



# **Unlocking Digital Business: Manage and Monetizing Your MikroTik cAP**

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# Presentation Agenda

- The Opportunity that be the Presentation Background
- Why MikroTik?
- Introduction to CAPsMAN a.k.a. cAP's Manager
  - Why CAPsMAN?
  - CAPsMAN Feature
  - CAPsMAN Basic Setup
  - CAPsMAN Result
- Monetizing!
- Study Case



# Presentation Background

- Indonesia with 264 Million citizen, around 64.8% of it was using the Internet or we can say 171 Million in Number are Internet users  
Source: <https://www.thejakartapost.com/life/2019/05/18/indonesia-has-171-million-internet-users-study.html>
- With 171 Million Internet users, they can give us more opportunity in Business
- Imagine if we can do the same thing in China with the Biggest Population in the World
- Or from China **expand** the Business to Indonesia 😊



# Why MikroTik?

- MikroTik Everywhere, Easy to Buy

<https://mikrotik.com/buy/asia>

- Rich of Feature

[https://wiki.mikrotik.com/wiki/Manual:RouterOS\\_features](https://wiki.mikrotik.com/wiki/Manual:RouterOS_features)

- And the **PRICE!** is really **Affordable**

<https://mikrotik.com/products>

Starting from \$19.95 (hAP-mini Price in October, 2019 from mikrotik.com)

And You Can Run All of MikroTik RouterOS Feature!



# Introduction to CAPsMAN

- **Controlled Access Point system Manager (CAPsMAN)** allows **centralization** of wireless network **management** and if necessary, data processing. When using the CAPsMAN feature, the network will consist of a number of '**Controlled** Access Points' (CAP) that provide wireless connectivity and a 'system Manager' (CAPsMAN) that manages the configuration of the APs, it also takes care of client authentication and optionally, data forwarding.
- When a **CAP** is **controlled** by CAPsMAN it only requires the **minimum configuration** required to allow it to establish connection with CAPsMAN. Functions that were conventionally executed by an AP (like access control, client authentication) are now executed by CAPsMAN. The CAP device now only has to provide the wireless link layer encryption/decryption.



# Introduction to CAPsMAN

CAPsMAN = Controlled Access Point system Manager!



# Why CAPsMAN?

- Data Processing (if necessary), usually used for Centralized DHCP and Hotspot
- Can Controlling All Type of MikroTik with at Least 1 Wireless Interfaces
- Auto Discovery (Layer 2 MAC Connection)
- No Additional Hardware Required
- Centralized Management
- Can Be Placed Anywhere
- Built-in with RouterOS
- No Additional License
- No Additional Cost





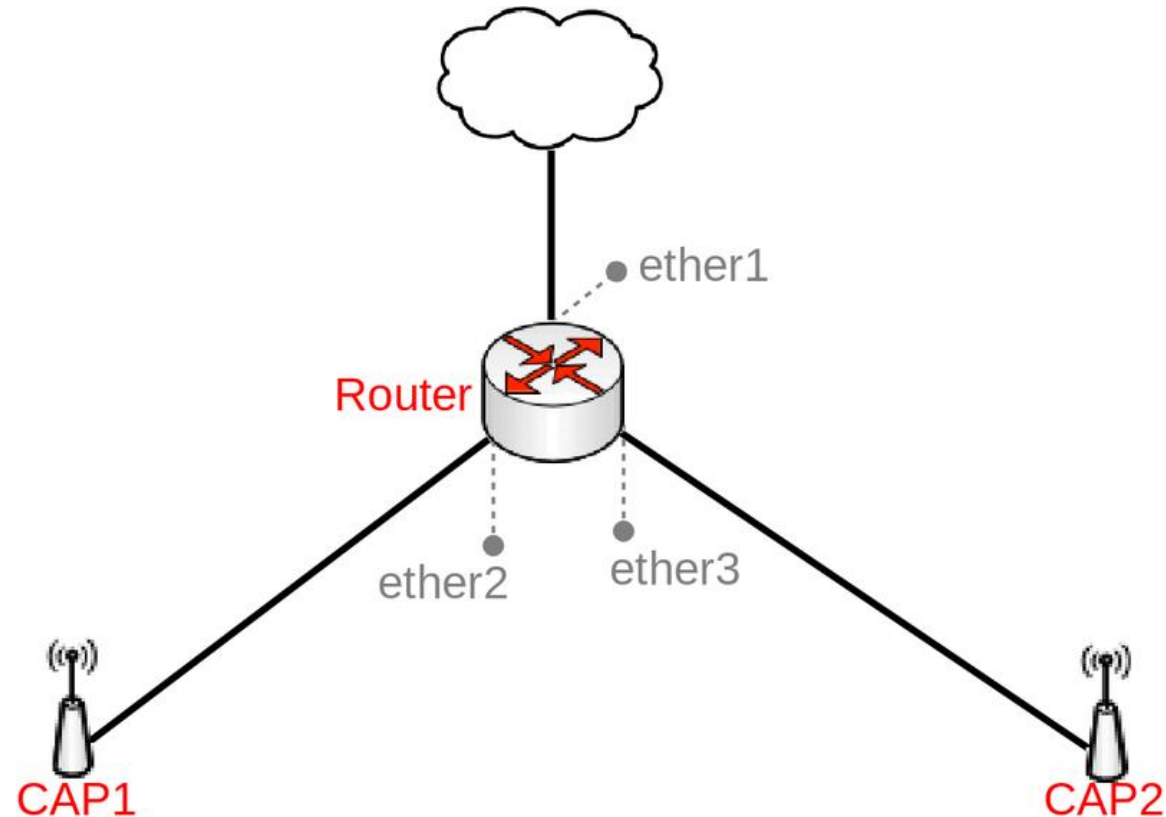
# CAPsMAN Feature

- VLAN
- Bridging
- Roaming
- Access List
- Data Processing
- Auto Provisioning
- Load Balancing AP
- Security Properties
- Channel Properties



# CAPsMAN Basic Setup

- In this setup, i have a simple topology that I took from [https://wiki.mikrotik.com/wiki/File:Simple\\_capsman\\_topology.png](https://wiki.mikrotik.com/wiki/File:Simple_capsman_topology.png)





# CAPsMAN Basic Setup (CAPsMAN)

- In first step, we need to configure the IP Address and DHCP Server for our users

```
/interface bridge add name=br-cap
```

```
/ip address add address=10.5.0.1/24 interface=br-cap
```

```
/ip pool add name=dhcp_pool0 ranges=10.5.0.2-10.5.0.254
```

```
/ip dhcp-server add address-pool=dhcp_pool0 disabled=no  
interface=br-cap lease-time=12h name=dhcp1
```

```
/ip dhcp-server network add address=10.5.0.0/24  
dns-server=10.5.0.1,1.1.1.1 gateway=10.5.0.1
```

- There is no any special configuration here, we set the IP Address on bridge because when a cAP join to CAPsMAN, there will be a new interfaces and we will set that new interfaces to join in one bridge interfaces



# CAPsMAN Basic Setup (CAPsMAN)

Bridge

Bridge Ports VLANs MSTIs Port MST Overrides Filters NAT Hosts MDB

+ - ✓ ✗ [icon] [icon] Settings

	Name	Type	L2 MTU	Tx	Rx
R	br-cap	Bridge	65535		0 bps

Address List

+ - ✓ ✗ [icon] [icon] Find

Address	Network	Interface
10.5.0.1/24	10.5.0.0	br-cap

DHCP Server

DHCP Networks Leases Options Option Sets Alerts

+ - ✓ ✗ [icon] [icon] DHCP Config DHCP Setup

Name	Interface	Relay	Lease Time	Address Pool	Add AR...
dhcp1	br-cap		12:00:00	dhcp_pool0	no

DHCP Server

DHCP Networks Leases Options Option Sets Alerts

+ - [icon] [icon]

Address	Gateway	DNS Servers	Domain	WINS Servers
10.5.0.0/24	10.5.0.1	10.5.0.1, 1.1.1.1		



# CAPsMAN Basic Setup (CAPsMAN)

```
/caps-man manager set enabled=yes
```

- enabled : Disable or Enable CAPsMAN Feature

The screenshot shows the CAPsMAN configuration interface. The 'Manager' tab is selected, and a dialog box titled 'CAPs Manager' is open. The 'Enabled' checkbox is checked, and the 'Certificate' field is highlighted. The dialog box also contains fields for 'CA Certificate', 'Require Peer Certificate', 'Generated Certificate', 'Generated CA Certificate', 'Package Path', and 'Upgrade Policy'.

Name	Type	MTU	Actual MTU	L2 MTU	Tx
------	------	-----	------------	--------	----

**CAPs Manager**

Enabled

Certificate:

CA Certificate:

Require Peer Certificate

Generated Certificate:

Generated CA Certificate:

Package Path:

Upgrade Policy: none

OK  
Cancel  
Apply  
Interfaces



# CAPsMAN Basic Setup (cAP)

```
/interface wireless cap set caps-man-addresses="x.x.x.x"  
discovery-interfaces=ether1 enabled=yes interfaces=wlan1
```

- caps-man-address : The IP Address of Your CAPsMAN
- discovery-interfaces : You can discovery your CAPsMAN automatically with Layer2 connectivity
- enabled : Disable or Enable CAP Feature
- interfaces : List of Wireless Interfaces to be Controlled by CAPsMAN



# CAPsMAN Basic Setup (cAP)

Wireless Tables

Interfaces | Nstreme Dual | Access List | Registration | Connect List | Security Profiles | Channels

+ - ✓ ✗ 📄 📏 CAP WPS Client Setup Repeater Scanner Freq. Usage Alignment Wireless Sniffer Wireless Snooper

Name	Type	Actual MTU	Tx	Rx	Tx Packet (p/s)	Rx Packet (p/s)	FP Tx
--- managed by CAPsMAN							
--- channel: 2427/20-Ce/gn(20dBm), SSID: ██████████, CAPsMAN forwarding							
X wlan1	Wireless (Atheros AR9...	1500	0 bps	0 bps	0	0	

**CAP** [OK] [Cancel] [Apply]

Enabled

Interfaces: wlan1

Certificate: none

Discovery Interfaces: ether1

Lock To CAPsMAN

CAPsMAN Addresses: 10.██████

CAPsMAN Names:

CAPsMAN Certificate Common Names:

Bridge: none

Static Virtual

Requested Certificate:

Locked CAPsMAN Common Name:



# CAPsMAN Basic Setup (CAPsMAN)

CAPsMAN				
CAP Interface	Provisioning	Configurations	Channels	Datap
				Man
	Name	Type	MTU	
SMB	cap01	CAP Interface	1500	
RSMB	cap02	CAP Interface	1500	
RSMB	cap03	CAP Interface	1500	
RSMB	cap04	CAP Interface	1500	
RSMB	cap05	CAP Interface	1500	
RSMB	cap06	CAP Interface	1500	
RSMB	cap07	CAP Interface	1500	
RSMB	cap08	CAP Interface	1500	
RSMB	cap09	CAP Interface	1500	
RSMB	cap10	CAP Interface	1500	
RSMB	cap11	CAP Interface	1500	
RSMB	cap12	CAP Interface	1500	
RSMB	cap13	CAP Interface	1500	
RSMB	cap14	CAP Interface	1500	
RSMB	cap15	CAP Interface	1500	
RSMB	cap16	CAP Interface	1500	
RSMB	cap17	CAP Interface	1500	
RSMB	cap18	CAP Interface	1500	
RSMB	cap19	CAP Interface	1500	
RSMB	cap20	CAP Interface	1500	
RSMB	cap21	CAP Interface	1500	
RSMB	cap22	CAP Interface	1500	
RSMB	cap23	CAP Interface	1500	
RSMB	cap24	CAP Interface	1500	
RSMB	cap25	CAP Interface	1500	
RSMB	cap26	CAP Interface	1500	
SMB	cap27	CAP Interface	1500	
RSMB	cap28-lobby	CAP Interface	1500	
MI	cap29	CAP Interface	1500	

- When your cAP was set, they will appear to CAPsMAN Interfaces
- You can configure them directly from your CAPsMAN manually or;
- You can automatically deploy the configuration using Provisioning feature





# CAPsMAN Manual Config

```
/caps-man configuration add channel.band=2ghz-b/g/n  
channel.control-channel-width=20mhz channel.frequency=2427  
country=indonesia datapath.bridge=br-cap mode=ap name=cfg1  
ssid="Your SSID Name"
```

- channel.band : Channel band for your cAP
- channel.frequency : Channel frequency for your cAP
- country : Country regulations
- datapath.bridge : Bridge to which particular interface should be automatically added as port
- mode : Set operational mode. Only ap currently supported.
- name : Descriptive name for the Configuration Profile
- ssid : Your cAP SSID Name

```
/caps-man interface set configuration=cfg1 [find]
```



# CAPsMAN Auto Provisioning

CAPsMAN

CAP Interface Provisioning Configurations Channels Datapaths Security Cfg. Access List Rates Remote CAP Radio Registration Table

+ - ✓ ✕ 📄 🔍

#	Radio MAC	Identity Regexp	Common Nam...	Action	Master Configurati...	Slave Configuration
---	-----------	-----------------	---------------	--------	-----------------------	---------------------

**New CAPs Provisioning** [Close]

Radio MAC: 74:4D:28:00:00:00 [OK]

Hw. Supported Modes: [Dropdown] [Cancel]

Identity Regexp: cAP.\* [Apply]

Common Name Regexp: [Text] [Disable]

IP Address Ranges: [Dropdown] [Comment]

Action: create dynamic enabled [Dropdown] [Copy]

Master Configuration: cfg1 [Dropdown] [Remove]

Slave Configuration: [Dropdown]

Name Format: identity [Dropdown]

Name Prefix: [Dropdown]

enabled

- You can automatically deploy your config to cAP based on your properties in Provisioning menu from your CAPsMAN





# CAPsMAN Result (Users)

CAPsMAN											
CAP Interface	Provisioning	Configurations	Channels	Datapaths	Security Cfg.	Access List	Rates	Remote CAP	Radio	Registration Table	
CAPs Scanner											
Interface	SSID	MAC Address	EAP Identity	Tx Rate	Rx Rate	Tx Signal	Rx Signal	Uptime	Tx/Rx Packets	Tx/Rx Bytes	
cap02		C0:87:EB:...		72.2Mbps-20MHz/1S/SGI	135Mbps-40MHz/1S	0	-54	01:44:42.37	1 178/1 835	129.0 KiB/282.7 KiB	
cap02		C0:87:EB:...		72.2Mbps-20MHz/1S/SGI	43.3Mbps-20MHz/1S/SGI	0	-69	03:44:12.26	310 561/81 563	405.7 MiB/10.2 MiB	
cap02		48:A0:F8:...		120Mbps-40MHz/1S/SGI	81Mbps-40MHz/1S	0	-56	15:02:49.78	83 432/84 489	7.3 MiB/7.3 MiB	
cap03		88:E8:7F:...		13Mbps-20MHz/1S	1Mbps	0	-91	01:13:26.94	3 062/4 502	243.7 KiB/598.8 KiB	
cap03		48:A0:F8:...		108Mbps-40MHz/1S	108Mbps-40MHz/1S	0	-55	06:26:08.75	1 712 217/956 280	2379.0 MiB/64.1 MiB	
cap04		74:12:BB:...		19.5Mbps-20MHz/1S	81Mbps-40MHz/1S	0	-54	01:28:12.48	454 658/244 427	650.8 MiB/16.6 MiB	
cap04		0C:98:38:...		39Mbps-20MHz/1S	1Mbps	0	-75	06:17:56.34	209/231	17.8 KiB/25.6 KiB	
cap05		74:12:BB:...		60Mbps-40MHz/1S/SGI	121.5Mbps-40MHz/1S	0	-54	23:47:05.94	12 371 029/6 140 325	16.9 GiB/439.7 MiB	
cap06		88:5A:06:...		65Mbps-20MHz/1S	52Mbps-20MHz/1S	0	-46	06:03:15.15	108 150/18 954	129.9 MiB/3054.2 KiB	
cap06		74:12:BB:...		30Mbps-40MHz/1S/SGI	1Mbps	0	-62	17:43:49.48	2 955 685/1 758 127	4120.0 MiB/150.2 MiB	
cap07		F0:18:98:...		117Mbps-20MHz/2S	52Mbps-20MHz/2S	0	-62	07:37:44.30	87 292/82 251	67.7 MiB/16.3 MiB	
cap07		84:20:96:...		120Mbps-40MHz/1S/SGI	40.5Mbps-40MHz/1S	0	-62	20:31:58.02	302 272/247 460	68.7 MiB/58.2 MiB	
cap07		74:12:BB:...		40.5Mbps-40MHz/1S	81Mbps-40MHz/1S	0	-58	08:10:17.37	4 604/5 183	2473.2 KiB/746.7 KiB	
cap08		F0:79:E8:...		28.8Mbps-20MHz/1S/SGI	11Mbps	0	-63	02:06:37.36	348 567/153 642	439.0 MiB/25.3 MiB	
cap08		74:12:BB:...		54Mbps-40MHz/1S	81Mbps-40MHz/1S	0	-64	01:22:55.70	2 112/2 176	283.6 KiB/242.2 KiB	
cap08		00:2F:D9:...		150Mbps-40MHz/1S/SGI	13.5Mbps-40MHz/1S	0	-62	00:19:02.25	1 924/2 029	1343.3 KiB/333.5 KiB	
cap08		00:2F:D9:...		120Mbps-40MHz/1S/SGI	13.5Mbps-40MHz/1S	0	-67	06:52:36.98	803 140/378 734	1153.5 MiB/25.2 MiB	
cap09		CC:79:CF:...		60Mbps-40MHz/1S/SGI	1Mbps	0	-60	04:52:30.29	49 782/116 200	8.9 MiB/45.8 MiB	
cap09		9C:4F:DA:...		11Mbps	13Mbps-20MHz/1S	0	-66	00:02:42.87	125/178	40.0 KiB/28.0 KiB	
cap09		70:EC:E4:...		43.3Mbps-20MHz/1S/SGI	6.5Mbps-20MHz/1S	0	-74	01:36:59.33	66 637/38 380	88.6 MiB/3790.7 KiB	
cap09		48:A0:F8:...		54Mbps-40MHz/1S	13.5Mbps-40MHz/1S	0	-60	06:35:10.81	26 732/26 388	30.2 MiB/2622.2 KiB	
cap09		48:A0:F8:...		54Mbps-40MHz/1S	54Mbps-40MHz/1S	0	-60	08:24:21	1 612 536/713 569	2315.6 MiB/42.4 MiB	
cap09		38:A2:8C:...		108Mbps-40MHz/1S	27Mbps-40MHz/1S	0	-55	20:01:32.27	3 636/3 147	748.9 KiB/529.2 KiB	
cap10		88:5A:06:...		72.2Mbps-20MHz/1S/SGI	1Mbps	0	-57	02:02:18.76	102 896/60 402	137.5 MiB/5.4 MiB	
cap10		0C:98:38:...		65Mbps-20MHz/1S/SGI	2Mbps	0	-67	01:52:23.98	2 614/2 715	230.1 KiB/317.7 KiB	
cap10		0C:98:38:...		58.5Mbps-20MHz/1S	9Mbps	0	-71	01:52:23.64	23 722/18 540	25.2 MiB/3021.9 KiB	
cap10		00:2F:D9:...		121.5Mbps-40MHz/1S	1Mbps	0	-64	07:05:28.58	3 564/4 020	1975.1 KiB/522.3 KiB	
cap10		00:08:22:...		72.2Mbps-20MHz/1S/SGI	1Mbps	0	-58	02:10:33.97	5 105/4 017	2971.8 KiB/618.4 KiB	



# Monetizing!

- After you can manage your cAP easier..
- Now the Questions is, how we can monetize our Wi-Fi?
  - You can place an ads in your Wi-Fi
  - You can create some survey in your Wi-Fi
    - From survey, you can gain some data that can be used for targeted ads
- Another Questions, how we can do that?

# MikroTik Hotspot!

- And design your **business** model 😊



# Simple Hotspot Setup

## 1. Setup

```
Terminal
[admin@MikroTik] > ip hotspot setup
Select interface to run HotSpot on

hotspot interface: br-cap
Set HotSpot address for interface

local address of network: 10.5.0.1/24
masquerade network: yes
Set pool for HotSpot addresses

address pool of network: 10.5.0.2-10.5.0.254
Select hotspot SSL certificate

select certificate: none
Select SMTP server

ip address of smtp server: 0.0.0.0
Setup DNS configuration

dns servers: 10.5.0.1,1.1.1.1
DNS name of local hotspot server

dns name: hotspot.ads.id
Create local hotspot user

name of local hotspot user: admin
password for the user:
[admin@MikroTik] >
```

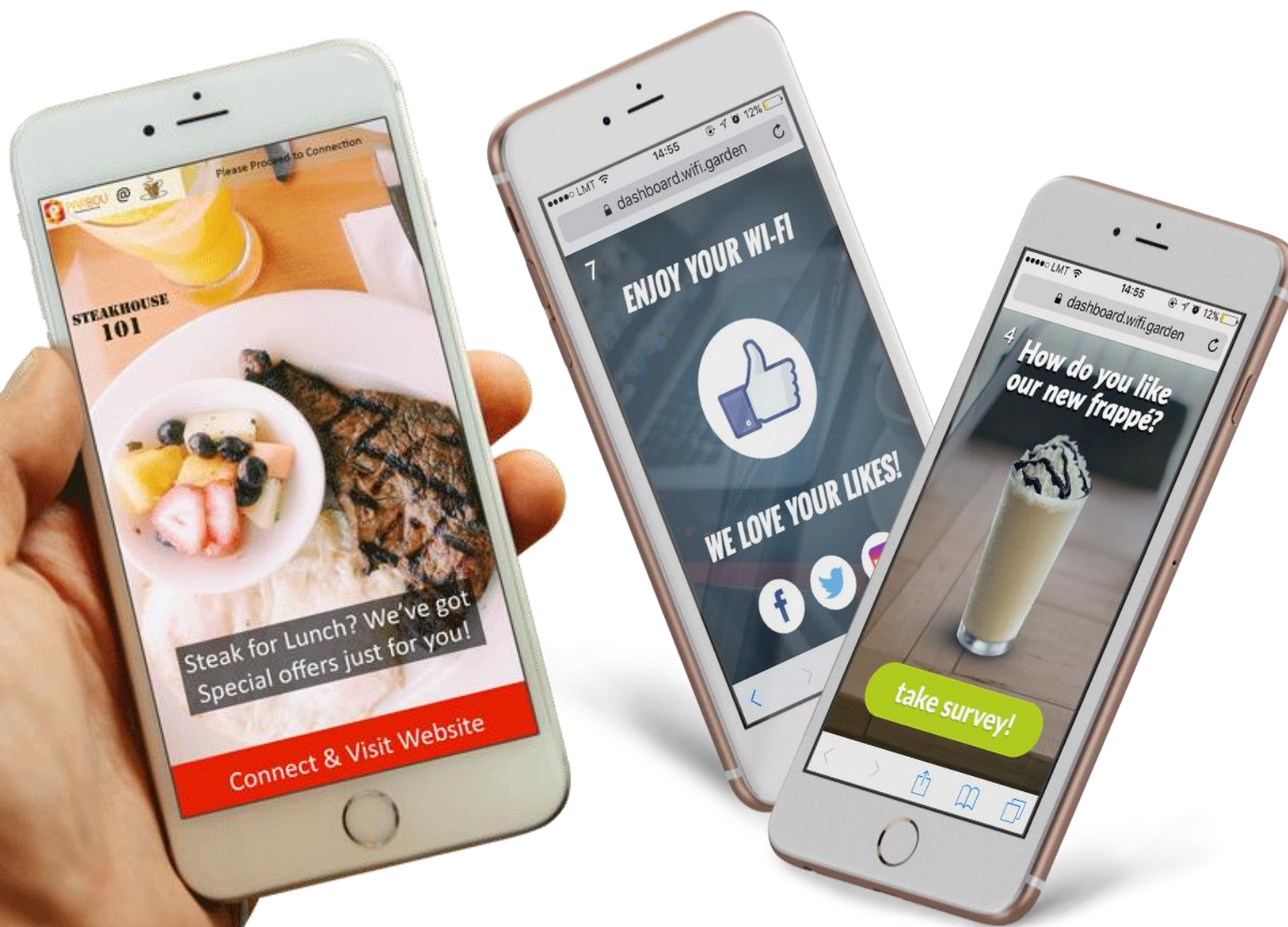
## 2. Customize

File Name	Type	Size	Creation Time
autosupout.old.rif	.rif file	1110.5 KiB	Jun/24/2019 20:23:35
autosupout.rif	.rif file	1138.4 KiB	Jul/26/2019 09:51:51
hotspot	directory		Jan/03/1970 03:57:52
hotspot/alogin.html	.html file	1296 B	Jan/03/1970 03:57:52
hotspot/background.png	.png file	30.8 KiB	Jan/03/1970 03:57:52
hotspot/error.html	.html file	938 B	Jan/03/1970 03:57:52
hotspot/errors.txt	.txt file	3615 B	Jan/02/1970 07:23:51
hotspot/favicon.ico	.ico file	903 B	Jan/02/1970 07:23:51
hotspot/img	directory		Jan/02/1970 07:23:51
hotspot/img/logobottom.png	.png file	3925 B	Jan/02/1970 07:23:51
hotspot/jquery-1.11.1.min.js	.js file	93.5 KiB	Jan/03/1970 03:57:52
hotspot/login.html	.html file	3434 B	Jan/03/1970 03:57:52
hotspot/logo.png	.png file	2105 B	Jan/03/1970 03:57:52
hotspot/logout.html	.html file	1886 B	Jan/03/1970 03:57:51
hotspot/lv	directory		Jan/02/1970 07:23:51
hotspot/lv/alogin.html	.html file	1303 B	Jan/02/1970 07:23:51
hotspot/lv/errors.txt	.txt file	3810 B	Jan/02/1970 07:23:51
hotspot/lv/login.html	.html file	3408 B	Jan/02/1970 07:23:51
hotspot/lv/logout.html	.html file	1843 B	Jan/02/1970 07:23:51
hotspot/lv/radvert.html	.html file	1475 B	Jan/02/1970 07:23:51
hotspot/lv/status.html	.html file	2760 B	Jan/02/1970 07:23:51
hotspot/md5js	.js file	7.0 KiB	Jan/02/1970 07:23:51
hotspot/next.png	.png file	1109 B	Jan/03/1970 03:57:51
hotspot/poweredby.png	.png file	1552 B	Jan/03/1970 03:57:51
hotspot/radvert.html	.html file	1571 B	Jan/03/1970 03:57:51
hotspot/redirect.html	.html file	330 B	Jan/03/1970 03:57:51
hotspot/status.html	.html file	3113 B	Jan/03/1970 03:57:51
hotspot/xml	directory		Jan/02/1970 07:23:51
hotspot/xml/WISPAccessGatewayParam.xsd	.xsd file	4251 B	Jan/02/1970 07:23:51
hotspot/xml/alogin.html	.html file	821 B	Jan/02/1970 07:23:51
hotspot/xml/error.html	.html file	416 B	Jan/02/1970 07:23:51
hotspot/xml/logout.html	.html file	361 B	Jan/02/1970 07:23:51
hotspot/xml/login.html	.html file	787 B	Jan/02/1970 07:23:51
hotspot/xml/logout.html	.html file	359 B	Jan/02/1970 07:23:51
hotspot/xml/rlogin.html	.html file	530 B	Jan/02/1970 07:23:51
pub	directory		Jan/03/1970 06:54:44
skins	directory		Jan/01/1970 07:00:02



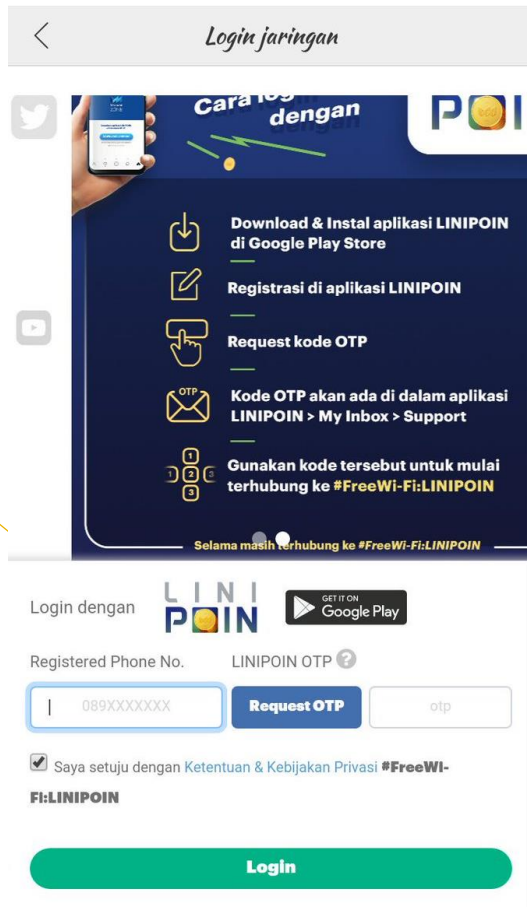


# Monetizing!





# Study Case



- **Network Data Sistem, PT** as a System Integrator has work with **MacroAd** to Deploy FreeWiFi services in JaBoDeTaBek (Jakarta, Bogor, Depok, Tangerang & Bekasi) **KRL Commuter Line**
- KRL Commuter Line is The rail system that uses metro/rapid transit rolling stock standard and operates at high frequency with a minimum headway of five minutes. As of June 2018, the average number of KRL users per day reaches **1,001,438 users** on weekdays, with a record of the highest number of users served in one day is **1,154,080**. The number is targeted to reach **1.2 million passengers** per day by 2019.





# Study Case



# DEMONSTRATION



# References

- <https://mum.mikrotik.com/archive>
- <https://wiki.mikrotik.com/wiki/Manual:CAPsMAN>
- [https://wiki.mikrotik.com/wiki/Manual:Simple CAPsMAN setup](https://wiki.mikrotik.com/wiki/Manual:Simple_CAPsMAN_setup)
- [https://wiki.mikrotik.com/wiki/Manual:Hotspot Introduction](https://wiki.mikrotik.com/wiki/Manual:Hotspot_Introduction)
- <https://wiki.mikrotik.com/wiki/Manual:IP/Hotspot>

# Interesting? Questions?

Leave us a messages on [info@nds.id](mailto:info@nds.id) 😊





**Thank You**

NETDATA Team