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Basic Config MikroTik Captive Portal (HotSpot)

Teddy Yuliswar #TR0442

Phnom Penh, Cambodia January 21, 2019





About Presenter

Teddy Yuliswar

- Used MikroTik since RouterOS 2.97 (Since 2008)
- **MikroTik Certified MTC [All] E (2014 – 2016)**
- **Mikrotik Certified Trainer (UEA, TTT Dubai 2016)**
- **MikroTiK Consultants Asia (Since 2016)**
- **Mikrotik Academy Coordinator in Indonesia (Since 2017)**
- **Founder Indonetworkers.com Training Center**
- **MikroTik User Meeting Presenter (2015 – 2019)**
 - Yogyakarta , Jakarta -Indonesia (2015-2018)
 - Phnom Penh – Kamboja (2017)
 - Vientiane - Laos (2017)
 - Phnom Penh – Kamboja (2019 - **NOW**)

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Mikrotik Training Class



Banjarmasin – borneo island , 2017

Mikrotik Training Class



Jakarta , 2017

Mikrotik Seminar



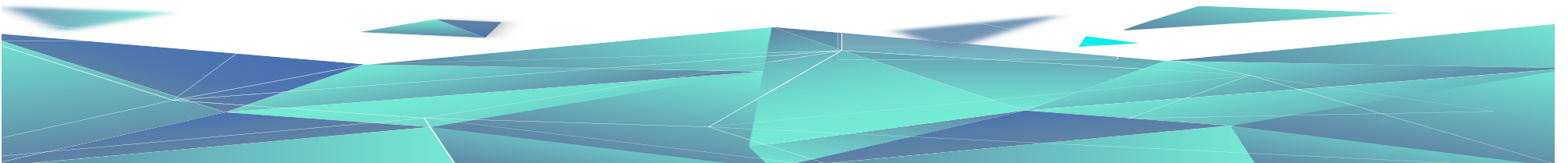
With hotspotsystem - Malaysia

Kuala Lumpur, Malaysia - 2019

MikroTik Train-the-Trainer

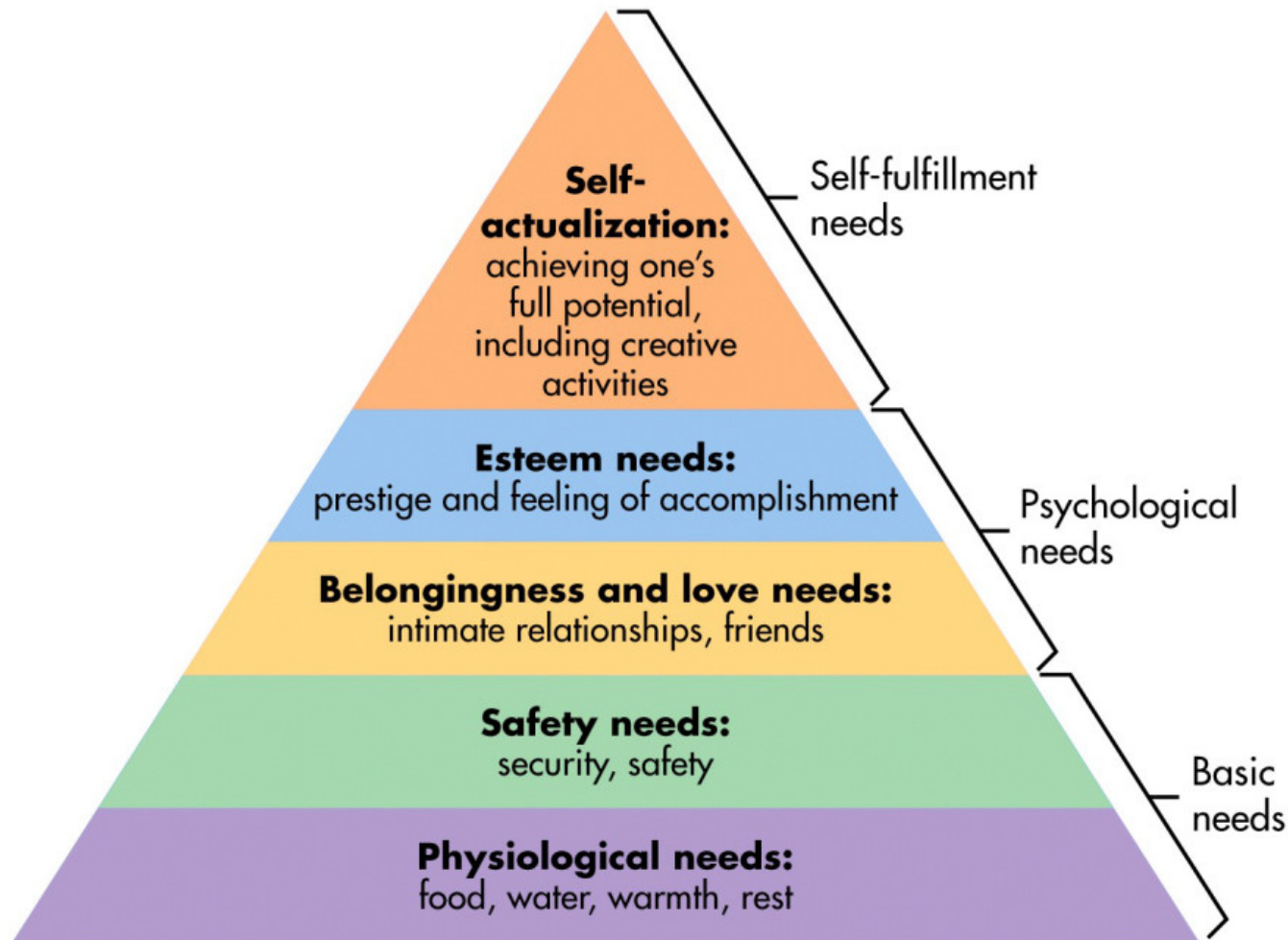


**How long you can survive
without the internet now?**

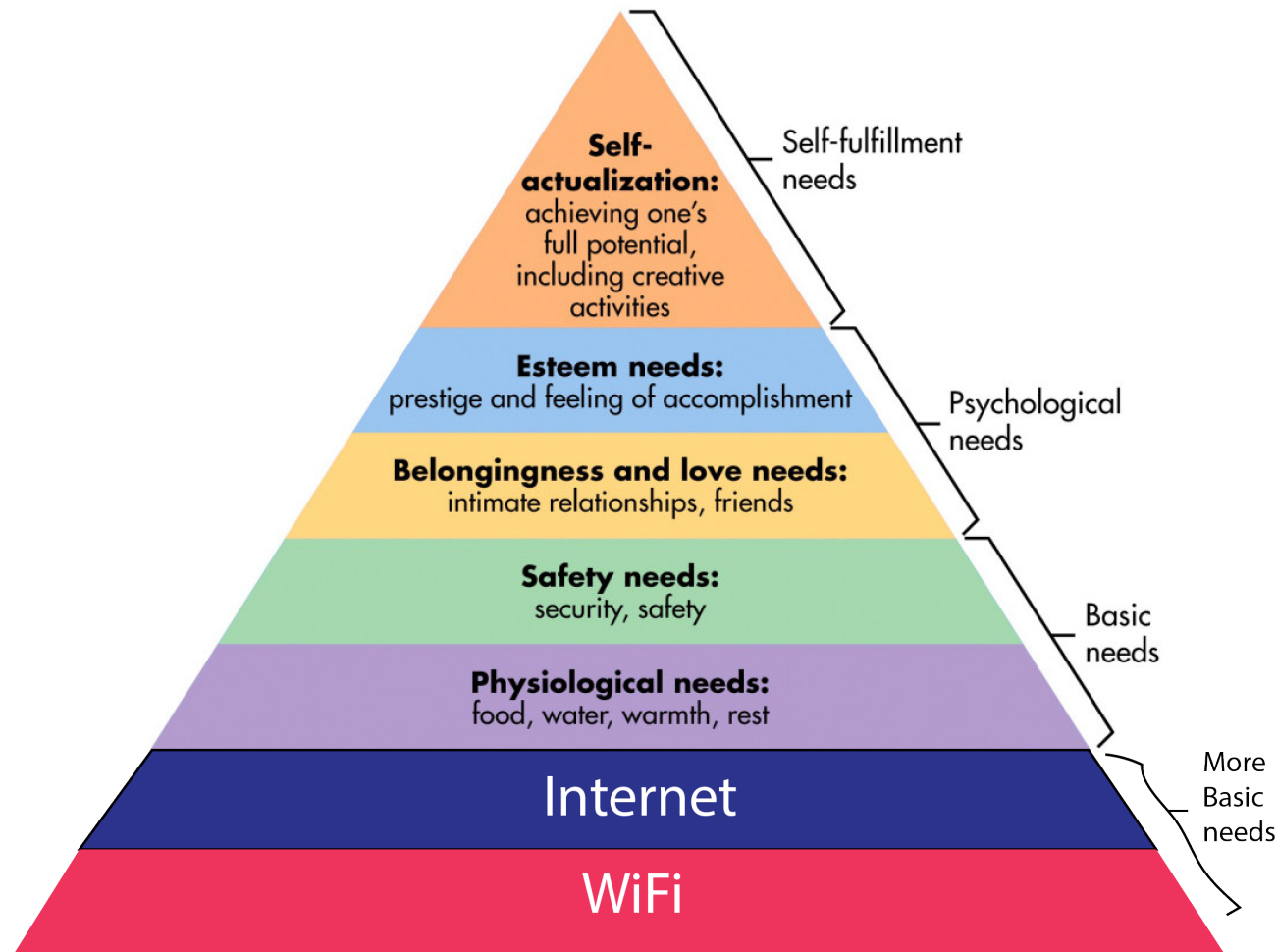




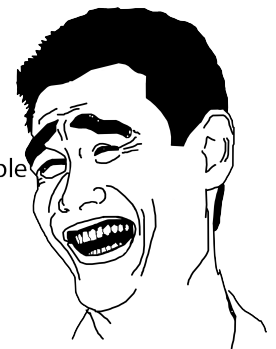
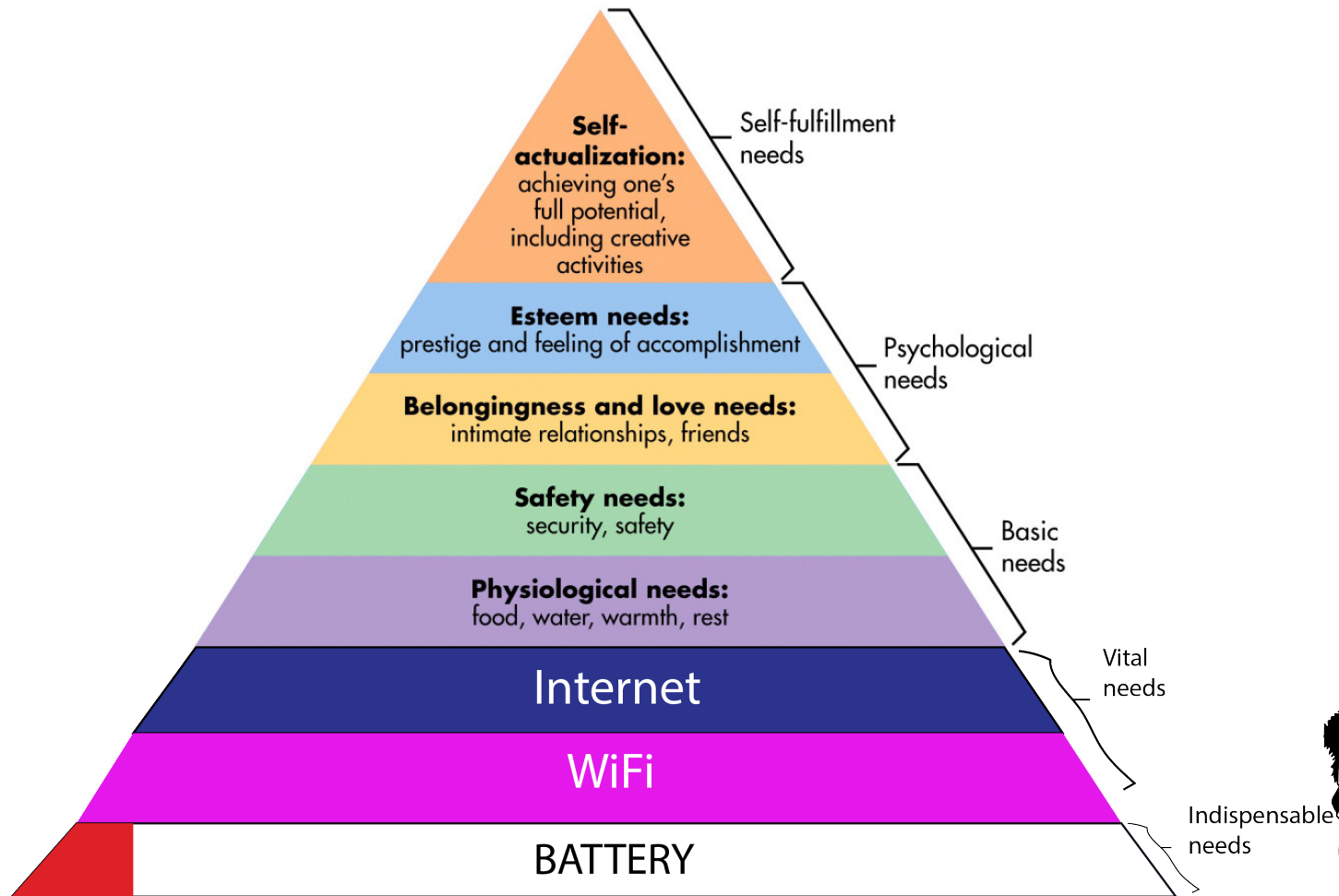
Past..



Now..



Now..



BASIC NEEDS FOR SURVIVAL

THEN



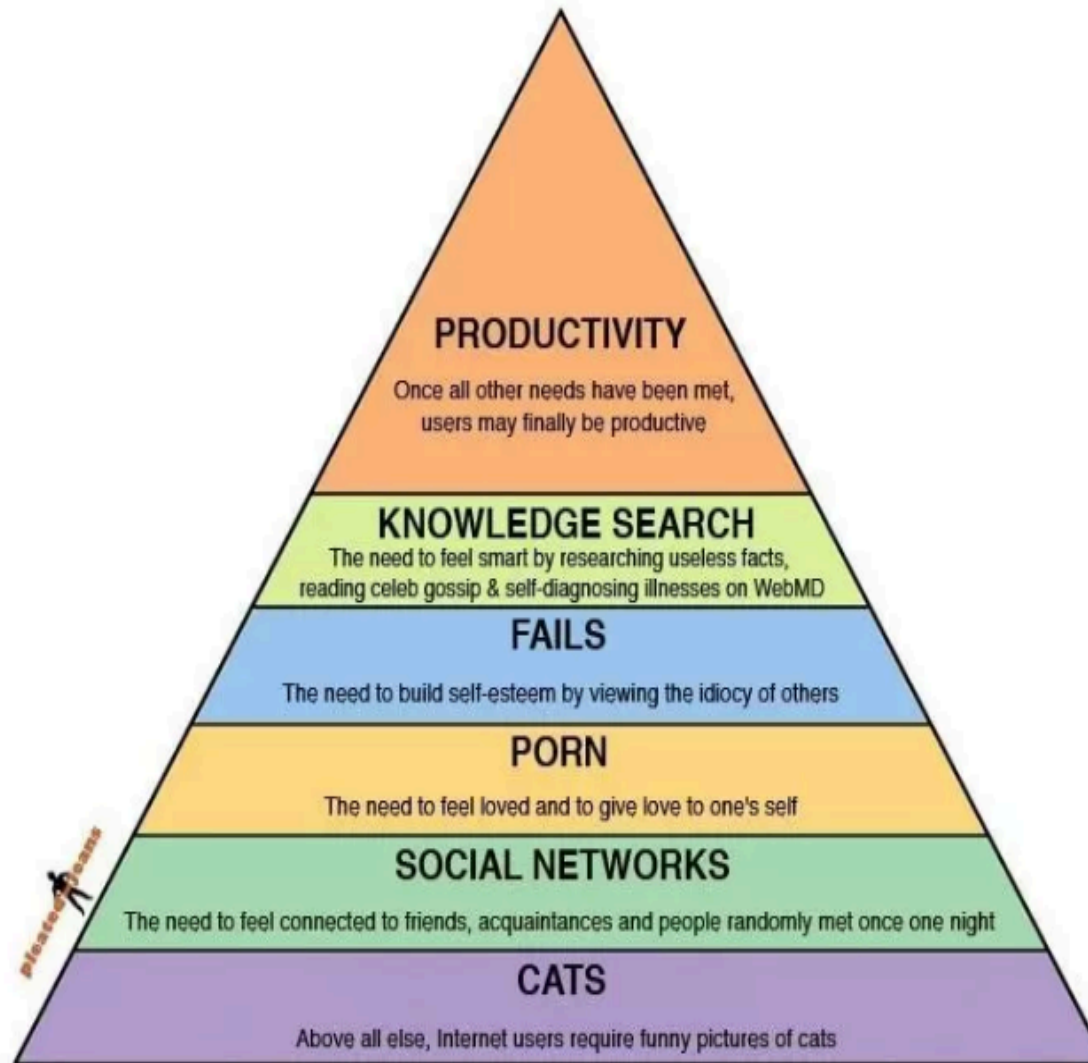
- FOOD
- WATER
- SHELTER
- CLOTHING

NOW

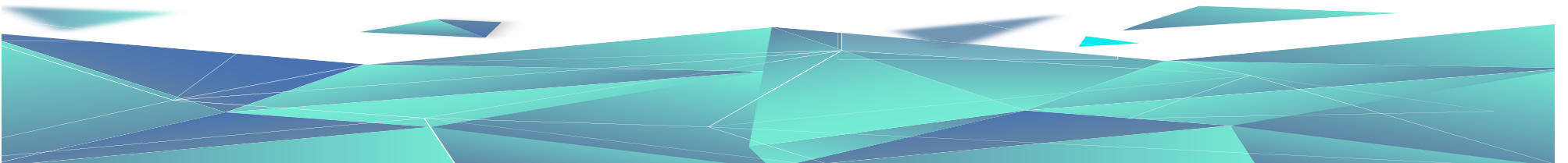


- INTERNET
- FOOD, SHELTER, WATER (OPTIONAL)

Maslow's Hierarchy of Internet Needs



Which jobs that don't need the internet now?



Where we can get internet source?

- Subscribe to the internet from Internet Service Provider (ISP) at home (Paid every month)
- Buy data packages for mobile connections (Limited Data Quota)
- Buy HotSpot Voucher (Paid Hourly)
- Or

Get Free Wifi 😊

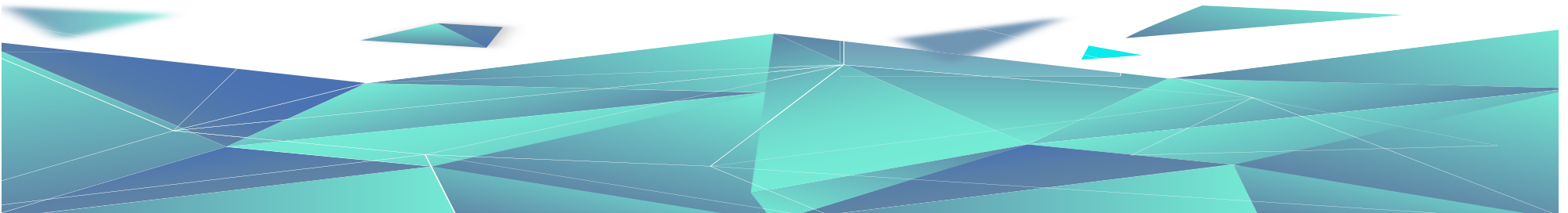




MikroTik
Login Hotspot



Hotspot is a physical location where people may obtain Internet access, typically using **Wi-Fi technology**, via a wireless local area network (WLAN) using a router connected to an internet service provider.



MikroTik

Login Hotspot

Gateway provides authentication for clients before access to public networks Commonly called “captive portal” can running in **wireless networks** or **wire networks** even **Virtual Interface** like VLAN, Virtual AP , Tunnel and etc.



Overview

- Plug-and-Play Internet Access
- Users authentication before access to the Internet
- Walled-garden to allow resources without authentication
- User Accounting
- Transparent proxy



Usage

Airports



Usage

University / Campus



Usage

Student Dormitories / Leased Housing



Usage

Restaurant or Café's



Usage

- Open Access Point
- Anywhere Authorization or Accounting are Required

Operation

- User can use wrong network configuration settings, Hotspot server **translates them** to correct ones
- No Internet Available **before** Hotspot **Authorization**
- **Exceptions** are added to walled-garden and / ip hotspot ip-binding

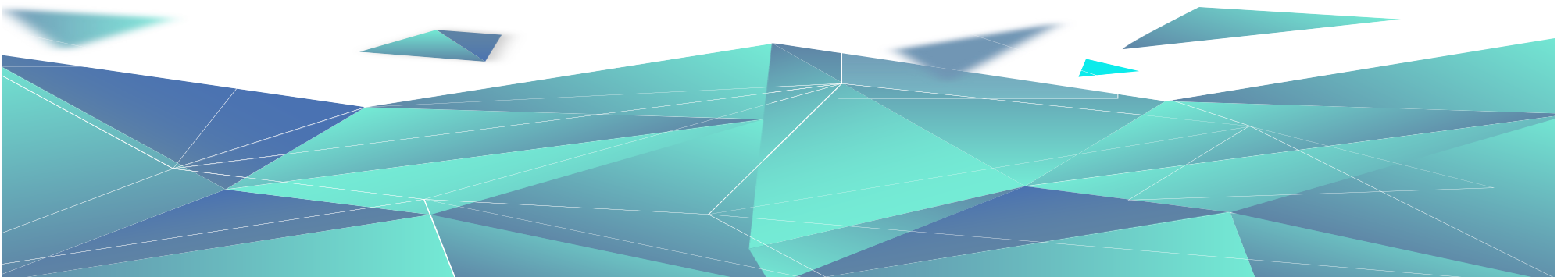


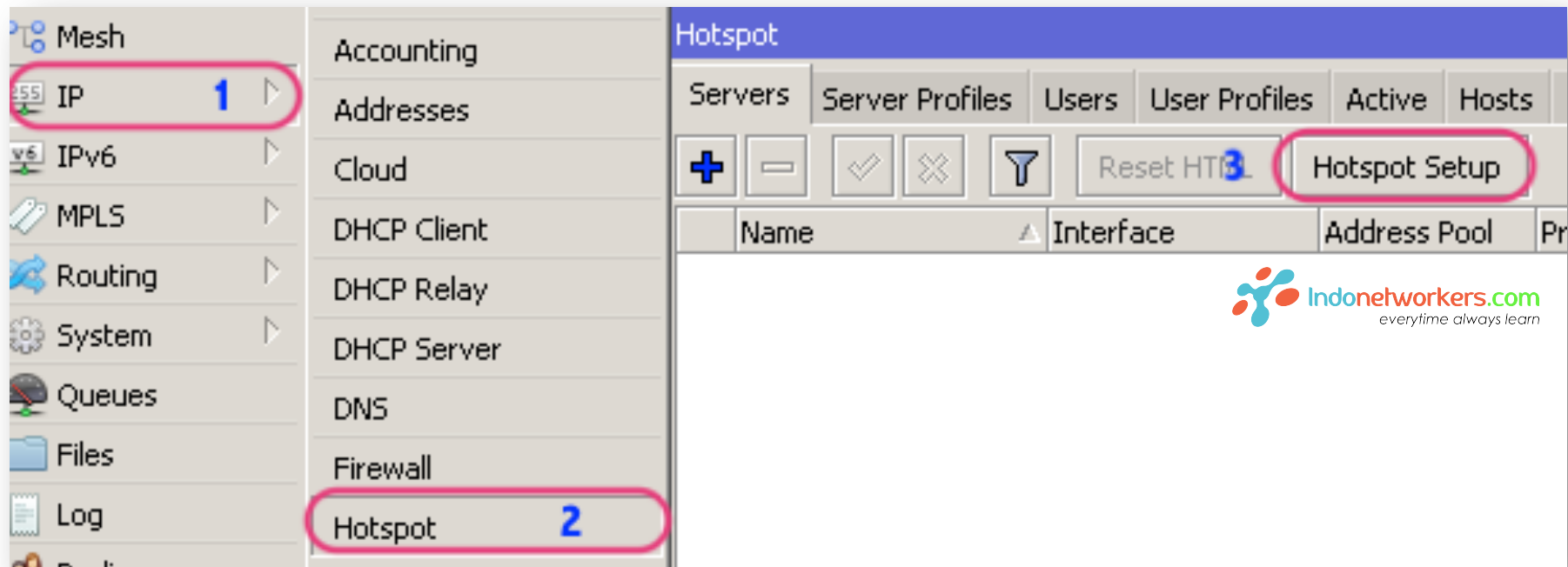
Operation

- Enter username/password in Hotspot Login page to get the **Internet (Authentication)**
- Other login **methods** available
- Different **accounting** options
 - Measures the resources a user consumes during access



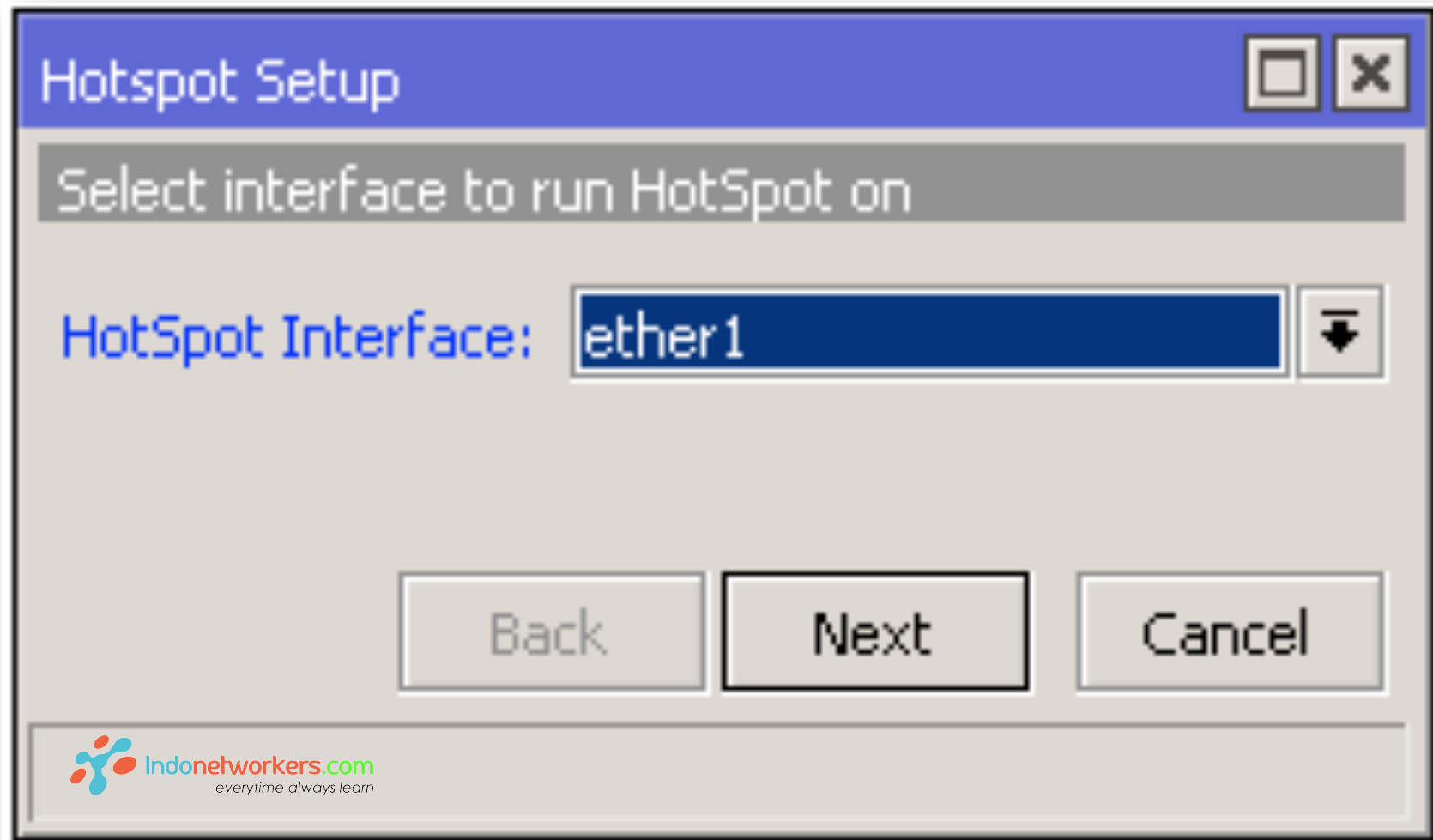
HotSpot Setup



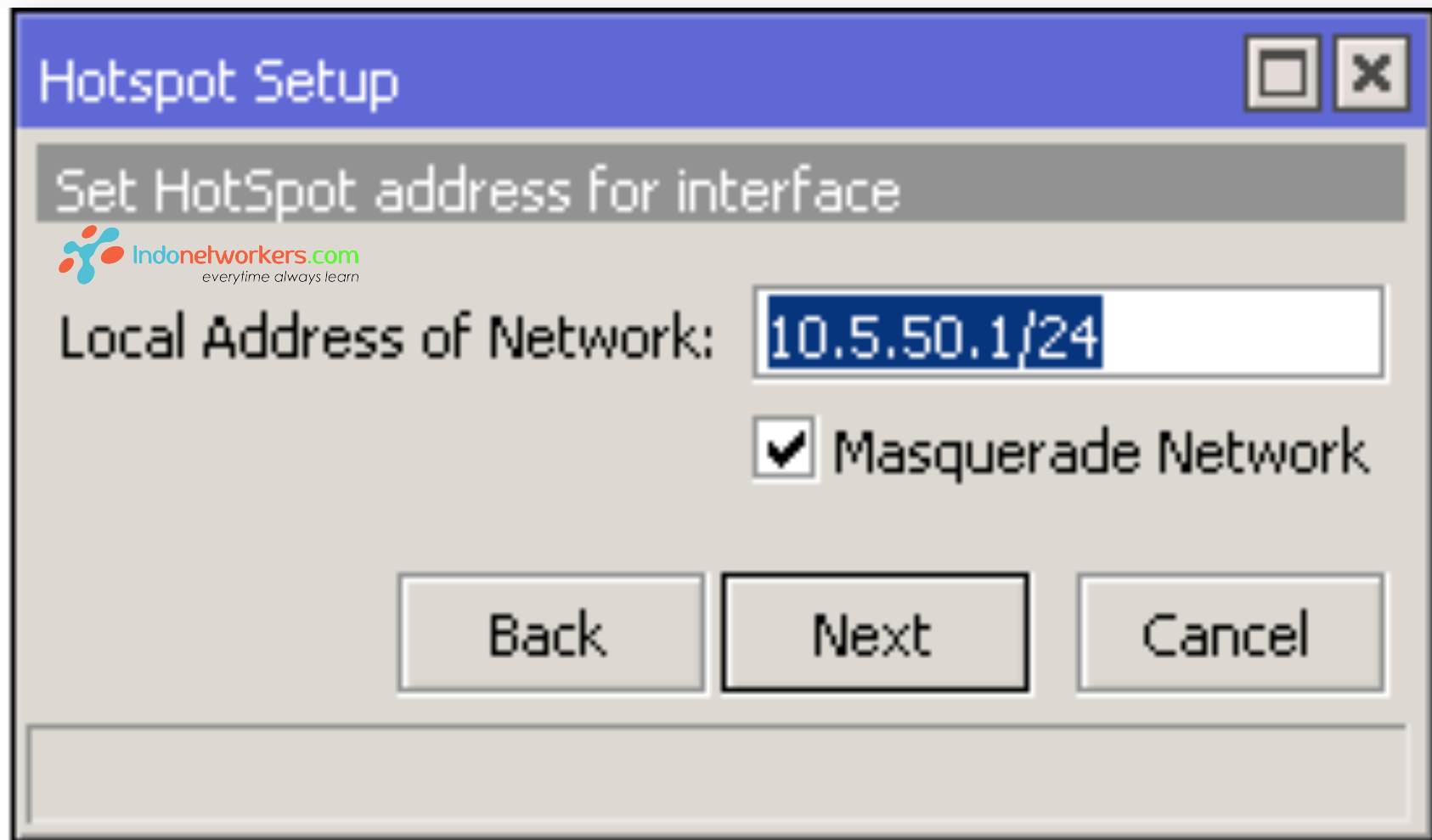


Select IP → Hotspot → Hotspot Setup in WinBox
or if with CLI/Terminal use command :
`/ip hotspot setup`

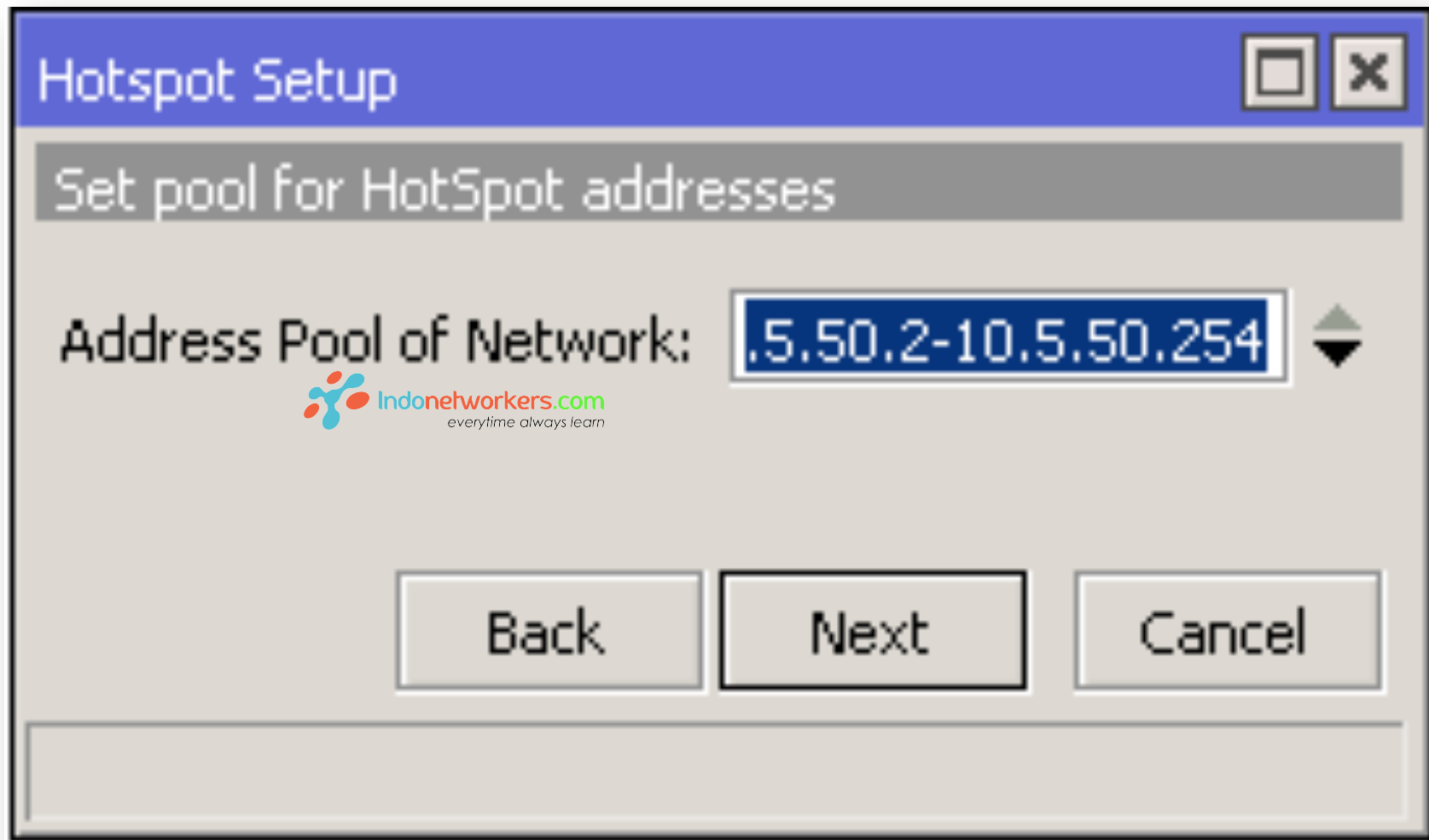




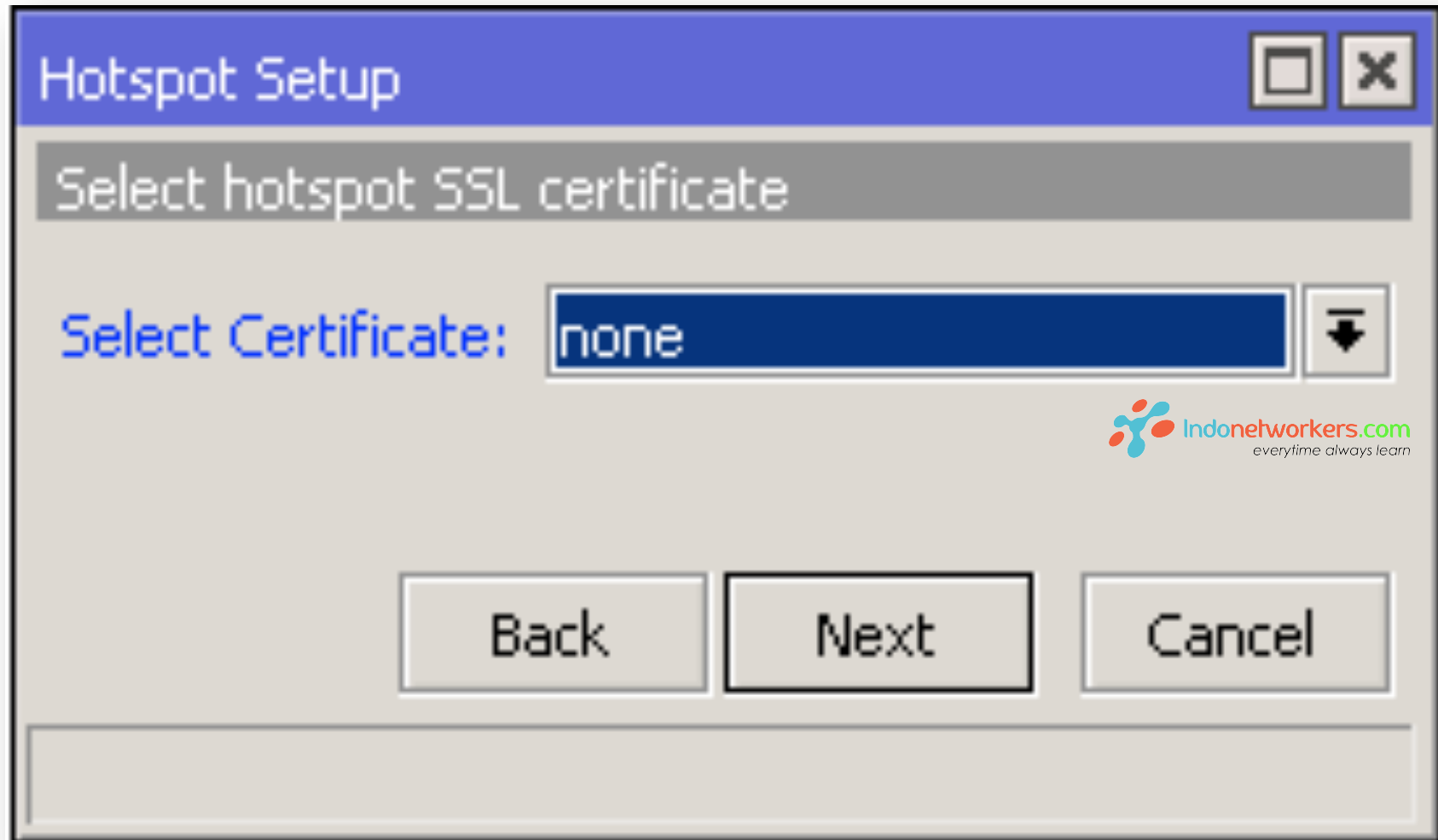
Select Interface then Click “Next”



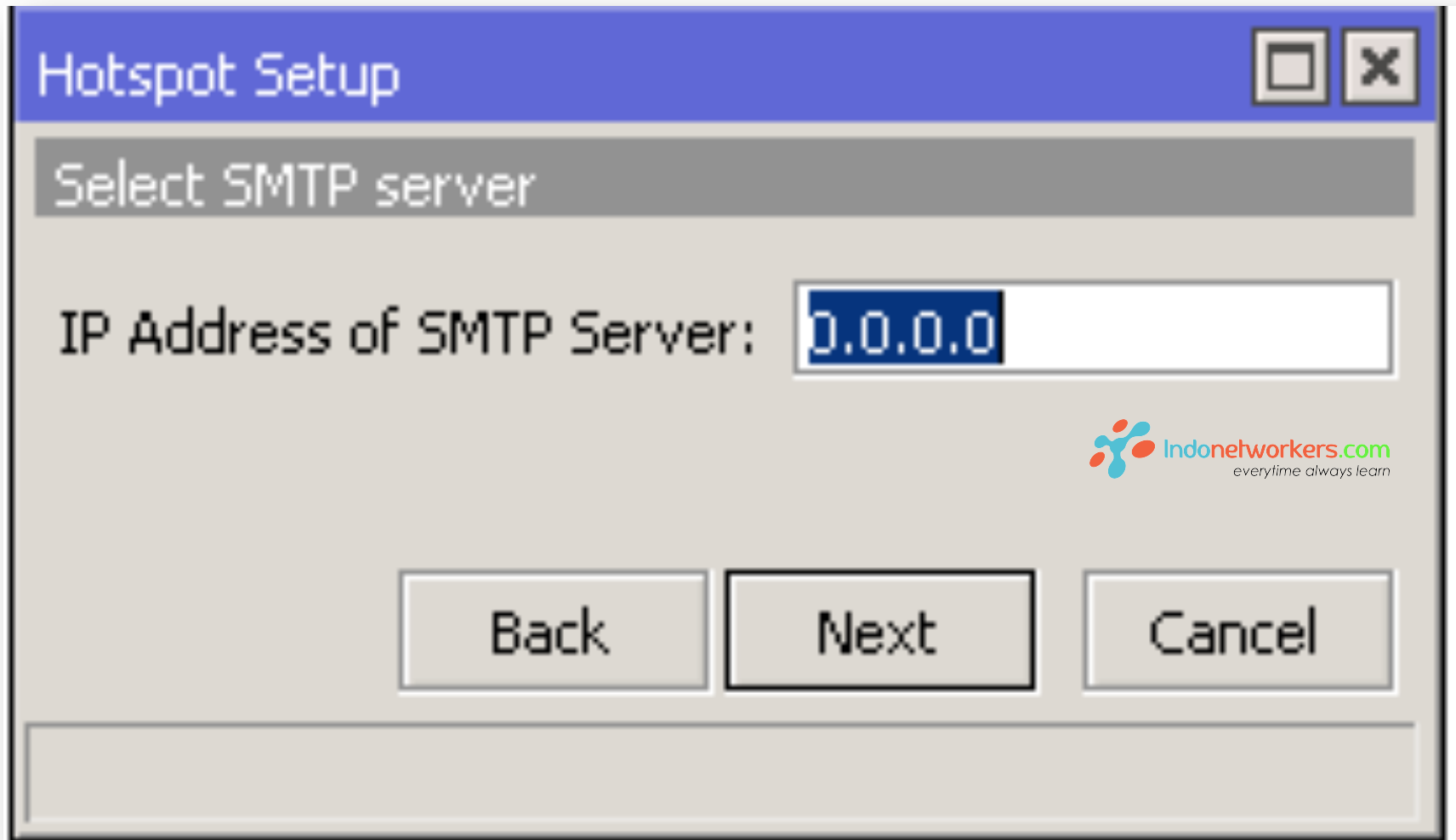
- Set HotSpot Address, offered automatically, if no IP Address in interface for HotSpot, MikroTik RouterOS will be give 10.5.50.1/24
- Masquerade Network or not



- **Address-range** to use for clients



- **SSL certificate**, used for HTTPS login

A screenshot of a 'Hotspot Setup' dialog box. The title bar is blue with the text 'Hotspot Setup' and standard window control buttons (minimize, maximize, close). Below the title bar is a grey header area with the text 'Select SMTP server'. The main area is light grey and contains the label 'IP Address of SMTP Server:' followed by a text input field containing '0.0.0.0'. To the right of the input field is a logo for 'Indonetworkers.com' with the tagline 'everytime always learn'. At the bottom of the dialog are three buttons: 'Back', 'Next', and 'Cancel'.

Hotspot Setup

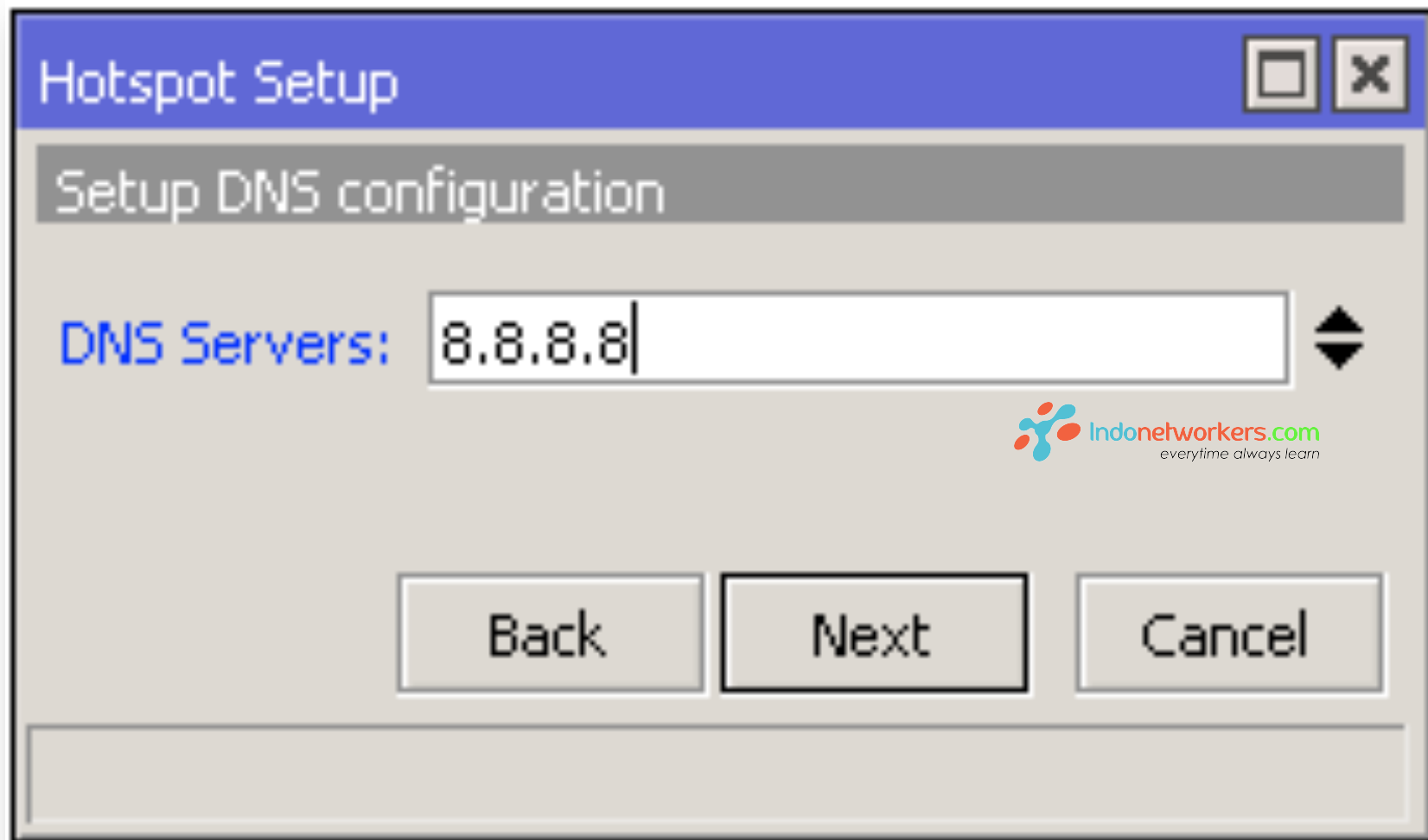
Select SMTP server

IP Address of SMTP Server: 0.0.0.0

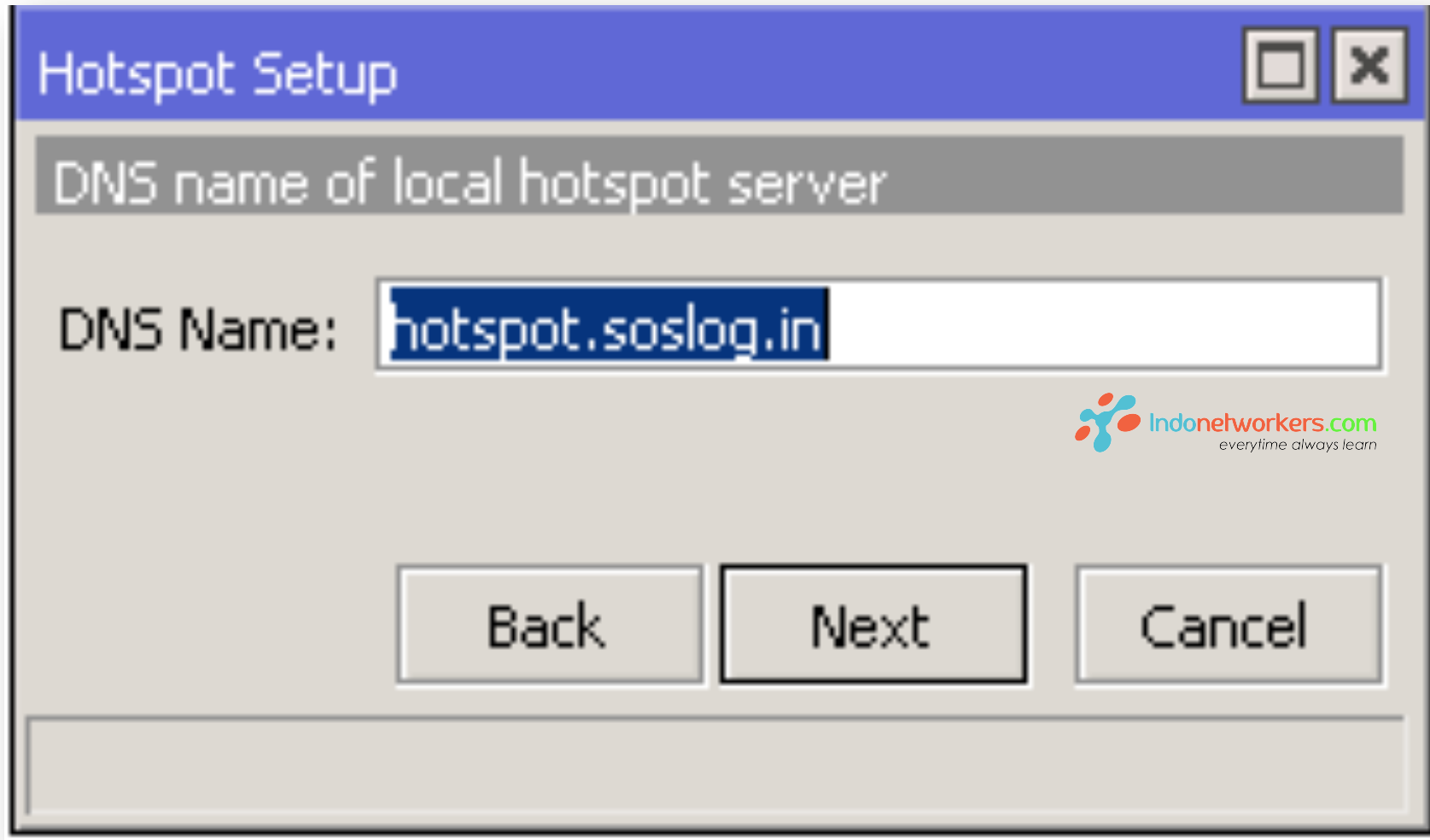
Indonetworkers.com
everytime always learn

Back Next Cancel

- **SMTP Server** address, to redirect all HotSpot users to



- **DNS Server** for HotSpot users, taken from /ip dns



- **HotSpot DNS name** for access login page, **FQDN** required (www.example.com)

Hotspot Setup

Create local HotSpot user

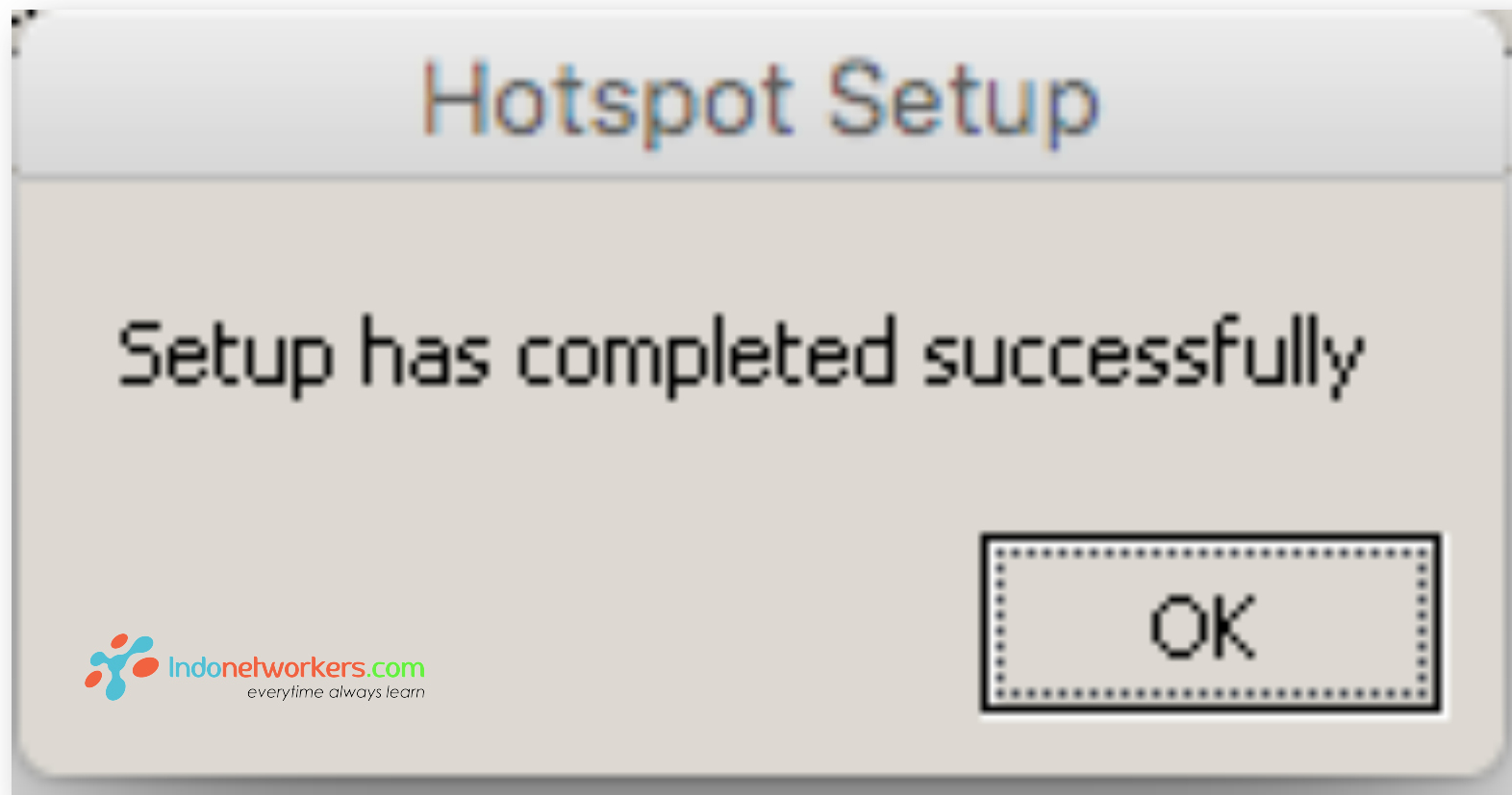
Name of Local HotSpot User: admin

Password for the User: admin

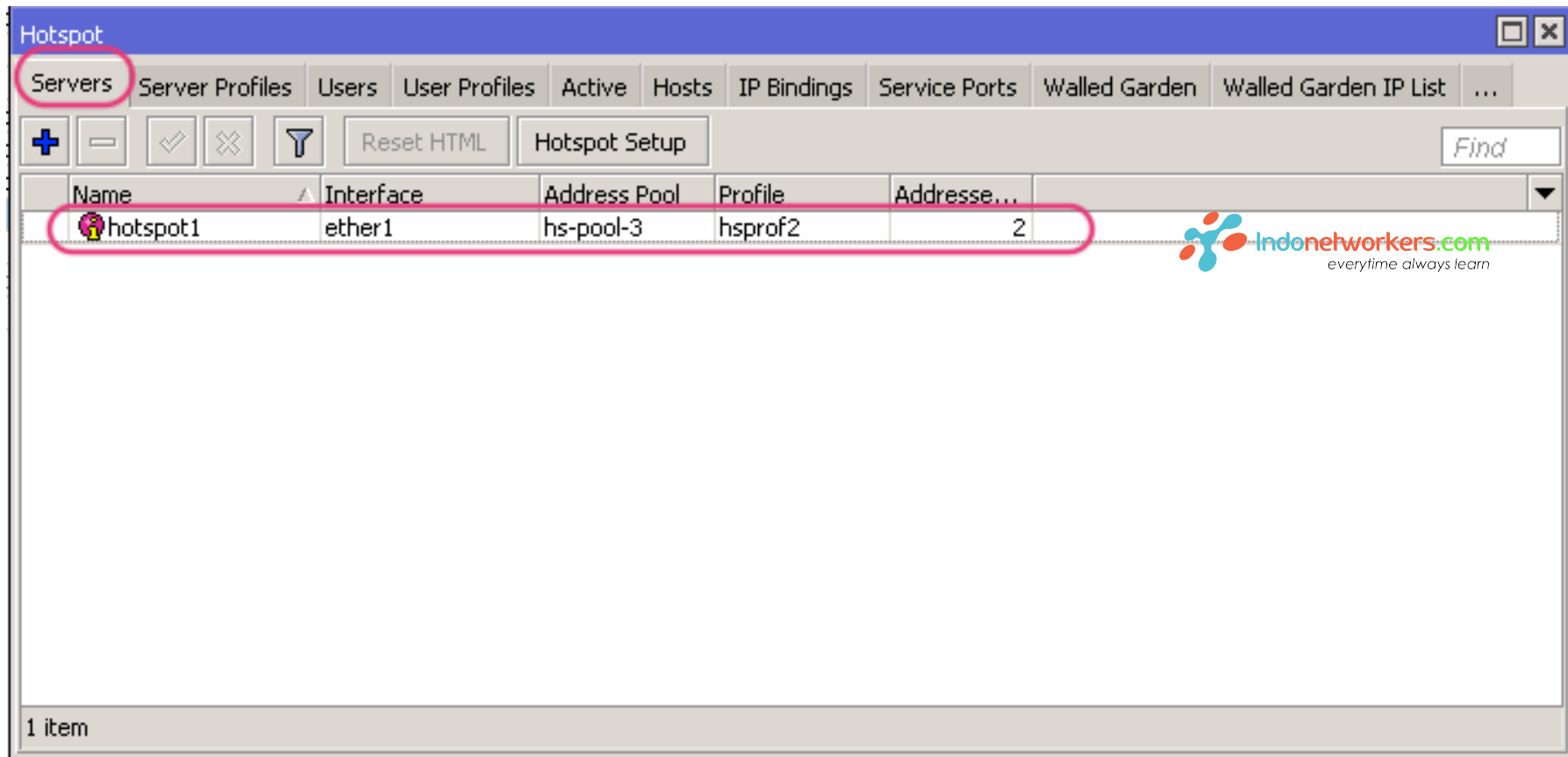
Back Next Cancel

 Indonetworkers.com
everytime always learn

- Create first HotSpot **user**



HotSpot setup is **completed** successfully



Check /ip hotspot menu

HotSpot Default Login Page

Latviski

 **Indonetworkers.com**
everytime always learn

Please log on to use the internet hotspot service

login

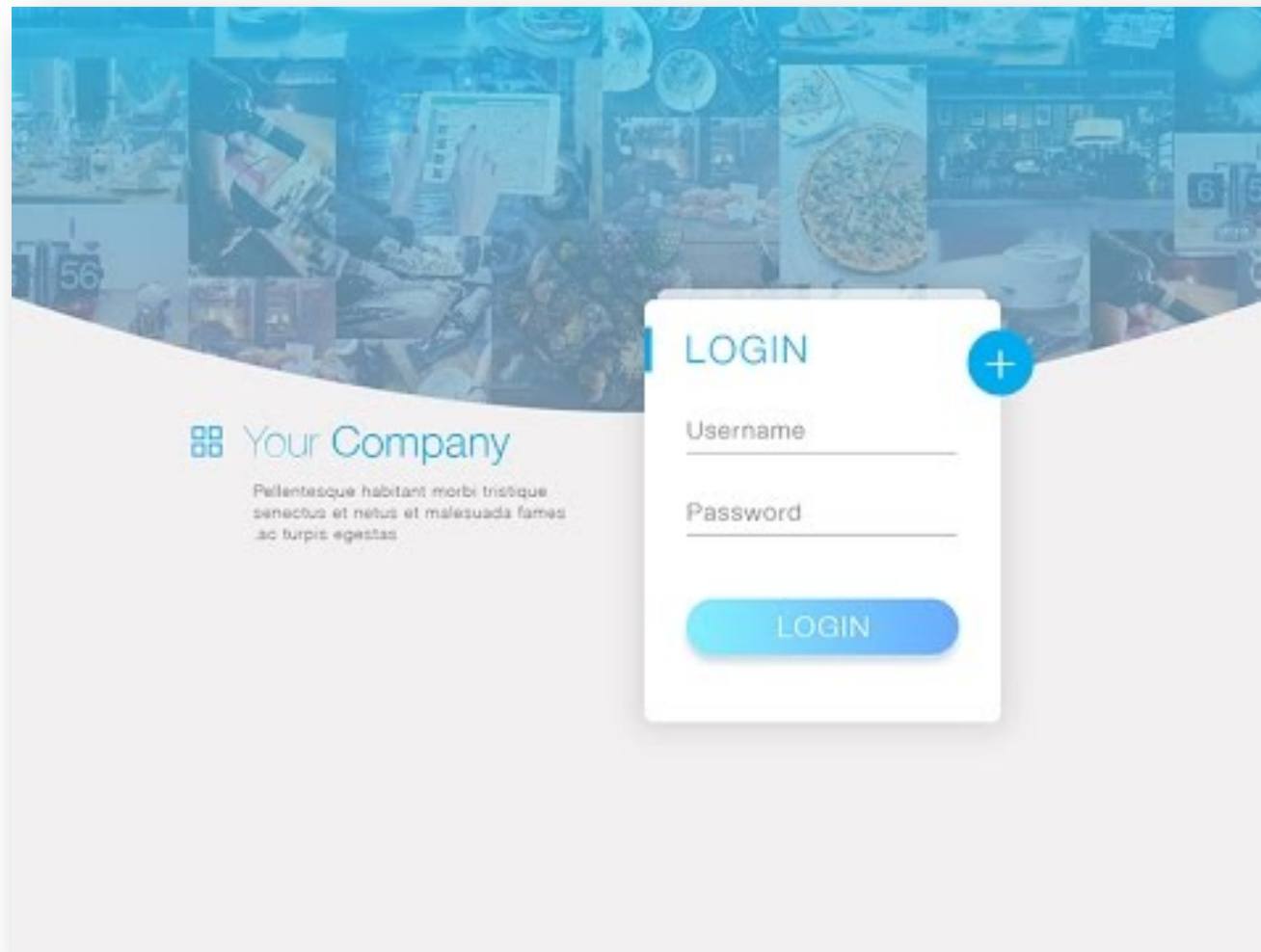
password

HOTSPOT GATEWAY

powered by *MikroTik*

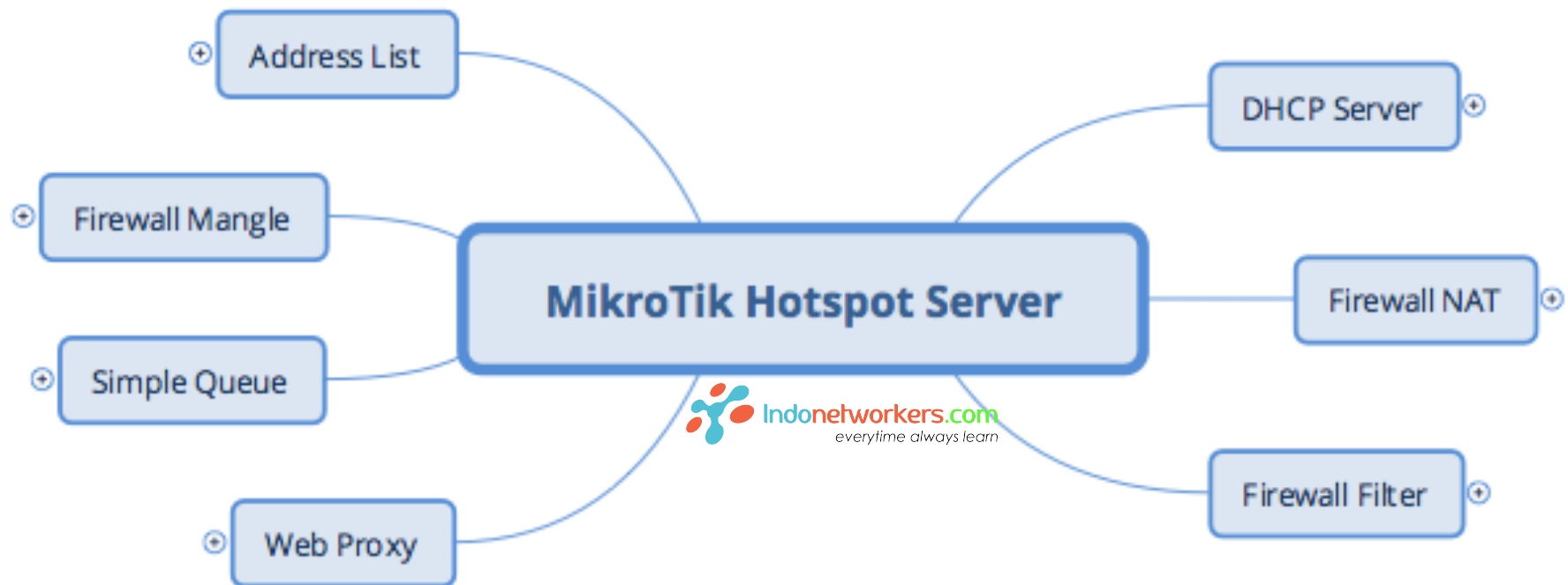
Powered by MikroTik RouterOS

HotSpot Custom Login Page



Required : web programming knowledge (html or php)

HotSpot Dynamic Rule



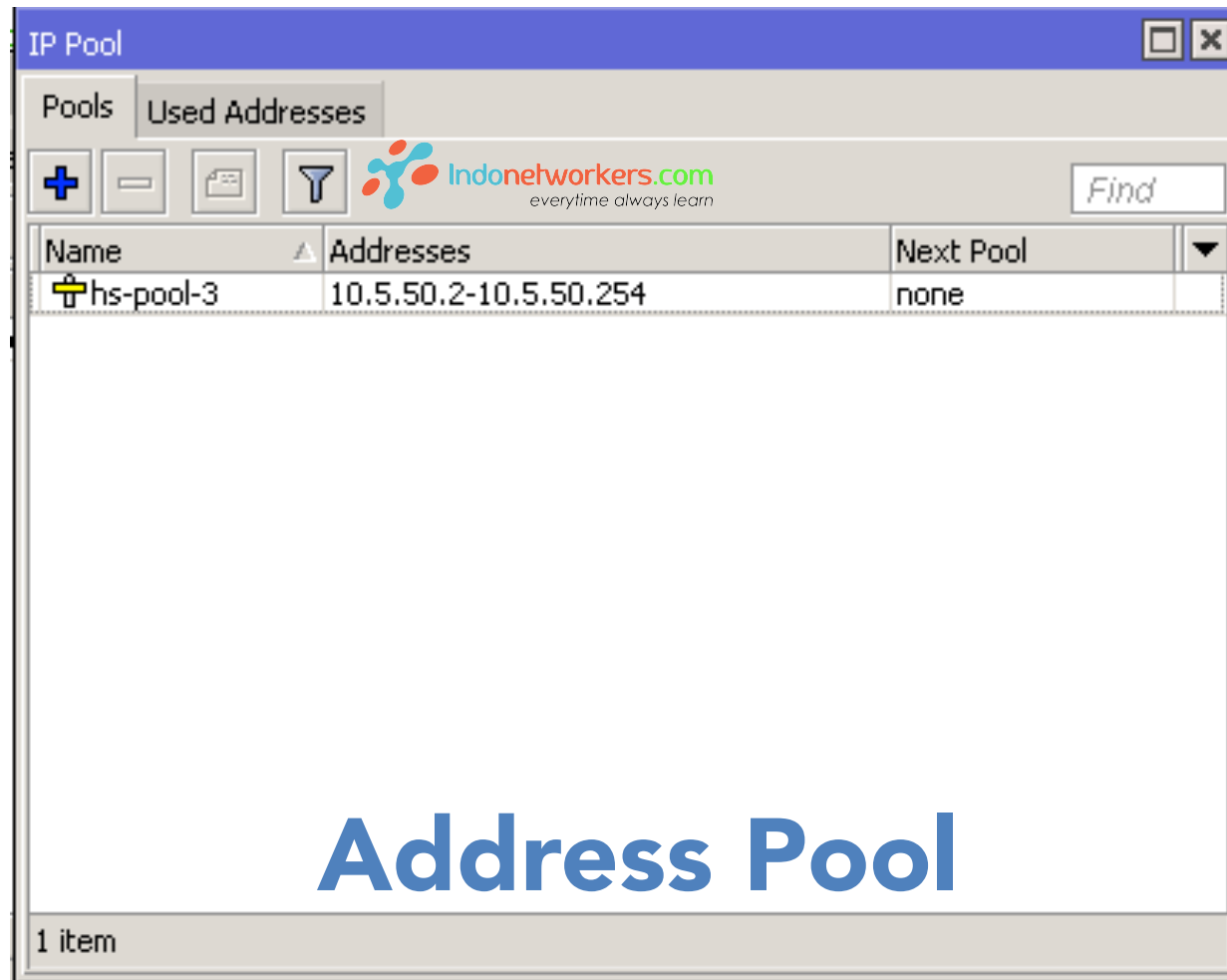
Configuration created

Leases Options Option Sets Alerts					
DHCP Config DHCP Setup					
Interface	Relay	Lease Time	Address Pool	Add A...	
ether1		01:00:00	hs-pool-3	no	



DHCP Server

Configuration created



Configuration created

Firewall

Filter Rules NAT Mangle Raw Service Ports Connections Address Lists Layer7 Protocols

00

Reset Counters

00

Reset All Counters

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#		Action	Chain	Src. Address	Dst. Address	Prot...	Src. Port	Dst. Port	In. Int...	Out. I...	Bytes	Packets
0	D	jump	forward								174.2 KiB	2 629
1	D	jump	forward								0 B	0
2	D	jump	input								1918.8 KiB	18 773
3	D	drop	input			6 (tcp)		64872-6...			0 B	0
4	D	jump	hs-input								1918.8 KiB	18 773
5	D	acc...	hs-input			17 (...)		64872			16.7 KiB	245
6	D	acc...	hs-input			6 (tcp)		64872-6...			1345.2 KiB	10 845
7	D	jump	hs-input								556.8 KiB	7 683
8	D	reject	hs-unauth			6 (tcp)					132.4 KiB	2 118
9	D	reject	hs-unauth								598.6 KiB	8 194
10	D	reject	hs-unaut...								0 B	0
;;; place hotspot rules here												
11	X	pas...	unused-h...								0 B	0

- /ip firewall filter print dynamic

Dynamic **Firewall** and **NAT** rules

Configuration created

Firewall

Filter Rules

NAT

Mangle

Raw

Service Ports

Connections

Address Lists

Layer7 Protocols

00

Reset Counters

00

Reset All Counters

</

- /ip firewall nat print dynamic

Dynamic **Firewall** and **NAT** rules

MikroTik Login HotSpot Featured

- 1. Bandwidth Limitation (Rate Limit or Quota)**
- 2. HotSpot server login method**
- 3. Exception or Bypass HotSpot connection**
- 4. Custom Landing Pages**
- 5. Advertisement System**
- 6. Integrated with Social Media Login with API**

Case Study – Bandwidth Limitation



Limit Bandwidth on MikroTik Hotspots is very necessary

Method of MikroTik Hotspot Bandwidth limitation is :

- 1. built-in limiter** is the MikroTik Hotspot Limit Bandwidth method that uses a **rate-limit** parameter on the **hotspot servers profile** to protect the total traffic from a hotspot network while if you want a limit **per user** you can use the rate-limit in the **hotspot user profile**. Built-in Limitation is done automatically and easily but it is not possible to implement HTB.

built-in limiter



Queue List

Simple Queues Interface Queues Queue Tree Queue Types

+ - ✓ ✕ 📄 🔍 00 Reset Counters 00 Reset All Counters Find

#	Name	Target	Upload Max Limit	Download Max Limit	Packets	Bytes
27 D	hs-<hs-ether3-...	ether3	2M	2M		
28 D	hs-<hs-ether8-...	ether7	3M	3M		

Rate Limit on Hotspots User Profile

Hotspot User Profile <default>

General Queue Scripts

Name: default

Address Pool: none

Session Timeout:

Idle Timeout: none

Keepalive Timeout: 00:02:00

Status Autorefresh: 00:01:00

Shared Users: 1|00

Rate Limit (rx/tx): 1M/1M

OK Cancel Apply Copy Remove

built-in limiter

Hotspot

Server Profiles Users User Profiles Active Hosts IP Bindings Service Ports W.

Name	Session Time...	Idle Timeout	Shared U...	Rate Limit (rx/tx)
default		none	100	1M/1M

Queue List

Simple Queues Interface Queues Queue Tree Queue Types

+ - ✓ ✗ [icon] [icon] 00 Reset Counters 00 Reset All Counters Find

#	Name	Target	Upload Max Limit	Download Max Limit	Packet
1 D	<hotspot-user1>	192.168.202.61	1M	1M	

Case Study – Bandwidth Limitation

The Other Method of MikroTik Hotspot Bandwidth limitation is :

- 2. Custom limitation** is the MikroTik Hotspot Limit Bandwidth method that uses the **Incoming-packet-mark** and **outgoing-packet-mark** parameters in the **user-profile**. By using Custom Limitation you can implement HTB and make limitations based on more diverse connection criteria.

User Profile : Premium
Share bandwidth upload/download : 10M/5M



Case Study – Bandwidth Limitation

Bridge

Bridge Ports VLANs MSTIs Port MST Overrides Filters NAT Hosts MDB

+ - ✓ ✗ [icon] Settings

	Name	Type	L2 MTU	Tx	Rx
R	bridge1	Bridge	1598	776 bps	14.0 kbps

1

Bridge

Bridge Ports VLANs MSTIs Port MST Overrides Filters NAT Hosts MDB

+ - ✓ ✗ [icon]

#	Interface	Bridge	Horizon	Trusted	Priority (...)	Path Cost	Role	Root Pat...
1 H	ether2	bridge1		no	80	10	designated port	
0	wlan1	bridge1		no	80	10	designated port	

2

Hotspot

Servers Server Profiles Users User Profiles Active Hosts IP Binding

+ - ✓ ✗ [icon] Reset HTML Hotspot Setup Find

Name	Interface	Address Pool	Profile	Adresse...
hotspot1	bridge1	hs-pool-4	hsprof1	2

3

Hotspot User Profile <premium>

General Queue Advertise Scripts

Name: premium

Address Pool: none

Session Timeout:

Idle Timeout: none

Keepalive Timeout: 00:02:00

Status Autorefresh: 00:01:00

Shared Users: 10

Rate Limit (rx/tx):

☒ Add MAC Cookie

MAC Cookie Timeout: 3d 00:00:00

Address List:

Incoming Filter:

Outgoing Filter:

Incoming Packet Mark: premium-incoming-packet

Outgoing Packet Mark: premium-outgoing-packet

Open Status Page: always

☒ Transparent Proxy

OK Cancel Apply Copy Remove

Firewall

Filter Rules

NAT

Mangle

Raw

Service Ports

Connections

Address Lists

Layer7 Protocols

+

-

✓

✗

📄

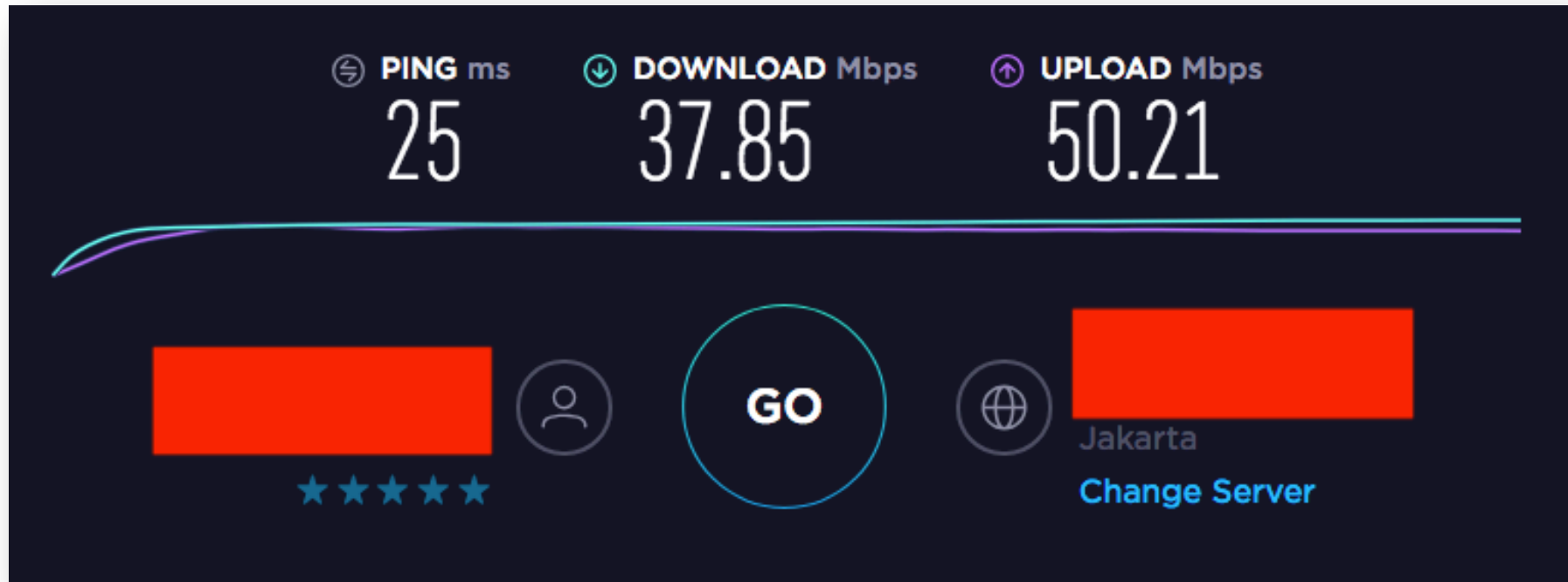
🔍

00 Reset Counters

00 Reset All Counters

#	Action	Chain	Src. Address	Dst. Address	Prot...	Src. Port	Dst. Port	In. Int...	Out. I...	Bytes	Packets
0	D mark packet	hotspot	10.5.50.251							0 B	0
1	D mark packet	hotspot		10.5.50.251						0 B	0
2	D mark packet	hotspot	10.5.50.254							0 B	0
3	D mark packet	hotspot		10.5.50.254						0 B	0

Case Study – Bandwidth Limitation



Unmetered & Unlimited Bandwidth

Case Study – Bandwidth Limitation

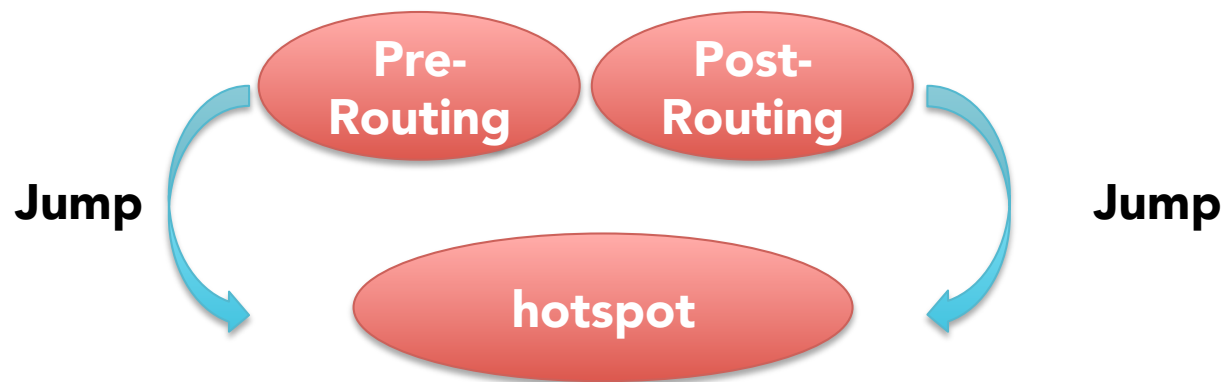


Important..!

Firewall											
Filter Rules NAT Mangle Raw Service Ports Connections Address Lists Layer7 Protocols											
+ - ✓ ✗ 📁 🔍 00 Reset Counters 00 Reset All Counters											
#	Action	Chain	Src. Address	Dst. Address	Prot...	Src. Port	Dst. Port	In. Int...	Out. I...	Bytes	Packets
0	jump	prerouting						bridge1		375.4 MiB	478 115
1	jump	postrouting							bridge1	274.1 MiB	351 879

6

```
/ip firewall mangle
add action=jump chain=prerouting in-interface=bridge1 jump-target=hotspot
add action=jump chain=postrouting jump-target=hotspot out-interface=bridge1
```



Case Study – Bandwidth Limitation

The image displays two side-by-side screenshots of the Mikrotik Queue Manager configuration interface, specifically the 'General' tab for two different queues: 'UPLOAD' and 'DOWNLOAD'.

Queue <UPLOAD> (Left Window):

- Name:** UPLOAD
- Parent:** global
- Packet Marks:** (empty)
- Queue Type:** default
- Priority:** 8
- Bucket Size:** 0.100
- Limit At:** (empty) bits/s
- Max Limit:** 50M bits/s
- Burst Limit:** (empty) bits/s
- Burst Threshold:** (empty) bits/s
- Burst Time:** (empty) s

Queue <DOWNLOAD> (Right Window):

- Name:** DOWNLOAD
- Parent:** global
- Packet Marks:** (empty)
- Queue Type:** default
- Priority:** 8
- Bucket Size:** 0.100
- Limit At:** (empty) bits/s
- Max Limit:** 50M bits/s
- Burst Limit:** (empty) bits/s
- Burst Threshold:** (empty) bits/s
- Burst Time:** (empty) s

Both windows include a 'General' tab and a 'Statistics' tab. The 'General' tab is active in both. The 'Statistics' tab is visible but not selected. The 'Queue <DOWNLOAD>' window has a blue highlight on the 'Name' field.

Large blue circles with the numbers **7** and **8** are overlaid on the bottom right of the 'Queue <UPLOAD>' and 'Queue <DOWNLOAD>' windows, respectively.

Case Study – Bandwidth Limitation

New Queue

General

Statistics

Name: Upload-Premium-user

Parent: UPLOAD

Packet Marks: premium-incoming-packet

Queue Type: default

Priority: 8

Bucket Size: 0.100

Limit At: bits/s

Max Limit: 10M bits/s

Burst Limit: bits/s

Burst Threshold: bits/s

Burst Time: s

OK

Cancel

Apply

Disable

Comment

Copy

Remove

Reset Counters

Reset All Counters

enabled

9

Queue <Download-Premium-user>

General

Statistics

Name: Download-Premium-user

Parent: DOWNLOAD

Packet Marks: premium-outgoing-packet

Queue Type: default

Priority: 8

Bucket Size: 0.100

Limit At: bits/s

Max Limit: 5M bits/s

Burst Limit: bits/s

Burst Threshold: bits/s

Burst Time: s

OK

Cancel

Apply

Disable

Comment

Copy

Remove

Reset Counters

Reset All Counters

enabled

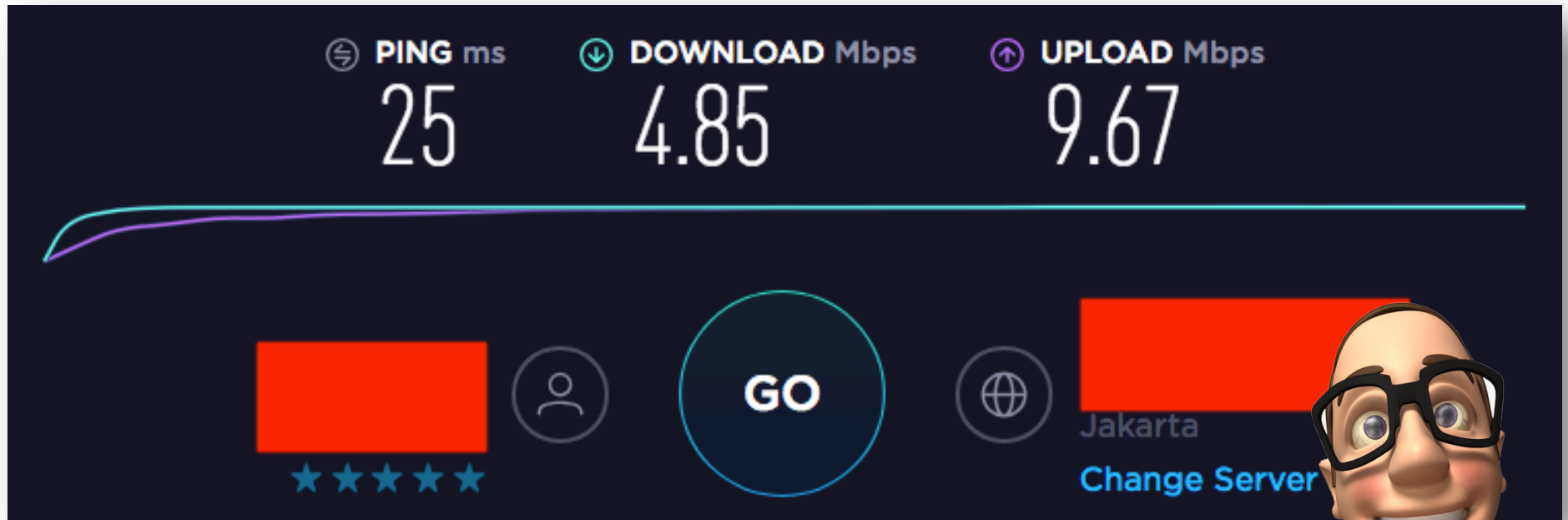
10

Result– Bandwidth Limitation

Queue List									
Simple Queues Interface Queues Queue Tree Queue Types									
+ - ✓ ✗ [icon] [icon] 00 Reset Counters 00 Reset All Counters Find									
Name	Parent	Packet Marks	Limit At (...)	Max Limit...	Avg. Rate	Bytes	Packets		
DOWNLOAD	global			50M	229.7 k...	231.2 ...	287 811		
Download-Premium-user	DOWNLOAD	premium-outgoing-packet		5M	229.7 k...	231.2 ...	287 774		
UPLOAD	global			50M	10.0 Mbps	206.0 ...	537 702		
Upload-Premium-user	UPLOAD	premium-incoming-packet		10M	10.0 Mbps	204.9 ...	536 849		

Queue List									
Simple Queues Interface Queues Queue Tree Queue Types									
+ - ✓ ✗ [icon] [icon] 00 Reset Counters 00 Reset All Counters Find									
Name	Parent	Packet Marks	Limit At (...)	Max Limit...	Avg. Rate	Bytes	Packets		
DOWNLOAD	global			50M	5.0 Mbps	210.3 ...	268 581		
Download-Premium-user	DOWNLOAD	premium-outgoing-packet		5M	5.0 Mbps	210.3 ...	268 551		
UPLOAD	global			50M	174.2 k...	194.9 ...	514 856		
Upload-Premium-user	UPLOAD	premium-incoming-packet		10M	120.5 k...	194.9 ...	514 474		

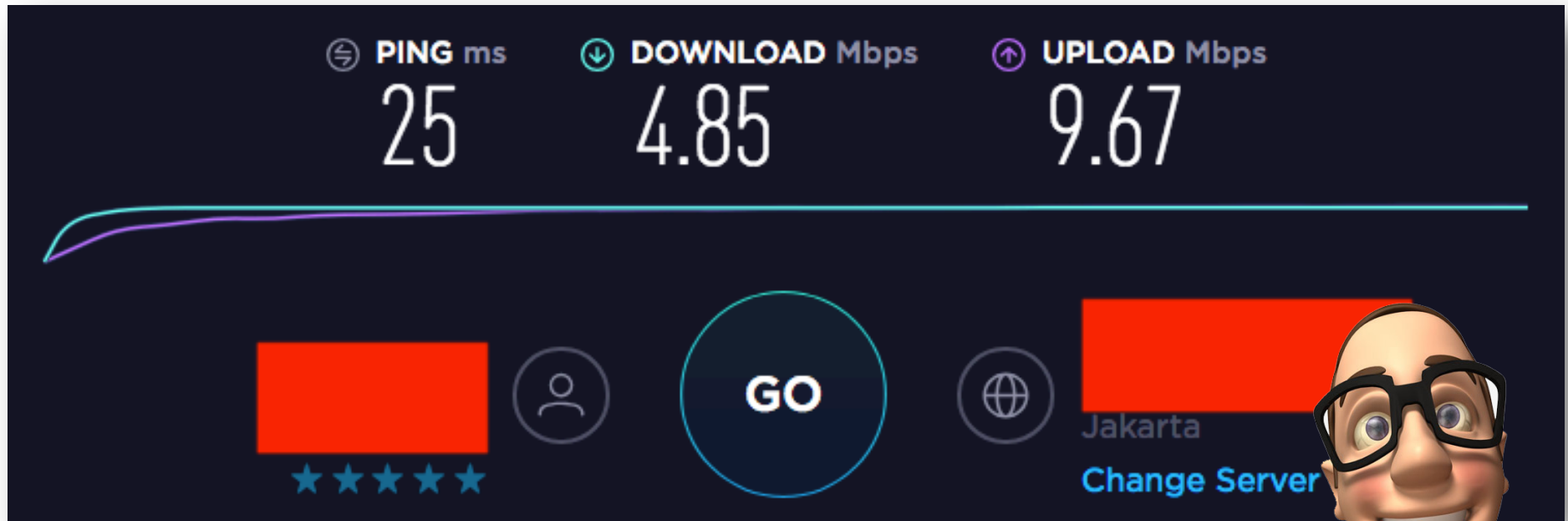
Result– Bandwidth Limitation



Testing result with just 1 user active, will be Shared bandwidth if more than 1 user active



Result– Bandwidth Limitation



Testing result with just 1 user active, will be Shared bandwidth if more than 1 user active





1. If Hotspot on Bridge, configure server on **bridge interface** not on the **bridge port**
2. Make correct **DNS name** for HotSpot server
3. **arp=enabled** for the interface

Get Presentation material and source code in :
<https://github.com/teddyuliswar/>

