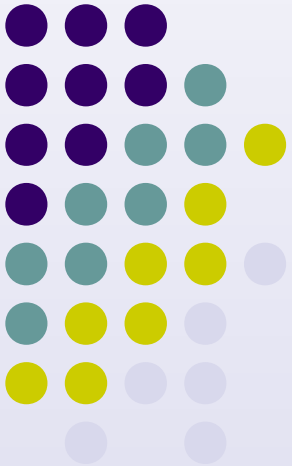
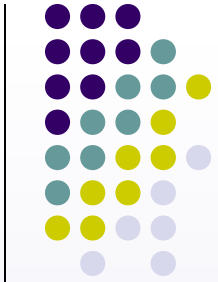
Mikrotik Firewall

Securing Your Router With Port Knocking



Introduction



- Name : Akbar
- Mikrotik User Since : Mid 2005
- IT Manager @ Agung Sedayu Group
- Trainer For Ufoakses Mikrotik Training
- www.forummikrotik.com
- akbar@forummikrotik.com

What is Port Knocking ?

- Port Knocking is a method of externally opening ports on a firewall by generating a connection attempt on a set of prespecified closed ports
- Once a correct sequence of connection attempts is received, the firewall rules are dynamically modified to allow the host which sent the connection attempts to connect over specific port(s)

Port Knocking Process

Host

Connection Attempt to Router with Winbox or Telnet or SSH →

← Connection Attempt Rejected / Drop

Knock : Connection Attempt to Pre Defined Port →

Firewall Rules Dynamically Modified to Allow Access From That Host

Connection Attempt to Router with Winbox or Telnet or SSH →

← Connection Granted

Router with Firewall

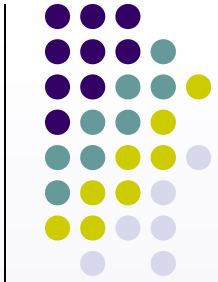
Why Port Knocking ?

- The primary purpose of port knocking is to prevent an attacker from scanning a system for potentially exploitable services by doing a port scan, because unless the attacker sends the correct knock sequence, the protected ports will appear closed.

When to Use Port Knocking ?

- When you need to do remote configuration or monitoring from remote area
- When you try to decrease brute force attack

How to Apply Port Knocking in Mikrotik ?

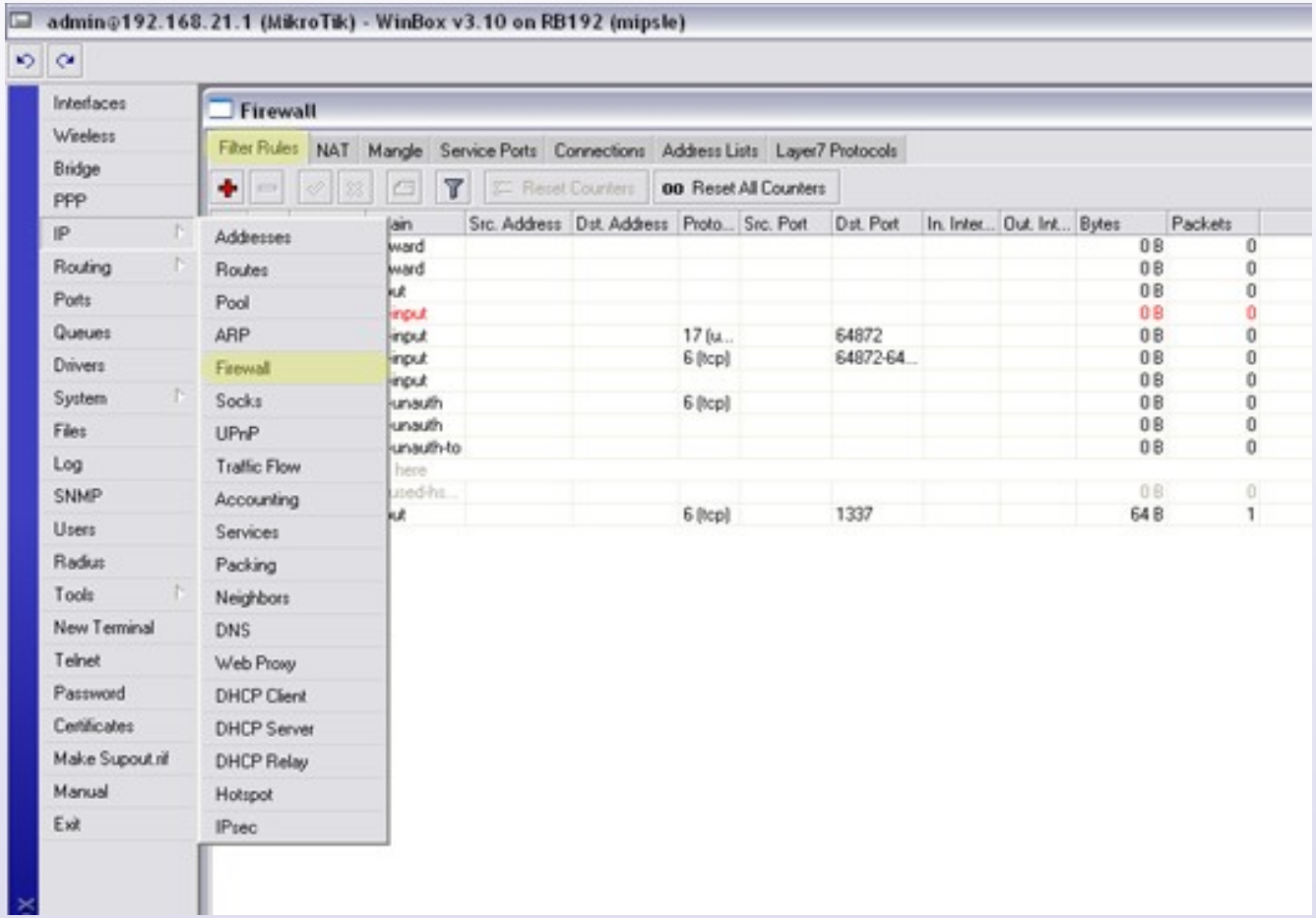


- Using :
  - **Firewall Filter**
  - **Address List**

  - **Knock Application**

Please download the application from :
www.zeroflux.org

The Basic of Firewall Filter



The Basic of Firewall Filter

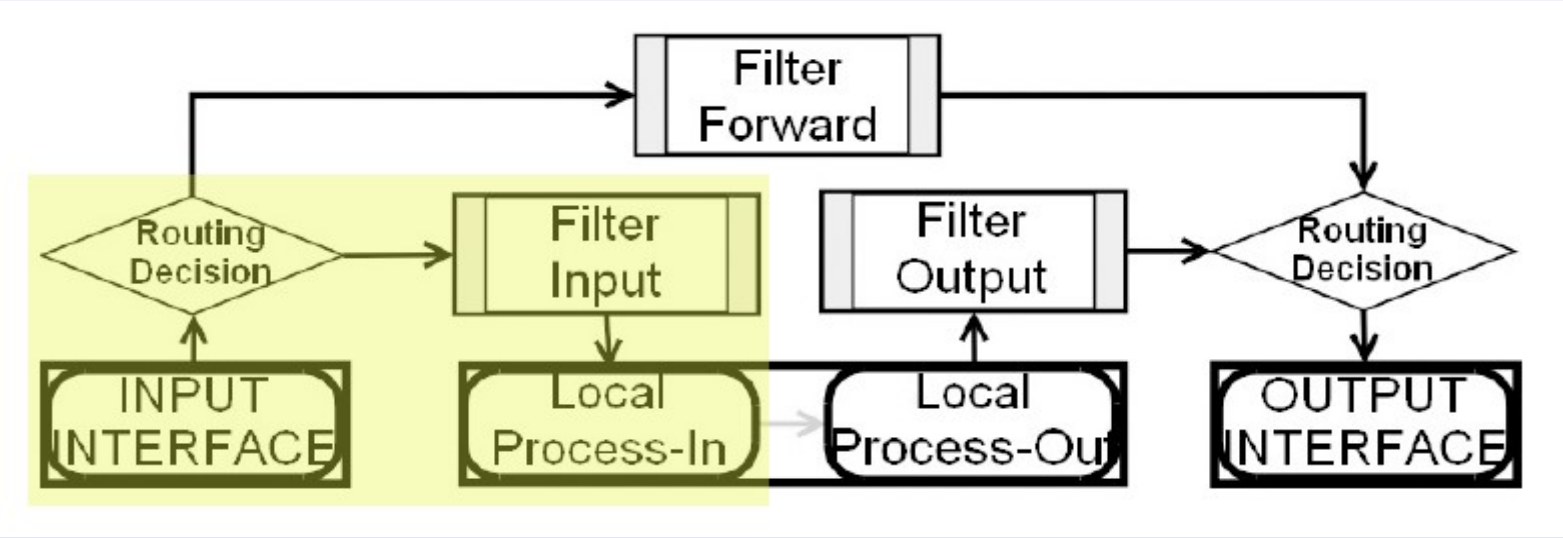
- Firewall Filter is used for packet filtering
- Firewall Filter consist of IF-THEN rules

  IF <conditions> THEN <action>
- Firewall Filter is done in sequential top to bottom
- Firewall Filter are organized in chains

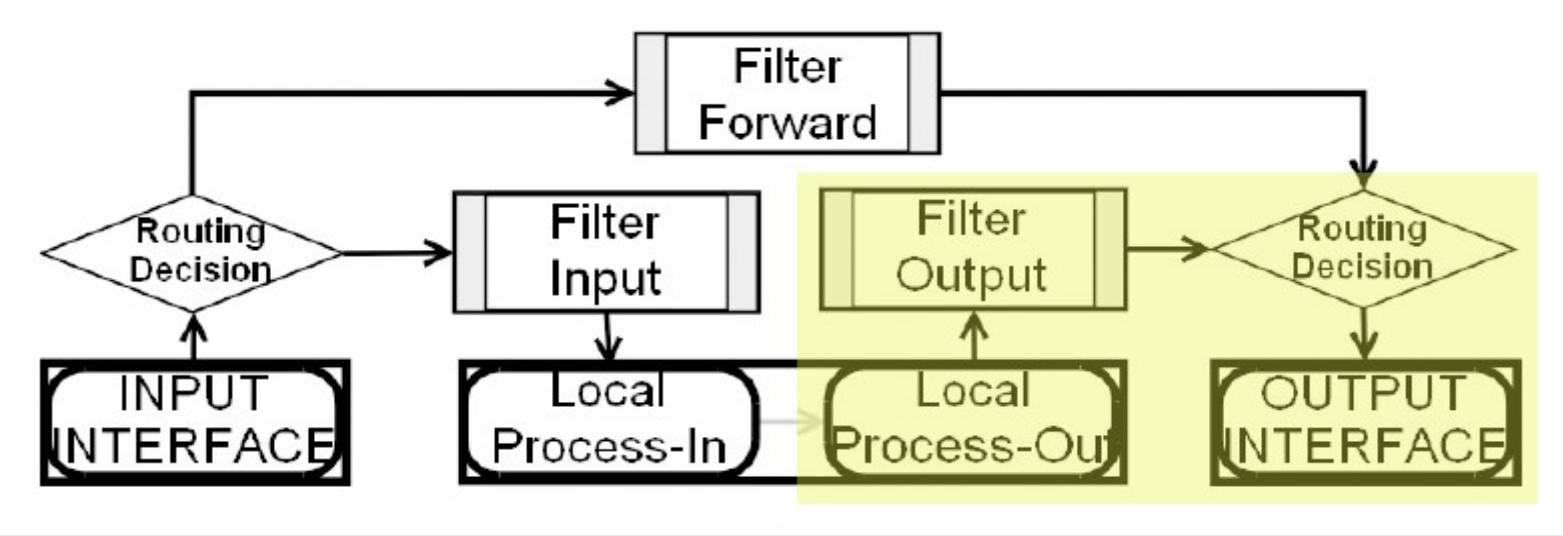
The Basic of Firewall Filter

- Input : Processes packets addressed to the router itself
- Output : Processes packets sent by the router itself
- Forward : processes traffic sent through the router

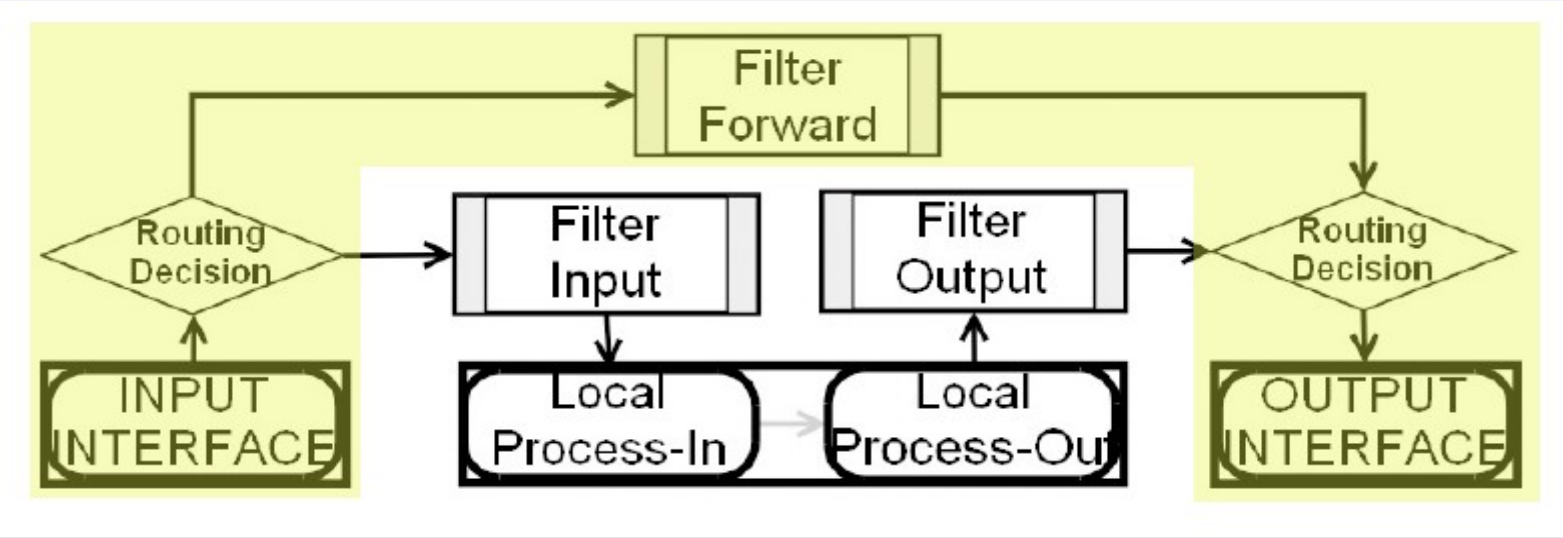
Chain Input


Filter
Forward
Routing
Decision
Filter
Input
Filter
Output
Routing
Decision
INPUT
INTERFACE
Local
Process-In
Local
Process-Out
OUTPUT
INTERFACE

Chain Output



Chain Forward

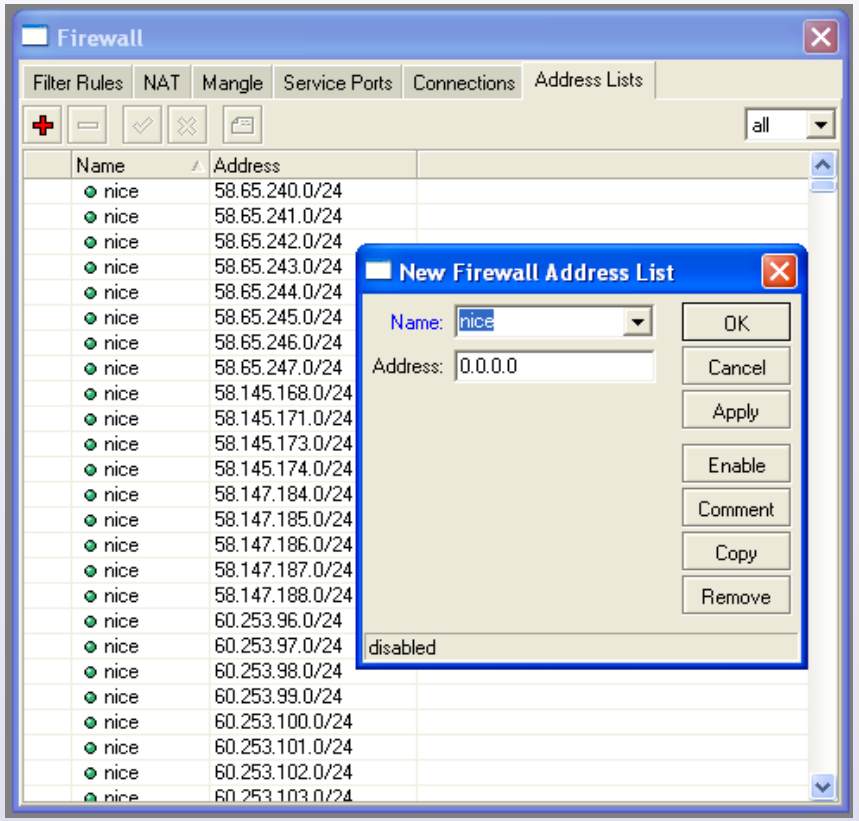


Firewall Filter Action

- **Accept** – accept the packet. No action is taken, I.e the packet is passed thourgh and no more rules applied to it
- **Add-dst-to-address-list** – adds destination address of an IP packet to the address list specified by address-list parameter
- **Add-src-to-address-list** – adds source address of an IP packet to the address list specified by address-list parameter
- **Drop** – silently drop the packet (without sending the ICMP reject messege)
- **Jump** – jump to the chain specified by the value of the jump-target-parameter
- **Log** – each match with this action will add a messege to the system log
- P**assthrogh** – ignores this rule and goes on the next one
- **Reject** – reject the packet and send an ICMP reject messege
- **Return** – passes control back to the chain where the jump took place
- **Tarpit** – captures and hold incoming TCP connections (replies with SYN/ACK to the inbound TCP SYN packet

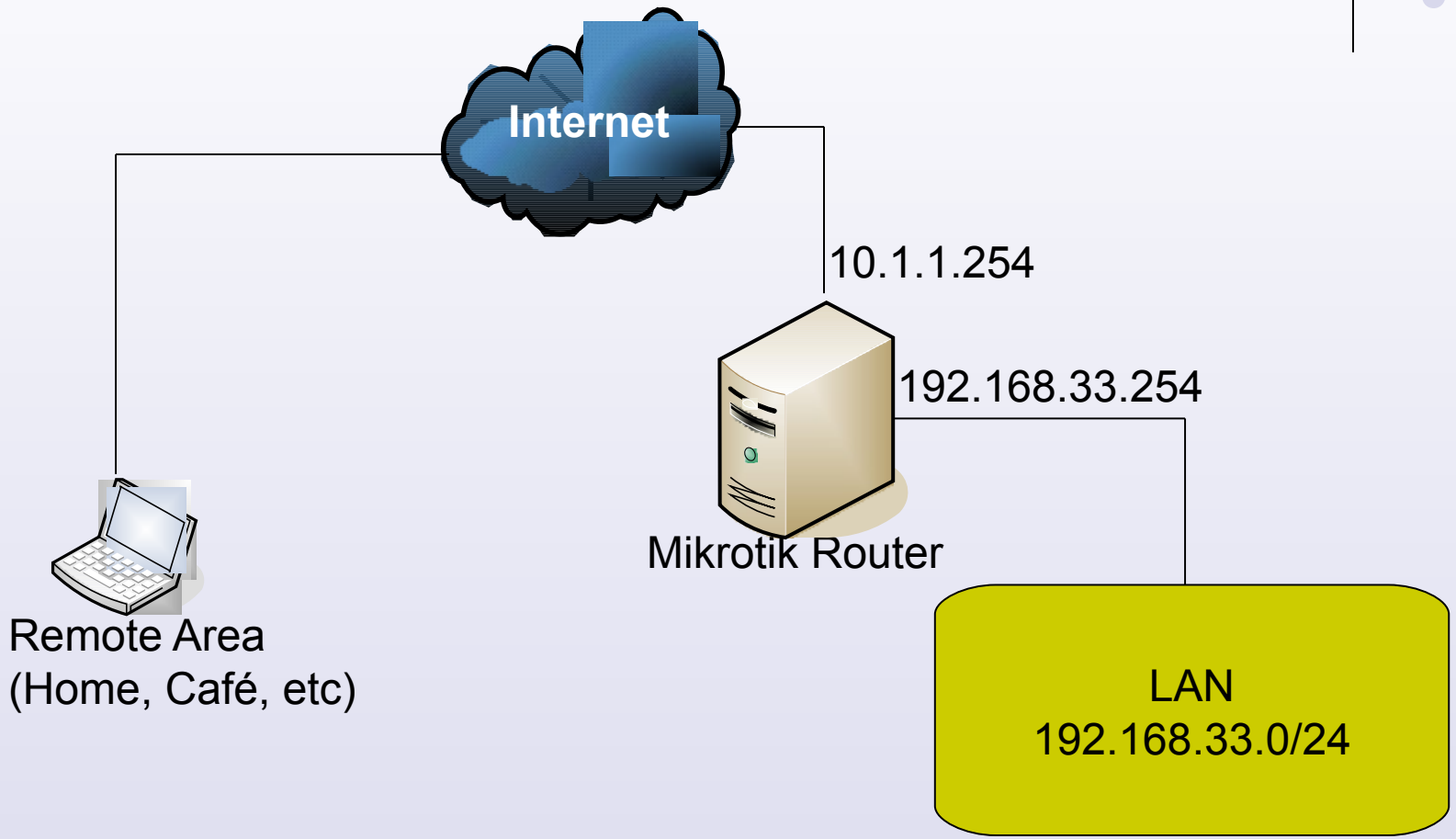
IP Address List

- You can also define group of IP address using “IP address List”
- IP address List can be used in Firewall Rules to apply certain action
- You can use mangle or firewall filter rule to dynamicly add IP address to IP address List certain time limit



Let's Start Implementing Port Knocking in Mikrotik Router OS…

Case Studies



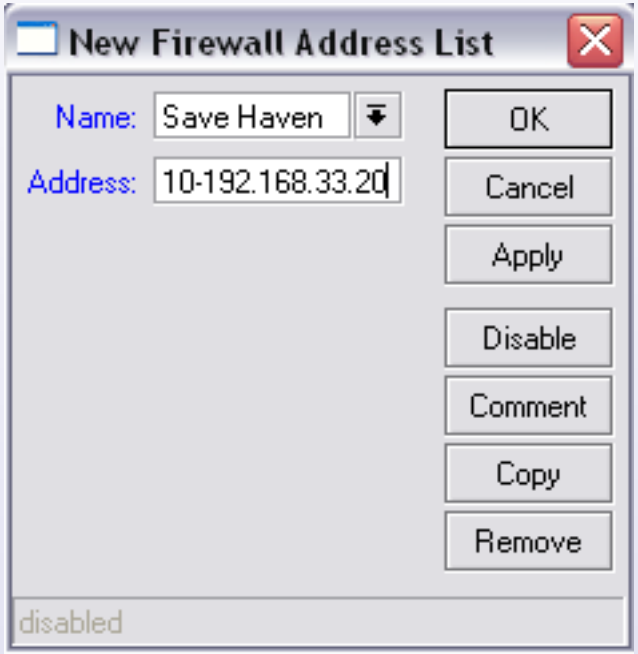
Case Studies

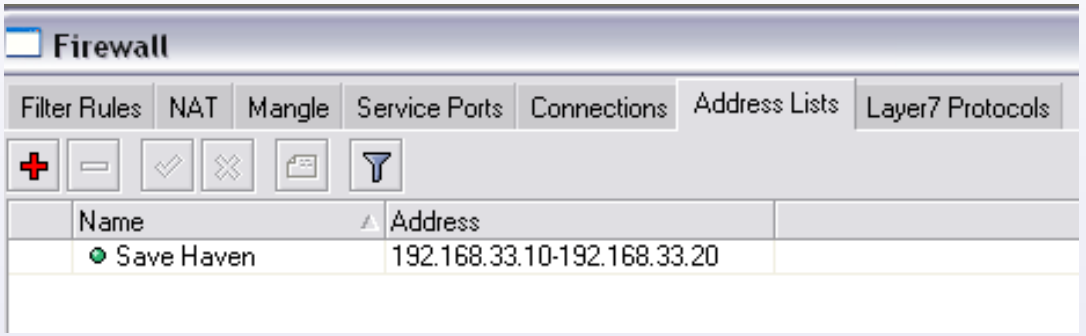
- We only allowed access to router only from several IP from LAN :
  - 192.168.33.10 Until 192.168.33.20
- Different IP from LAN have to knock first before gain access to router
- Remote area from Internet have to knock first before gain access to router

Case Studies

- We will only allowed access to router from address list named “Safe Haven”
- Other have to knock first to :
  - Protocol TCP, Port 1337
  - Protocol UDP, Port 17954

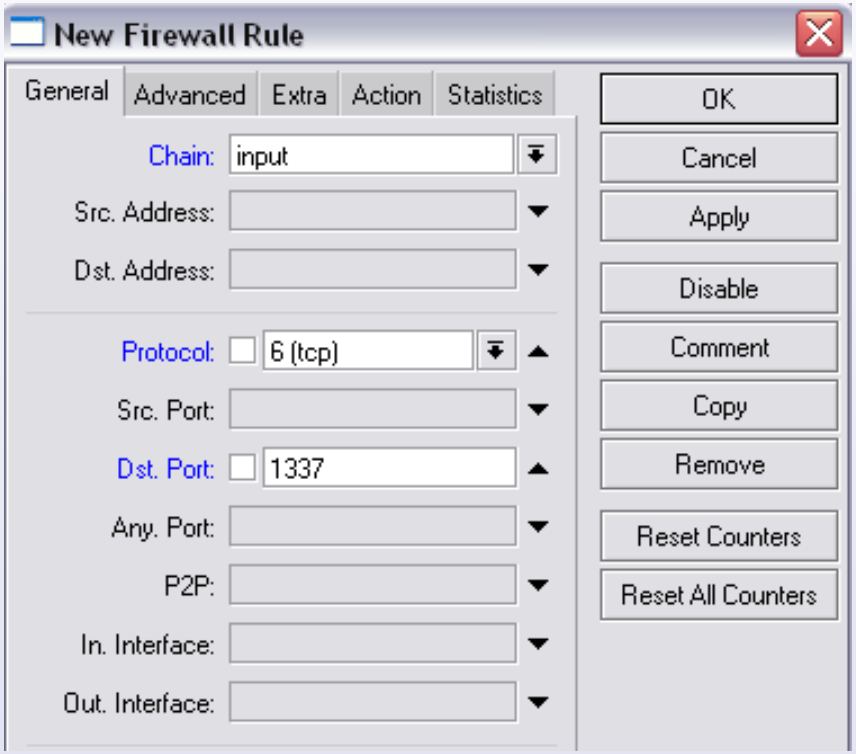
Adding Allowed LAN Address to Address List

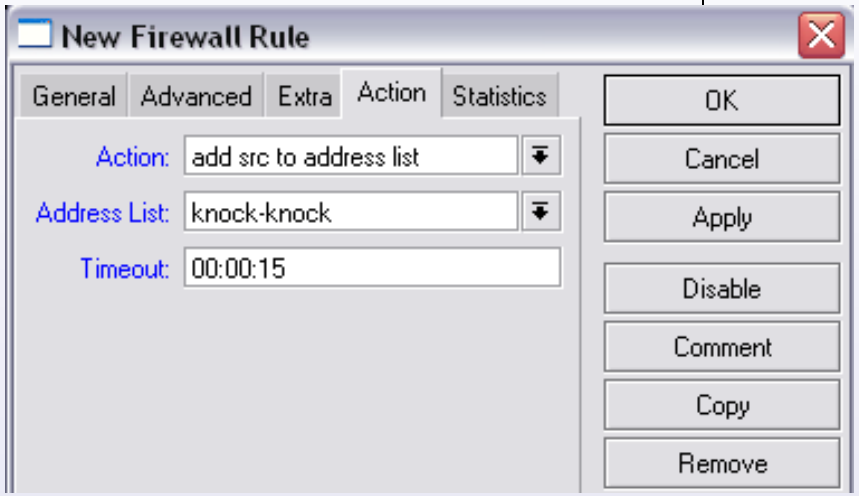





```
add address=192.168.33.10-192.168.33.20 comment="" disabled=no list=\
    "Save Haven"
```

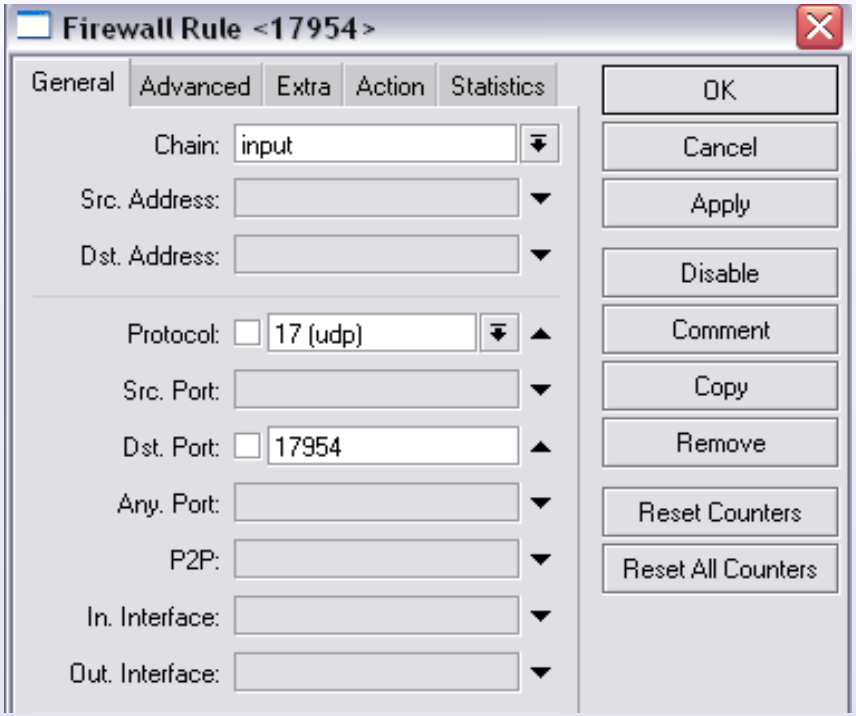
Knock Rules 1

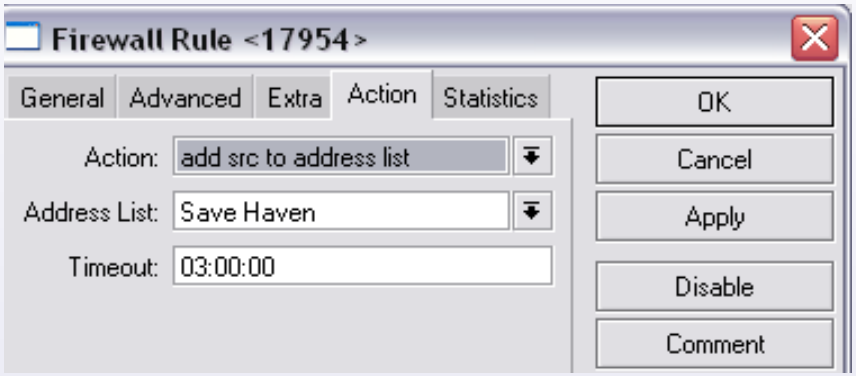





```
add action=add-src-to-address-list address-list=knock-knock address-list-timeout=15s chain=input comment="Knock 1" disabled=no dst-port=1337 protocol=tcp
```

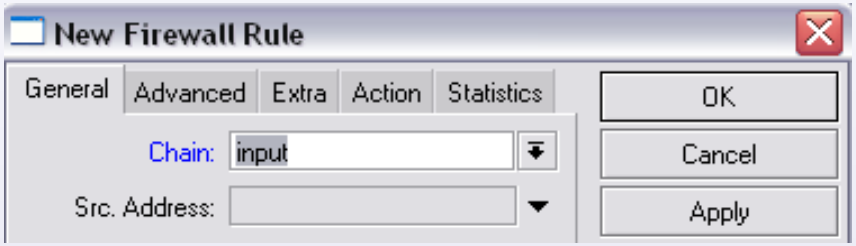
Knock Rules 2

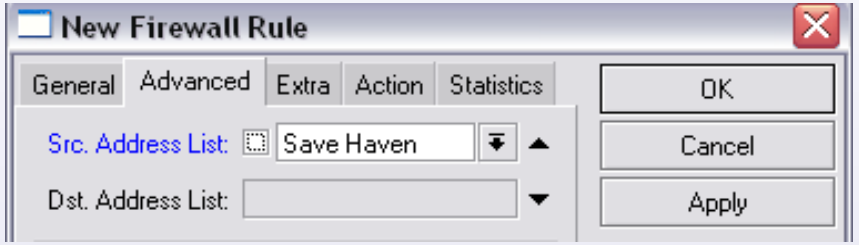


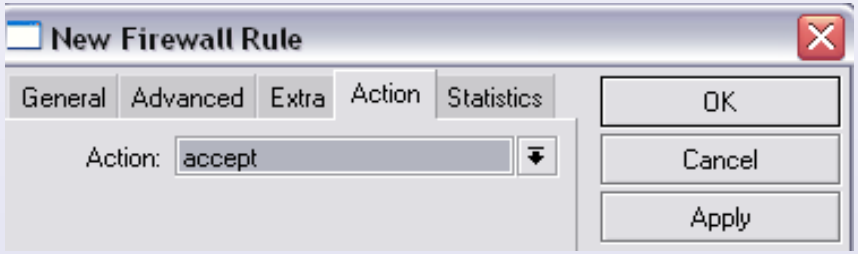



```
add action=add-src-to-address-list address-list="Save Haven“ address-list-timeout=3h chain=input comment="Knock 2 - OK" disabled=no dst-port=17954 protocol=udp src-address-list=knock-knock
```

Only Allowing “Save Haven” to Connect to the router

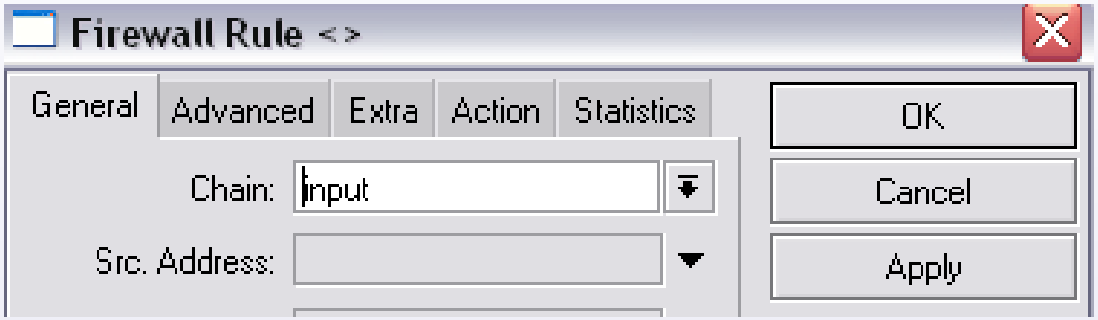


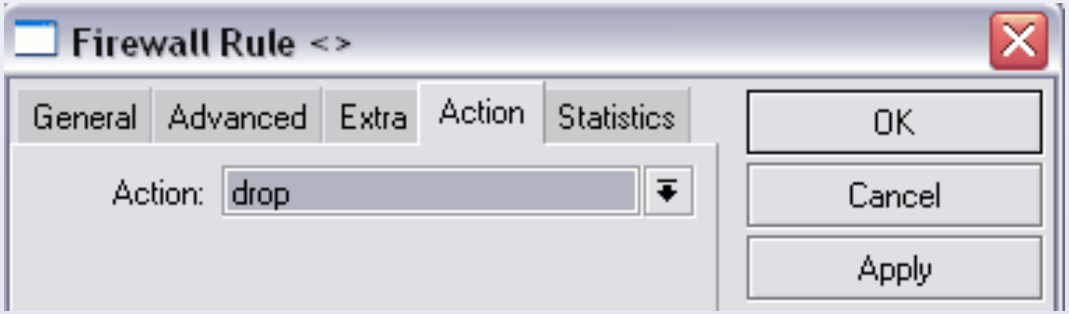





```
add action=accept chain=input comment="Only Allow Access from Save Haven" disabled=no src-address-list="Save Haven"
```

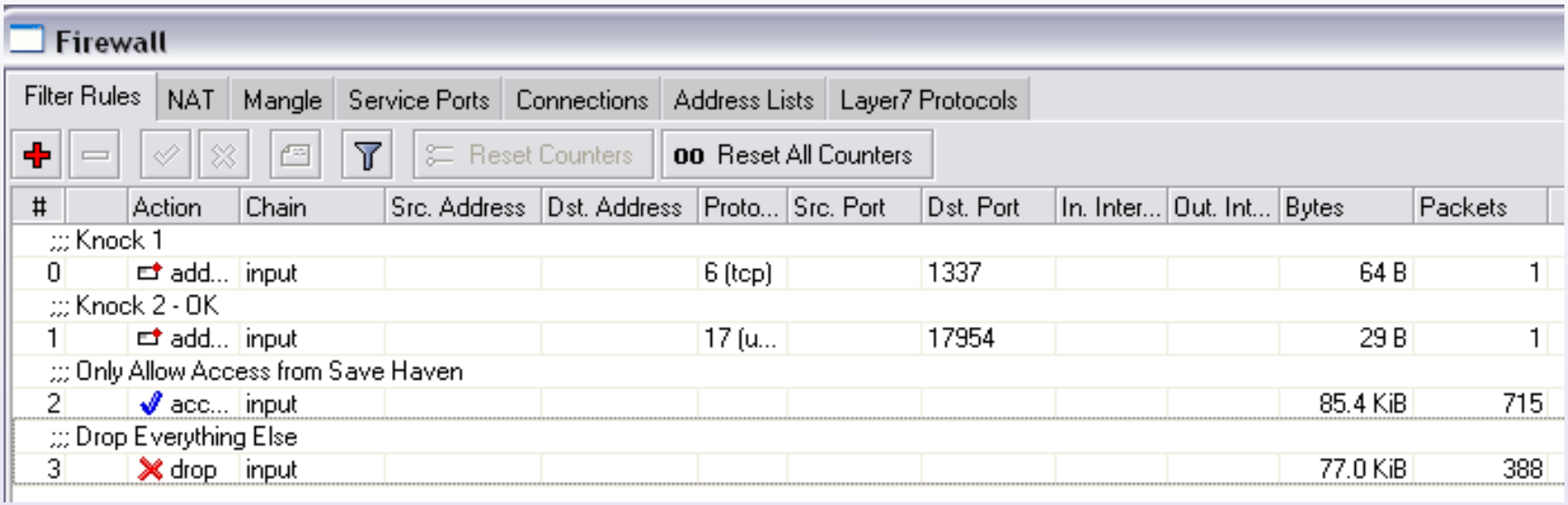
Drop Everything Else





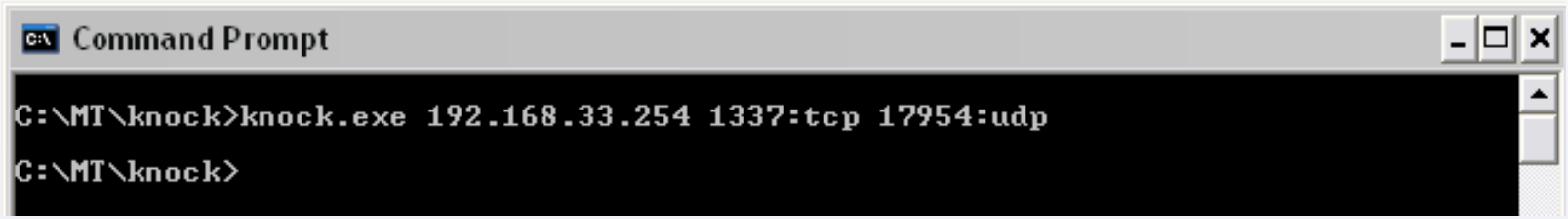

```
add action=drop chain=input comment="Drop Everything Else" disabled=no
```

Configuration



Here's the configuration for port knocking. Just make sure you don't change the sequence or this will not worked

Knock Attempt



- Hosts have to Knock the correct ports
- Hosts IP Address that have knocked the correct ports will be put in dynamically to “Save Haven” Address List
- Hosts can access router

Closing

- Port Knocking is useful for securing the router
- Port Knocking is also useful to decrease a brute force attack
- Port Knocking has it’s weakness also:
  - It' s possible to spy out the knocking sequence by sniffing the network
  - It' s necessary to have a special knocking-client
- Port Knocking is only one method to secure the router, best to combine this with other methods.

Thank You

Your Question Will be Appreciated