



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??



*Mikro***Tik**

Indonesia Banget



*Mikro***Tik**

Fitur Lengkap dalam 1
perangkat



*Mikro***Tik**

Sesuai dengan
kurikulum TKJ



*Mikro***Tik**

Manajemen
Jaringan

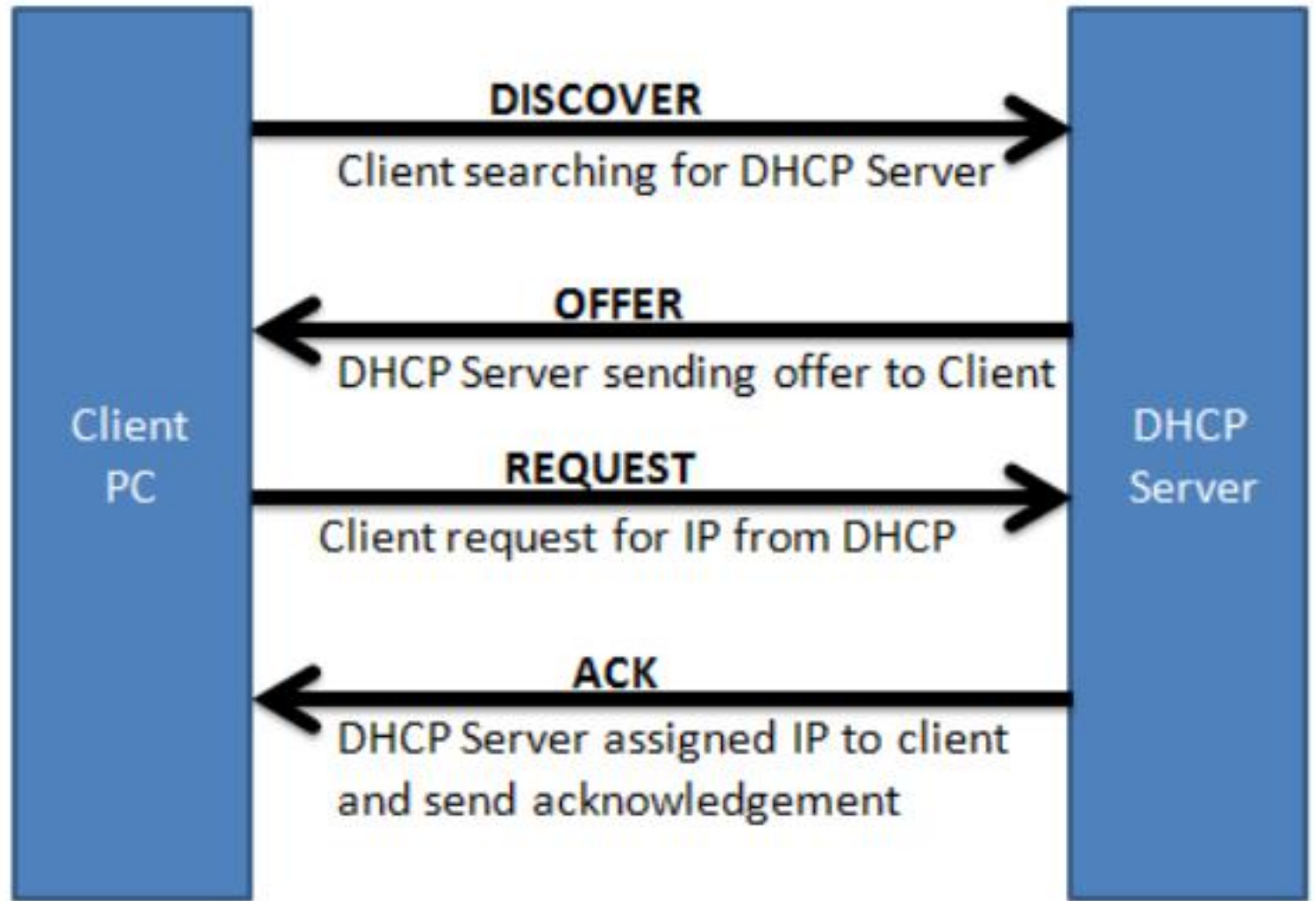
The Mikrotik logo features the word "Mikrotik" in a stylized orange font. The "i" in "Mikro" has a dot, and the "i" in "tik" has a dot. The "T" in "Tik" is bold and has a horizontal bar. Above the "i" in "Mikro" is a small orange arc.

MikroTik

Manajemen Jaringan

The screenshot displays the Mikrotik WinBox v6.43.2 interface. The top bar shows the user 'admin@00:0C:29:B9:C3:E6 (MikroTik)' and the session ID '00:0C:29:B9:C3:E6'. The main menu includes 'Session', 'Settings', and 'Dashboard'. A sidebar on the left lists various configuration categories: Quick Set, Interfaces, Bridge, PPP, Mesh, IP, IPv6, MPLS, Routing, System, Queues, Files, Log, Radius, Tools, New Terminal, Dude, KVM, and Make Subout.rtf. The main window shows the 'Address List' window, which is currently empty with '0 items' displayed. A 'New Address' dialog box is open in the foreground, showing the following fields: 'Address' set to '192.168.100.20/24', 'Network' set to '192.168.100.0', and 'Interface' set to 'ether1'. The dialog box includes buttons for 'OK', 'Cancel', 'Apply', 'Disable', 'Comment', 'Copy', and 'Remove'. The status 'enabled' is shown at the bottom of the dialog box.

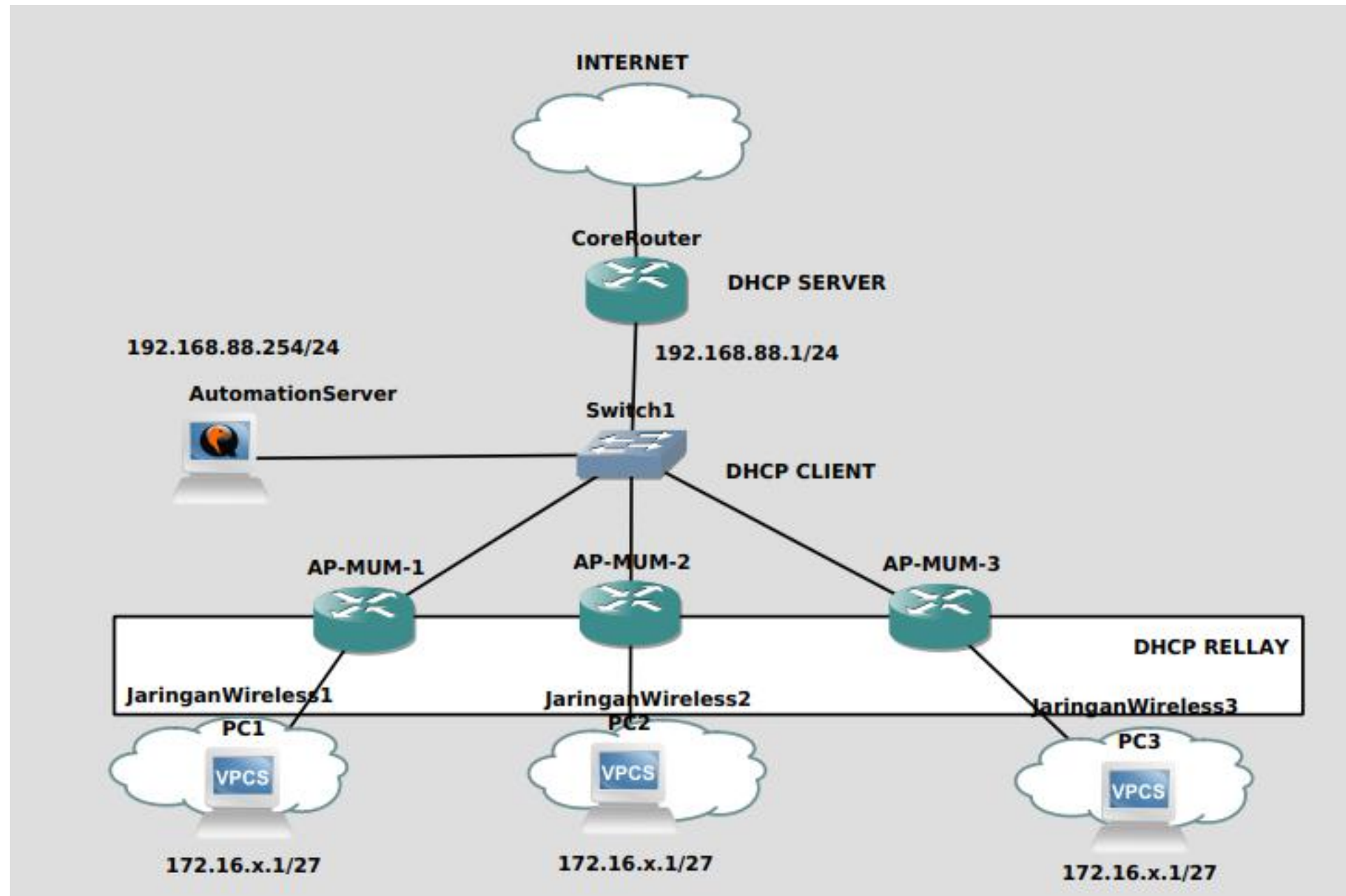
DHCP (Dynamic Host Configuration Protocol)



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 configuration window for a server named 'mum'. The interface includes several fields and buttons:

- 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 text area labeled "Lease Script" containing the following code:

```
: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

#	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

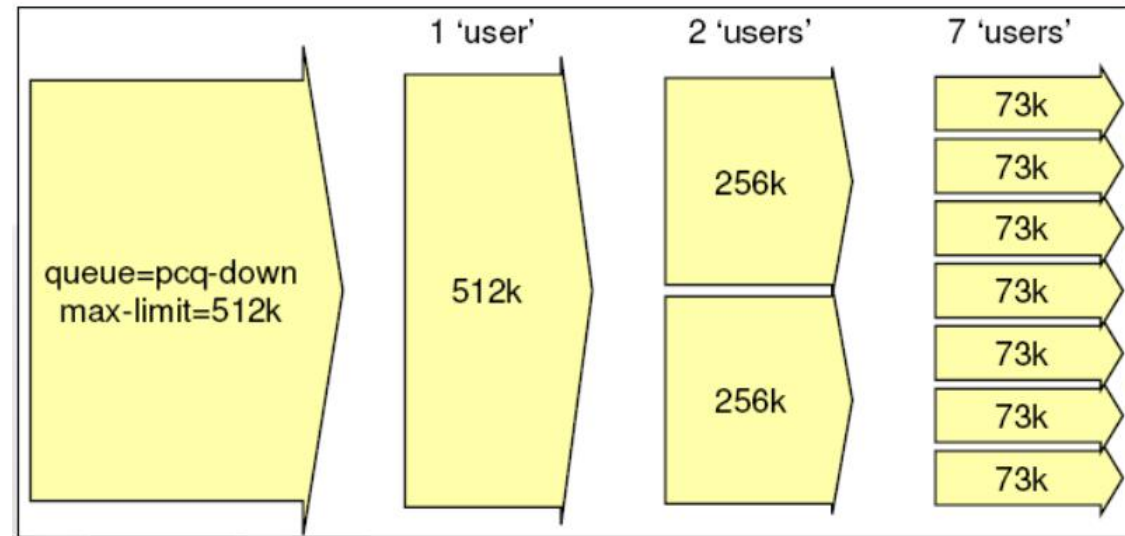
Queue List

Simple Queues Interface Queues Queue Tree Queue Types

+ - ✓ ✗ 📄 ⚙️ 00 Reset Counters 00 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	0 b
3	Limit-AP-MUM-251	172.16.251.0/27	100M	100M		15M	15M	pcq-upload-default	pcq-download-default	0 bps	0 b
2	Limit-AP-MUM-252	172.16.252.0/27	100M	100M		15M	15M	pcq-upload-default	pcq-download-default	0 bps	0 b
1	Limit-AP-MUM-253	172.16.253.0/27	100M	100M		15M	15M	pcq-upload-default	pcq-download-default	0 bps	0 b

PCQ Rate = 0



Manajemen Wireless

	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

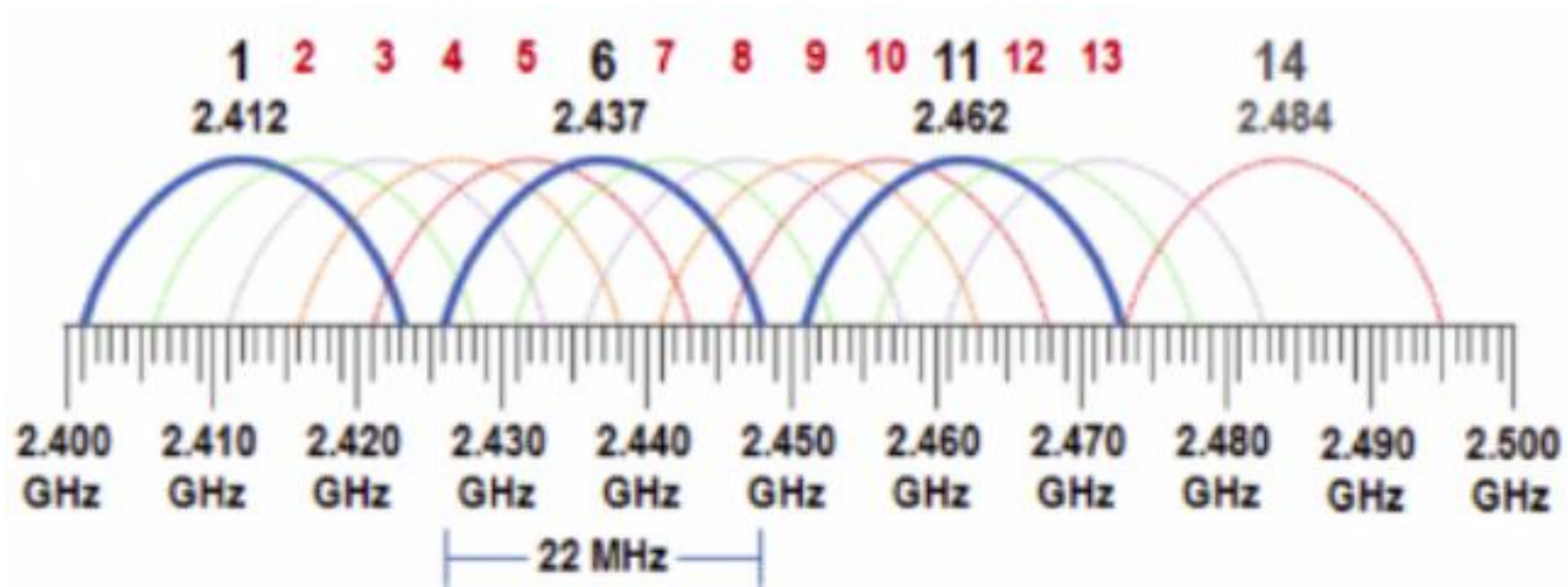


image source : <https://www.extremenetworks.com/>

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 not-set</i> ; Default: not-set)	Store the output in a variable, should be used with the output property.
ascii (<i>yes no</i> ; Default: no)	
check-certificate (<i>yes 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, <div style="border: 1px solid #ccc; padding: 5px; margin: 10px 0; background-color: #fff9c4;">address=wiki.mikrotik.com host=forum.mikrotik.com</div> 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 no</i> ; Default: yes)	If yes, creates an input file.
mode (<i>ftp http tftp {!} 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 tk j
- sekali config 1 - banyak device terlampaui
- komputer tidak mengeluh (sing sambat uwonge)
- implementasi kurikulum program ke networking



Using python For Automation

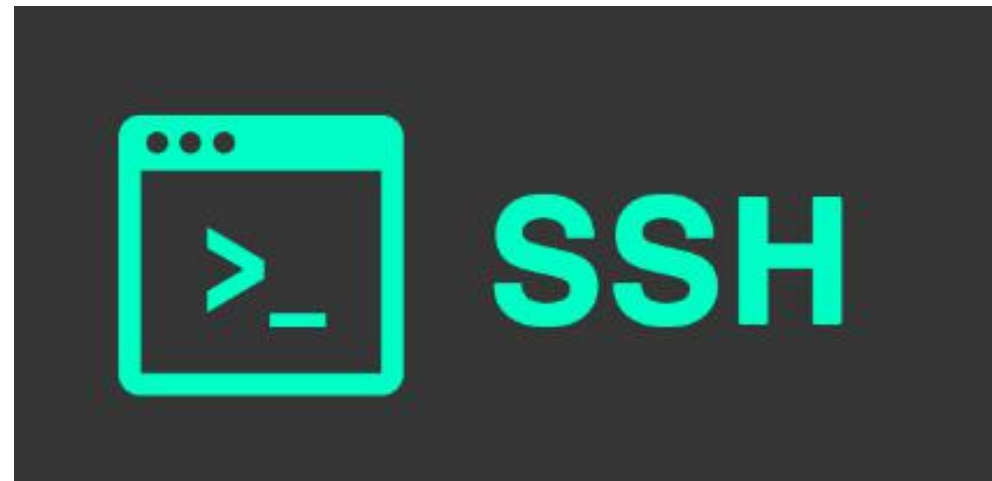
- mudah dipelajari daripada pemrograman yang lain
- support automation dengan paramiko for ssh
- support flask for microweb
- bisa digunakan sebagai materi pemrograman dasar di TKJ



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

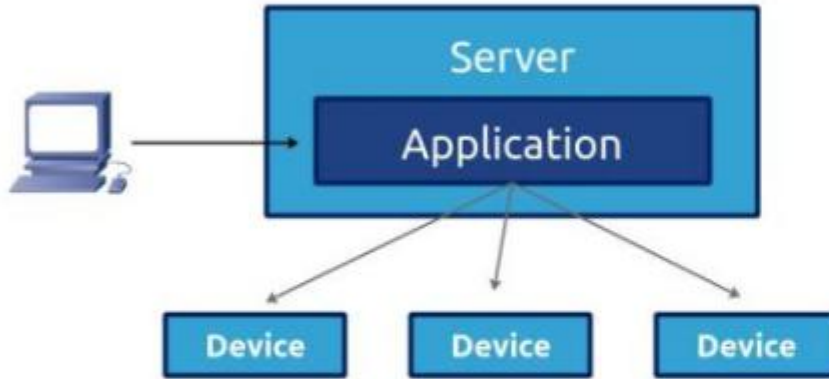
Paramiko for SSH

```
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}")
```



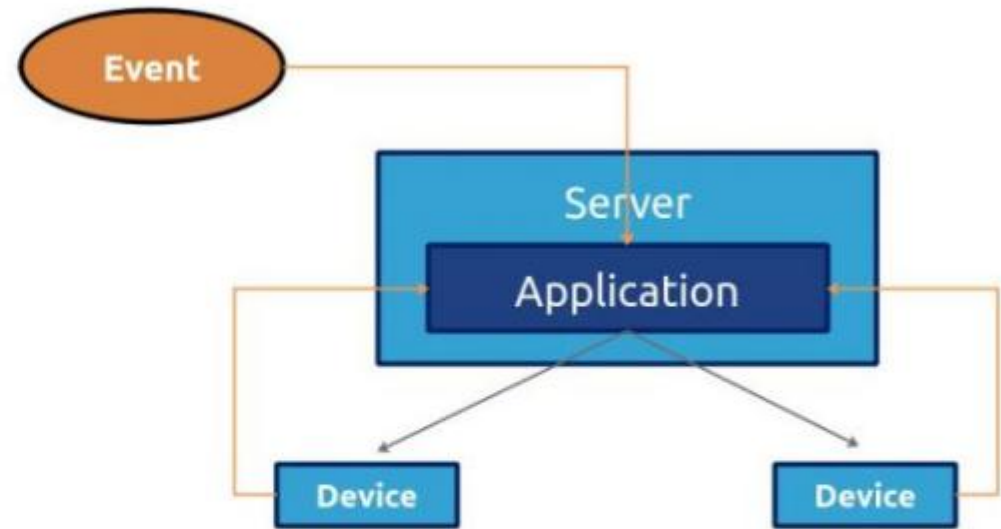
DEMO TIME!!!





Proactive

- Manual Change
- Change by human



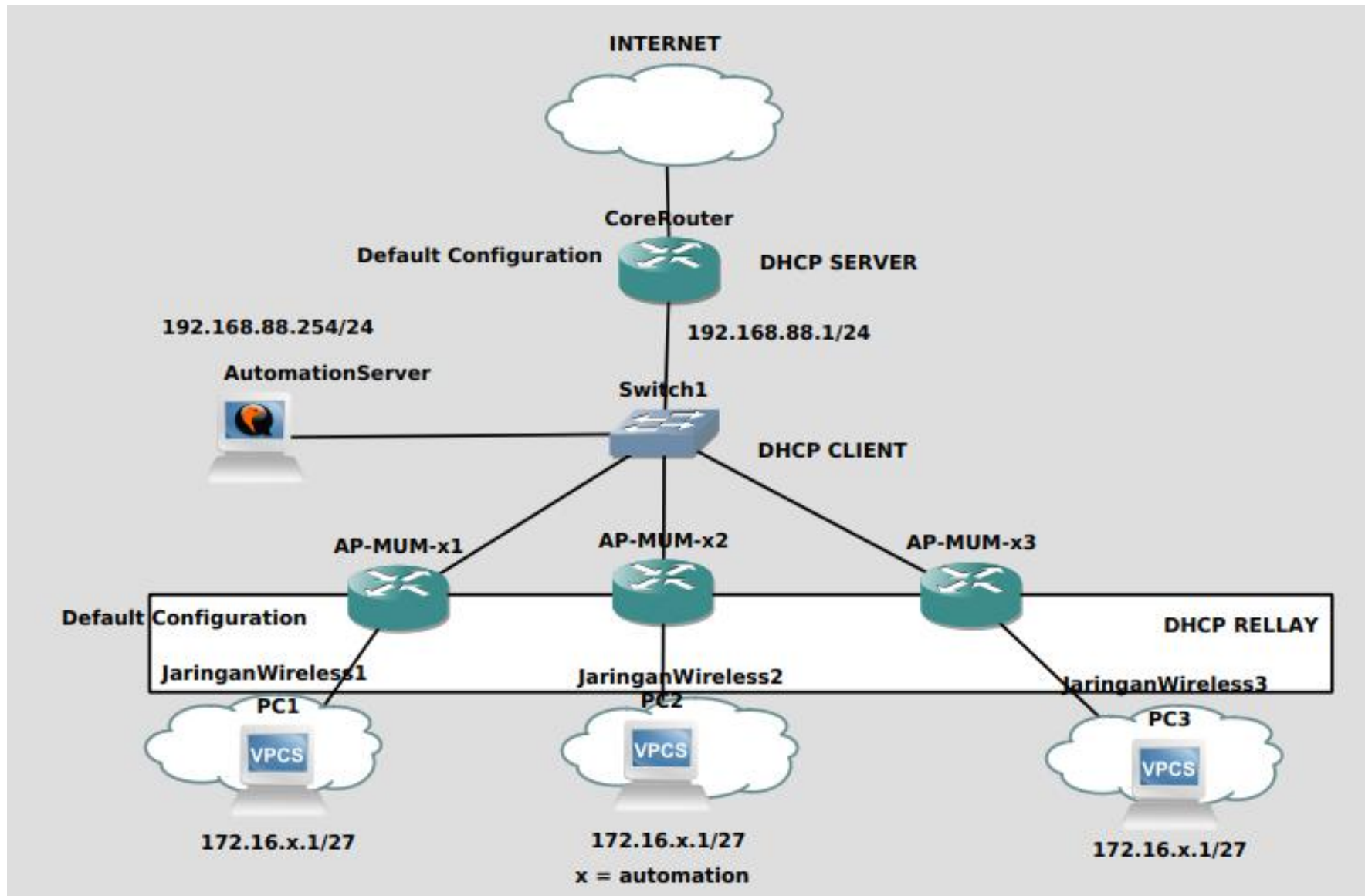
Reactive

- Change by event
- Device send information to server

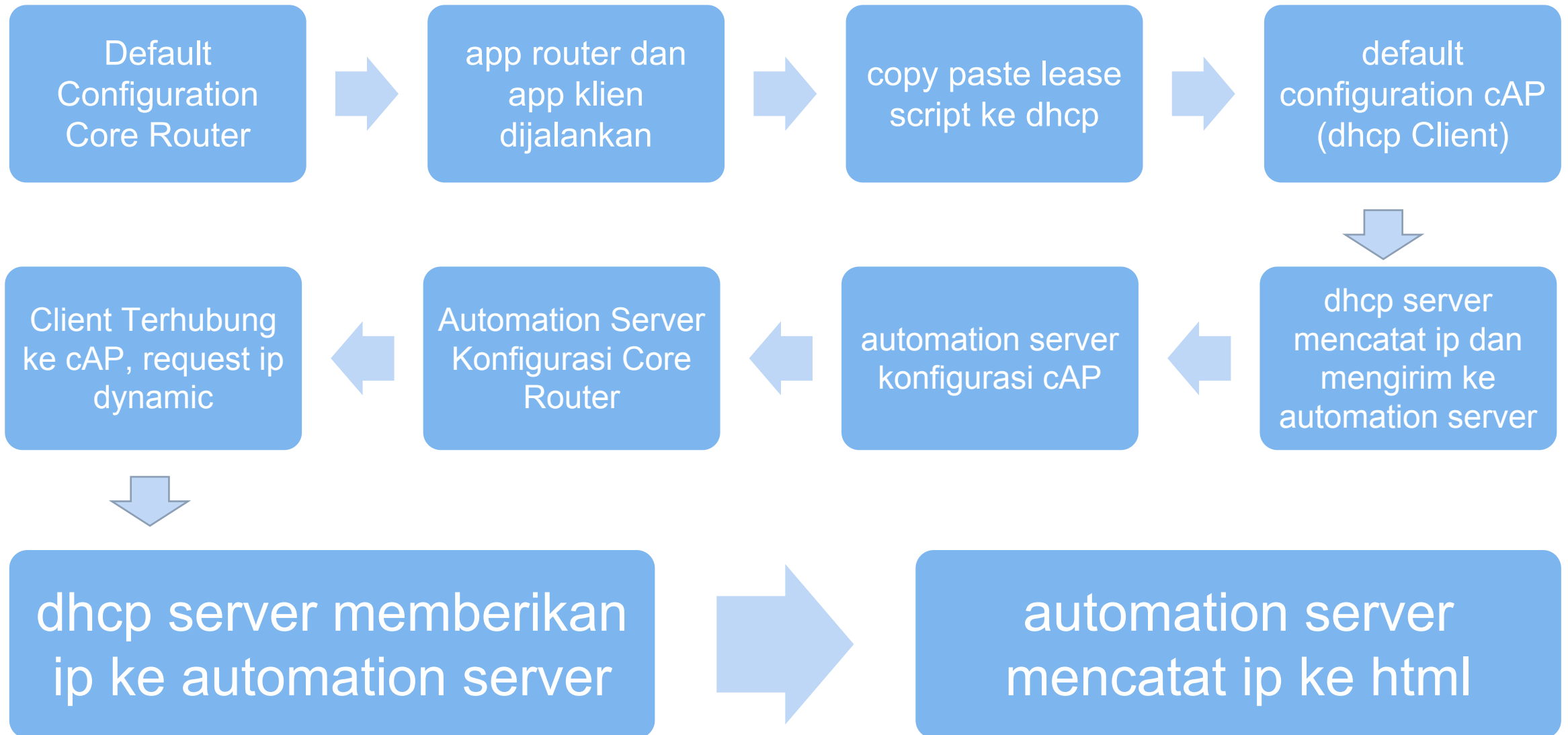
Image Source: EN-SDN Slide by Zufar Dhiyaulhaq

Type of Automation

Layout



Flow Chart



Question???



My Bio

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