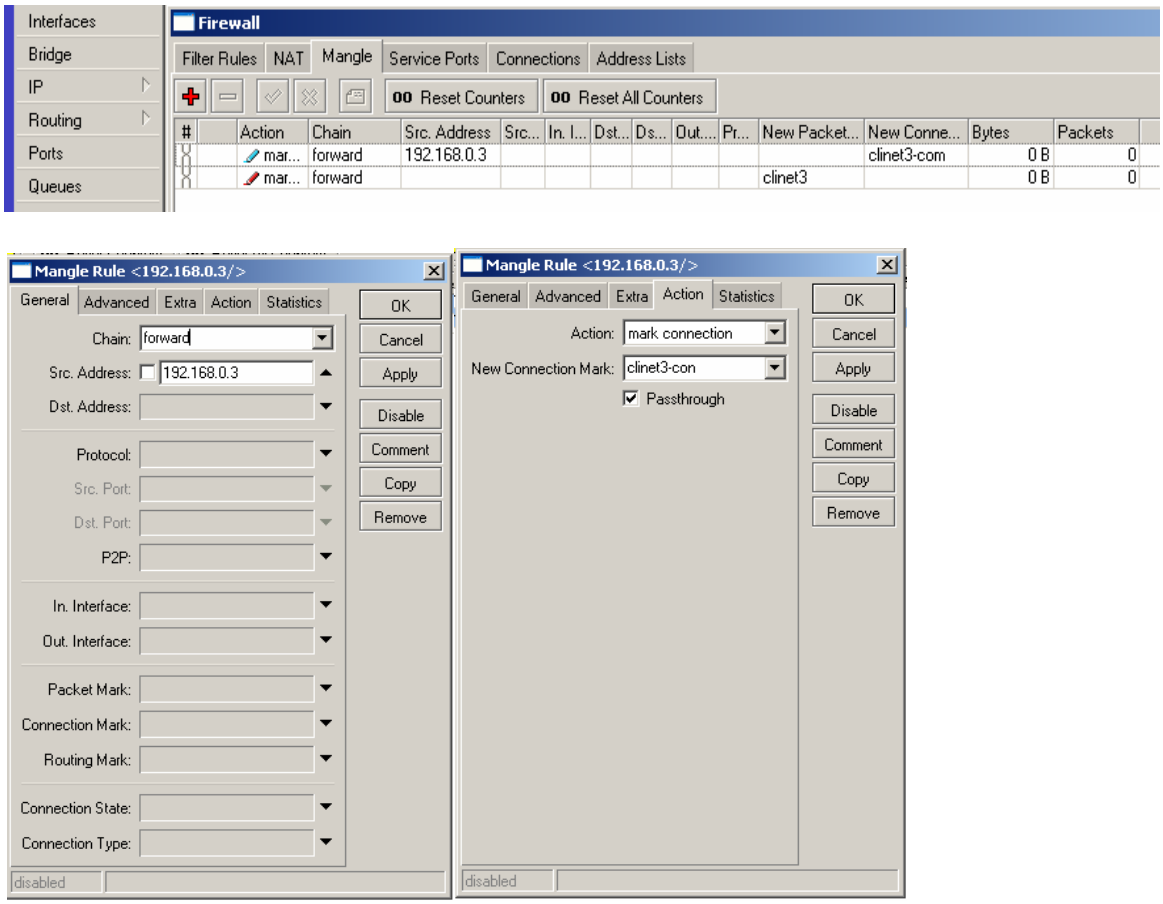
For example we will limit the bandwidth of the client with ip 192.168.0.3 that is for upstream and downstream 128kbps 64kbps

Settings on the menu Queues> Simple Queues



Queue tree

Click the ip> firewall> magle



Make a rule (click the + red) with the following parameters:

On the General tab:

Chain = forward,

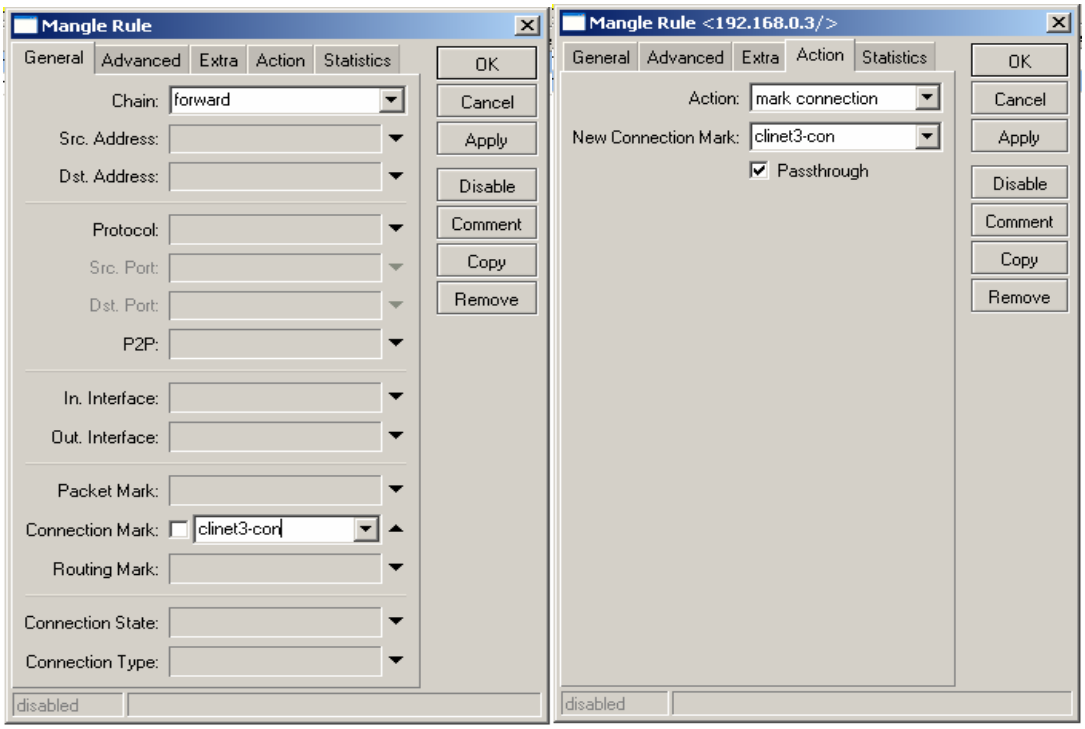
Src.address = 192.168.0.3 (or ip who want the limit)

On the Action tab:

Action = mark-connection,

New connection-mark = client3 con (or the name of the mark we created a distinguished conection)

Click Apply and OK



Create another rule with the following parameters:

On the General tab: chain = forward,

Connection mark = client3-con (choose from dropdown menu)

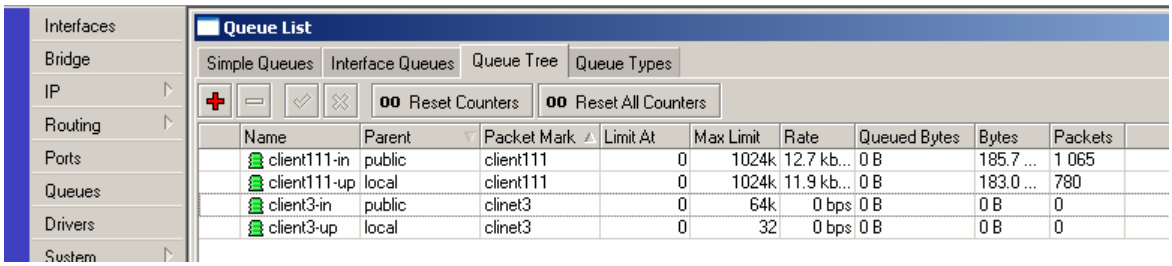
On the Action tab:

Action = mark-packet,

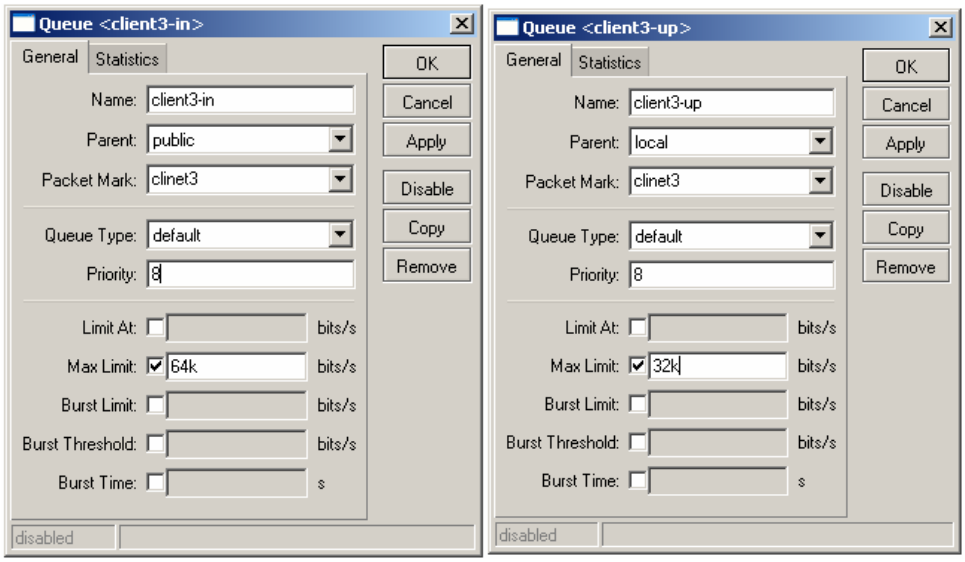
New pcket Mark = client3 (or the name of the packet we created a distinguished mark)

Click Apply and OK

Click the Queues> Queues Tree



Make a rule (click the + red) with the following parameters:



On the General tab:

Name = client3-in (eg),

Parent = public (which is the direction of outgoing interface),

Mark = client3 Package (choose from the dropdown, just that we make to magle)

Queue Type = default,

Priority = 8,

Max limit = 64k (for setting the bandwidth max download)

Click aplly and Ok

Create another rule with the following parameters:

On the General tab:

Name = client3-up (eg),

Parent = local (as an interface into which direction),

Mark = client3 Package (choose from the dropdown, just that we make to magle)

Queue Type = default,

Priority = 8,

Max limit = 64k (for setting max upload bandwidth)

Click aplly and Ok

Mikrotik as Bridging

Bridge is a way to connect two separate network segments together in a protocol itself. Packages that are forwarded based on Ethernet addresses, not IP addresses (such as routers). Because the packet forwarding done at Layer 2, all protocols can be via a bridge.

So the analogy is like this, you have a local network 192.168.0.0/24 gateway to an ADSL modem which also as a router with a local ip 192.168.0.254 and public ip 222.124.21.26.

You want to create a proxy server and proxy as a BW management for all clients. Well want to put the location for the PC mikrotik? Among the hub / switch and gateway / modem? Do not be like him as a NAT and we have to add 1 block io private again different from the gateway modem?

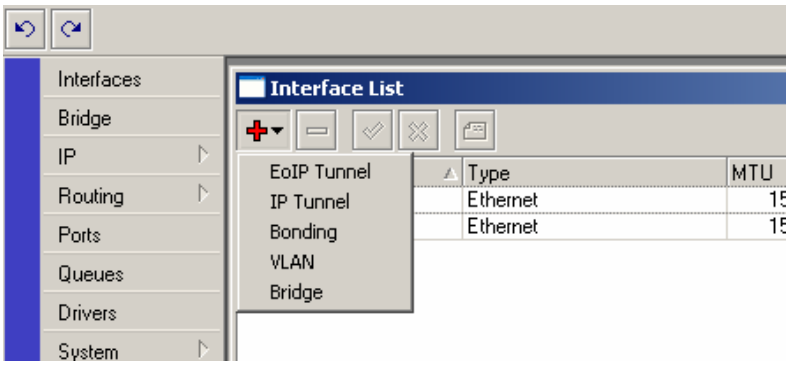
The solution set as a bridging proxy, so seolah2 he only bridge between UTP cable only. Topology as follows:

Internet----------Moderm/router-----------Mikrotik--------Switch/Hub-----Client

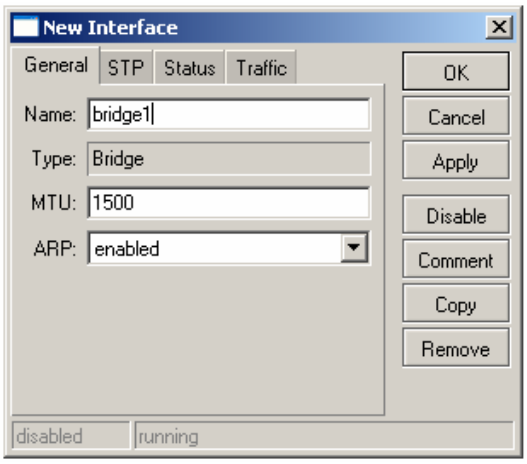
Setting bridging using Winbox

1. Add a bridge interface

Click the Interface menu and then click the + sign to add a red color interface, select the Bridge



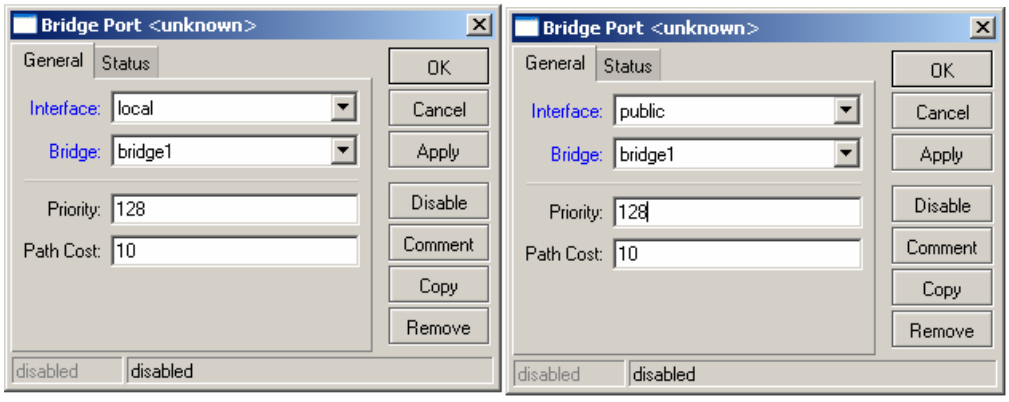
to name bridge interface, eg, we named bridge1



2. adding ether interface on the local and public interface

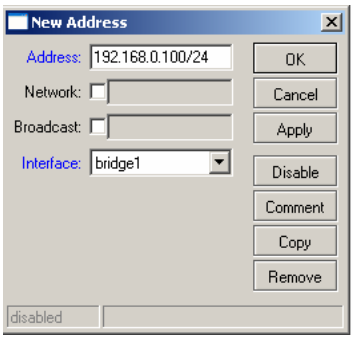
Click the IP> Bridge> Ports, then click the + sign to add a new rule:

Make 2 rules, to local and public interface.



3. Giving IP address to bridge interface

Click the IP menu and then click the + sign to add an interface IP, eg 192.168.0.100, select bridge1 interface (or the name of the bridge interface that we created earlier)



By giving the IP address on bridge interface, the proxy can be either remote from the network which is connected to a local interface or the public.

Mikrotik as MRTG / Graphing

Graphing is a tool in mokrotik enabled to monitor changes in the parameters at any time. Changes that change the form of graphs uptodate and can be accessed using a browser.

Graphing can display the information in the form:

* Resource usage (CPU, Memory and Disk usage)

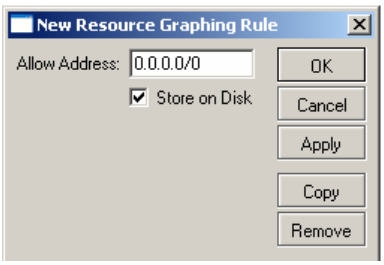
* Traffic passing through the interfaces

* Traffic through simple queues

Activating the function grapping

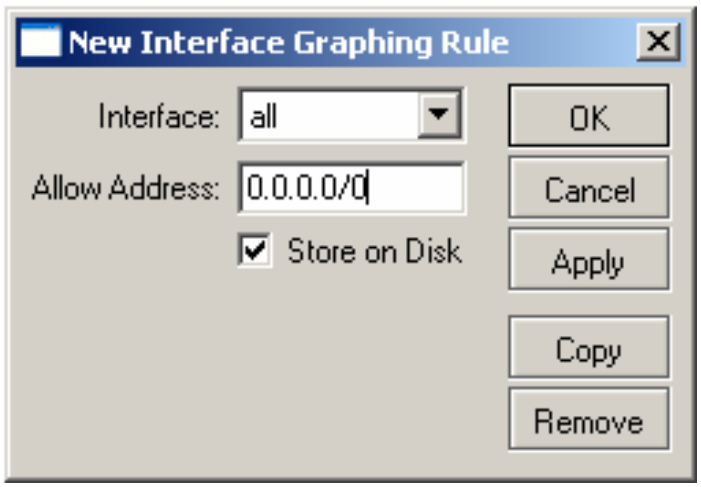
Click the Tools menu> Graphing> Resource Rules

Is to enable graphing for Mikrotik resource usage. While allow address is anywhere IP that can access these charts, 0.0.0.0 / 0 for all ip address.



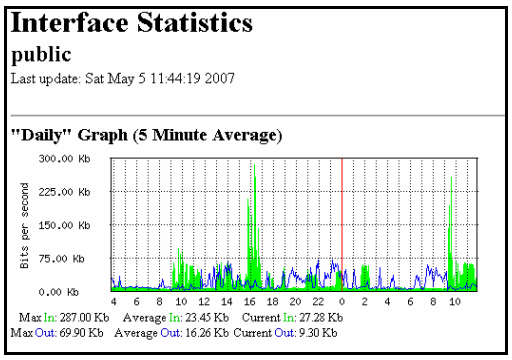
Click the Tools menu> Graphing> Interface Rules

Is to enable graphing for monitoring traffic passing through the interface, please select which interface you want monitored, or select "all" for all.



Graphing consists of two parts, first to collect information / data that both show in a web format. To access the graphics, type the URL with the format **http:// [Router_IP_address] / graphs /** and choose from the menus there, where you want to display graphics.

Sample results graph for traffic public interface:



Similarly, the authors convey a little tutorial for just sharing the knowledge or simplify for easy understanding of the tutorials that are already available on the official site mikrotik.

Warmest Regards,

Anung Muhandanu