



MIKROTIK USER MEETING ONLINE INDONESIA 2020

Network Automation Mikrotik For Managing Wireless Access Point in Computer Laboratory Using Python

Very Setiawan - SMKN 1 Nglegok

INTRODUCTION

Very Setiawan



- Guru TKJ SMKN 1 Nglegok
- Mengenal mikrotik dari 2007 (Freelance IT Support)
- Academy Trainer Mikrotik SMKN 1 Nglegok (ACTR0592) - 2016
- MTCNA, MTCRE, MTCIPV6E
- <https://www.linkedin.com/in/very-setiawan-6572abla2/>
- Linux User

Training Mikrotik Guru TKJ oleh ID Networkers





SMK NEGERI 1 NGLEGOK

- SMK Negeri Termuda di Kabupaten Blitar
- Mikrotik Academy 2016
- Juara 2 Olimpiade Mikrotik APJII 2017
- Juara 1 Olimpiade Mikrotik APJII 2018
- Juara 3 Lomba Ketangkasan Jaringan Dirhubad Cup 2019





Komunitas IT SMKN 1 Nglegok



Bootcamp SMK TKJ Blitar Raya oleh KITS



Routing on The Road oleh Citraweb/Mikrotik.id

Apa Yang Kita BAHAS???

- Yang dilakukan dalam manajemen wireless Access Point di lab
- Alasan Menggunakan Mikrotik?
- Kenapa perlu Network Automation?
- DEMO!!!



Yang dilakukan dalam
manajemen wireless
Access Point di lab



Manajemen Basic Configuration



Manajemen Jaringan



Manajemen Bandwidth



Manajemen Wireless



Why Must Use MikroTik??



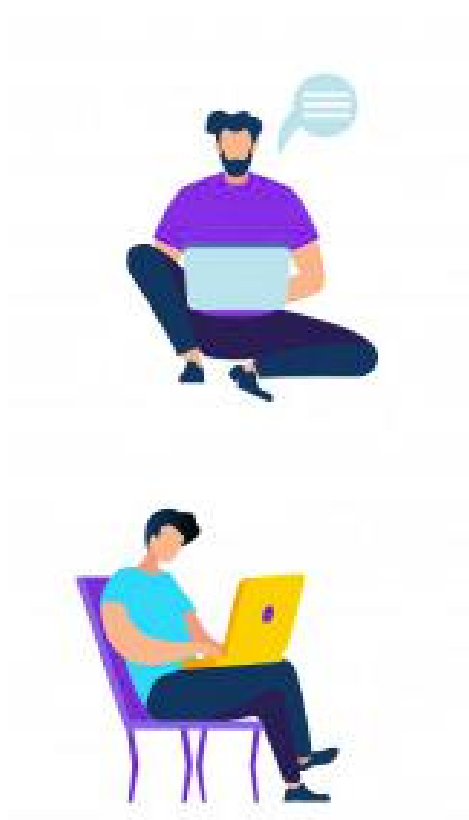
MikroTik

Indonesia Banget



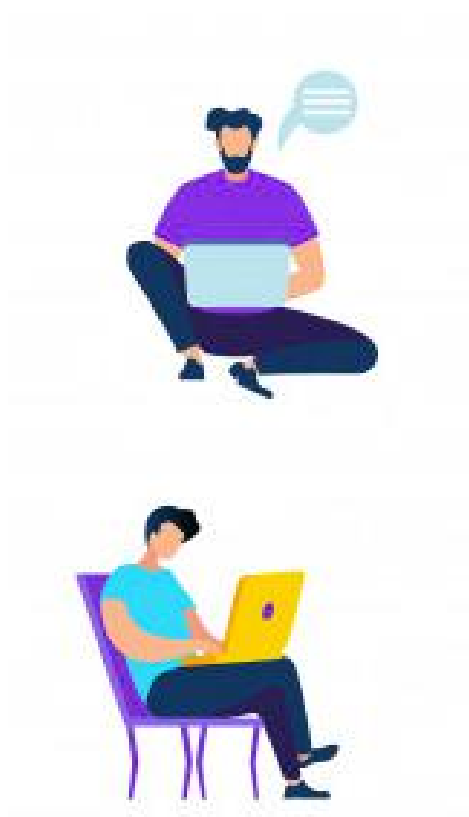
MikroTik

Fitur Lengkap dalam 1
perangkat



MikroTik

Sesuai dengan
kurikulum TKJ

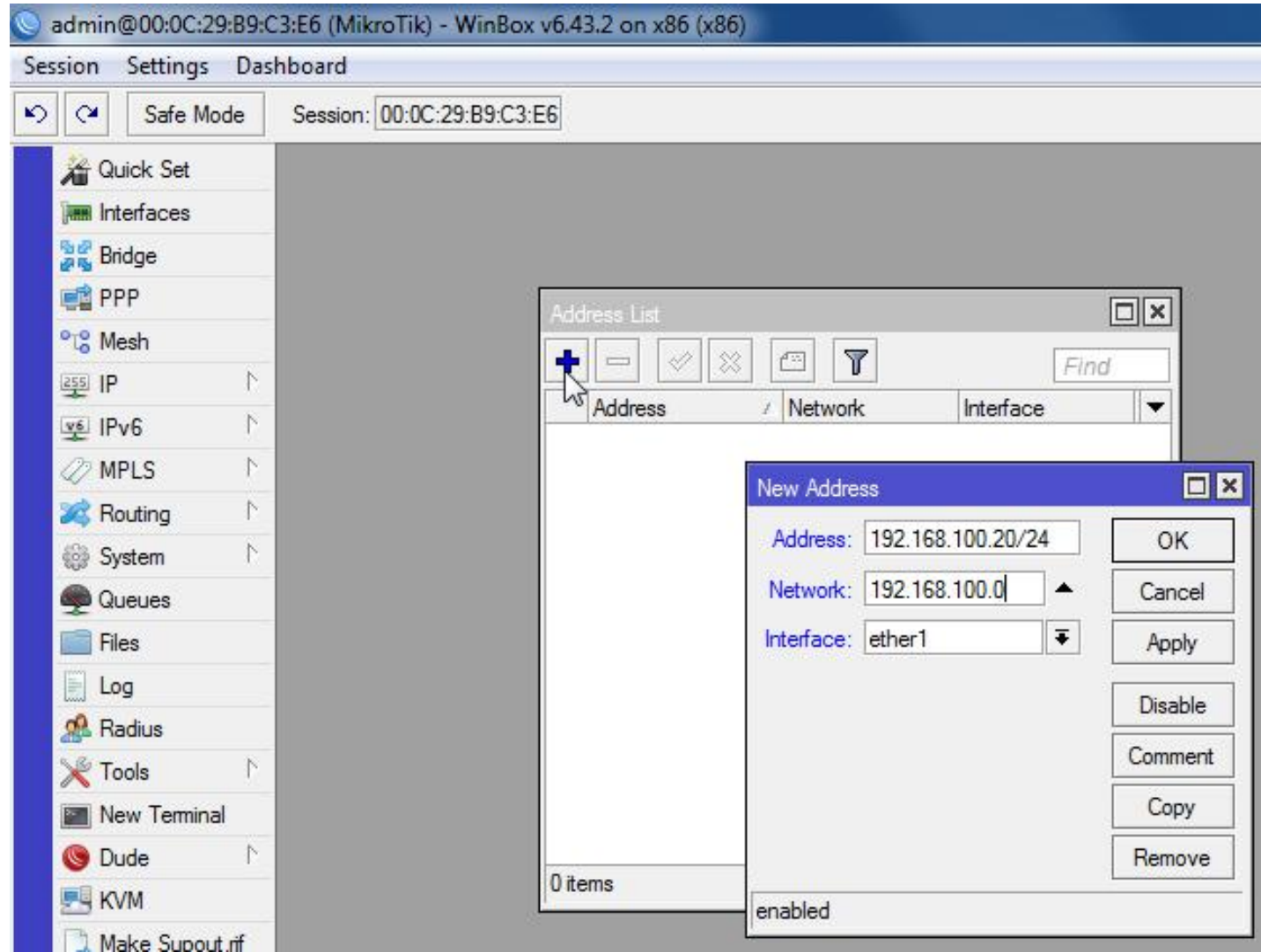


MikroTik

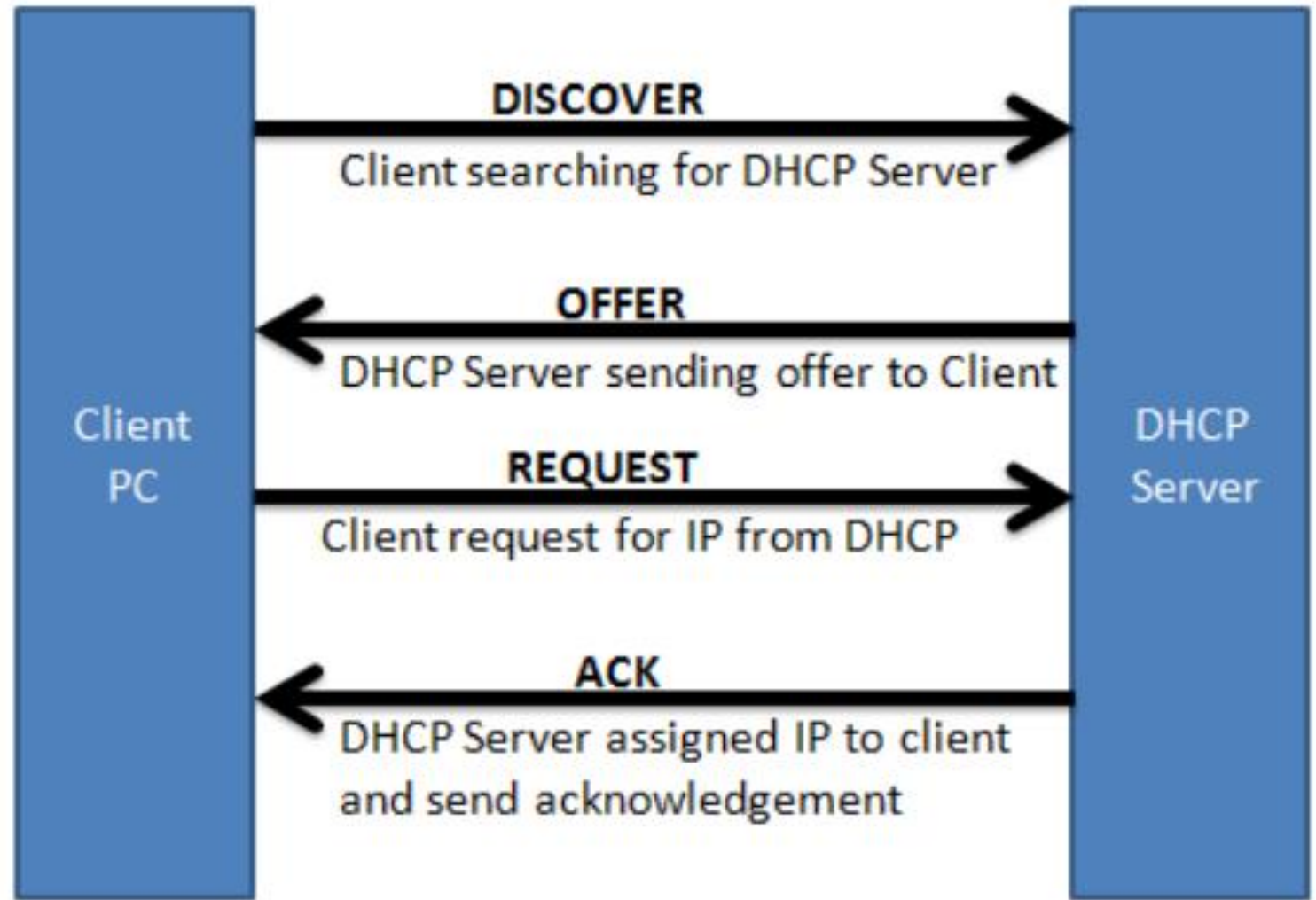
Manajemen
Jaringan

The logo for MikroTik, featuring the word "MikroTik" in a stylized orange font. The "i" in "Mikro" has a small orange arc above it, and the "T" in "Tik" is bold and stylized with horizontal bars.

Manajemen Jaringan



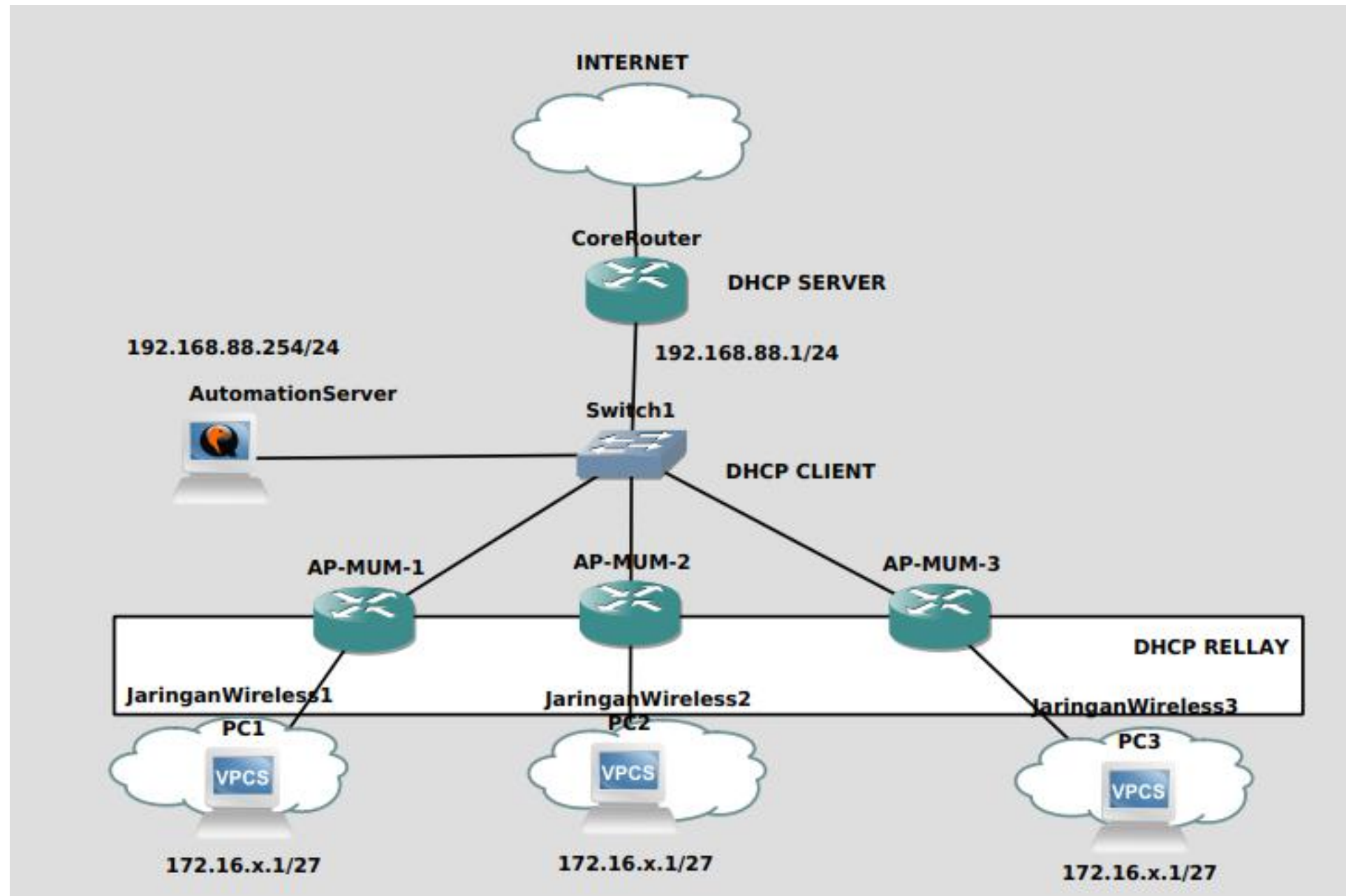
DHCP (Dynamic Host Configuration Protocol)



DHCP Client

DHCP Relay

DHCP Server



✓ DHCP Server Lease Script

```
:local date [/system clock get date]
:local time [/system clock get time]
:foreach x in=[/ip dhcp-server lease find server=mum dynamic last-seen<6s]
do={
local ip [/ip dhcp-server lease get value-name=address $x]
foreach y in=[/ip address find interface=bridge] do={
local gate [/ip address get value-name=address $y]
/ip dhcp-server lease make-static $x
/ip dhcp-server lease comment comment="ip diterima pada : $time-$date" $x
/tool fetch url="http://192.168.88.254:5010/conf" http-method=post http-
content-type="application/json" \
  http-data="{\"ip_router\": \"$ip\", \"ip_gateway\": \"$gate\"}"
}
}
```

The screenshot shows the 'DHCP Server <mum>' configuration window in Mikrotik WinBox. The configuration is as follows:

- Name: mum
- Interface: bridge
- Relay: (empty)
- Lease Time: 00:10:00
- Bootp Lease Time: forever
- Address Pool: default-dhcp
- DHCP Option Set: (empty)
- Src. Address: (empty)
- Delay Threshold: (empty)
- Authoritative: yes
- Bootp Support: static
- ☐ Always Broadcast
- Insert Queue Before: first
- ☐ Add ARP For Leases
- ☒ Conflict Detection
- Use RADIUS: no

At the bottom, there is a 'Lease Script' field containing the following script:

```
:local date [/system clock get date]
:local time [/system clock get time]
:foreach x in=[/ip dhcp-server lease find
server=mum dynamic last-seen<6s] do={
local ip [/ip dhcp-server lease get value-
name=address $x]
foreach y in=[/ip address find
interface=bridge] do={
local gate [/ip address get value-
name=address $y]
```

The status at the bottom of the window is 'enabled'.

Manajemen Bandwidth

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 Lim	Packet Marks	Upload	Download	Total Max Limit (b.	
0	🌿 Parent-Limit-AP	172.16.0.0/16	100M	100M		0 bps	0 bps		▼
1	🌿 Limit-AP-MUM-253	172.16.253.0/27	100M	100M		0 bps	0 bps		
2	🌿 Limit-AP-MUM-252	172.16.252.0/27	100M	100M		0 bps	0 bps		
3	🌿 Limit-AP-MUM-251	172.16.251.0/27	100M	100M		0 bps	0 bps		

4 items

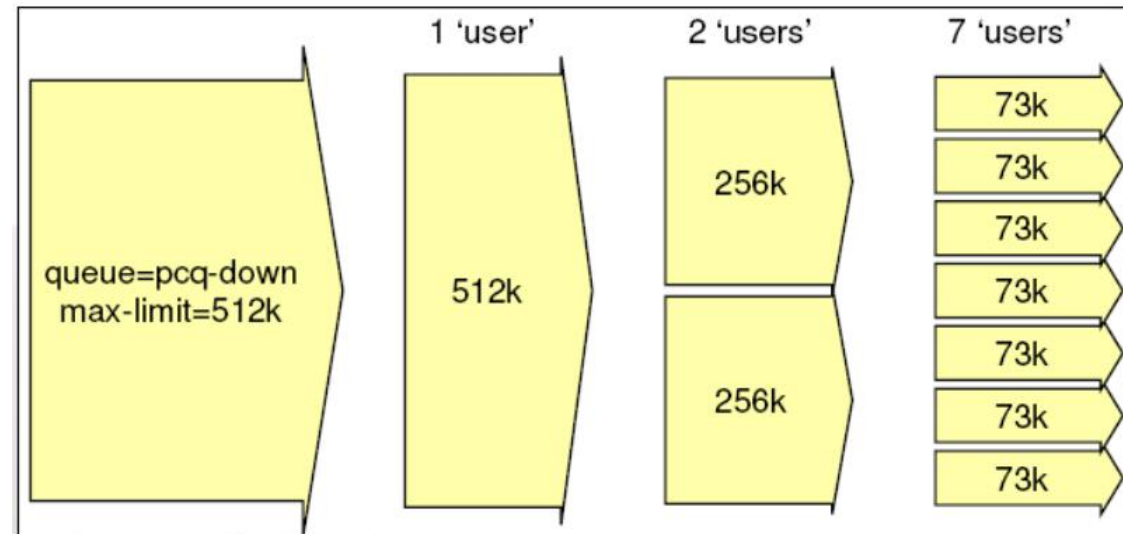
0 B queued

0 packets queued

Simple Queue Using Parent, Child and PCQ

Queue List										
Simple Queues Interface Queues Queue Tree Queue Types										
00 Reset Counters00 Reset All Counters Find										
#	Name	Target	Upload Max Limit	Download Max Lim	Packet Marks	Upload Limit At	Download Limit At	Upload Queue Type	Download Queue Typ	Upload
0	Parent-Limit-AP	172.16.0.0/16	100M	100M		unlimited	unlimited	pcq-upload-default	pcq-download-default	0 bps
3	Limit-AP-MUM-251	172.16.251.0/27	100M	100M		15M	15M	pcq-upload-default	pcq-download-default	0 bps
2	Limit-AP-MUM-252	172.16.252.0/27	100M	100M		15M	15M	pcq-upload-default	pcq-download-default	0 bps
1	Limit-AP-MUM-253	172.16.253.0/27	100M	100M		15M	15M	pcq-upload-default	pcq-download-default	0 bps

PCQ Rate = 0



Manajemen Wireless

Wireless Tables									
WiFi Interfaces W60G Station Nstreme Dual Access List Registration Connect List Security Profiles Channels									
+ - ✓ ✕ [Icon] [Icon] CAP WPS Client Setup Repeater Scanner Freq. Usage Alignment Wireless Sniffer Wireless Snooper Find									
	Name ▲	Type	Actual MTU	Tx	Rx	Tx Packet (p/s)	Rx Packet (p/s)	FP Tx	FP Rx ▼
RS	wlan1	Wireless (Atheros AR...	1500	26.0 kbps	0 bps	35	0		0 bps

Frequency 1,6,11

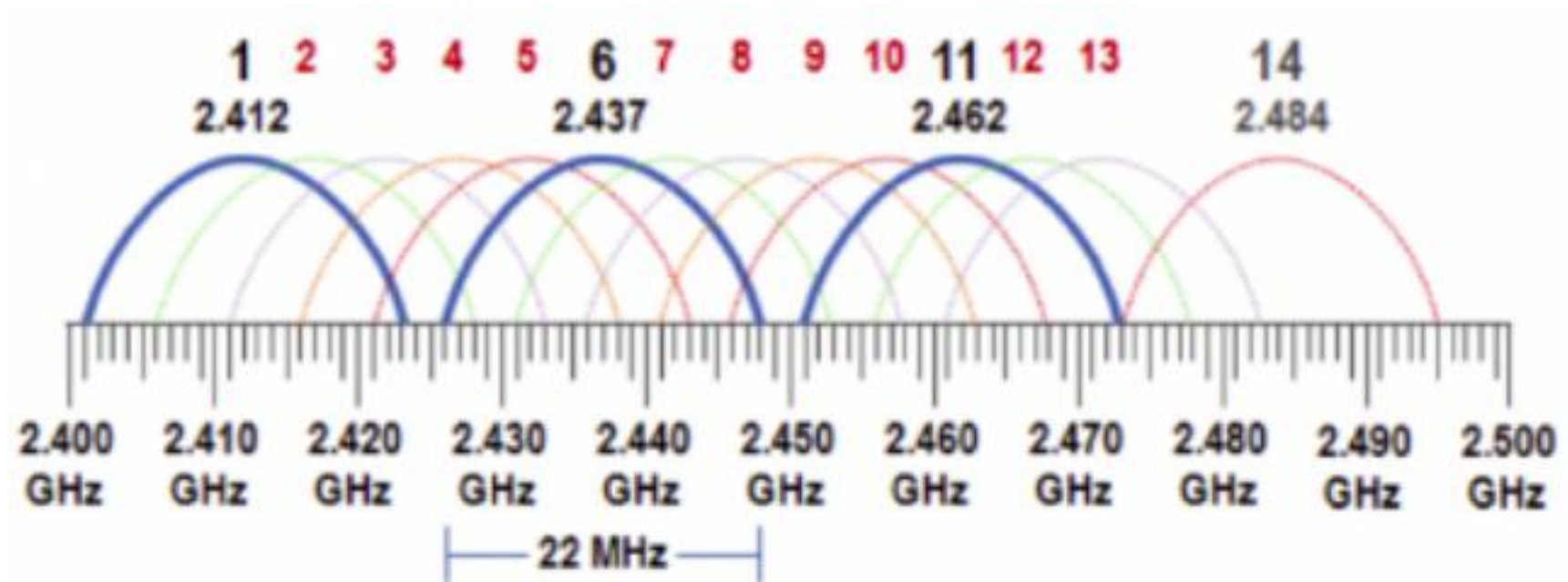


image source : <https://www.extremenetworks.com/>

Using Access List For Drop Bad Connection

New AP Access Rule

MAC Address

Interface wlan1

Signal Strength Range -80..120

Allow Signal Out Of Range 00:00:10

AP Tx Limit

Client Tx Lim

☒ Authentication

☒ Forwarding

VLAN Mode no tag

VLAN ID 1

Private Key none 0x

Private Pre Shared Ke

Management Protection K

Time

enabled

OK

Cancel

Apply

Disable

Comment

Copy

Remove

Tool Fetch

Properties

Property	Description
address (<i>string</i> ; Default:)	IP address of the device to copy file from.
as-value (<i>set</i> <i>not-set</i> ; Default: not-set)	Store the output in a variable, should be used with the output property.
ascii (<i>yes</i> <i>no</i> ; Default: no)	
check-certificate (<i>yes</i> <i>no</i> ; Default: no)	Enables trust chain validation from local certificate store.
dst-path (<i>string</i> ; Default:)	Destination filename and path
host (<i>string</i> ; Default:)	Domain name or virtual domain name (if used on web-site, from which you want to copy information). For example, address=wiki.mikrotik.com host=forum.mikrotik.com In this example the resolved ip address is the same (66.228.113.27), but hosts are different.
http-method (<i> delete get post put</i> ; Default: get)	the HTTP method to use
http-data (<i>string</i> ; Default:)	the data, that is going to be send, when using PUT or POST methods
http-header-field (<i>string</i> ; Default: *empty*)	list of all header fields and their values, in the form of <code>http-header-field=h1:fff,h2:yyy</code>
http-content-type (<i>string</i> ; Default: application/x-www-form-urlencoded)	the MIME type of the data you are going to send via POST/GET. Removed since v6.44, now <code>http-header-field="content-type: xxx"</code> should be used.
keep-result (<i>yes</i> <i>no</i> ; Default: yes)	If yes, creates an input file.
mode (<i>ftp http tftp</i> {!} <i>https</i> ; Default: http)	Choose the protocol of connection - http, https , ftp or tftp.

Sumber : <https://wiki.mikrotik.com/wiki/Manual:Tools/Fetch>

Network Automation??



Kelebihan

- memudahkan pekerjaan utamanya guru tkj
- sekali config 1 - banyak device terlampaui
- komputer tidak mengeluh (sing sambat uwonge)
- implementasi kurikulum program ke networking



Using python For Automation

- mudah dipelajari daripada pemrograman yang lain
- support automation dengan paramiko for ssh
- support flask for microweb
- bisa digunakan sebagai materi pemrograman dasar di TKJ



image source : <https://datawider.com/>

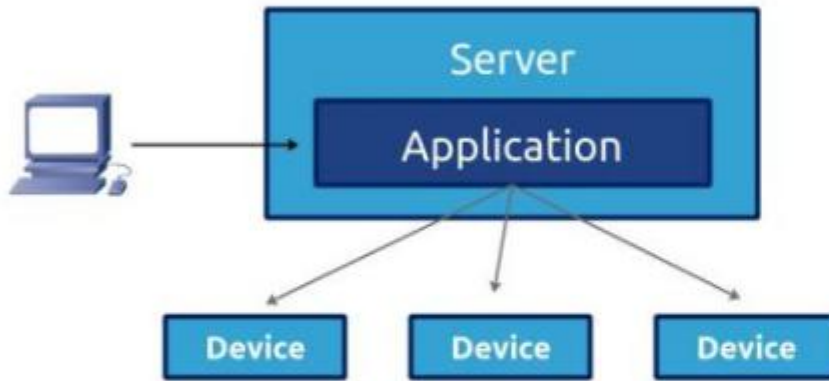
Paramiko for SSH

```
ssh_client = paramiko.SSHClient()  
ssh_client.set_missing_host_key_policy(paramiko.AutoAddPolicy())  
ssh_client.connect(hostname=ip_mik,username=username,password=password,  
allow_agent=False,look_for_keys=False)  
print (f"sukses login to {ip_mik}")
```



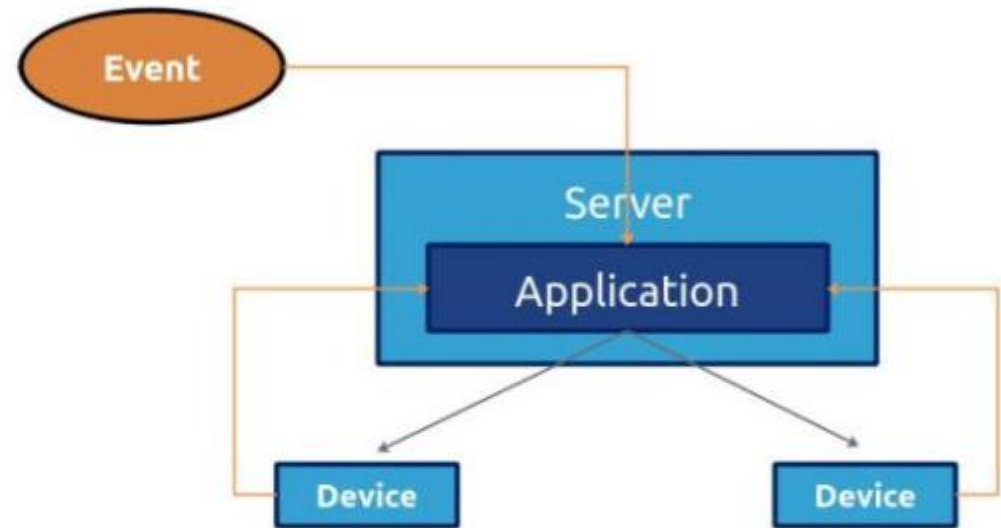
DEMO TIME!!!





Proactive

- Manual Change
- Change by human



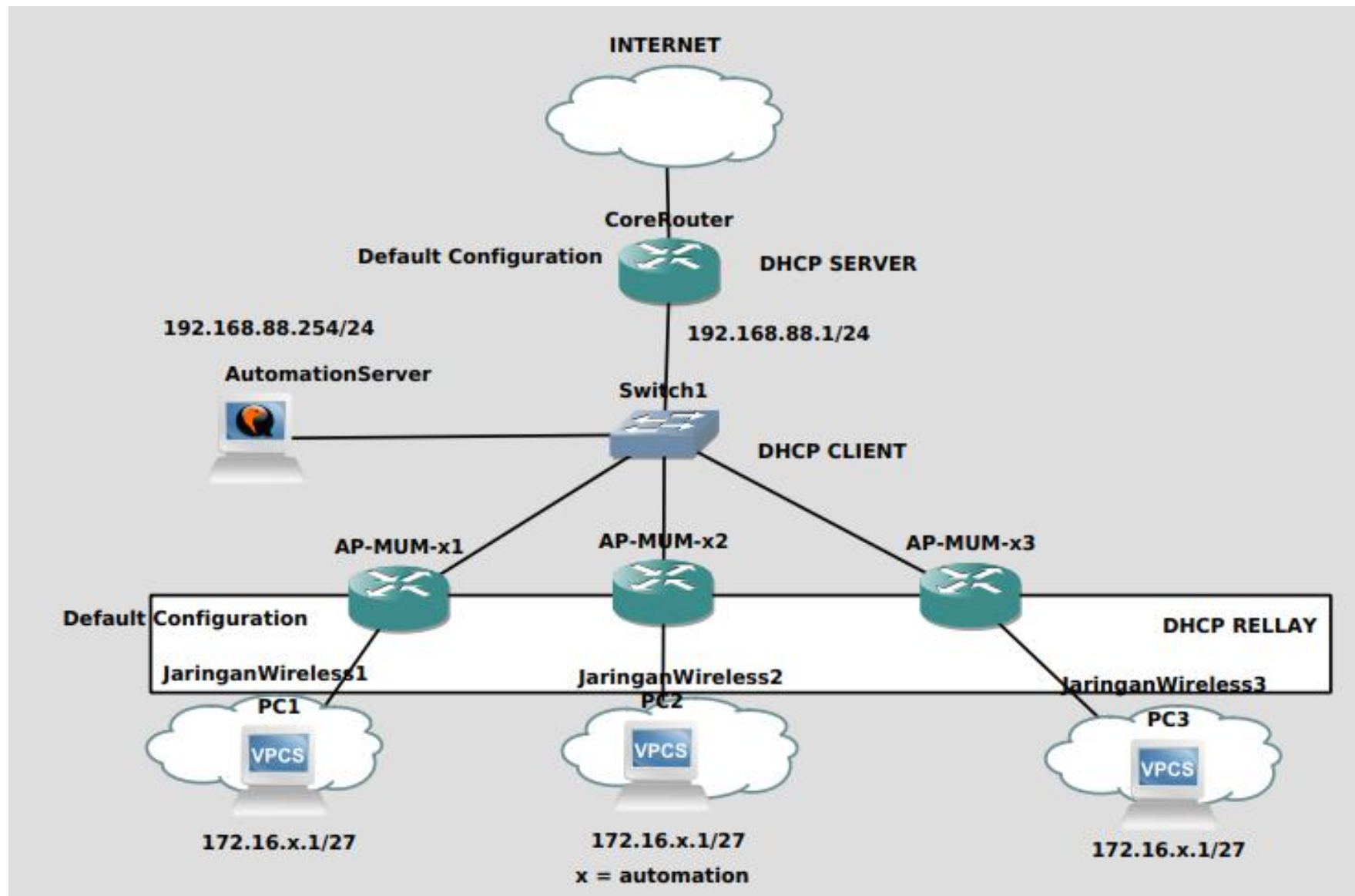
Reactive

- Change by event
- Device send information to server

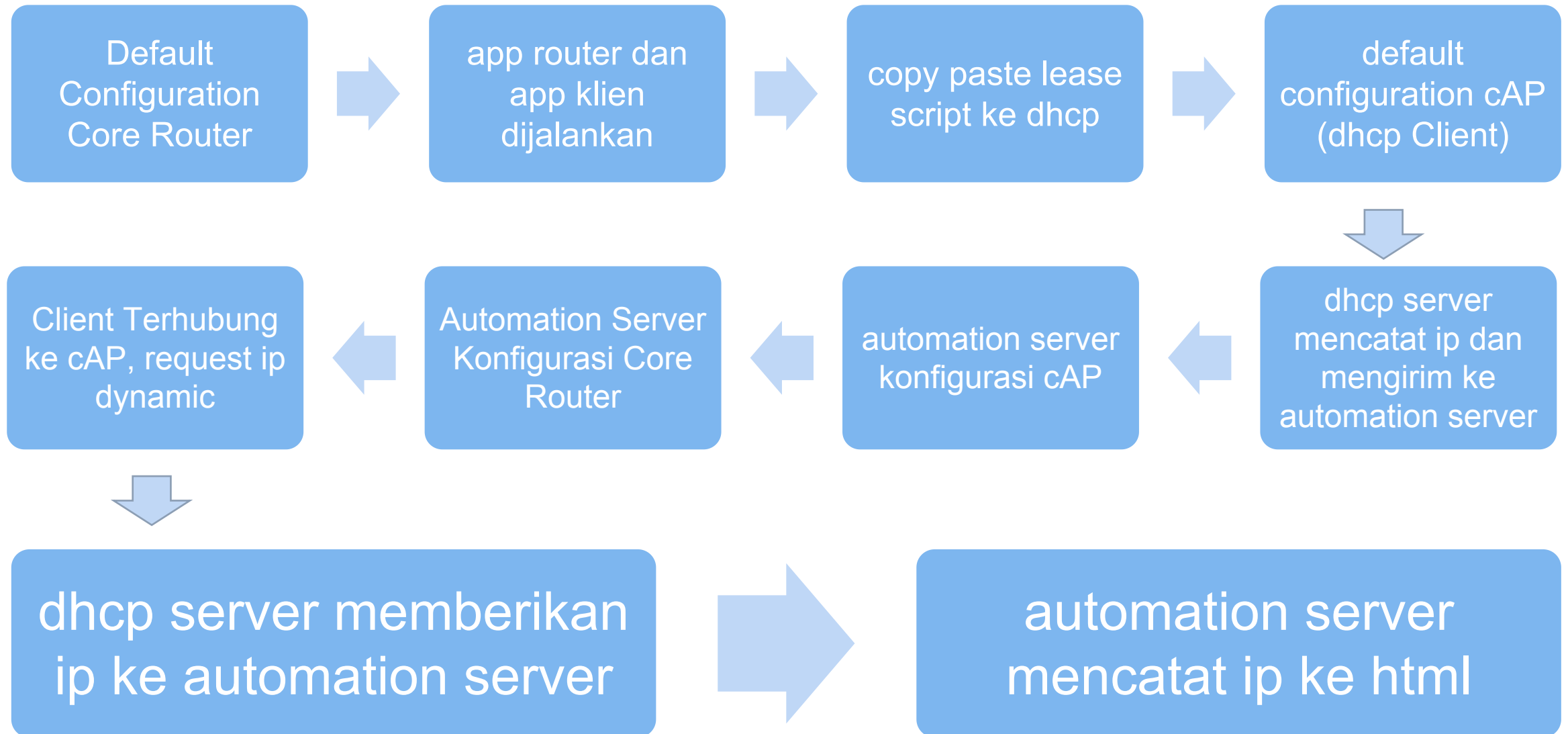
Image Source: EN-SDN Slide by Zufar Dhiyaulhaq

Type of Automation

Layout



Flow Chart



Question???



My Bio

- email : kangphery@gmail.com
- script :
<https://github.com/verysetiawan/NetworkAutomationInWirelessAccessPoint>